Charles University in Prague

Faculty of Social Science

Institute of Economic Studies

DIPLOMA THESIS

2009 **Jan Seifert**

Charles University in Prague

Faculty of Social Science

Institute of Economic Studies

DIPLOMA THESIS

Soft budget constraint and financial crisis

Author: Bc. Jan Seifert

Consultant: Prof. Ing. Karel Janda M.A., Dr., Ph. D.

Academic year: 2008/2009

Hereby I declare that I complied this thesis independently, using only the listed literature and resources.

Prague, 18. 4. 2009 Jan Seifert

Acknowledgements

Hereby I would like to thank to all that have helped me in writing this masters thesis. A particular word of thanks is due to my consultant, Professor Karel Janda, who has provided me with necessary support and valuable ideas for my master's thesis work.

Soft Budget Constraint and the financial crisis

Abstrakt:

Tato práce se snaží popsat vliv měkkého rozpočtového omezení ve vyspělých ekonomikách. Hlavní důraz je kladen na znovuoživení pojmu měkké rozpočtové omezení, neboť se domníváme, že díky současné finanční krizi, je důležité zaměřit se na tento pojem poněkud důrazněji. Tato práce se zabývá především analýzou amerického finančního sektor, jelikož tento byl finanční krizí zasažen nejvíce. Snahou je rozpoznat, zda americké prostředí poskytuje podmínky pro vznik měkkého rozpočtové omezení. Především nás zajímá, zda je relevantní předpokládat přítomnost měkkého rozpočtového omezení v bankovním sektoru, a pokud ano, jaký efekt to vyvolává na americkou ekonomiku popřípadě na finanční krizi. Zde je kladen důraz na vliv jak institucionálních faktorů tak i na současný stav bankovního sektoru. Dalším krokem je prozkoumání, zda za daných podmínek existuje možnost, že americké firmy mají měkké rozpočtové omezení a možné následky toho syndromu. V konečné fázi jsme se zaměřili více na finanční krizi a možné řešení s tím, že zvolená metoda by měla zohledňovat následky vzniklé měkkým rozpočtovým omezením.

Abstract:

This work attempts to describe the role of soft budget constraint in the mature economies. The main attention is paid to the revival of the notion „soft budget constraint“, because we assume that because of the current financial crisis it is important to focus on this problem. This work focuses mainly on the analysis of the U.S. financial sector, because this sector was hit by the financial crisis the most. Our effort is to find out whether the U.S. environment provides sufficient conditions for appearance of the soft budget constraint. We are especially interested in the assumption whether it is relevant to assume the presence of the soft budget constraint in the bank sector and in the consequences of its presence. Here we stress the importance of institutions and the current form of the bank sector. The next step is to analyze if under current conditions there is a positive probability that some U.S. firms do have soft budget constraint. The final part of this work covers the problems of soft budget constraint

and financial crisis. We analyzed a few possible solutions for the current financial crisis and compare its effects on soft budget constraint appearance in the U.S. economy.

Content

List of schemes, tables and graphs

List of schemes

List of tables

List of graphs

1. Introduction

The current state of global economy forces us to think more about the causes and the consequences of the financial crises. One of the problems connected with the provision of financial resources is the soft budget constraint. The notion of soft budget constraint was always connected with transitive economies. As it is mentioned in the Maskin and Xu (2001) the most of the SBC models do take care about SBC syndromes in the socialistic transitional countries. This is of course reasonable, thanks to the fact that these countries underwent and some of them even nowadays are undergoing the complete transformation of their institutions, but this does not mean that SBC syndrome cannot be present in the market economies Dewatripont and Roland (2000).

"The SBC syndrome has by no means been absent from market economies. Notable recent examples of its mischief include the U.S. government's bailouts in the Savings and Loans and the Long Term Capital Management crisis." (Maskin, Xu,2001;2)

"Soft budget constraints in the banking sector of East Asian economies are also believed to have played an important role in the big East Asian crisis of the late nineties (Huang and Xu, 1998)." (Dewatripont, Roland, 2000;2)

Thus we suppose that analysis of the mature markets is reasonable activity moreover when we are facing the turmoil on financial markets nowadays. And there are other reasons, which make this problem interesting. Only the fact that the originators of this syndrome were countries with high degree of state ownership and nowadays we are witnessing more and more nationalizing of private properties even in mature economies forces us to think hard in which way the current economic flow goes.

Taking into account all the previously mentioned ideas we decided to examine the soft budget problem closer. The main goal of this work is to analyze the U.S. economy. Special attention is paid to the financial sector as the part of the economy most vulnerable to the soft budget constraint.

In the first part of the work we summarizes the soft budget constraint literature focused on soft budget constraint, mature economies and financial crises.

In the third chapter of this work we introduce the basics of the soft budget constraint syndrome. We describe the whole process of the soft budget constraint with its incentives and consequences.

The next part is focused on the government's bailout policy. The goal of this chapter is to find out some specific features of the soft budget constraint in the U.S. history plus it tries to depict the possible incentives of the soft budget constraint in the U.S. economy. The special attention is paid on the institutional character of U.S. economy.

The fifth and sixth chapters examine the U.S. bank sector. The special attention was paid to the form and the assets portfolio of the U.S. banks. The possible consequences of the soft budget constraint are also described in these chapters.

The seventh chapter is dedicated to the possible solutions of the financial crises. The analysis of these methods regarding the soft budget constraint is part of this chapter too. We also discuss the possible solution of the current financial crisis for the U.S. economy.

The eighth chapter tries to disclose the new possible extensions of this work. We want to pay more attention to the empirical testing of theoretical models presented in this diploma thesis.

The last chapter tries to summarize the whole work describing the conditions and results regarding the U.S. economy.

2. SBC literature and financial crisis in the USA

The notion SBC was firstly mentioned in the seminal work of Kornai (1979, 1980) and developed by Schaffer (1989) and later by Dewatripont and Maskin (1995). As we have stated above there are many works dealing with SBC models in transition countries ex. Aghion et col. (1996), Berglof and Roland (1995, 1998), who describe the banking restructuring in transition countries. Kornai (2001) investigates possible solutions how to harden the budget constraints in transitive countries. The exception can be Dewatripont and Roland (2000), who examine the SBC consequences in transition economies but also in market economies. We can get good overview of written SBC literature from Maskin (1999), Maskin and Xu (2001) and Kornai, Maskin and Roland (2003), which summarize literature written on the SBC syndrome. Finally Bignebat and Gouret (2008) represent recently written SBC literature focused on the determinants of SBC syndrome in transitive countries; in their work they empirically test data from transition firms.

On the other hand SBC literature describing the syndrome in mature economies is not as large. Between these works can be add Yu-Chu and Eggleston (2008), who in their work focused on the U.S. healthcare system. The authors consider the SBC syndrome as possible explanation of the different behavior of the similar hospitals. The main two goals of the Schen and Eggleston (2007) are to develop metrics of SBC for the U.S. hospital industry and examine the role of the SBC and hospital ownership on the provision of the net safety services. They found out that hospitals in the government hospitals and hospitals in highly concentrated hospital markets face softer budget constraints than private hospitals and hospitals in highly competitive markets. Further they found out that hospitals with softer budget constraints have lower hazard of shutting down safety services, and for-profit hospitals there exists higher risk of shutting down safety net services independent of the SBC effect. Moreover they discovered that the lower risk of shutting down safety net services connected with SBCs differs with the types of the hospital ownership, with the weakest SBC effect observed in for-profit hospitals.

Another work trying to investigate SBC syndrome is Pettersson-Lidbom and Per-Dahlberg (2003). Authors in this working paper developed econometric model using subordinated organization's expectations of being bailed out by a superior organization in case of financial trouble. For the consistent estimates authors use the instrumental variable

estimator based on the previous organization's experiences of being bailed out. They use their model on the 286 Swedish local governments, where 1697 bailouts have been experienced between years 1974 and 1992. The results of their empirical work confirm that SBC appearance increases a local government level of debt by 6-10 percent if the government expected bailouts. Moreover they found out that the increase of the debt level from bailouts of its geographical neighbors is roughly four times as large.

Because we are interested even in the SBC syndrome and its influence on the financial crisis we decided to overview even literature dealing with this issue. The recently written SBC literature on this subject is work from Alexeev and Sunghwan (2008), who test the role of soft budget constraint (SBC) in Korea during the Asian financial crisis (1997-1998). Their goal is to find out whether SBC syndrome occurs in bank lending. The presence of the SBC in firms was represented by low Altman's *z*-score. They found out that ability of distressed firms to borrow from banks before financial crisis had significantly decreased after the crisis plus they confirmed the SBC influence on firm's default during the crisis. Theoretical SBC literature regarding financial crisis is represented by Huang and Xu (1999a), who try to explain the formal theory of financial crisis and soft budget constraint (SBC). The model is based on the fact that there are many banks on interbank market and each bank receives particular amount of deposits, which can be invested according each bank's will. Banks can operate on the interbank market in the cases of lack of liquidity. But the "lemon" problem makes the cost of borrowing high for the strong banks forcing them to leave the interbank market. This decreases the quality of the market, which leads to another exodus of good banks from interbank market. This process can cause the complete collapse of entire interbank market. The conclusion is that when all projects are financed jointly by many banks the lemon problem is decreased. On the other hand when projects are invested separately the lemon problem can lead to collapse of interbank market.

As the basic SBC literature focused on the financial sector can be considered Mitchell (1998, 1999) and Berglof and Roland (1995). Mitchell (1998, 1999) focuses on the role of creditor's passivity in the creation of the soft budget constraint. Especially these two works explain the incentive of creditor to roll over their bad loans in the case banks believe that government will help him. The incentive of "too many to fail" (TMTF) is described here as factor, which forces government to bailout creditor. One possible reason why banks are bailed out despite the fact they should be terminated is that the private information of their projects makes the costs of these projects prohibitive for other banks. Mitchell states that

TMTF incentive is usually connected with solvent but troubled banks. Berglof and Roland (1995) analyze the behavior of banks in the environment, where government is not able to say no to bailouts. The banks behavior is then influence by the government behavior; thus banks do gamble for the bailout even in the case when refinancing poor projects is inefficient. The authors show that when recapitalization of bank is necessary, governments should force banks to invest part of the injected capital to monitoring and screening rather than to the reserves. Moreover authors show that transferring all bad loans to a special agency is never optimal, but transferring part of the bad loans might be efficient under specific conditions.

We can take a lesson from this chapter that there is hardly any new literature, which is closely connected to the U.S. economy or mature economies dealing with SBC. This is good reason to make a new research in these areas theoretically and empirically.

3. Soft Budget Constraint[1]

3.1 Definition of „soft budget constraint“

This chapter is dedicated to the „soft budget constraint“(SBC), we will try to describe and explain the main characteristics of SBC syndrome. We begin with definition of SBC syndrome then we move to the dynamics of the problem and finally we introduce possible incentives which lead to creation of SBC problem.

It is well known that SBC syndrome is mainly located in the transition economies and there are many studies which describe this problem in these economies. But on the other hand the question whether this problem can occur even in the western mature economies is not sufficiently answered. On this spot we must add that possibility to investigate the transition economies, gives us valuable piece of knowledge and experiences, which can be used even in western mature economies. So what remains is to examine whether SBC syndrome is only problem of transition economies and western mature economies are not endangered by this phenomenon or even the mature markets should be concerned with it. The one possible way how to find it out is to use information which we get from examination of transition economies and try to adjust them to particular circumstances. But now let us move to the basics of the SBC syndrome.

„The expression “soft budget constraint” syndrome is borrowed from the budget constraint terminology of microeconomics. It applies figuratively to a specific, comprehensive social *syndrome* found in economic reality. A syndrome customarily denotes a characteristic configuration of manifestations generated by a particular constellation of circumstances. “

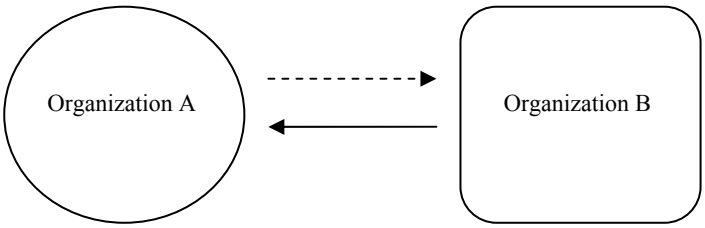
(Kornai, Maskin, Roland, 2003:4)

According to this definition it is quite obvious that we need to have a closer look at these characteristic symptoms and circumstances, which help in creation of this syndrome.

[1] Part of this chapter is taken over from Seifert (2007).

Classical scheme of SBC syndrome looks as follows.

Scheme 1: Relationship between organizations in SBC syndrome



Source: Author

Now we explain the previous diagram. In this simple model we have two organizations; each organization has its own budget constraint. From the microeconomics we know that this budget constraint forces organizations to cover their costs by revenues. This is basic microeconomic model, but for now let us assume, that organization A is not able to fully cover its liabilities, which means that organization runs into deficit. If the situation does not get better, organization runs into even higher deficit and faces situation in which it is not able to continue its operation without external help. According to Kornai, Maskin and Roland (2003) organization faces "hard budget constraint" (HBC) as long as it does not get financial support for covering the financial deficit from other organizations and in case of continuation of deficits the organization quits its activity.

We cannot omit the activity of the organization B, which plays crucial role in SBC syndrome, because the whole problem is not created until organization B comes into play and offers financial support to the organization A, which is in deficit. Moreover Bonin and Schaffer (1995), Coricelli and Djankov, (2001) and Huang et al.(2004) show that organizations B (banks) directly look for the firms in trouble when allocating credit.

3.2 Incentives of the SBC syndrome and means of its creation

The scheme 1 shows how the whole process of the SBC syndrome works. This diagram can also help us to distinguish some of the fundamental incentives of creation of the SBC syndrome. Again as in the previous section we begin with organization A, which is in financial troubles. The possible way how to get out of these troubles is to exert an effort or in our case influence to get financial support from organization B. This process is represented by dashed arrow in the diagram. The incentive of this behavior is quite obvious in the profit-maximizing environment; the question is how this incentive is presented in the non-profit environment. Here it is usually stated that this motive is transformed into the survival problem.

The role of organization B, which is represented by arrow in our diagram, is to offer financial support to the organization A. There are mainly two incentives for organization B to provide financial support to the organization A. These motives are divided according to the fact whether organization B supports organization A voluntarily or involuntarily. The latter motive from the mentioned incentives describes situation in which organization B thanks to prohibitive costs for extorting its financial liabilities from organization A, is in the position of involuntary supporting of organization A. Kornai, Maskin and Roland (2003) argue that ability to extort tax liabilities and private contracts is necessary condition for HBC.

On the other hand the former incentive describes situation in which organization B deliberately supports organization A. It is quite obvious that there are many incentives, which lead to the former motive, but here we describe only the most frequent ones.

These typical incentives of SBC by Kornai, Maskin, Roland, (2003) are following:

a) Previous business relationship between BC-organization[2] and S-organization[3]

(this is usually represented by state, bank or another investor). In this case S-organization is usually for its own sake forced to support BC-organization, which runs deficit financing. This problem is connected to the problem of the

[2] Definition BC-organization (budget constraint organization) is taken from Kornai, Maskin, Roland, (2003).

[3] Definition S-organization (support organization) is taken from Kornai, Maskin, Roland, (2003).

"sunk costs", where already invested financial resources are gone and investors yet still invest another financial resources in quest of getting back some of its previously invested financial resources.

b) Paternalism – in this case the relationship between S-organization and BC organization is something more than just ordinary business relationship. This implies that incentives of S-organization to support BC-organization are more than just financial, good example can be the treatment of state firms by state. The similar effect can occur even there is a close relationship between banks (S-organization) and government. This case is described by Berglof and Roland (1995), who show that a close relationship between banks and government may also cause SBC. The SBC appearance can emerge in the case that firms have soft budget constraints but banks by themselves would refrain from refinancing them. The idea is that refinancing of projects is a way for banks to exploit the softness of government, who takes care about total welfare. It is obvious that this problem happens in the environment where state sector plays significant role in economy. But of course nowadays this motive can be seen even in mature western economies, where this motive is usually connected with domino effect.

c) Hierarchical order – motivates head workers to forego financial failures. Especially cases of huge collapses on the lower levels can induce feeling that head workers do not carry out their responsibilities correctly. Helping these troubled units can prevent the possible managerial removal from the office.

d) Domino effect – this relationship as in the case b) describes more than just ordinary business relationship between S-organization and BC-organization. Moreover the business relationship between these two organizations can be even considered as irrelevant, because when big corporation ceases to exist and does not pay to its creditors, then the creditors will not be able to pay to their own creditors and this "domino effect" can have very important influence to the whole economy. So the main incentive for S-organization to support the BC-organization is to prevent more serious consequences of potential termination of BC-organization.

e) Connections, political pressures, corruption – all these influences must be also considered as a possible parts of SBC syndrome.

When we already know the most typical incentives of SBC syndrome, it is time to focus on the means of softening of budget constraint.

These means can be divided into three classes:

a) Fiscal means

- Tax benefits
- Protracting of tax due day
- Subsidies

b) Credits

- Credits to financially unhealthy corporations
- Protractions of credits maturity
- Cheap credit programs

c) different (e.g. market protectionism)

- Administrative restrictions
- High barriers created by tariffs
- High barriers of entrance on market

We have already explained the basic dynamics, incentives and means, but we still missed one of the most fundamental part of SBC syndrome and this is expectation and mentality of organizations. We cannot omit this part of SBC syndrome, because is the cornerstone of our problem, BC-organizations must expect that when they are in financial trouble, there is particular S-organization, which offers them helping hand. Without this mechanism we cannot talk about SBC problem, because the support of S-organizations would be more or less coincidental and probably also one-off. Knowing that, it is quite obvious that basic SBC mechanism between two organizations lays ground for long-term relationship and without this specific long term relationship we cannot talk about SBC syndrome.

The main consequence of SBC syndrome is distortion of exit system from the market. In classical HBC environment organizations, which are in deficit and are not able to get from this deficit on their own, cease to exit and leave the market. But as we described above this mechanism does not work properly in the environment where SBC problem occurs. So the

economies with SBC syndrome can look healthy, but when we look under the lid, serious problems can be seen. This problem must be taken seriously, because thanks to the SBC syndrome severe financial troubles can be concealed but at the end this growing bubble can easily and painfully burst out.

„Theories of SBC syndrome help illuminate the role of the S-organizations in producing deviations from normal exit rates, by weakening or even eliminating the "destructive" aspect of the Schumpeterian process." (Kornai, Maskin a Roland, 2003:13)

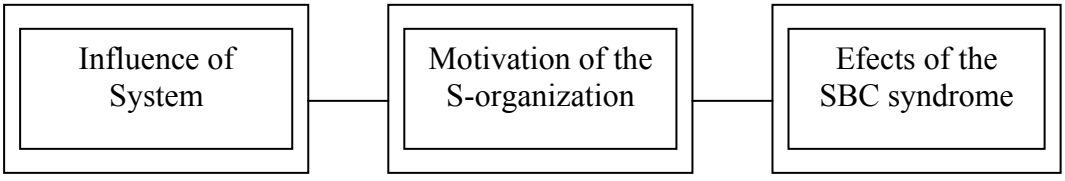
Another consequence connected with SBC syndrome is different economical behavior of organizations in softer environment compared to the harder environment. As we mentioned above BC-organization in the soft environment expect helping hand from S-organizations, this recognition of course influences the pattern of behavior of these BC-organizations. When they know that in the worst case they will be rescued, it is quite obvious that their behavior will be riskier and not as much efficient as it should be. This implies that price system does not fulfill its role as an information system.

3.3 Basic theoretic models of SBC syndrome

This chapter will be focused on the SBC syndrome more theoretically and we examine some of the models, which analyze problem of SBC syndrome. When we are interested in the SBC syndrome, we must always have in our head that SBC syndrome is complex system of causal relationships.

3.3.1 Dynamic behavior of SBC syndrome

Scheme 2: Causal chain of relationships of SBC syndrome



Source: Author

This diagram describes specific order of relationships, which is characteristic feature of SBC syndrome. Now we describe notions used in our diagram, the notion „Influence of system“ represents political-economical-social environment, in which all incentives of SBC syndrome are created, the second notion in our causal chain is „Motivation of S-organization“, this represents incentives, which support the creation of SBC syndrome. And the last notion in the line is „Effect of SBC syndrome“, which represents the consequences of the SBC syndrome.

In the previous chapter we have already defined what SBC syndrome is. Now we would like to return to this definition and analyze thoroughly problem, which is created by this syndrome. From the detailed analysis of incentives, means, behavior and effects of SBC syndrome, which we did in the previous chapter, we are able to characterize SBC syndrome as an inability of supporting organizations to end their expanding credit policy to the troubled organizations, after the first investments have been realized. This makes our syndrome dynamic process, which is based on different willingness of S-organizations to invest ex-ante and ex-post to the BC-organizations Maskin (1999).

3.3.2 Dewatripont-Maskin model

The one of the fundamental models taking care of SBC syndrome as dynamic commitment process is Dewatripont-Maskin model. This model was developed from previously presented model by Schaffer (1989), and tried to answer questions which were not sufficiently explained by its forerunner. The main assumptions of Dewatripont-Maskin model are following:

a) there is only one center, which sustains financial resources,

b) there are many homogeneous firms, each one managed by one manager, which need financial resources from the center for their projects,

c) the whole process of providing financial resources is taking place into two time horizons.

The timing of the model is following.

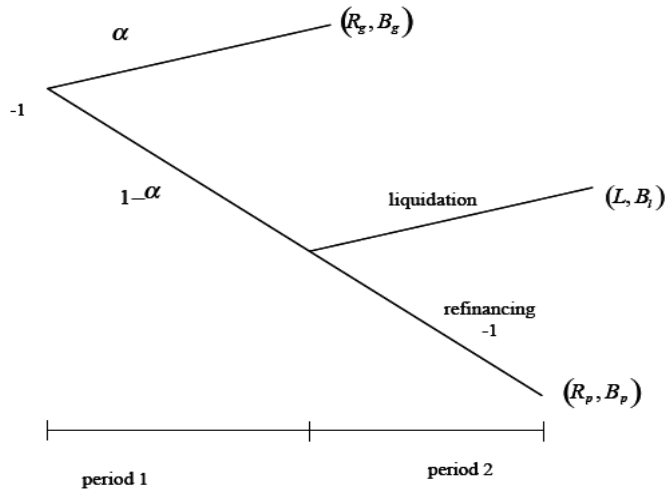
In the first time interval every single manager of the firm decides which project his/her firm undergoes and whether the firm presents its project for financing to the center. The managers have only two possible options from which they can choose. They can decide to undergo

good project or bad project. The distribution of these projects is following - good projects are undertaken with probability α and the bad projects are undertaken with probability $(1-\alpha)$. Once the project is chosen the managers are aware of the quality of the project, but this information is not provided to representatives of the center, this lays the groundwork for the information asymmetry, which is the main framework of the SBC syndrome.

When the project is proposed by the manager, the center has to decide whether to provide financial resources for this project or not. The costs of the financial support from center are equal to one. When financed the good project yields in the second time period gross return $R_g(>0)$ and private benefit to firm equals to $B_g(>0)$.

On the other hand when the bad project is financed by the center it yields zero gross return in the second period. Then one of the possibilities of the center to get back some of its costs is to liquidate the assets of the firm. When this method is chosen the center gets back financial resources in the value of $L(>0)$ and firm gets net private benefit equals to $B_L(<0)$. The liquidation of the firm assets is not the only possibility which the center has to get back some of its provided financial resources from the bad project; the other possibility is to refinance the bad project. In this method center provides another financial support of 1 to the firm for the support of the project. When refinanced the project yields in the second time period gross return $R_p(>0)$ and net private benefit $B_p(>0)$. The distribution of these two methods of dealing with bad project is following - the refinancing is chosen with probability σ and liquidation of firm assets is chosen with probability $(1-\sigma)$.

Scheme 3: Dewatripont-Maskin model



Source: Dewatripont-Maskin (1995)

The value of parameter σ belongs to interval $[0,1]$; this recognition is implied from the definition of σ as probability function. When the value of the parameter sigma is equal to one it means that center prefers refinancing instead of liquidation and firms are located in the soft budget constraint environment. When the value of the parameter sigma is equal to zero the center decided to liquidate the assets of the firm, firms are located in the hard budget constraint environment. It is quite obvious that parameter σ can be considered as benchmark of the softness of budget constraint.

The softness of the environment in which firms are located is crucial parameter which must be taken into account when we examine behavior of the managers in this model. In the case when all gross returns return back to center, the managers propose bad project to the center for financing when the following assumption holds:

(1) $$\sigma B_p + (1-\sigma) B_L \geq 0$$

From this equation we can derive following equation:

(2) $$\sigma \geq \frac{-B_L}{B_p - B_L} \equiv \underline{\sigma}\,.$$

So as can be seen from the equation (2), there is minimal value of the parameter $\underline{\sigma}$, from which the managers will propose bad projects for financing.

Now let us return back to the financial center and its own incentives to finance projects. As it was already mentioned financial center has three possibilities - financing project ex-ante, liquidation and refinancing project ex-post. There are many institutions and organizations which can represent this financial center but for our purpose we represent our financial center as a state (government), which maximizes society welfare through the financed projects. For that purpose the state uses gross financial returns, private benefits and external "effect E", which influences the whole economy. External effect E represents e.g. creation of the unemployment due to liquidation of firms.

If our previous assumptions and following equation (3) hold

(3) $$\alpha(R_g + B_g + E_g - 1) + (1-\alpha)(R_p + B_p + E_p - 2) > 0\,,$$

then state will refinance particular project. In the equation (3) letters E_g, E_p represent external effect on the economy of the good project respectively bad project.

It is important to add that equation (3) explains only state incentives of refinancing ex-post and it does not have any impact on financing ex-ante.

For state, it pays out to finance bad project ex-ante, if costs of financing do not exceed returns from this financing. Mathematically we can write it as follows:

(4) $$1 < R_p + B_p + E_p - 1 .$$

The situation when it is not efficient for state to finance bad project ex-ante can be mathematically described as follows:

(5) $$1 > R_p + B_p + E_p - 1 .$$

When we analyze previously described equations, it is obvious that investments ex-ante do not have any direct influence on decision making whether to refinance or liquidate. Then this fact and information asymmetry, which is integrated into this model, implies that there is different willingness of S-organizations to invest ex-ante and ex-post to the BC-organizations. And it is this difference, which makes SBC problem dynamic.

One of the possible solutions to this problem is to force managers of firms not to propose bad projects for financing, this can be done by state declaration that state will not help troubled firms, these firms will have to cease their existence, and very important fact is that state will keep this policy in long term horizon. This would imply that managers who would like to propose bad project will get in the second period of the model following return $B_l (< 0)$, because their firms will be liquidated instead of refinanced. So this solution would decrease the softness of environment and state goal will be achieved.

But if state does not commit to this behavior or does not behave consistently, the consequence will be that bad projects will be refinanced which will spur managers to propose these bad projects for financing. Roland, Maskin and Kornai (2003) state that for government it is usually hard to commit as it has promised, when facing requirements for bailouts. Thus hardening of the budget constraint is not as easy as can be seen.

As it was mentioned above one of the characteristic component of the SBC syndrome is asymmetric information, this asymmetry is in our model represented by uncertainty whether the proposed project is good or bad. This asymmetry is of course the reason which makes our problem interesting, because in the case that this asymmetry does not exist, S-organization would know what type of project is proposed and would behave accordingly.

Since in our model we assume information asymmetry, the S-organization (state) has to decide whether to finance all projects or neither of them. The following equation (6) has the same form as the equation (3) and represents the case when all proposed projects will be financed:

(6) $$\alpha(R_g + B_g + E_g - 1) + (1-\alpha)(R_p + B_p + E_p - 2) > 0 .$$

This can also be expressed in the following form:

$$\alpha > \frac{2 - R_p - B_p - E_p}{R_g + B_g + E_g - R_p - B_p - E_p + 1} \equiv \alpha^s ,$$

where α^s represents minimal value of ratio of good projects to the all projects needed for S-organization provide financing of all projects. So if the following assumptions are fulfilled $L + B_L < 1$, $\alpha > \alpha^s$, then there is only one stable equilibrium, in which managers propose bad projects to the center and all projects are financed by state and simultaneously all bad projects are in the second period refinanced, which implies that $(\sigma = 1)$.

4. The U.S. Government Bailouts[4]

In this chapter we focus more on the U.S. Government bailouts. As it was already said before, the SBC syndrome is a dynamic process, and due to this fact we think that analysis of previous bailouts must be considered as an essential. The main goal of this chapter is to find out whether government bailouts can be considered as ordinary solution to the financial problems in the USA or whether it is the other way around and government bailouts are only the last and less desirable solution to the financial problems. In the first part of this chapter we pay special attention to the history of the U.S. government bailouts, trying to estimate its consequences on the future decisions of all market participants (firms, banks and even the government). In the second part of the chapter we examine contemporary solutions to the financial crisis adopted in the USA.

4.1 The History of the U.S. Government bailouts

When we talk about SBC syndrome and problems connected with this syndrome we cannot omit notions as institutions and path dependency of particular nation. The notion "institutions" means in this context the special kind of rules. These rules have following features. „The rules include norms of behavior and social conventions as well as legal rules. Such rules are potentially codifiable. Members of the relevant community share tacit or explicit knowledge of these rules." (Hodgson,2006;3)

The reason why these factors are important for our analysis of the SBC syndrome is that it is more or less the environment and the behavior of people which forms the SBC syndrome. As it was mentioned above, the special character of SBC forces the market participants to behave differently ex-ante and ex-post. Some might object that the presence of the different institutions and different path-dependency is not as important as we here present, but imagine the difference of the bankruptcy law and its implementation in the reality. The importance of the institutions is stressed in Dewantripont and Roland (1997), who state that the institutional

[4] The part of this chapter is taken over from the article History of U.S. Government Bailouts presented in www.propublica.org and from encyclopedia www.wikipedia.org. All information presented in the article, were checked on particular sources.

creation and development plays crucial role in market development. The country, where the enforceability of particular claims is faster and on higher level, has smaller problems with SBC, because the creditors are able to obtain higher guarantee L from their loans. This is the problem why it is almost impossible to compare two different economies using only verifiable variables, because these will only tell us the approximate magnitude of the syndrome.

Hence the journey to the history of the U.S. bailouts may bring us some interesting findings.

We begin our analysis in the second part of 20th century even though we are aware of the government interventionist policy after the Great Depression. The overview of the U.S. bailouts is arranged in the following way – we begin with the name of the bailed out company and the year of the bailout, then we briefly describe the circumstances regarding the bailout and present the amount of money in 2008 dollars used for the bailout and at the end the consequences of the bailout are discussed.

Penn Central Railroad

1970

In May 1970, Penn Central Railroad, then on the verge of bankruptcy, appealed to the Federal Reserve for aid on the grounds that it provided crucial national defense transportation services. The Nixon administration and the Federal Reserve supported providing financial assistance to Penn Central, but Congress refused to adopt the measure. Penn Central declared bankruptcy on June 21, 1970, which freed the corporation from its commercial paper obligations. To counteract the devastating ripple effects to the money market, the Federal Reserve Board told commercial banks it would provide the reserves needed to allow them to meet the credit needs of their customers.

The amount of money used in the bailout in 2008 dollars is $3.2 billion.

In 1971, the government provided $676.3 million in loan guarantees. A statutory commitment by the federal government to pay part or all of a loan's principal and interest to a lender or the holder of a security in case the borrower defaults. The Federal Credit Reform Act of 1990 requires that the cost of guaranteed loans be included in the computation of budget authority and outlays. The congressional budget resolution includes loan guarantee totals. (Parliamentary Outreach Program, U.S. House of Representatives)). In 1976, the federal government consolidated the still struggling Penn Central with five other railroad companies that were also failing to form Consolidated Rail, or Conrail. The government

spent $19.7 billion, including roughly $7.7 billion for the initial investment, to keep Conrail operating. By 1981, Conrail began to earn a profit. The government sold Conrail in 1987 for $3.1 billion. In addition to the sale price, the Treasury received a $579 million dividend from Conrail.

Lockheed

1971

In August 1971, Congress passed the Emergency Loan Guarantee Act, which could provide funds to any major business enterprise in crisis. Lockheed was the first recipient. Its failure would have meant significant job loss in California, a loss to the GNP and an impact on national defense.

The amount of money used in the bailout in 2008 dollars is $1.4 billion.

By 1977, Lockheed had paid off its loans, and its dependency on the federal loan guarantees came to an end. The government earned about $112.22 million in loan fees.

Franklin National Bank

1974

In the first five months of 1974 the bank lost $63.6 million. The Federal Reserve stepped in with a loan of $1.75 billion.

The amount of money used in the bailout in 2008 dollars is $7.8 billion.

As the story behind Franklin National's failure unfolded, evidence emerged of corruption and shady business practices among the bank's executives -- several were eventually convicted. With the need for further intervention apparent, the FDIC stepped in as receiver that same year and sold Franklin National's104 branches and other assets to European American Bank. By 1981 the FDIC had sold Franklin assets worth about $5.1 billion. The agency still owed another $185.3 million in interest.

New York City

1975

During the 1970s, New York City became over-extended and entered a period of financial crisis. In 1975 President Ford signed the New York City Seasonal Financing Act, which released $2.3 billion in loans to the city.

The amount of money used in the bailout in 2008 dollars is $9.4 billion.

Until 1986, the government continued using loan guarantees and direct loans to support the fiscally-troubled city. All the loans, loan premiums and fees have since been repaid.

Chrysler

1980

In 1979 Chrysler suffered a loss of $1.1 billion. That year the corporation requested aid from the government. In 1980 the Chrysler Loan Guarantee Act was passed, which provided $1.5 billion in loans to rescue Chrysler from insolvency. In addition, the government's aid was to be matched by U.S. and foreign banks.

The amount of money used in the bailout in 2008 dollars is $4.0 billion.

By 1983, seven years earlier than the scheduled deadline, Chrysler had paid back its loan with the aid of the guarantees from the U.S. government. The corporation bought back the 14.4 million stock warrants given to the government in exchange for the loan guarantee. Because Chrysler's finances had improved and its stock had bounced back -- it reported $1.7 billion in profits for the second quarter of 1984 -- the government netted a profit of more than $660 million from its bailout investment.

Continental Illinois National Bank and Trust Company

1984

Then the nation's eighth largest bank, Continental Illinois had suffered significant losses after purchasing $1 billion in energy loans from the failed Penn Square Bank of Oklahoma. The FDIC and Federal Reserve devised a plan to rescue the bank that included replacing the bank's top executives.

The amount of money used in the bailout in 2008 dollars is $9.5 billion.

It took the FDIC seven years to completely divest itself of Continental Illinois -- the bailout plan had given the government 80 percent ownership over the bank -- through the gradual sale of its share holdings. By 1991, Continental Illinois had been returned to the private sector, but the FDIC had suffered a $1.8 billion loss. Three years later BankAmerica Corp. acquired the bank.

Savings & Loan

1989

After the widespread failure of savings and loan institutions, President George H. W. Bush signed and Congress enacted the Financial Institutions Reform Recovery and Enforcement Act in 1989.

The amount of money used in the bailout in 2008 dollars is $293.3 billion.

The Financial Institutions Reform Recovery and Enforcement Act authorized $293.8 billion dollars to finance the folding of numerous failed S&Ls. The final tab for the bailout was roughly $220.32 billion. Of that total, taxpayers were responsible for about $178.56 billion; the private sector covered the rest.

4.2 The U.S. Government bailouts – current solution to the financial crisis?

Lehman Brothers

2008

In 2008, Lehman faced an unprecedented loss to the continuing subprime mortgage crisis. Lehman's loss was apparently a result of having held on to large positions in subprime and other lower-rated mortgage tranches when securitizing the underlying mortgages. In the first half of 2008 alone, Lehman stock lost 73% of its value as the credit market continued to tighten. It culminated on September 9, when Lehman's shares plunged 45% to $7.79. Investor confidence continued to erode as Lehman's stock lost roughly half its value and pushed the S&P 500 down 3.4% on September 9. The Dow Jones lost 300 points the same day on investors' concerns about the security of the bank. The U.S. government did not announce any plans to assist with any possible financial crisis that emerged at Lehman. The next day, Lehman announced a loss of $3.9 billion and their intent to sell off a majority stake in their investment-management business, which includes Neuberger-Berman.

In New York, shortly before 1 a.m. on September 15, Lehman Brothers Holdings announced it would file for Chapter 11 bankruptcy protection citing bank debt of $613 billion, $155 billion in bond debt, and assets worth $639 billion. It further announced that its subsidiaries will continue to operate as normal. A group of Wall Street firms agreed to provide capital and financial assistance for the bank's orderly liquidation and the Federal Reserve, in turn,

agreed to a swap of lower-quality assets in exchange for loans and other assistance from the government. On Tuesday, September 16, 2008, Barclay plc announced that they will acquire a "stripped clean" portion of Lehman for $1.75 billion, including most of Lehman's North America operations. On September 17, 2008, the New York Stock Exchange delisted Lehman Brothers. Nomura Holdings, Japan's top brokerage firm, agreed to buy the Asian division of Lehman Brothers for $225 million and parts of the European division for a nominal fee of $2

Merrill Lynch

2008

In November 2007, Merrill Lynch announced it would write-down $8.4 billion in losses associated with the national housing crisis. In July of 2008, the new CEO of Merrill Lynch, John Thain, announced $4.9 billion fourth quarter losses for the company from defaults and bad investments in the ongoing mortgage crisis. In one year between July 2007 and July 2008, Merrill Lynch lost $19.2 billion or $52 million daily. On September 5, 2008 Goldman Sachs downgraded Merrill Lynch's stock to "conviction sell" and warned of further losses from the company. Bloomberg reported in September 2008 that Merrill Lynch had lost $51.8 billion in mortgage-backed securities as part of the subprime mortgage crisis. On September 14, 2008, Bank of America announced it was in talks to purchase Merrill Lynch for $38.25 billion in stock. The Wall Street Journal reported later that day that Merrill Lynch was sold to Bank of America for 0.8595 shares of Bank of America. Even though it seems that Merrill Lynch did not use any money from the government bailouts, in March 2009 it was reported that in 2008, Merrill Lynch received billions of dollars from its insurance arrangements with AIG, including $6.8bn from funds provided by the United States taxpayers to bail out AIG.

Bear Stearns

2008

JP Morgan Chase and the federal government bailed out Bear Stearns when the financial giant neared collapse. JP Morgan purchased Bear Stearns for $236 million; the Federal Reserve provided a $30 billion credit line to ensure the sale could move forward.

The amount of money used in the bailout in 2008 dollars is $30 billion.

Fannie Mae / Freddie Mac

2008

The near collapse of two of the nation's largest housing finance entities was yet another symptom of the subprime mortgage and housing market crisis. In an effort to prevent further turmoil within the financial market, the U.S. government seized control of Fannie Mae and Freddie Mac and guaranteed up to $100 billion for each company to ensure they would not fall into bankruptcy.

The amount of money used in the bailout in 2008 dollars is $200 billion.

American International Group (A.I.G.)

2008

When AIG was unable to secure a private-sector loan, the federal government intervened by seizing control of the insurance giant. Less than one month after the initial bailout and just days after AIG announced it had already drawn down $61 billion of its loan, the Fed stepped in with an additional $37.8 billion to bolster AIG's securities lending business. In November, with the insurance giant continuing to report heavy losses, the Feds revised the terms of the bailout and purchased $40 billion in AIG preferred shares.

The amount of money used in the bailout in 2008 dollars is $150 billion.

Auto Industry

2008

In late September 2008, Congress approved a more than $630 billion spending bill, which included a measure for $25 billion in loans to the auto industry. These low-interest loans are intended to aid the industry in its push to build more fuel-efficient, environmentally-friendly vehicles. The Detroit 3 -- General Motors, Ford and Chrysler -- will be the primary beneficiaries.

The amount of money used in the bailout in 2008 dollars is $25 billion.

Troubled Asset Relief Program

2008

The Bush administration has proposed a rescue plan to ease the current crisis on Wall Street. If approved by Congress, the Treasury Department will be authorized to purchase up to $700

billion of distressed mortgage-backed securities and other assets and then resell the mortgages to investors.

The amount of money used in the bailout in 2008 dollars is $700 billion.

Citigroup

2008

After Citigroup lost half its value in the stock market last week, the government decided to throw a hefty life ring to the drowning bank. The government will back roughly $306 billion in loans and securities and will inject about $20 billion in capital. This is in addition to the $25 billion the bank received not too long ago. As part of the agreement, Citigroup will freeze dividend payments at one penny per share per quarter for three years, restrict executive compensation and absorb the first $29 billion in losses and 10 percent of subsequent losses. The government could absorb up to $247.5 billion of Citigroup's losses.

The amount of money used in the bailout in 2008 dollars is $247.5 billion.

Chrysler/G.M.

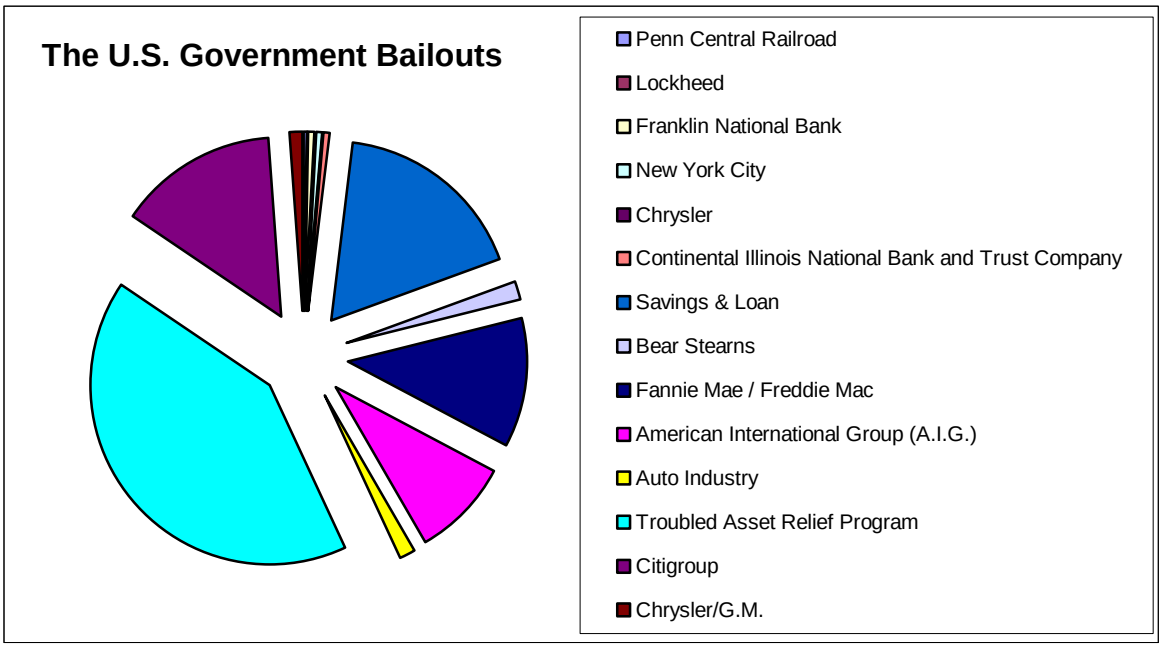
2008

Chrysler, General Motors and the Treasury Department have agreed upon terms for a bailout package to rescue the drowning automakers. The package consists of $13.4 billion in emergency loans; another $4 billion will be made available if needed. But it comes with strings. The auto giants must reduce their debt by two-thirds, and restore profitability, possibly by lowering wages and benefits. Limits on executive pay and a ban on the use of executive jets have also been imposed. Should the Obama administration determine that the two automakers have not reached the agreed upon goals, they will be required to repay the loans and face bankruptcy.

The amount of money used in the bailout in 2008 dollars is $17.4 billion.

To understand the seriousness of the current state of government support to the financially distressed companies we present the graph (1), where we can see the huge support for firms hit by current financial crisis.

Graph 1: The U.S. Government Bailouts



Sources: computed from Treasury Department, GAO, CBO data

The whole overview of the U.S. Government bailouts, should give us particular feeling about how the U.S. Government deals with financial issues. As we could see the companies, which operate in politically important sector, can count on government financial support. But on the other hand there is no direct evidence that this relationship, between these companies and the government, persists. And as we have stated above the characteristic feature of the SBC is recurrent relationship between the S-organization and BC-organization. Thus it is quite complicated to say that there exist characteristic patterns of SBC in the U.S. history. However when we examine the companies, which have already received bailout, we find out that all have similar feature – they are all too big or to important to let them fail. And this is in our point of view the issue of the U.S. economy. Moreover if we realize that through years the initial capitalism in the USA changed into corporatism, in which the market is usually command by few huge international companies. This makes the whole sector more vulnerable to the economical changes, not mentioning the socio-political pressures which these economical changes can have. And this forces the government to bail out firms even though the long term consequences might be worse than the short-term gains the society gets.

5. Decentralism x centralism of bank sector

In this chapter we will continue with soft budget constraint, we take up on the previously described Dewatripont-Maskin (1995) model, using its modifications created for specific problems in bank sector. Our main goal is to point out possible SBC patterns that can occur in the bank sector.

This chapter is focused on the importance of the decentralism and centralism of bank system in SBC syndrome. The model we use is model presented by Dewatripont-Maskin (1995). Our assumption is that decentralized bank system can help to make our soft environment harder. This assumption can be starting point from which we can describe the main differences between transition economies and western economies and possibility of creation of SBC syndrome in these economies.

5.1 Dewatripont – Maskin model

The model we use in this chapter is very similar to the Dewatripont-Maskin model presented in chapter 2.3.2, but there are some differences. The first important difference with the simplest version of the presented model is that there is not a single finance center which offers financial resources to the managers [agents], but there is bank sector which is represented by more financial organizations [banks]. These financial organizations invest their financial resources to the proposed project. The second important difference is that in the simplest version of this model there is only one agent instead of many agents. As in the previous model agents can propose two different projects good projects and poor projects. The good projects are completed within the first period and poor projects are completed within the second period. Both projects yield returns in the period in which they are completed. All parties are risk-neutral so we can assume that they maximize the expected profit. The dynamics of the model is following, in the beginning the contract between agent and bank is created, then in the first period some of the projects are completed and on the rest of the projects new contract can be created or projects can be terminated. In the second period these projects with renewed contract are completed. The returns and private benefits are very similar to the mentioned model, the private benefit of good project yields to its

manager $B_g > 0$, the private benefit of poor project yields to its manager $B_t < 0$, when terminated in the first period or $B_p > 0$ when completed in the second period. The important assumption of this model is that $B_p > B_t$, which can make sense if we take into consideration the fact that the longer the manager stays in his position the longer he can benefit from particular perquisites. The manager's ability to stay in his position will be highly affected by the ownership concentration, because from Berle and Means (1932) we know that with the lower ownership concentration the managers of the firms are able to take more advantage of their positions.

The main idea of this model is based on the fact that thanks to information asymmetry, which is integrated in this model, it is more costly for more banks to exert effort than for only one bank.

So as was mentioned above we will compare two alternatives. The first alternative will be centralized bank sector, which in our model will be represented only by one bank B, which has sufficient capital for financing and even refinancing particular project. In this special case we assume that our bank has all the bargaining power, which means that offers one-off contract to the manager, who can accept it or reject it. The verifiable variable in the contract is the observable return of the project, which in case of the good project is $R_g > 1$, in the case of the terminated poor project the return is zero. Refinancing the poor project costs B another one unit of capital and the observable return is random variable $\tilde{R}_p$, whose realization is either 0 or $\overline{R}_p$. We assume that $\tilde{R}_p > 0$ and that bank B can exert monitoring effort $e \in [0,1]$, which represents the probability of $\tilde{R}_p$ being $\overline{R}_p$. This effort of course brings together costs of this monitoring.

We assume that $C(0) = 0 \wedge C'(e) > 0 \wedge C''(e) > 0 \wedge \lim_{e \to 0^+} C'(e) = 0 \wedge \lim_{e \to 1^-} C'(e) = \infty$. Having these assumptions allow us to find optimal effort of monitoring. To do that we will use the following profit function:

(7) $$\Pi_p = e\overline{R}_p - C(e),$$

this defines the return for bank B in the case of refinancing. To find the optimal level of effort e^* we have to differentiate the equation (7) and put it equal to zero. Then we get that:

(8) $$\overline{R}_p = C'(e^*),$$

using this effort e^* we can input it into equation (7), which gives us following:

(9) $$\Pi^*_p = e^* \overline{R}_p - C(e^*) \ ,$$

this is maximized return from refinancing in centralized bank sector. Taking into consideration the cost of refinancing the net profit for bank B under the centralized bank sector is $\Pi^*_p - 2$. The value of this profit is quite crucial and we will analyze it later.

So this was the first analyzed alternative and now we can move on to the second one, which is decentralized bank sector, which in this case is represented only by two banks B_1 and B_2. These two banks own each only one unit of capital, which implies that they have enough capital for financing project but they do not have sufficient capital for refinancing. The problem of refinancing is in this model solved in the way that only the bank B_1 has the bargaining power and is able to offer a contract to the manager in the first period. The bank B_2 can only wait whether the bank B_1 will need its capital in the second period. We assume that all monitoring efforts exerted by the bank B_1 in first period are private information of the bank B_1. The results of this model are the same as the centralized bank sector model in the following cases:

a) the project is good,

b) the project is poor and terminated.

The only difference between these two models is thus case when poor project is refinanced. The bank B_1 then does not have sufficient amount of capital for refinancing and must convince the bank B_2 to invest into this project. The bank's B_2 willingness to take part in this project is derived from its estimation of the bank's B_1 monitoring effort in the first period. The higher the expectations of the bank B_2 of the monitoring effort of the bank B_1, the smaller pay-off is required from the bank B_2. This reward function $RW(e)$ for the bank B_2 can have following form:

(10) $$RW(\overline{e}) = 1/\hat{e} \, ,$$

for such $\overline{e}$ that $\tilde{R}_p = \overline{R}_p$.

The reward function $RW(\bar{e}) = 1/\hat{e}$, then changes the equation (7), so the bank's B_1 return function will look like:

(11) $$\Pi_p = e(\bar{R}_p - RW(\bar{e})) - C(e),$$

using this equation to find the optimal effort level e^{**}, we get following result:

(12) $$\bar{R}_p = C'(e^{**}) + 1/e^{**},$$

from this equation and equation (8) is quite obvious that $e^* > e^{**}$, because part of the marginal return is transferred to the bank B_2.

So the optimal return function for the bank B_1 in the decentralized bank sector has the following form:

(13) $$\Pi^{**}{}_p = e^{**}\bar{R}_p - C(e^{**}).$$

Thus when we compare equations (9) and (13), it is quite obvious that the expected return in the centralized bank sector is higher than in the decentralized bank sector, mathematically:

(14) $$\Pi^{*}{}_p > \Pi^{**}{}_p.$$

The net profit for bank B_1 for refinanced poor project is $\Pi^{**}{}_p - 2$.

Now we would like to compare all possible equilibriums between these two models. For this purpose we assume that poor project generates negative "social surplus" $\Pi^{*}{}_p + B_p < 2$ and good project generates positive "social surplus" $R_g + B_g > 1$. Very important assumption is that managers are deterred from proposing poor projects only by termination $E_t < 0 < E_p$.

Using these assumptions the following equilibriums can happen:

a) Let $\Pi^{*}{}_p > \Pi^{**}{}_p > 1$, then for banks in decentralized and thus also for bank in the centralized bank sector is profitable to refinance poor projects and because managers are deterred from proposing poor projects only by termination $B_t < 0 < B_g$, the result is that in this equilibrium both projects will be financed.

b) Let $\Pi^{**}{}_p < \Pi^{*}{}_p < 1$, then for bank in centralized and thus also for banks in the decentralized bank sector is inefficient to refinance poor projects and thanks

to the fact that managers are deterred from proposing poor projects only by termination $B_t < 0 < B_g$, the result is that in this equilibrium only good projects will be financed.

c) Let $\Pi^{**}_p < 1 < \Pi^{*}_p$, then for banks in decentralized bank sector is inefficient to refinance poor projects, which together with the fact that managers are deterred from proposing poor projects only by termination $B_t < 0 < B_g$, brings equilibrium in which only good projects are financed.

For bank in the centralized bank sector on the other hand refinancing of poor projects is profitable and together with fact that managers are deterred from proposing poor projects only by termination $B_t < 0 < B_g$, the result is that in this equilibrium both projects will be financed.

The conclusion from this analysis is that compared equilibriums are almost same for all cases except one in which under specific conditions the centralized bank sector suffers from SBC syndrome but decentralized bank sector does not have problem with SBC syndrome.

This analysis can be quite handy when we look at particular bank sector. More centralized bank sectors have tendency thanks to lower cost of monitoring to suffer from SBC syndrome on the other hand more decentralized bank sector with wide base have lower chance that SBC syndrome will occur in it.

When we use this recognition we must be aware of the fact that this model is just simplification of real world and some of its assumption can be found misleading. “All models are wrong, but some are useful.” George E. Box (1979; 202)

5.2 Analysis of U.S. bank sector

Now we would like to use the previously described model on the data we get for bank sector in the USA and after this analysis we would like to add to this model another assumption and try to find out whether the results of the model would be the same.

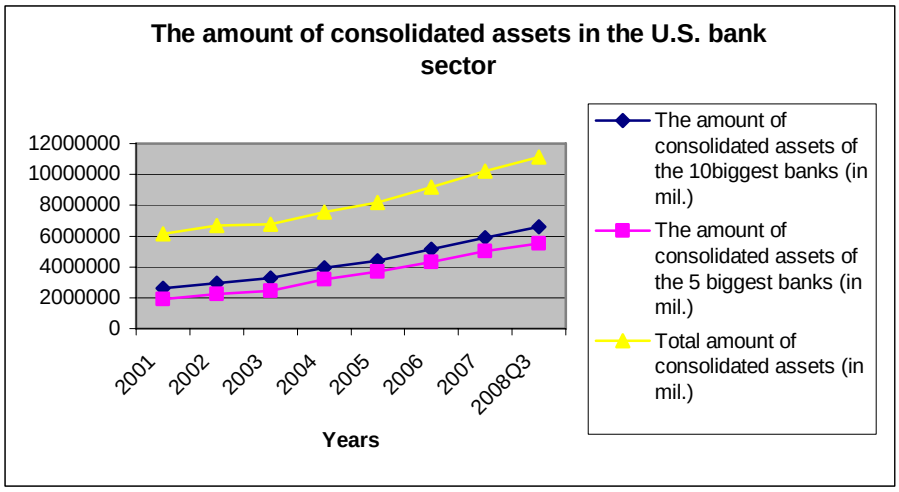
For the analysis of bank sector in the USA we used data for years 2001 – 2008Q3[5]. Our intention was to find out whether the U.S. bank sector is more oriented to the centralized version or decentralized version of bank sector. We used consolidated assets of banks as a benchmark. These assets can show us whether there exists higher amount of consolidated assets located just around few banks or whether the consolidated assets are more or less evenly spread between banks. To make the analysis even easier we focus on the consolidated assets of the five and ten biggest U.S. banks[6] and compare them with the amount of consolidated assets of the whole U.S. bank sector. The whole U.S. bank sector is represented by the U.S. banks owning 300 mil. $ in their consolidated assets or more, the only difference is in the year 2001, when the U.S. banks which have 100 mil. $ in consolidated assets were taken.

In our analysis we originally focused on the ten biggest U.S. banks but when we figured out that the results of the five biggest U.S. banks are even more significant, hence we also focus on the analysis of the five biggest U.S. banks.

For better understanding of the discussed problem we created a few graphs, which should describe current state of U.S. bank sector. The first two graphs describe the evolution of the U.S. bank sector, specifically concentrated on the size of the ten biggest U.S. banks through years 2001 – 2008Q3. The graph (2) depicts the increase of consolidated assets in the U.S bank sector. The total amount of consolidated assets almost doubles up from the year 2001 to 2008, beginning with 6166070 mil. $ and ending with 11123331 mil. $. But what is even more important is the behavior of the ten and the five biggest U.S. banks. The volume of consolidated assets of the ten biggest U.S. banks in the same time period increases from 2614474 mil. $ to 6602992 mil. $, which approximately corresponds to 250% increase. When we make the same analysis for the five biggest banks the volume of consolidated assets rose from 1894443 mil. $ to 5513811 mil. $, which approximately corresponds to 290% increase.

[5] The latest data we use in our work were from the third quarter of the year 2008.
[6] By U.S. bank we mean bank which operates in U.S. bank sector.

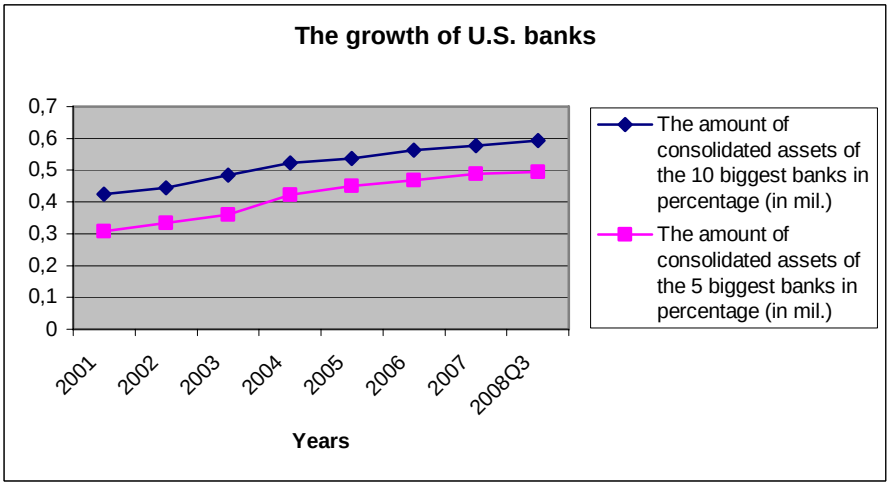
Graph 2: The amount of consolidated assets in the U.S. bank sector



Source: computed from Federal Reserve System data

This recognition implies that the size of the largest U.S. banks is rising and so is their position on the market. The similar result can be seen in the graph (3), where instead of absolute value of total consolidated assets we use the relative size of the U.S. banks to the whole bank sector. Again we can see relatively steep increase of the relative power of the ten and the five largest U.S. banks.

Graph 3: The growth of U.S. banks

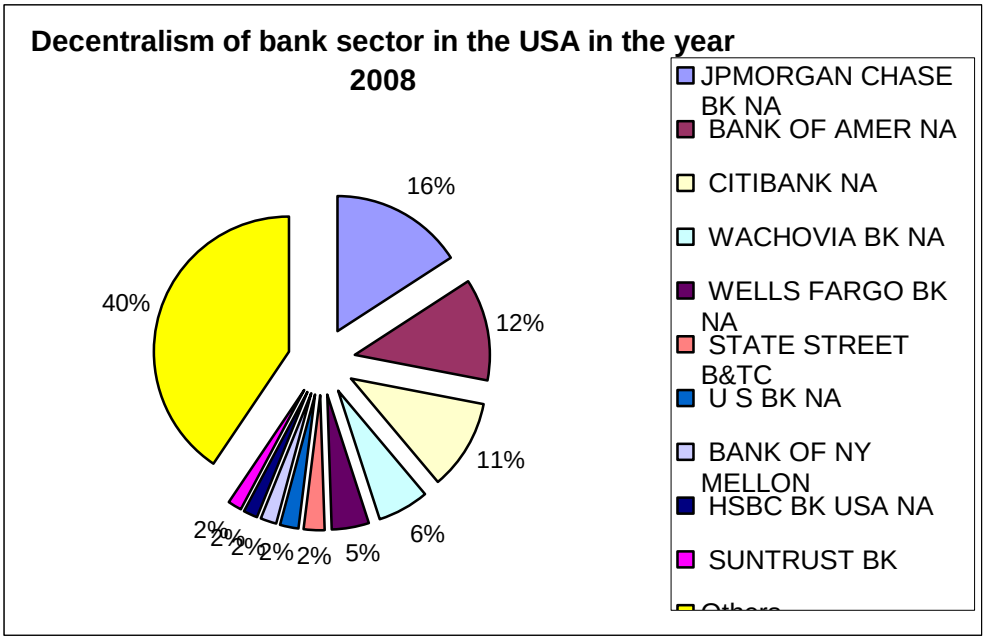


Source: computed from Federal Reserve System data

The relative size of the ten biggest U.S. banks rose from 42% to 59% and relative size of the five biggest banks rose from 31% to 49%. The distribution of the banks relative size in the year 2008 can be seen in the graph (4) and (5). To judge the concentration of the bank sector we use concentration ratio of five largest and ten largest banks and Herfindahl index.

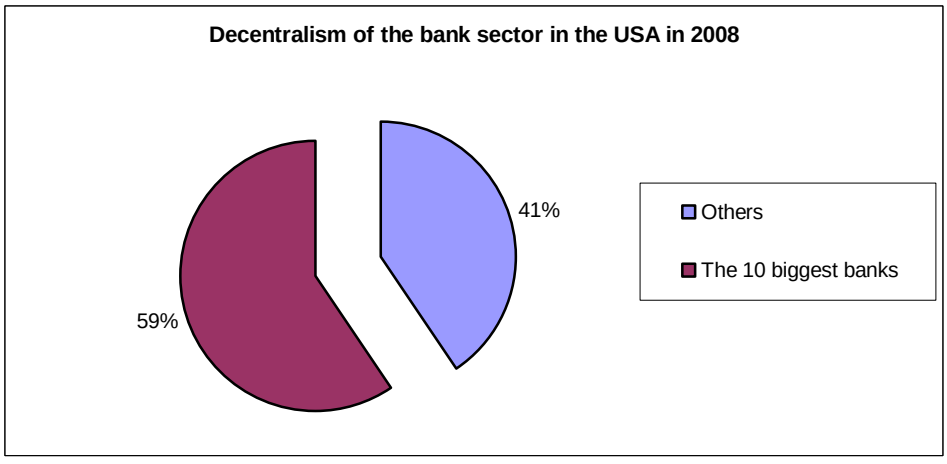
The concentration ratio of the five and ten largest banks in year 2008 equals to 0,495698 and 0,593616 respectively. The Herfindahl index of the 1100 largest banks equals to 615,2255. According to the concentration ratio the U.S. bank sector is little bit concentrated on the other hand the Herfindahl index says that the bank sector is unconcentrated.

Graph 4: Decentralism of bank sector in the USA[7]



Source: computed from Federal Reserve System data

Graph 5: The volume of consolidated assets of the ten biggest banks in the USA



Source: computed from Federal Reserve System data

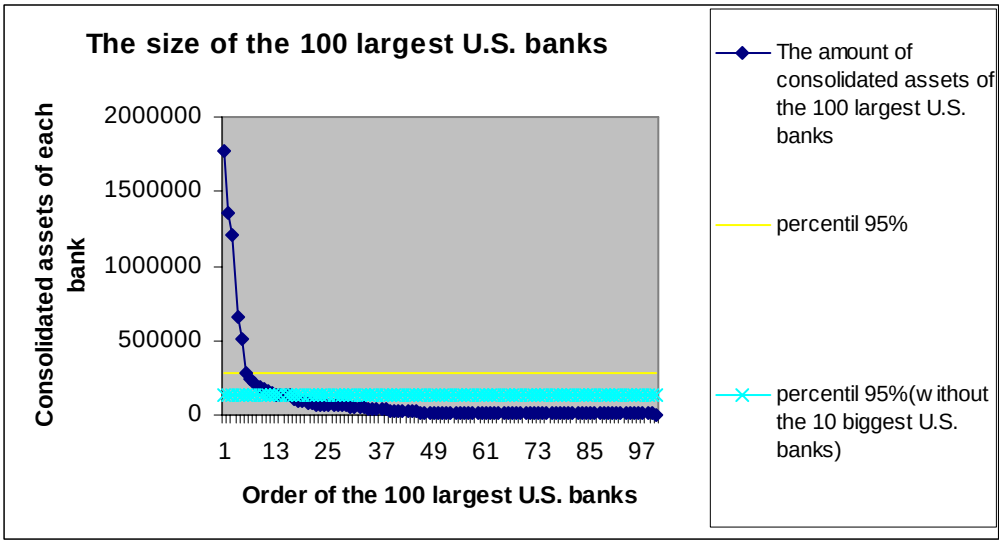
[7]This survey is made of insured U.S. – Chartered commercial banks that have consolidated assets of $300 million or more, ranked by consolidated assets.

Table1: Assets concentration in bank sectors

	Percentage of [...] held by the five largest commercial banks at year-end 2005?		Fraction of assets held by just commercial banks
	deposits	assets	
Austria	Not available	Not available	Not available
Belgium	0.887	0.913	1
Bulgaria	0.540	0.540	1
Cyprus	0.480	0.670	0.850
Czech Republic	0.691	0.655	0.738
Denmark	0.770	0.820	0.930
Estonia	0.980	0.980	1.000
Finland	0.981	0.992	0.798
France	0.663	0.649	0.527
Germany	0.743	0.722	0.357
Greece	0.655	0.656	Not available
Hungary	0.669	0.634	0.841
Ireland	Not available	Not available	Not available
Italy	0.539	0.577	Not available
Latvia	0.696	0.673	1
Lithuania	0.838	0.813	0.992
Luxembourg	0.360	0.310	Not available
Malta	0.535	0.425	1
Netherlands	0.920	0.900	Not available
Poland	0.558	0.486	0.934
Portugal	0.880	0.870	0.951
Romania	0.570	0.587	0.997
Slovak Republic	0.685	0.674	0.920
Slovenia	0.648	0.636	1
Spain	0.431	0.532	1
Sweden	0.922	0.964	0.840
United Kingdom	0.580	0.670	0.940
Croatia	0.721	0.744	0.974
Macedonia	0.817	0.750	0.986
Norway	0.950	0.960	0.680
Switzerland	0.741	0.751	0.960
Australia	0.767	0.737	0.970
Canada	0.867	0.874	Not available
Japan	0.443	0.500	0.857
New Zealand	0.937	0.918	0.907
United States	0.390	0.410	0.700
(a) The data from the survey was available in early July of 2007 and it is perhaps accurate to interpret the responses as describing the situation in 2006.			

Source:
http://siteresources.worldbank.org/INTRES/Resources/469232-1107449512766/Banking_regulation_Survey_III_061008.xls

Graph 6: The size of the 100 largest U.S. banks



Source: computed from Federal Reserve System data

All these graphs and results of these graphs do give us particular feeling how the U.S. bank sector evolved in the given period but our intention is to confirm all these conclusions empirically. For this purpose we created the distribution of the one hundred largest U.S. banks and we used this distribution for creation of 95% percentile. Some could object that distribution of the one hundred largest U.S. bank is not big enough to be statistically significant, but as we used the largest banks, adding more banks to the distribution, using the same criteria that banks with smaller and smaller amount of consolidated assets will be added to our distribution, would only increase the statistical significance of our results. The results are described in the graph (6). As we can see from the one hundred largest U.S. banks, the largest five banks do exceed the 95% percentile and the sixth largest bank is just tightly under this line. We can observe that the empirical results confirm our previous recognition that the five largest banks do have very important role in U.S. bank sector. But when we compare our findings with table (1), which describes the concentration of assets of the five largest banks in other countries, from this table it is obvious that the U.S. bank sector has the second least concentration.

The conclusion of this chapter taking into the account the results of the previous chapter is that even though the centralization is not very high, we should not consider the U.S. bank as a perfectly decentralized, hence the SBC syndrome must be taken seriously into consideration as a possible threat to U.S economy. We are aware of the fact that centralization and decentralization of the bank sector is not the necessary condition for SBC

syndrome but from our point of view it can be consider as a sufficient condition for SBC syndrome. Although we argue that Dewatripont – Maskin model is not fully optimal for each economy, it is special case for only economies with well working liquid capital market, in the next chapter, we will show that similar results, where centralization of the bank sector plays crucial role in the creating of this syndrome, can be modeled by other models.

5.3 Cost analysis in Dewatripont-Maskin model

In this chapter we would like to continue in the analysis of the centralized and decentralized bank sector. In the first part we would like to present analysis of the cost functions in the Dewatripont – Maskin (1995) model, with special attention on the capital market. Then we would like to describe other models of the SBC dealing with centralized and decentralized bank sector. And finally we would like to conclude the whole chapter "Decentralization and centralization of bank sector".

As we promised in the previous chapter we would like to focus more on the possible problems of the model. We argue that some implicit conclusions of the model should be revised; and thus we focus on the analysis of the cost functions. Our attention is particularly paid to the capital market in decentralized bank sector and its role in the Dewatripont – Maskin (1995) model. We do think that the model is a good basic tool in analysis of particular bank sector and the possible creation of SBC and its main strength is that it can outline the basic features of the SBC syndrome. The problem is that as each model it is only simplification of reality and thus some of its conclusions can be considered misleading. We specially had in mind the fact that the hardening of the budget constraint according to Dewatripont and Maskin (1995) and von Thadden (1995) can lead to shortism even between the good managers.

But for us the most problematic part of the model is the main idea on which it is based. From our point of view the model works well for specific economy and using it as a general model can be misleading, hence we created two enhanced models, which have similar results as the Dewatripont-Maskin model (1995), but the method, on which they are built, is different. The reason why we decided to support our analysis with these two new models is that from our point of view Dewatripont-Maskin model (1995) is built on special assumptions, which can have misleading conclusions. This special assumption will be

explained in the analysis of the cost functions and there will be also explained the reason why we think the conclusion of the Dewatripont-Maskin model (1995) can be misleading.

The reason why decentralized bank sector is considered under specific conditions $\Pi^{**}{}_p < 1 < \Pi^{*}{}_p$ more efficient is because the costs that bank B_1 has to pay to the bank B_2 decrease the optimal level of effort e^{**} under decentralization; thus for the model holds following inequality $e^{**} < e^{*}$, where e^{*} represents the optimal level of effort under centralization. These costs are represented by the reward function $RW(\overline{e})$. The equations (9) and (13) imply $\Pi^{**}{}_p < 1 < \Pi^{*}{}_p$.

We argue that any decrease of costs of information, which can be achieved by technological, institutional or any other way, should also decrease the probability that poor projects will be financed; thus increases the efficiency. The easier we can get relevant information, the more we are able to decrease the problem of asymmetric information; thus through this algorithm we basically decrease the SBC appearance Mejstřík (1999).

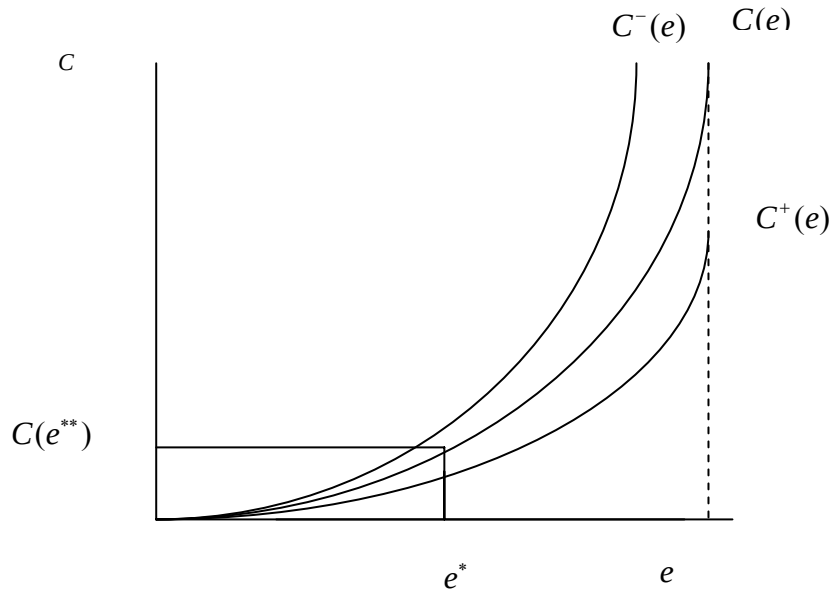
We know that:

(15) $$\Pi_p = e(\overline{R}_p - RW(\overline{e})) - C(e),$$

where $C(e)$ represents the costs of exerting effort and have following conditions $C(0) = 0 \wedge C'(e) > 0 \wedge C''(e) > 0 \wedge \lim_{e \to 0^+} C'(e) = 0 \wedge \lim_{e \to 1^-} C'(e) = \infty$ and $RW(\overline{e})$ is reward function of bank B_2.

Graphically the $C(e)$ are depicted in scheme 4, which we specially created for our analysis. The cost functions depicted in the scheme 4 satisfy all the assumptions imposed on the cost functions by the Dewatripont-Maskin (1995).

Scheme 4: The Cost Functions



Source: Author

We can see that we added to the scheme other two cost functions. These cost functions are of the same form $C(e)$ and thus they have the same properties as the cost function $C(e)$. The only difference between these two functions is that the function $C^-(e)$, ($C^+(e)$) is steeper (flatter) version of the function $C(e)$, mathematically it can be expressed that:

$$C^{-\prime}(e) > C'(e) \text{ for } \forall e > 0 \text{, where } \lim_{e\to 0} C'(e) = 0 \wedge \lim_{e\to\infty} C'(e) = \infty$$

$$C^{+\prime}(e) < C'(e) \text{ for } \forall e > 0 \text{, where } \lim_{e\to 0} C'(e) = 0 \wedge \lim_{e\to\infty} C'(e) = \infty .$$

These properties of the new cost functions with $C(e)$ assumptions ensure that we can find the optimal level of e for the profit function (15).

As it can be seen from the scheme the cost function $C^-(e)$ makes the monitoring effort more costly and the cost function $C^+(e)$ makes them less costly. These changes of old cost function $C(e)$ are mainly considered to be caused by institutional and technological causes. Here in this chapter we will not hold forth the possibilities of technological changes on the

cost function, but it is good to know that these changes exist. We rather focus on the institutional changes namely the current state of capital market and its development.

To justify our orientation we should say few words about the differences between western mature markets and transition economies. As it was mentioned above one of our main goals is to find out whether the SBC can occur even in mature western economies. Usually economists say that SBC is mainly a problem of transition and socialistic economies but sometimes it can occur even in western mature markets.

"SBC directly influence the efficiency of the state sector through its effect on the expectations of state-firm managers. Moreover, they are strongly linked to most of the basic problems confronted by socialist and transitional economies, e.g., shortage and inefficient innovation. The SBC syndrome has by no means been absent from market economies. Notable recent examples of its mischief include the U.S. government's bailouts in the Savings and Loans and the Long Term Capital Management crisis. Nevertheless, its force appears to be more attenuated in relatively decentralized economies. Why this should be so seems important both for understanding transition (how to transform a centralized economy into a market economy) and for understanding the market economy itself. "(Maskin, Xu,2001;2)

When we thoroughly examine the differences between transition and mature western economies, we find out that the biggest difference is on the institutional basis. The biggest problem of immature markets is that they usually lack credible price system, which monitors the performances of firms. This function is in the mature markets provided by capital market. From our point of view the reason why in relatively decentralized economies the SBC syndrome is not so visible is the working capital market. The capital market carries out two very important roles:

a) it provides financial resources to the firms, which are listed on the market,

b) it creates price system, in which each stock is valuated according to the firm's performance.

Both of the functions are very important and can decrease the persistence of the SBC in the economy. But for our cost analysis in the model the second function is more important. The price system, which is created by the capital market, can serve as a basic indicator of firm's performance. We must be aware of the fact that thanks to the efficient market

hypothesis all relevant information already contained in the price. So the well working capital market can help us to monitor the behavior of firms. (Fama, 1970)

So through the capital market we can decrease the cost of monitoring, because all the listed firms have to provide relevant information regarding their business and moreover their performance is watched by the stock price.

Because we argue that capital market is important factor, which decreases the incentives of SBC syndrome, we tried to integrate the capital market to the Dewatripont-Maskin (1995) model. Our assumption is that the capital market through its second function improves knowledge about firms; thus banks have more information about projects, which decreases the costs of monitoring.

Let's suppose that the basic model is created for the economy without working capital market. The problem with working capital market was noticed in many transition economies. The new capital markets were usually considered to be illiquid – huge volume of new firms were listed on the market and there was no benchmark, which could be used for evaluation of these firms (Kouba, 2004). Then any development of capital market should decrease the cost of monitoring through the bank's better knowledge of the firms. This means that instead of cost function $C(e)$ we will have to use in the new model cost function $C^{+}(e)$. So the new profit function Π_p^{CM}, which represents the decentralized bank sector with capital market, will have following form:

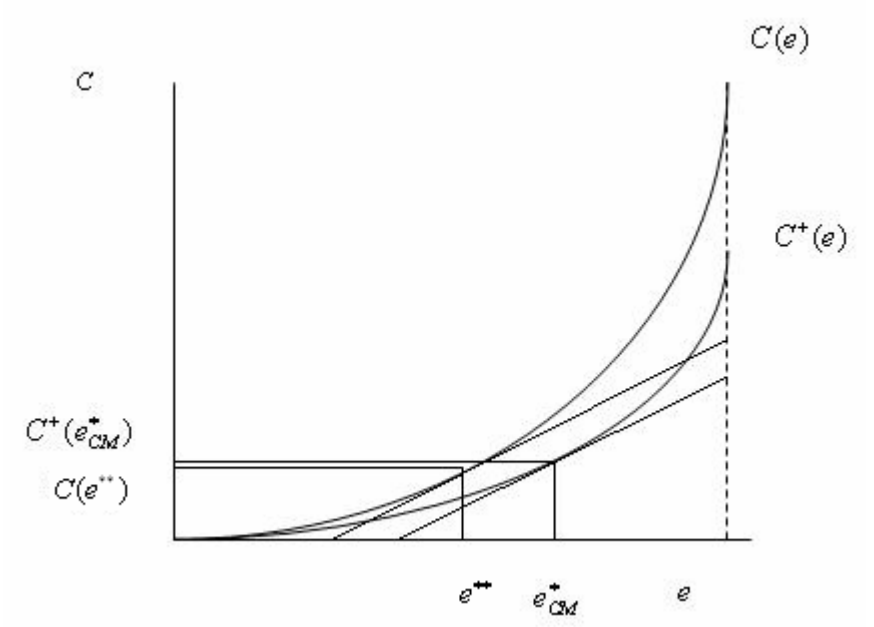
(16) $$\Pi_p^{CM} = e(\overline{R}_p - RW(\overline{e})) - C^{+}(e).$$

Now we need to find the optimal level of effort e, this optimal level of effort must satisfied following formula:

(17) $$\overline{R}_p = C^{+\prime}(e^*_{CM}) + 1/e^*_{CM}.$$

To show the difference between the model without and the model with capital market graphically we created the cost functions satisfying all the previously mentioned properties imposed on the cost functions by Dewatripont-Maskin (1995). These cost functions are depicted in the scheme 5.

Scheme 5: The Cost Functions Capital Market



Source: Author

As we can see the optimal level effort increases so that $e^*_{CM} > e^{**}$, but also the cost for exerting effort rose so that $C^+(e^*_{CM}) > C(e^{**})$. The first important consequence of this change is that the value of reward function $RW(e^*_{CM}) = 1/e^*_{CM}$ is lower than the value of reward function before the change $RW(e^{**}) = 1/e^{**}$. When we realize that the value of the reward function represents the interest rate in the economy, then decrease of the interest rate due to better knowledge is appropriate effect. The second important consequence is the change of the bank's profit. So now we need to describe the general influence on the profit function Π^{CM}_p. We can see that $C^+(e^{**}) < C(e^{**})$. When we use this recognition inputting particular efforts to the profit function we get following result:

$$\Pi^+_p = e^{**}\overline{R}_p - C^+(e^{**}) > \Pi^{**}{}_p = e^{**}\overline{R}_p - C(e^{**}).$$

More if we realize that e^*_{CM} maximizes profit function Π^{CM}_p, the following must be true:

(18) $$\Pi^{CM}_p > \Pi^+_p > \Pi^{**}_p.$$

These inequalities imply that due to the improved banks´ knowledge, the profit from refinanced poor projects can be higher in the model with capital market compared to the

model without capital market. Right no we have similar three possibilities as in the basic model:

a) let $1 > \Pi_p^{CM} > \Pi_p^{**}$, then refinancing of poor projects ex-post is inefficient in both models and only good projects will be financed,

b) let $\Pi_p^{CM} > \Pi_p^{**} > 1$, then refinancing of poor projects ex-post is profitable in both models and both good and poor projects will be financed,

c) let $\Pi_p^{CM} > 1 > \Pi_p^{**}$, then refinancing of poor projects ex-post is profitable in the model with capital market and is inefficient in the model without capital market.

To summarize our results, the previous three points told us that the model with capital market works similarly under the two of three circumstances. The only difference is, when $\Pi_p^{CM} > 1 > \Pi_p^{**}$ then the integration of capital market to the basic model increases the probability of SBC in economy. This is of course seen as a contradiction to our assumption that the more information is provided to the banks the lower is the information asymmetry and thus the SBC should decrease.

The similar result is found by Faure-Grimaud (1996), which in their work show that capital market with its increase of knowledge about firm's projects increases the probability that the sufficient effort will not be exerted by manager.

„But imagine that, owing to privatization, a stock market is created and that the firm becomes publicly owned. Then, in addition to the regulator, there are now many other "monitors" of the firm's behavior, namely, its shareholders or potential shareholders. This additional scrutiny is likely to improve the quality of information about the firm. Let us assume, in fact, that the firm's stock market value accurately predicts whether or not the firm's project will succeed. This advance warning enables the regulator to intervene selectively whenever the project seems likely to fail. But the guarantee of having the project bailed out in advance of any failure destroys the manager's incentive to exert effort. And thus the ultimate effect of the stock market may well be harmful to the firm." (Maskin, Xu,2001;25)

5.4 Enhanced decentralized and centralized models

In the previous section we presented the different cost functions and their influence on the Dewatripont-Maskin model (1995). Now we would like to present two enhanced models, in which we integrated new incentives for appearance of SBC. Both of these models deal with centralized and decentralized bank sector with special attention to the size of the banks.

The first model is based on Dewatripont-Maskin (1995) and focuses on the reputation of the banks and its influence on the SBC syndrome. We argue that centralized bank sector, with bigger banks, due to higher reputation of these banks is more prone to the SBC syndrome than the decentralized bank sector, where banks size is more or less evenly distributed. We assume that bigger banks, which had to attract more capital, have higher reputation than smaller banks in the same economy. We represent the reputation of the big bank by GW_B and the reputation of the small bank by GW_S. All other assumptions of the previously described model are considered to be fulfilled except the following inequality:

(19) $$\prod_p^{**} < \prod_p^{*} < 1,$$

this implies that refinancing poor projects ex-post for banks is inefficient in decentralized and centralized bank sector. When we add to this recognition that $E_P > 0 > E_t$ the only equilibrium we can get, is the one, where only good projects will be proposed by managers.

But when we add to our model the reputation of each bank the costs from terminating poor projects could be different. The act of termination of poor project can be seen by public as a certain acknowledgement of banks wrong decision making in the first period, which in the eyes of the public decreases the reliability and credibility of the bank. On the other hand when the poor project is refinanced, its completion in the second period may be regarded by public as a successful project; thus there is no change of bank's credibility. So terminating of the poor projects brings other costs, which should be added to the return of refinanced poor project. So the return will have following form:

(20) $$\prod_p^{*} + \triangle GW,$$

where $\triangle GW$ represents the change of reputation of the bank and $\triangle GW \in \langle \triangle GW_S, \triangle GW_B \rangle$.

Our assumption is that the percentage change of reputation is for all banks same, which means that:

(21) $$\triangle GW_B > \triangle GW_S .$$

We also assume that:

(22) $$\prod_p^* + \triangle GW_S < 1 + L ,$$

where the letter $L \geq 0$ represents the value of liquidated assets, when the project is terminated. The Dewatripont and Maskin (1995) did work with L=0. Inequality (22) says that for small banks refinancing is inefficient even when the reputation is taken into account.

On the other hand we assume that:

(23) $$\prod_p^* + \triangle GW_B > 1 + L .$$

In other words for big bank it is always profitable to refinance poor ex-post taking into consideration the reputation, which can lose.

As we can see all the returns are calculated for banks in the centralized bank sector, we suppose that in the decentralized bank sector the size of each bank is insignificant with regard to the whole bank sector and thus inequality:

(24) $$\prod_p^{**} + \triangle GW < 1 + L ,$$

is satisfied for each bank in decentralized bank sector. Moreover even if for decentralized bank sector would hold that $\prod_p^* = \prod_p^{**}$, the inequality (24) would be still satisfied.

Now it is time to summarize our conclusions. The main purpose of this model is to show that even hardly verifiable variables should be taken into account when talking about SBC. We particularly focus on the reputation of the banks, but similar problem is with the reputation of the management of the banks, which refinances the poor project rather than confesses wrong decision making, the similar conclusion can be find in the Aghion, Bolton, and Fries (1996), who believe that a major source of SBC is bank managers' incentives to conceal or misreport their bank's loan losses, and this behavior can lead to banking crises.

This model is even more interesting when we realize that even though the refinancing of poor projects is ex-post inefficient ($\prod_p^{**} < \prod_p^* < 1$) the projects are refinanced owning to the reputation. The catch is that the reputation is very hard to be identified for the external

observer and so the refinancing may be seen as not reasonable. This similar process unfortunately exists in reality, where many banks and financial institutions choose continuation rather than termination of the poor projects, which from the view of external observers might be seen as an inefficient. Deviatov and Barry (2005) describe the role of the reputation in the SBC syndrome, arguing that not only reputation of the creditor but also of the lender matters.

As in the chapter 4.1 we especially focused on the decentralized and centralized bank sector and we discovered that under particular circumstances the centralized bank sector is more prone to the SBC syndrome, which only supported our previous conclusions. In the second enhanced model based on the model described in chapter 2.3.2 we focus on the influence of deposits in the bank's decision making whether to refinance poor project ex-post. The reason why we pay special attention to the deposits is that in the time of possible financial turmoil the amount of capital in the bank can vary, which brings cost to the banks. The difference against the basic model is that we define bank as a financial institution, which acquires in each period particular amount of capital from deposits. The amount of deposits is contingent on the number of depositors the bank has. We assume that each depositor deposits the same amount of money to the bank and the bigger the bank is the more depositors it has. For our purpose we assume that the big banks have two times or more depositors than the small banks. We define the total amount of deposits acquired through years by D_B for big banks and by D_S for small banks, where $D_B \geq 2D_S$. And we assume that each bank is able to acquire $\triangle D_B$ and $\triangle D_S$ ($\triangle D_B \geq \triangle 2D_S$), these financial resource are then used for financing of projects. It is obvious that the total amount of capital, which is held in bank, is lower than the amount of deposits, according to the Basel rules the required capital should be at least 8% of risk weighted credit exposures, so we can assume that banks do hold approximately 10% of their deposits.

Instead of the basic model this model is divided into two parts, where in the first part the bank has to decide whether to finance the projects in the first period and in the second period whether to refinance or terminate poor project, its decision is observed by managers and public, which influences their behavior in the second part of the model. The important role in our model plays the letter $L \geq 0$, which represents the value of liquidated assets, when the project is terminated. From the basic model we know that when:

(25) $$L < R_p - 1,$$

the ex-post refinancing of poor projects is profitable.

Now let's define function Π_{ref} :

(26) $$\Pi_{ref} = R_p - 1 - L .$$

Then the higher the value of Π_{ref} is the higher is the probability of refinancing poor projects. When we differentiate the function Π_{ref} respect to parameter L, we get following result $\frac{\delta \Pi_{ref}}{\delta L} = -1 < 0$, so as we can see the parameter L significantly decreases the probability of SBC.

We know that due to asymmetric information banks cannot distinguish between good and poor projects, thus they have to decide whether it is profitable to finance all proposed projects or none of these projects. If the (25) is fulfilled, the banks will finance all projects if:

(27) $$\alpha(R_g - 1) + (1 - \alpha)(R_p - 2) > 0 .$$

In the case the (25) is not fulfilled, the banks will rather terminate the poor projects than refinance. This means that:

(28) $$\alpha(R_g - 1) + (1 - \alpha)(L - 1) > \alpha(R_g - 1) + (1 - \alpha)(R_p - 2) > 0 .$$

So the condition (27) is fulfilled and again all projects will be financed.

So if $L > R_p - 1$ all projects will be financed and all poor projects will be terminated. This with fact that $B_p > 0 > B_t$ implies that in equilibrium only good project will be proposed to the banks. The number of poor projects proposed in the second part of the model is based on the managers´ expectation. We expect that managers have rational expectations and hence no poor project will be proposed. In the case the managers would have adaptive expectations the proportion of poor projects would decline proportionally.

Unfortunately as it is mentioned above, the act of termination of poor project can be seen by public as a certain acknowledgement of banks wrong decision making in the first period, which in the eyes of the public decreases the reliability and credibility of the bank. Our assumption is that when bank does terminate any project before its completion, depositors are afraid of its deposits and thus they want to withdraw them (run on the bank). There are two problems connected. The first is that in case of small run the opportunity cost must be taken into consideration these opportunity costs are connected with the fact that in

the next period less depositors will come to the bank, which means that bank will have fewer financial resources for investing into new projects (loses liquidity). The second problem is that with big run the bank faces massive withdrawal of deposits, which makes the bank insolvent. We pay more attention to the first problem and we try to describe possible effects on SBC.

Let's assume that $L < R_p - 1$. Then the opportunity cost will have the following effect:

$$L - \triangle D\left[\alpha(R_g - 1) + (1-\alpha)(L-1)\right] < R_p - 1, \tag{29}$$

these opportunity costs are represented by the profit from the project, which cannot be financed due to the outflow of capital. Thus the problem is more relevant to the bigger banks, because they are able to acquire $\triangle D_B \geq \triangle 2D_S$ and hence the interval for SBC is much wider than for smaller banks:

$$\triangle D_S\left[\alpha(R_g - 1) + (1-\alpha)(L-1)\right] < \triangle D_B\left[\alpha(R_g - 1) + (1-\alpha)(L-1)\right]. \tag{30}$$

The conclusion for this model is that these wider intervals make the importance of our parameter L weaker, creating more space for SBC syndrome. The important property is, that the bigger the bank is, its incentives to refinance the poor project are higher, due to the higher outflow of capital. This can be another proof that decentralized bank sector is less prone to the SBC syndrome than centralized bank sector.

When we want to analyze the SBC the good starting point is the market of financial resources. Our reason why we start there is that the SBC syndrome is mainly financial problem related to the different willingness of financial institutions to invest ex-ante and ex-post. Thus in this chapter we paid special attention to the bank sector and its form and use all the recognitions to the analysis of the U.S. bank sector. Firstly we showed that according to the Dewatripont – Maskin (1995) the decentralized bank sector is less prone to the SBC than centralized bank sector even though we do find some interesting results regarding this model we still believe that this model is not expendable in analysis of bank sectors. Moreover we achieved the similar results with two other models. These models work on little bit different basis than the Dewatripont – Maskin model, emphasizing the importance of less visible costs for decision making of banks, but the results confirmed previously discover findings in the Dewatripont – Maskin model. So the conclusion from all these models was that centralized bank sector is more prone to the SBC syndrome; thus all economies with this form of bank sector should be more cautious and pay more attention to this problem. From the analysis of

the U.S. bank sector it is obvious that the centralization of this sector increases through years to the form, in which is today. According to Herfindahl index and concentration ratio we can see that U.S. bank sector is not heavily centralized, despite fact that the five largest banks[8] owning almost 50% of all consolidated assets in the bank sector. On the other hand we are not allowed to consider the U.S. bank sector to be perfectly decentralized and because we know from Maskin and Xu (2001) that the SBC appearance is less present in the decentralized economies, we cannot reject the possibility that SBC is present in the U.S. economy.

This finding with respect to the results of mentioned models lays the groundwork for more investigation of SBC in the USA. Especially in the circumstances of today's world the results of this chapter should not be underestimated, because as was proved the U.S. economy can be prone to the SBC syndrome.

[8] The size is measured according to the consolidated assets.

6. Paternalism and profit maximizing behavior

6.1 Model of paternalism and profit maximizing behavior

The model, which we use in analysis of SBC syndrome in the bank sector, is modified version of Dewatripont-Maskin model by Qian and Roland (1993). In the former model agents do make decisions whether to propose their project to the center or not according to the softness of environment. The latter model from Qian and Roland (1993) does not use this assumption. Qian and Roland (1993) instead of previously mentioned process use process where all projects are proposed to the center and then agent's effort is exerted. So the main difference is that there is a new variable in the model - the agents "effort". The dynamics of the whole model are following – all projects are automatically proposed to the center, it is not important whether the project is poor or good, then all agents who propose poor project to the center have a possibility to exert effort, which guarantees them same return as from the good project ($R_g > 0$ and $B_g > 0$). On the other hand the agent who propose poor project and does not exert effort, will get zero return in the hard budget constraint environment. The reason why Qian a Roland integrate this assumption to the model is that according to them this model better describes moral hazard. It is not profitable for agents to exert any effort in the environment with SBC syndrome.

The other assumptions of Dewatripont-Maskin model hold, so we can describe this model of SBC syndrome.

Proposition of the model (1):

Let's $B_p > B_g$ and $L < R_p + B_p - 1$, then firms do have soft budget constraint and will exert low effort. And if following inequality holds $\alpha > \alpha^S = \frac{2-(R_p+B_p)}{(R_g+B_g)-(R_p+B_p)+1}$, then all projects will be financed but if following inequality holds, $\alpha < \alpha^S = \frac{2-(R_p+B_p)}{(R_g+B_g)-(R_p+B_p)+1}$ then no project will be financed. And

refinancing of poor projects ex-post is inefficient, if following inequality holds $R_p + B_p < 2$.

Model (1) describes situation, in which the motive of paternalisms is taken into consideration. This is obvious mainly from the fact that state takes the private benefit B_g and B_p into consideration when deciding whether to finance or refinance the projects. As it was mentioned above the paternalism as an incentive of SBC syndrome is usually found in the transitive economies, but it would be interesting to examine whether this incentive can be found even in the western economies and if so how important role it plays there. But paternalism is neither the necessary assumption of SBC nor the only incentive which creates SBC syndrome, so it is wise to examine other models of SBC syndrome in bank sector to have more complex view of discussed problem.

The next presented model - Model (2) points out that SBC syndrome is not just problem of socialistic and transitive countries but it can occur even in mature western economies where the providers of financial services are profit-maximizing banks.

Proposition of the model (2):

Let's $B_p > B_g$ a $L < R_p - 1$, then firms have soft budget constraint and exert low effort. All projects will be financed by banks, if following inequality holds $\alpha > \alpha^B = \frac{2 - R_p}{(R_g - R_p) + 1}$. And financing of poor projects is not efficient for banks, if following inequality holds $R_p < 2$.

From the inequalities described in the Model (2), it is obvious that if the inequality $L + 1 < R_p$ holds for firms, then when banks do decide what to do ex-post - whether to liquidate or refinance, the only efficient solution for them is to refinance the poor projects. When firms know that banks will ex-post refinance the poor projects, $B_p > B_g$. This implies that firms will exert no effort to improve their poor projects. So in the case that all poor

projects are ex-post refinanced the expected profit is equal to $\Pi_p = \alpha(R_g - 1) + (1-\alpha)(R_p - 2)$, from which we can derive that α must be higher than $\alpha > \alpha^B = \frac{2 - R_p}{(R_g - R_p) + 1}$, when we want the expected profit to be bigger than zero, $\Pi_p > 0$. The loss for banks from each poor project is then represented by $2 - R_p$.

These two models, that we analyzed, thoroughly describe system, which provides financial services to the firms. Now it is good time to return back to the model (1) and compare its outcomes with these obtained from model (2).

The visible difference between these models is the assumption of environment in which they are created. The model (1) represents environment where financial returns and private benefits are taken into account which is considered to be characteristic model for more socialistic tuned economies, but nowadays we must be aware that even in the mature western economies it is not just profit what determines the economy but more often it is intention of particular classes. Now it is obvious that model (2), which omits the private benefits, represents market environment, but as we said above even in the mature western economies the assumption of pure market environment can be extreme.

The comparison of these two models implies that decentralism of financial system, where the providers of financial resources are profit-maximizing private banks, improves the softness of budget constraint. We can see this fact from following inequalities $R_p - 1 < L < R_p + B_p - 1$, where the importance of the private benefits is obvious. But this recognition does not change the fact that when following inequality holds $L < R_p - 1$, then there is SBC syndrome even in the profit-maximizing environment.

6.2 The analysis of paternalism and profit maximizing behavior

Now we would like to apply these two models on reality, namely we focus on Czech Republic in years 1992 – 1999 and on USA in years 1992 -2008[9]. The reason why we chose these two states is that Czech Republic went through its own bailout period before the USA; hence it can be good case to compare with the USA. The reason why we chose USA as the second state is that we consider the American economy as one of the corner stones of the world economy. So when this corner stone is shifted the whole building is swaying. Nowadays all the world is going through financial crisis and the USA are one of the most affected by this crisis. And as the financial crisis deepens it is much more obvious that even the American economy will have to undergo some transition to be able to survive. So we would like to examine whether there are any significant patterns which could lead to the SBC syndrome in the USA. The Czech Republic data can serve us as benchmark case even though that we must be aware of different economic institutions with different behavior. We are aware of the fact that these two economies are completely different. The American economy is import oriented on the other hand Czech republic is export oriented, the size of these two economies is almost incomparable, American markets are much more liquid than Czech markets, the path dependency of institutions are completely different (Executive, Legislative and Judicial powers). But knowing that we want to focus on specific pattern of behavior which has already occurred in Czech Republic during the transition and try to decode similar patterns of behavior in the USA.

The model (1) we presented above is only extended model (2), which includes the incentive of paternalism, this implies that intervals of soft budget constraint in the model (1) are wider than the intervals of soft budget constraint in the model (2). Knowing that, we focus on analysis of model (2), in which harder budget constraint persists. Our assumption is that if we are able to prove the SBC syndrome exists in the model (2), than thanks to the paternalism integrated in the model (1) following inequality holds $R_p - 1 < R_p + B_p - 1$, which in other words means that the model (1) is located even in the environment with softer budget constraint than the model (2). The assumption of strong paternalism can be justified in the transition countries, where governments were not able to cut off government's ownership in many companies and banks, which led to uncontrolled financial supports. So the question is,

[9] For the year 2008 we have only statistical data for first three quarters of year.

whether this assumption can be justified even in the western countries. The partial answer can be found in the Kornai, Maskin, Roland, (2003), where they argue that similar behavior to the paternalism can be found even in mature western economies.

„A similar mentality as paternalism can be found in large corporate organizations consisting of any business units (big American conglomerates, Japanese *keiretsu* and *zaibatsu*, and Korean *jaebol* organizations). If one of the separate accounting units makes a loss, earnings from the profitable units are often reallocated to help out the loss-makers. That is, cross-subsidization serves as insurance against failure." (Kornai, Maskin, Roland, 2003:9)

The important property, which must not be overlooked, is that if state or banks would declare that they will not refinance bad project, the only possible solution for firms will be to exert effort because $B_g > 0$.

But now let us return to the model (2) where we focus on the inequality $L < R_p - 1$, where letter L>0, represents the market value of the liquidated assets. It can be also describe as certain guarantee for banks in the case when firms are not able to fulfill their obligations. There are many reasons why this guarantee can be considered by banks as an insufficient, which from the following inequality $L < R_p - 1$ leads to the SBC syndrome. The value of this parameter is dependent on the following factors:

a) institution of private property,

b) liquidity of liquidated assets,

c) market of liquidated assets,

d) political influence ,

e) legislative power,

f) judicial power.

Kouba (2004), Vychodil (2004), Hanousek, Kočenda (2003)

To show important problem with the value of the collateral offered to the financial institutions, we modify the model from Qian and Roland (1993). This problem is mainly connected to investment companies, which engage in financial investing. The problem is that

the firm's value and partly the collateral, which is offered to the financial institutions, are mostly in the form of value of the shares the firms have already invested into. The similar issue arises with asset backed securities, whose value is mostly determined by the underlying assets. This may be found problematic especially in the times, where there is turmoil on financial markets. For such a case can be even considered situation when capital market is drawn more by the expectations of its participants, than by the true firms´ performance.

The value of the firm and its collateral can dramatically decrease from day to day in these times, which can influence the initial intentions of the financial institutions.

Let's imagine that bank provided one unit of capital to the financial investment company and that:

(31) $$L > R_p - 1.$$

This means that in the case that the project is poor; bank prefers to terminate the projects rather than refinance. We know that the value of the financial investment company and its collateral to the bank is mainly created by the value of the investments, which the firm has already done. In the case when capital markets works well, this means that it reveals the true values of the listed firms according to their performance everything is alright and in the case of the poor project, bank will terminate the project. But now we assume that there is a panic on the capital market and the market is not fully drawn by the performance of the listed firms but it is rather drawn by the expectations. These expectations might be right, but more often happens that thanks to these expectations the prices of the shares oscillates in very wide interval.

Due to this panic the value of the collateral decreases, this causes that:

(32) $$L < R_p - 1.$$

This implies that bank will rather refinance the project than terminate it. Another incentive for bank to refinance the project can be the further negative development of the collateral relatively to the firm's assets. In this case the bank is aware of the fact that the value of the collateral sharply fell down and that the assets´ future perspective is pessimistic, which makes the collateral in the eyes of the potential buyers illiquid and useless. The assumption that the collateral will be useless and illiquid is extreme, but we must be aware of the fact during problematic times, only few investors are willing to invest into risky assets and these investments are usually made with significant discounts. This forces the bank to

make the only possible option – refinance. Another issue emerges with this problem - the bank's reluctance to invest into the firm's, whose assets could undergo similar process we described above. But this can lead to the situation known as "credit crunch". We will focus on this specific situation in the following chapters.

This simple model shows the importance of the parameter L in the SBC syndrome.

Another important parameter in the model is a parameter α, which represents the ratio of good projects to all projects. It is obvious that the lower the value of α is, the higher are the losses from inefficiency of SBC syndrome.

Table 2: The Rate of Charge-offs and Delinquencies in Czech Republic[10]

Year	Charge-off and Delinquency rates on loans and leases at Commercial banks in Czech Republic
1992	19,00
1993	24,00
1994	38,00
1995	33,40
1996	28,21
1997	26,95
1998	26,67
1999	32,09

Source: Výroční zpráva ČNB z roku 1998 a 1999, Jonáš (1997).

[10]These charge-offs and delinquencies were provided to clients, managements of companies and banks. The figures are computed for banks with valid license 31.12.1999 taking into account foreign branches of these banks. The figures do not depict the work of Konsolidační banka.

Table 3: The Rate of Charge-offs and Delinquencies in the USA

Charge-offs and delinquencies of all commercial banks in the USA				
Year	Annual Charge-off Rates[11]	Annual Delinquency Rates[12]	Net Charge-offs	Delinquencies
1992	1,300	5,230	6570	105870
1993	0,855	3,968	4389	82061
1994	0,513	2,780	2816	62204
1995	0,493	2,483	3055	62131
1996	0,585	2,405	3898	65015
1997	0,635	2,270	4531	64825
1998	0,650	2,188	4974	67576
1999	0,603	2,133	4938	70750
2000	0,658	2,180	5994	80075
2001	0,943	2,613	9023	99450
2002	1,073	2,690	10468	105893
2003	0,858	2,328	8965	98442
2004	0,595	1,795	6805	82874
2005	0,538	1,568	6786	80036
2006	0,415	1,573	5844	88928
2007	0,608	2,053	9424	128611
2008(Q3)	1,217	3,227	20099	216365

Source: Federal Reserve System

When we want to analyze the parameter α one possible way, how to do it, is analysis of banks credit policy in particular economy. The reason why we focus on the banks credit policy is that the number or value of bad loans can be considered as indicator of parameter α .

[11] Charge-off rates for any category of loan are defined as the flow of a bank's net charge-offs (gross charge-offs minus recoveries) during a year divided by the average level of its loans outstanding over that year.

[12] The delinquency rate for any loan category is the ratio of the dollar amount of a bank's delinquent loans in that category to the dollar amount of total loans outstanding in that category.

This is of course simplification, because all delinquencies cannot be considered as bad projects. In our case the bad loans are represented by net charge-offs and by delinquencies. Charge-offs are the value of loans and leases removed from the books and charged against loss reserves. Charge-off rates are annualized, net of recoveries. Delinquent loans and leases are those past due thirty days or more and still accruing interest as well as those in nonaccrual status.

We know that this assumption is of course substantial simplification of reality, because all bad loans cannot be considered as bad projects. But we can get around this problem with help from Maskin and Dewatripont (1995) who in their work argue that as a good projects can be consider those whose pay off is quick and those projects whose pay-off is paid later in the time can be considered as a poor projects. So with this recognition even the delinquencies can be considered as the bad loans.

Firstly we focus on the absolute value of ratio of bad loans and secondly we try to analyze its behavior in the time. From the previous two tables we can imagine how the credit policy in Czech Republic and the USA looks like. When we look at these two tables there is visible difference between the ratio of bad loans in Czech Republic and the USA. As bad loans are considered charge-offs and delinquencies for both states. The credit policy of Czech banks during the transition period was highly influenced by the political pressure; this led to the situation where a lot of these credits were in fact bad loans Švejnar (1993). Also the state ownership of the banks in the Czech Republic can play its significant role because we know that state ownership of banks decreases its efficiency La Porta, Lopez-deSilanes and Shleifer (2002) .The credit policy of American banks on the other hand can be considered as a prudent with highest ratios about 6% of bad loans. But the true extent of the bad loans in the bank sectors can be far greater, because for banks disclosure of all the bad assets is harmful.

„It is a well known characteristic of bank regulation and of bank crises that the true level of bad debt on banks' balance sheets is often learned only during the course of implementation of the policy chosen in response to the bad-debt problem. The level of bad debt is virtually always greater than the originally estimated levels.“ (Mitchell,1997;5)

Now when we know the approximate ratio of bad loans in particular bank sector, we can use this number as an approximation of $(1-\alpha)$. Then it is easy to find out the approximate value of parameter α and whether following inequality holds $\alpha > \alpha^B$. In the

case that $\alpha < \alpha^B$ the only solution will be that no credit will be provided. The reason why no credit will be provided is that provision of credit has negative returns.

But this fact is true only for the case without paternalism. In the case that we permit for the paternalism the inequality $\alpha < \alpha^B$ is not binding and we must fulfill another inequality $\alpha > \alpha^S$. So the credit can be provided despite the fact that $\alpha < \alpha^B$ but the inequality $\alpha > \alpha^S$ must be fulfilled. This case represents nice example of the fact that state interventions with good or bad intention only decrease economic efficiency.

As we promised above now we turn our attention to the behavior of bad loans through time.

To examine the growth of delinquency rates and charge-off rates we use data from 1985 to 2008. We use these data to create approximate appearance of their statistical distribution. Our main idea was to distinguish any possible abnormality from the growth of these two rates. To find these anomalies we use two similar methods. Because our chosen data are not normal, we cannot use the method of standard coefficient intervals, instead of this method we just estimate the percentiles from our distribution and compared them with our data. The similar method is used even with the moving average model. The first method utilizes the percentiles of our distribution. So the memory of the process can be considered as a long-term, taking into account even the oldest data. The second method we use is the moving average method. Here we take only a few previous data instead of all data. We can consider this process to have short-term memory. Both methods have its advantages and disadvantages; the long-term method does have the disadvantage of the classical average – the distortion of rare high values (outliers) which can overestimate or underestimate our whole distribution, on the other hand the advantage of this method is that it examines the whole time period, thus all economic cycles are taken into account, the advantage of short-term method is that, thanks to the fact that only a few data are chosen, our outlier problem can be easily solved; thus the problem with outliers is decreased only to the smaller part of our distribution[13], the biggest disadvantage of the short-term method is that it is really hard to decide how long your chosen time period should be, this is closely connected with the fact that the values of chosen time period are heavily[14] emphasized, which can lead to the fact, that our distribution can be distorted in both ways. The difference between the lengths of

[13] The fact that the outlier problem is decreased to the smaller area of our distribution also helps us to distinguish these outliers and when possible remove them from our distribution.

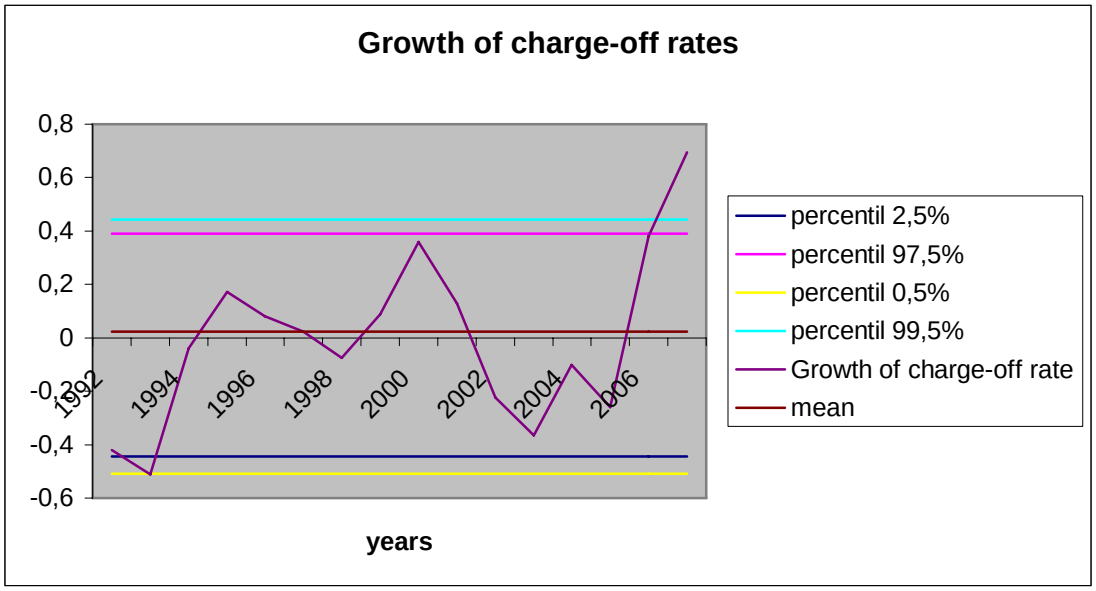
[14] The values of other than chosen data are equal to the zero, so in this case heavily means infinitely.

time period can be crucial, because the length of the time period depicts the economic cycle, thus longer than sufficient period distorts the distribution with useless data, on the other hand smaller than sufficient period is not able to correctly describe the economic reality Baltagi (2008).

The first reason why we decided to use both methods was, that we want to overcome previously mentioned disadvantages, the second reason was that we would like to examine whether these two methods will have similar results or will differ.

When we look at the "Growth of charge-off rates" in the USA during the years 1993 – 2008, the graph tells us that the curve is within the 0,05% percentile and 99,5% percentile almost through the whole chosen period represented by graph (7).

Graph 7: The Growth of Charge-off rate in the USA

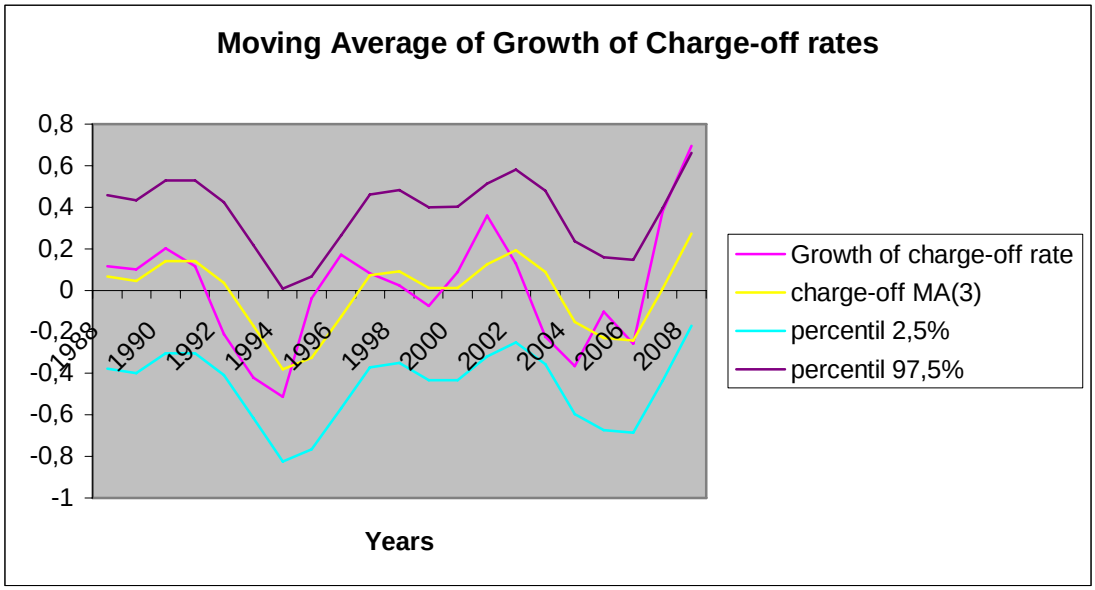


Source: computed from Federal Reserve System data

There are only two exceptions, where the curve touches or crosses the percentiles, the first case is in the second quarter of the year 1993, where the curve touches the 0,05% percentile and in the second quarter of the year 2007, where the steep increase of the "Growth of charge-off rates", which begins in the forth quarter of the year 2006, crosses the 99,5% percentile. When we use the 2,5% and 97,5% percentiles the differences are almost insignificant, if we omit the fact that the curve gets over the 2,5% percentile from the second quarter of the year 1993 to the forth quarter of the year 1994, which is not so important for our analysis, then the only difference is that the curve crosses the 97,5% percentile in the first quarter of the year 2007 instead of the second quarter of the year 2007.

The graph (8), in which we can see the results of the moving average method, brings similar results as the previous graph. The curve of the moving average stays within the intervals created by the 2,5% percentile and 97,5% percentile except only one case, when in the first quarter of the year 2008 the curve crosses the 97,5% percentile.

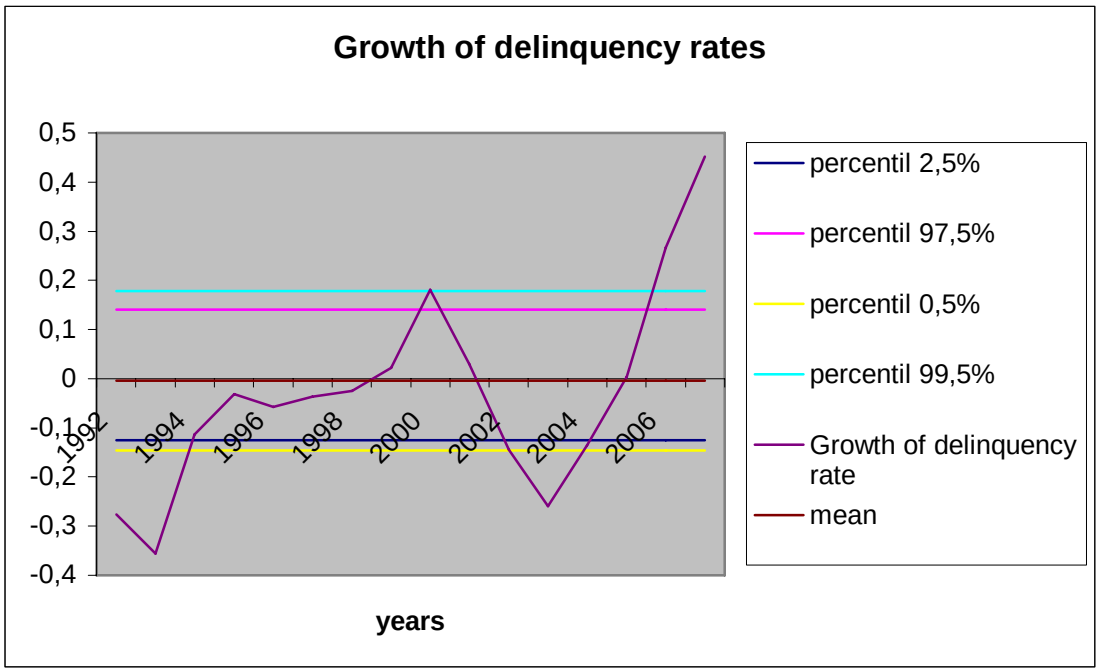
Graph 8: Moving Average of Growth of Charge-off rates



Source: computed from Federal Reserve System data

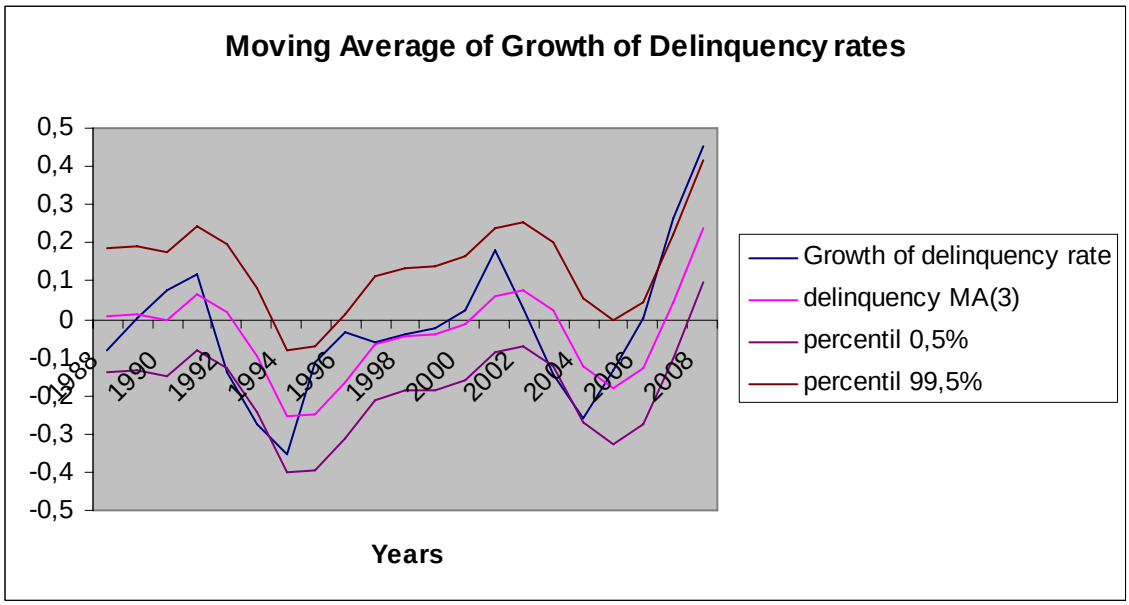
Now we would like to examine the behavior of the curve of the „Growth of delinquency rates“ depicted in the graph (9). The difference between the growth of delinquency rates and the growth of charge-off rates is apparent from the graphs. As was mentioned above, the curve of the „growth of charge-off rate“ stays almost all the time within the chosen boundaries. On the other hand the curve of the „growth of delinquency rate“ touches and crosses even the 0,5% and the 99,5% percentiles lines. Again we can see that the steep increase of the delinquencies began in the third quarter of the year 2006, this increase crosses the 97,5% and 99,5% percentile in the first quarter and second quarter of the year 2007 respectively.

Graph 9: Growth of delinquency rates



Source: computed from Federal Reserve System data

Graph 10: The Growth of Delinquency rates in the USA



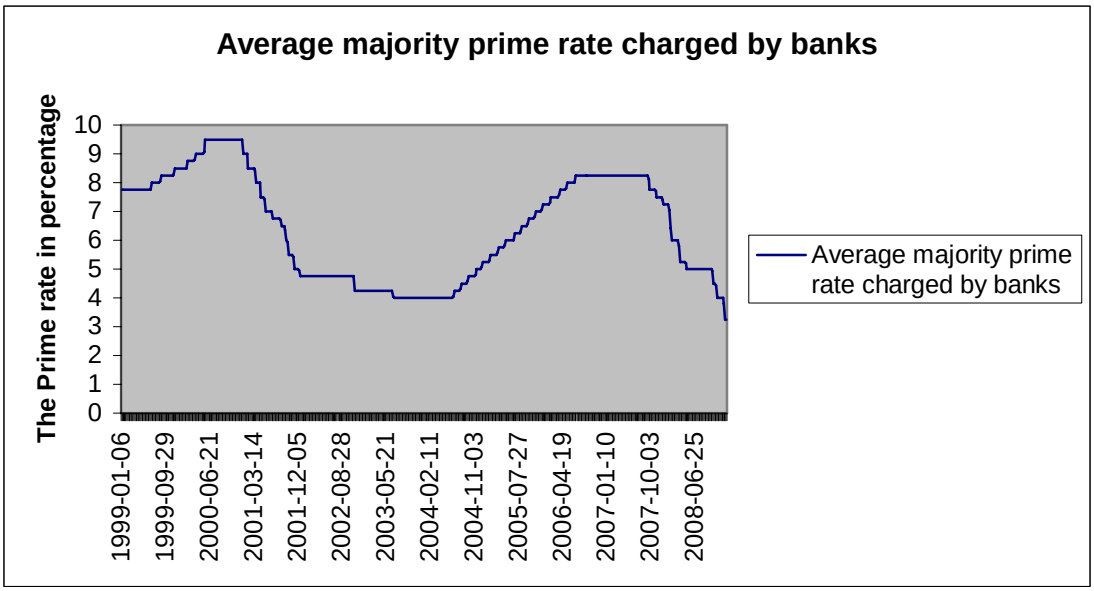
Source: computed from Federal Reserve System data

When we use the moving average method, the results are not as clear as in the previous case but still we can see that the curve crosses our predetermined boundaries. Again we can find significant increase of the delinquencies in the first quarter of the year 2007. So

the both methods confirmed that the growth of delinquency rates in the year 2007 is significant and thus should be consider as serious problem.

The reason why we made this research was to empirically confirm that the steep growth of bad loans during the last two years should be considered as abnormal. To summarize our analysis of the delinquencies and charge-offs both methods discovered that there is significant increase of the charge-offs and delinquencies from the year 2007 to the third quarter of the year 2008. Even though the amount of bad loans in the U.S. bank sector compared to other economies, where the presence of the SBC syndrome was proved, is small, the steep increase of bad loans should be recognized as a problem. As we said in the beginning of this work the SBC is dynamic problem, which is heavily based on the expectation of the market participants. We must be aware of the fact that when financial institutions do commit to termite bad projects and their intention is clear to the market participants the growth of bad loans should decrease. The conclusion of our assumption is quite contrary to the results we achieved in our analysis. This forces us to think on other possibilities, which could lead to this steep increase of the bad loans. One of the most reasonable solutions to this issue can be the development of the interest rate. The low interest rate can spur borrowing, which can increase the amount of bad loans. Even though we think that this process may be the solution to our problem, we must realize that we analyzed the delinquency and charge-off rates and these rates represents the ratio of the amount of delinquencies and charge-offs during particular time period to the total amount of outstanding loans in the same time period, hence with the higher number of loans there should proportional increase of the bad loans, which implies that the rates should be constant. Moreover when we look at the development of the Average prime rate charged by U.S. banks, there is no sign of low rate during the problematic years.

Graph 11: Average majority prime rate charged by U.S. banks



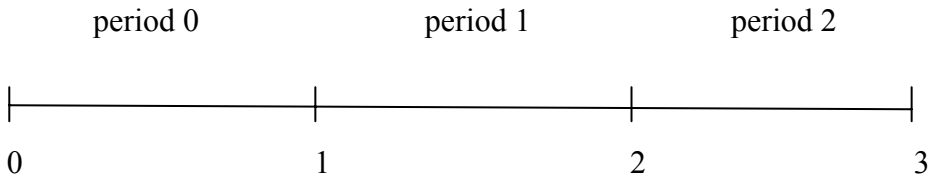
Source: computed from Federal Reserve System data

If we look at it statistically, there must be particular reason why entrepreneurs and managers propose proportionally more poor projects. Taken into consideration the conclusions of the previous chapters we argue that entrepreneurs and managers do propose more poor project because it is profitable for them. But the only situation, in which proposing poor projects can be profitable for the agents, is a situation, in which these poor projects are refinanced. So the reason, why we witness the steep increase of the bad loans, can be accounted for the agents' expectation of the environment. These findings should not be underestimated, because we have already found possible incentives of SBC in U.S. economy. However we are aware of the fact that the steep increase of the bad loans is not caused only by the SBC syndrome and that the beginning and the outbreak of the financial crisis play for sure important role in it.

6.4 „Credit crunch“

In this chapter we focus on the model presented by Qian and Roland (1993). The first part of this chapter clarifies the relationship between projects, which are in the progress, and the new projects and the second part focuses on the situation called “credit crunch”. The importance of this model is that phenomenon of credit crunch was originally considered to be a consequence of the hardening of soft budget constraint. But this model provides different view on this issue.

The difference against the basic model (1) is that we add one new time period. It is time period 0.



The dynamics of the model are following:

a) banks finance particular number of project in the beginning of the time period 0,

b) firms, which have proposed the poor project to the bank, can use the whole period 0 in order to decide whether they restructure their projects. This process is based on the firms’ expectations about refinancing.

c) Banks have to decide whether they will refinance poor projects from period 0 or they will choose to finance new projects.

One of the important assumptions is that there are more new projects than amount of the financial resources needed for their funding, which in other words means that the demand is perfectly elastic. Another important assumption regarding the new projects is that the number of good projects proposed in period 1 can differ from the number of good projects proposed in the period 0. Let’s assume that β is the ratio of good projects in the period 1,

then the following equality must not be satisfied $\alpha = \beta$. The process for the new projects financed in the period 1 is the same as for the projects financed in the period 0 except the fact that in the period 2 there are no new projects. Thus banks only decide whether to refinance or terminate the poor projects from the period 1, using the money they earned from the projects funded in the period 0.

We assume that $2 > R_p > 1$, which implies that return from refinancing is higher than the cost of refinancing but it is lower than all costs funded into the project. This assumption underlines the fact that even though for banks refinancing ex-ante is inefficient, the refinancing ex-post is profitable. This finding is expected by the representatives of the firms, who know that banks are willing to refinance their poor projects and hence they do not exert effort to restructure their projects. The profit of the new projects is defined as:

$$\Pi^1 = \beta(R_g - 1) + (1-\beta)(R_p - 2). \tag{33}$$

In the beginning of the period 1, banks can decide whether they will refinance old projects or rather finance new projects. When they choose to refinance the old poor projects the profit is $\Pi^0_{ref} = (R_p - 1)$ and when they choose to invest into new projects the profit is $\Pi^1 = \beta(R_g - 1) + (1-\beta)(R_p - 2)$. The banks decision has influence on the firms´ future expectation and thus when banks decide to invest all their earned money to new projects, for firms is profitable to restructure their projects as long as $B_g > 0$. On the other if we assume that $B_p > B_g$ and firms expect financial help from banks, then there will be no reason for restructuring. This is the case when banks select the refinancing of poor projects rather than investing into new projects.

Proposition 1 of the model (4)

Let the parameter α is determined and we know that $2 > R_p > 1$, then firms have HBC in the period 1 if $\Pi^1 = \beta(R_g - 1) + (1-\beta)(R_p - 2) > (R_p - 1) = \Pi^0_{ref}$. This implies that for parameter β the following inequality must hold true $\beta > \dfrac{1}{(R_g - R_p + 1)} \equiv \hat{\beta}$. On the other hand if $\beta < \dfrac{1}{(R_g - R_p + 1)} \equiv \hat{\beta}$, then firms do have SBC in the period 1.

We know that for function $\hat{\beta}$ the following property is true:

(34) $$\frac{\delta\hat{\beta}}{\delta(R_g - R_p)} = \frac{-1}{(R_g - R_p + 1)^2} < 0 .$$

The previous property is very important, because it states that the bigger is the difference between the return of good and poor project $(R_g - R_p)$, the lower is the probability of SBC. Another important point, which should not be overlooked, is that higher β decreases the probability of SBC in the period 1.

The importance of this model is that it offers insight into another problem, which is usually seen as a contrary to the SBC. This issue is called "credit crunch". Initially the credit crunch was described as the consequence of hardening of budget constraint; this can be the case, which is described in Berglof and Roland (1998), where banks creates reserves, which decrease the amount of financial resources for investing into projects. Due to these models many economists do not suppose any positive relationship between SBC and credit crunch. But we would like to show that credit crunch can be caused even by the SBC, so it should not be only considered as the consequence of hardening budget constrain but it should be also considered as the consequence of the SBC.

Proposition 2 of the model (4)

If all assumptions of the model (4) are satisfied, we can state that fewer new projects will be funded if firms do have SBC.

The proof of this proposition comes from the fact that the profit in the HBC is equal to $(\beta R_g + (1-\beta)(R_p - 1))R_g - 1$ and in the SBC is equal to $(\beta R_g + (1-\beta)(R_p - 1))(\alpha R_g - (1-\alpha)) + (1-\alpha)R_p - 1$. From these two profit functions we can see the available financial resources in the beginning of the period 1 for banks, which operate in the HBC and SBC. The financial resources for bank in the HBC are equal R_g and for bank in the SBC are equal to $(\alpha R_g - (1-\alpha))$. For these financial resources the following is true:

(35) $$(\alpha R_g - (1-\alpha)) < R_g .$$

When we differentiate the $FR^{SBC} = (\alpha R_g - (1-\alpha))$ respect to parameter α we get:

(36) $$\frac{\delta FR^{SBC}}{\delta\alpha} = R_g + 1 > 0 ,$$

So with increasing α there is higher amount of financial resources, which can be used for funding of new projects.

Thus we can state that SBC through its influence on the parameter α decreases the financial resource needed for investing into new project, hence it creates credit crunch. This fact is very important because credit crunch was initially considered as a consequence of the hardening of the soft budget constraint Berglof and Roland (1998), but knowing that credit crunch can be caused by the SBC syndrome imposes question on the government support programs during credit crunches. Janda (2008) mentions the fact that the government credit support programs can run into problem when high degree of asymmetry between financial market participants is present. This recognition can be found very useful especially that nowadays the whole bank sector with the interbank market suffers from the credit crunch.

7. Possible solutions of financial crisis in bank sector

In the previous chapters we described the basics of the SBC syndrome and we pay special attention to the bank sector and its form. As we said above we find the bank sector the most vulnerable part of economy to SBC. Our findings showed that even the western mature economies should not underestimate the SBC syndrome. Moreover with today's complicated situation on the financial markets and with huge state interventions no country is safe and all economical and political decisions should bear in mind the SBC´s danger. And thus this chapter will focus on description of possible solutions to the increase of bad loans in the bank sector. The models presented in this chapter are based on Berglof and Roland (1995) we have only made slight distinctions from their work on page 79 regarding the proposition 3 and its consequences. We think that this chapter might be very interesting, because the question "how to get rid of bad loans from bank sectors" is a contemporary problem.

7.1 Government's bailout model

As in the previous chapters we begin with description of the basic model. The model is very similar to the Dewatripont – Maskin (1995) model, but there are few differences. There are n managers, one bank and a government. The interaction of these participants takes place in two time periods. The parameter α represents the proportion of good projects; hence parameter $(1-\alpha)$ represents the proportion of bad projects. However the net return of each poor project can be the same as the net return of good project in the case that firm exerts effort in the first period, but when no effort is exerted in that period the return of poor project is zero and private benefit equals to $B_p(>0)$. After the first period the financial institution has to decide whether to terminate the poor project or refinance. When the project is terminated the bank gets liquidation value $L(\geq 0)$ and zero private benefit on the other hand when the project is refinanced, investing another unit of capital to the project, the bank gets return $R_p(>0)$ and private benefit equals to $B_p(>0)$. We assume that the bank has all the bargaining power and that all the participants in the model are risk neutral; thus they

maximize the expected profit and we do not use any discounting. The biggest difference in this model is the presence of government. The government serves as a special financial institution, which helps bank in financial distress. Under the notion „financial mistress“ we have in mind problems with bad loans, liquidity and insolvency. Of course the main role of government is to take care about social welfare thus it maximizes expected returns and private benefits. When we speak about bank's financial distress, we have in mind high number of bad loans in their assets. The only help the government can arrange is the injection of new capital into the bank. We distinguish two types of this injection. The first type is recapitalization of bank; it is one-off support in period 0 without further help. The second type is classical bail-out, where bank gets financial support after the period 0. The letter C represents the amount of capital injected during recapitalization and the letter G represents the amount of capital injected during bail-out. The capital injected to the bank brings other costs to the government, these costs are defined as $\lambda(C)$ and $\lambda(G)$. These costs are created by the inefficiency of the government interventions (dead weight lost). We assume that:

(37) $$\lambda(0) = 0 \wedge \lambda'(.) \geq 0 \wedge \lambda''(.) \geq 0$$

and that the cost of recapitalization $\lambda(C)$ in the period 0 and the cost of bailout $\lambda(G)$ in the period 1 are equal to $\lambda(C) + \lambda(G)$.

Before we get to the main part of this model we have to present and describe important assumptions of the model. The first assumption is that the liquidation value $L(\geq 0)$ is set to the zero. So we assume that $L = 0$. The second assumption concerns the incentives of the managers to exert effort:

(38) $$2B_g > B_p > B_g > 0.$$

The inequalities tell us that managers do exert effort only if the poor projects will be terminated.

The third assumption regards to the social efficiency of transforming the poor projects into good projects:

(39) $$2(R_g + B_g) > R_p + 2B_p - 1.$$

The fact that yield, from transformed project, is higher than the yield from the refinanced project, informs us that for managers exerting effort in the first period is socially

efficient. The fourth assumption deal with the profitability of refinancing poor projects ex-post:

(40) $$R_p + B_p > 1 + L\,,$$

this tells us that refinancing poor projects ex-post is socially efficient. The value of parameter L is set to the zero thus the inequality has the following form: $R_p + B_p > 1$.

From the equation (38) and (39) we again can see that when financial institutions are able to publicly commit not to refinance poor projects ex-post, then the only profitable possibility for firms would be exerting effort, which would guarantee hard budget constraint, and this situation is socially more efficient than SBC.

The fifth and very important assumption concerns the efficiency of refinancing the poor project ex-post for banks. We assume that:

(41) $$R_p \leq 1.$$

This informs us that refinancing ex-post is inefficient. This assumption can be seen as a contrary with the classical view of the SBC syndrome, which is built on the different willingness to invest into the project ex-post and ex-ante. The difference is that in this model the SBC is not directly caused by the refinancing of poor projects ex-post, but it is caused by banks effort to get the financial support from state. The dynamics of the process are following:

1) managers of the firms propose good and poor projects for financing,
2) banks do expect that government will provide them financial help in the case of need,
3) banks decide to refinance the poor projects, for which efforts have not been exerted,
4) the banks decision to refinance the poor projects for which efforts have not been exerted, causes the lack of liquidity in the banks,
5) government provides financial support to these banks, in order to prevent banks from further problems.

We must realize that banks have to expect that government will provide them financial support in the case of their financial distress; otherwise they would never refinance the poor projects, because it is inefficient for them.

The assumption of the model is that government provides just enough amount of capital G, which covers the lack of liquidity caused by the refinancing of poor projects for which efforts have not been exerted. This amount of capital is defined by:

(42) $$G = (1-\alpha)n - \alpha n R_g - (C-n),$$

where $(1-\alpha)n$ represents the bank's costs from refinancing, $\alpha n R_g$ represents the bank's return from good projects obtained in period 1 and $(C-n)$ represents the difference between capital injected to the bank in period 0 and capital already invested to the all projects in period 0.

The reasonable assumption is that bank refinances the poor projects if and only if it is profitable for it, or

(43) $$G \geq (1-\alpha)n(1-R_p),$$

this can be rewritten in the following form:

(44) $$G - (1-\alpha)n(1-R_p) \geq 0.$$

The $(1-\alpha)n(1-R_p)$ represents the net costs of refinancing to the bank.

Using all these assumptions then we can state:

Proposition (1): Let's the bank finance n projects then, whenever the inequality $G-(1-\alpha)n(1-R_p) \geq 0$ is satisfied, there is unique SBC equilibrium and whenever the inequality $G-(1-\alpha)n(1-R_p) < 0$ is satisfied, there is unique HBC equilibrium.

Using the fact that $R_p \leq 1$ together with $G-(1-\alpha)n(1-R_p) < 0$ implies that for banks refinancing is not efficient without or even with government bailout. Given that $2B_g > B_p$ managers would rather exert effort than to slack, which guarantees HBC. On the other hand when $G-(1-\alpha)n(1-R_p) \geq 0$, for banks refinancing is profitable and together with $R_p + B_p > 1 + L$ and $B_p > B_g$ it is obvious that mangers would rather exert low effort than high effort, which implies creation of the SBC.

7.2 Recapitalization of banks

In this chapter we will continue in describing the influence of the government financial help on the SBC syndrome. We will focus on the recapitalization of bank as one of the possible solutions to the problematic bank's situation. The model used in this chapter is based on the model presented in the chapter 6.1.

We define recapitalization as a one-off financial support in period 0. We must realize that the word "one-off " is very important in our analysis. From the previous chapter we know that the amount of capital provided by government in the period 0 influences the bank's incentives to ask for bailout $G = (1-\alpha)n - \alpha n R_g - (C-n)$.

We know that:

(45) $$\frac{\delta G}{\delta C} = -1 < 0 .$$

This recognition together with $G - (1-\alpha)n(1-R_p) \geq 0$, tells us that the higher the amount of capital at time 0 is used the lower is the probability that bank will ask for bailout.

To analyze the approximate influence of the recapitalization on the SBC and HBC, we need to compare the social profits under both possibilities.

We get under HBC:

(46) $$2C(R_g + B_g) - C - \lambda(C) .$$

And under SBC we get:

(47) $$C\left[2\alpha R_g - (1-\alpha)(1-R_p)\right] + G + C\left[2\alpha B_g + 2(1-\alpha)B_p\right] - (G+C) - \lambda(C) - \lambda(G) .$$

When we subtract the (47) from (46) we get the gain from obtaining HBC. This efficiency of HBC can be written as:

(48) $$(1-\alpha)C\left[(2R_g + 1 - R_p) - 2(B_p - B_g)\right] + \lambda(G) .$$

The $(1-\alpha)C(2R_g+1-R_p)$ represents the efficiency gain from HBC and $(1-\alpha)C2(B_p-B_g)$ represents the cost of exerting effort and finally the $\lambda(G)$ represents the dead weight loss, which would be lose if the government bailed-out the firms.

The problem is that we still do not know whether this efficiency is positive, whether:

(49) $$(1-\alpha)C\left[(2R_g+1-R_p)-2(B_p-B_g)\right]+\lambda(G)>0\ .$$

To find it out it is sufficient to compare the efficiency gain from HBC and the cost of exerting effort:

(50) $$(2R_g+1-R_p)-2(B_p-B_g)\geq 0,$$

from which we get:

(51) $$2R_g+2B_g\geq R_p+2B_p-1.$$

This inequality is satisfied by the third assumption; hence the efficiency from HBC is positive.

The problem of SBC is that even though the government would get more when commits to use HBC, there is still chance that the government will bailout the banks. This situation can happen when it is socially profitable to refinance ex-post the poor projects. The government is for refinancing of poor projects ex-post when:

(52) $$(1-\alpha)C(R_p+B_p-1)>\lambda(G).$$

Before we continue, we must add another important assumption. As we mentioned above there are only n projects to be financed and we assume that under SBC the following is true:

(53) $$\frac{d}{dn}\left[2\alpha R_g-(1-\alpha)(1-R_p)\right]+\left[2\alpha B_g+2(1-\alpha)B_p\right]\geq\lambda'(1-\alpha+\alpha R_g)+\lambda'(n)+1.$$

This implies that under SBC the government will always provide financial help for all n projects. Now we need to find out when there will be SBC and HBC. From the previous equations we know that banks do ask for help if and only if it is profitable for them $G-(1-\alpha)n(1-R_p)>0$. We know that $G=(1-\alpha)n-\alpha nR_g-(C-n)$, but in the case that all projects are financed by the recapitalization $(C=n)$, we have slightly modified version $G=(1-\alpha-\alpha R_g)n$. So from these definitions we get that:

(54) $$\alpha < \frac{R_p}{R_p + R_g} \equiv \alpha^{HBC}.$$

So when the $\alpha < \alpha^{HBC}$, then there is SBC equilibrium and for $\alpha > \alpha^{HBC}$ holds true that there is HBC equilibrium. This is summarized by the proposition 2.

Proposition (2): Let's (53) is satisfied and the injected capital at period 0 equals to n $(C = n)$, then there is unique SBC equilibrium whenever the inequality $\alpha < \frac{R_p}{R_p + R_g} \equiv \alpha^{HBC}$ is satisfied and whenever the inequality $\alpha > \frac{R_p}{R_p + R_g} \equiv \alpha^{HBC}$ is satisfied, there is unique HBC equilibrium.

The importance of the proposition 2 is that it again confirms the essential magnitude of the parameter α. Thus it is the value of bad loans in the banks´ assets, which determines whether the banks will ask for bailout, which results into SBC. The similar result is achieved by the model presented in the chapter 5.1.

Let's define the bank's profit function from refinancing:

(55) $$\Pi_{bank}^{ref.} = (1-\alpha)nR_p - \alpha nR_g .$$

The important property of this function is that $\frac{\delta \Pi_{bank}^{ref.}}{\delta \alpha} = -nR_p - nR_g < 0$. This recognition is very important for our analysis of U.S. bank sector in the chapter 5.2. We may suppose that the value of the parameter α in U.S. bank sector is quite high; the amount of bad loans in U.S. bank sector is low compare to other economies struggling with SBC, hence we could suppose that the problem of SBC in the USA is not relevant, that $\alpha^{USA} > \alpha^{HBC}$. However we argue that the current state of bad loans is overestimated and it is not as important as is the trend of growth of these bad loans. When we look at the profit function $\Pi_{bank}^{ref.}$ and its property, the increase of the bad loans, increases the profit from refinancing the poor projects, hence it increases the probability of SBC. The problem of current states of bad loans is that no one knows where the α^{HBC} for its own economy lies, even if we found for particular economy the optimal value of α^{HBC}, we cannot guarantee that this value is binding for other economies. We support the opinion that the value of α^{HBC} is for each state different. And without this value we can only compare the amount of bad loans in bank sector with the amount of bad loans in other bank sector, where the presence of the SBC syndrome was

confirmed, but we cannot safely confirm that we should not be afraid of the SBC syndrome. Because of these findings we state proposition 3.

Proposition (3): Let's all assumptions and conclusions of proposition 2 hold true, then for the hard budget constraint is more important the behavior of the growth of bad loans than the current state of bad loans.

The proof is quite simple, with the fact that we are not able to say whether we reached following inequalities $\alpha > \alpha^{HBC}$, $\alpha < \alpha^{HBC}$ we should suppose that there exists a positive probability that $\alpha > \alpha^{HBC}$ is not fulfilled and thus inequality $\alpha < \alpha^{HBC}$ will be satisfied. We must realize that this probability stays more or less the same in the case that the growth of bad loans oscillates evenly around particular state of bad loans without any huge increase or decrease. On the other hand when there is a huge increase or decrease of the growth of bad loans in the longer time period the probability rises or falls respectively. The conclusion is that for each economy the optimal strategy how to avoid SBC is not to allow for a long period of steep increase of its bad loans.

So far we have assumed that the value of the guarantee for the banks $L \geq 0$ is equal to the zero. When we leave our assumption the following happens:

$$G \geq (1-\alpha)n(1+L-R_p), \tag{56}$$

hence if we integrate $L > 0$ to our model then the profit function $\Pi_{bank}^{ref.}$ has following form:

$$\Pi_{bank}^{ref.} = (1-\alpha)nR_p - \alpha nR_g - (1-\alpha)nL, \tag{57}$$

where $\frac{\delta \Pi_{bank}^{ref.}}{\delta L} = -(1-\alpha) < 0$. This recognition stresses the importance of collateral. The higher is the offered collateral the lower is the profit from refinancing. The higher collateral decreases the value of the parameter α^{HBC}, hence it is easier to get $\alpha > \alpha^{HBC}$.

$$\alpha > \frac{R_p - L}{R_p + R_g - L} \equiv \alpha^{HBC}. \tag{58}$$

So as in the previous case with the parameter α we argue that the growth of the value of the parameter $L > 0$ is more relevant for SBC analysis than the current value of the parameter. The logic is more or less the same as in the previous case, the growth of L increases the probability that we satisfy $\alpha > \alpha^{HBC}$, hence it decreases the probability that we have $\alpha < \alpha^{HBC}$.

We made similar analysis of parameter L in the chapter 5.1. There were presented other circumstances, which can affect the value of this parameter and we thoroughly discussed the problem with the value of the collateral offered to the financial institutions from financial investment companies and its effect on the bank's decision making. Even though these problems with the value of collateral exist, we argue that the collateral plays very important role in the SBC syndrome and improving the areas of liquidated assets improves even the SBC.

7.3 Bank equity and reserves

In the previous chapter we talked about recapitalization as a possible cure. But as we have noticed recapitalization can be efficient only under specific condition. This condition unfortunately regards the proportion of bad loans in the bank's portfolio, which in the time of the financial crisis might be high. This forces us to think about different method of obtaining HBC. In this chapter we focus on one of these methods, which we can use when the results of conditional recapitalization are unclear. This method uses special reserves, which are set aside by bank from the initial recapitalization. We will show that the right amount of reserves kept in the bank can impose HBC.

In the previous chapter we assumed that bank uses all the injected capital $C = n$ for investing into projects. In this chapter we leave out this assumption, allowing bank to keep part of the injected capital as a reserve. This means that the new number of the projects funded by the bank is:

$$k = C - E, \tag{59}$$

where, E represents the reserves, which are kept by the bank. The primary reason, why bank saves this amount of capital, is to use it in the case of unexpected troubles in our case the troubles are represented by the poor projects, which need refinancing. Thus the change from the previous model is that the bank does not receive financial help from the government unless all the reserves are pumped-out. This assumption implies that:

$$G = (1 - \alpha - \alpha R_g)k - E\,. \tag{60}$$

Using the inequality $G - (1-\alpha)n(1-R_p) \geq 0$ we get that:

$$E = k\left[R_p - \alpha(R_g + R_p)\right], \tag{61}$$

this is the amount of reserves, which makes bank indifferent between refinancing and termination.

Using (59) we get that:

$$E = \frac{C\left[R_p - \alpha(R_g + R_p)\right]}{1 + \left[R_p - \alpha(R_g + R_p)\right]}. \tag{62}$$

The property of the function (62) is following:

$$\frac{\delta E}{\delta \alpha} < 0 \tag{63}$$

Now we can make the analysis of the amount of reserves. We know that bank, which operates in HBC chooses the $E = 0$, because $\alpha > \frac{R_p}{R_p + R_g} \equiv \alpha^{HBC}$. On the other hand when the $\alpha < \frac{R_p}{R_p + R_g} \equiv \alpha^{HBC}$ is satisfied, we can use the property (63) to state that with higher parameter α banks need lower amount of reserves and vice versa. This implies that the quality of the bank's portfolio affects the amount of money, which the bank must set aside in order to guarantee HBC. It is obvious that with higher number of bad loans more money is required, which decreases the financial resources for new projects. Thus the cost of having HBC is that less projects can be financed, which can lead even up to "credit crunch".

Now we need to find out whether for bank is profitable to have HBC or SBC. For this purpose we need to define profit functions under each regime:

$$\Pi^{SBC} = -C + \left[\alpha R_g + (1-\alpha)R_p)\right]k \tag{64}$$

is the profit function for SBC and:

$$\Pi^{HBC} = (C - E)(2R_g - 1) \tag{65}$$

is the profit function for HBC.

The properties of these functions are following:

$$\frac{\delta \Pi^{SBC}}{\delta E} < 0 \text{ and } \frac{\delta \Pi^{HBC}}{\delta E} < 0. \tag{66}$$

This mean that for bank operating under the SBC is optimal to set $E = 0$ and for bank

operating under the HBC is optimal level of reserves set by equation (62), any increase of E would only decrease profit function Π^{HBC}.

So far we found the optimal level of E in both regimes, but now we should compare these profits to find out, which regime will be preferred by bank.

Our assumption is that for bank is more profitable to have HBC, so we get:

$$\Pi^{HBC} = (C-E)(2R_g - 1) > \left[\alpha R_g + (1-\alpha)R_p) - 1\right]C = \Pi^{SBC} \quad , \tag{67}$$

where $\alpha R_g + (1-\alpha)R_p) - 1 > 0 \quad \text{for} \, \alpha > \frac{1-R_p}{R_g - R_p}$, which is lower than $\alpha^{HBC} = \frac{R_p}{R_p + R_g}$ if $R_g > \frac{R_p}{1+2R_p}$.

The equation (67) we can modify to the following form:

$$R_g > \frac{(1-\alpha)R_p^2 - \frac{\alpha^2}{(1-\alpha)}R_g^2}{2} \quad , \tag{68}$$

where the fact that inequality holds true can be easily verified.

Proposition (4): The bank always chooses the HBC regime for any C given unconditionally by the government, this decreases the number of projects financed to $k(\alpha) = C(1 - R_p + \alpha(R_p + R_g)$.

We know that the function $k(\alpha)$ has following property $\frac{\delta k(\alpha)}{\delta \alpha} > 0$, which implies that with higher number of good projects (with better portfolio) the costs of having HBC are lower.

So far we have examined the decision making of the banks but now we focus on the government and its incentives to maintain HBC. We know that for the government when using the recapitalization contingent on some particular number of projects the potential threat is emergence of the SBC. On the other hand when the government uses unconditional recapitalization the potential threat is emergence of credit crunch for firms.

We begin with the unconditional recapitalization; using the fact that the whole amount of capital C is used for financing. Then for the government under HBC the profit is:

(69) $$\Pi_{Gov.}^{HBC} = (C-E)\left[2(R_g + B_g) - 1\right] - \lambda(C).$$

Together with equation (48) and (60) we can get the total profit under HBC for conditional recapitalization, which can be written as:

(70) $$(1-\alpha)C\left[(2R_g + 1 - R_p) - 2(B_p - B_g)\right] + \lambda(G) - E\left[2(R_g + B_g) - 1\right].$$

We know that for bank under SBC the total profit can be written as:

(71) $$(1-\alpha)C\left[(2R_g + 1 - R_p) - 2(B_p - B_g)\right] + \lambda(G).$$

With the help of (62) we can get that (70) is positive if and only if:

(72) $$(1-\alpha)\left[(2R_g + 1 - R_p) - 2(B_p - B_g)\right] + \lambda(G) > \frac{\left[R_p - \alpha(R_g + R_p)\right]}{1 + \left[R_p - \alpha(R_g + R_p)\right]} 2(R_g + R_p) - 1.$$

The problem is that this inequality is not satisfied if $\alpha = 0$, $\lambda(G)$ is not too large and B_p is sufficiently large. So we differentiate the (72) respect to parameter α in order to have better view on the behavior of each side of the inequality.

The derivative of the left side has following form:

(73) $$\frac{\delta(1-\alpha)C\left[(2R_g + 1 - R_p) - 2(B_p - B_g)\right] + \lambda(G)}{\delta\alpha} = -\left[(2R_g + 1 - R_p) - 2(B_p - B_g)\right],$$

this is for sufficiently big B_p small. The derivative of the right side has following form:

(74) $$\frac{\delta \dfrac{\left[R_p - \alpha(R_g + R_p)\right]}{1 + \left[R_p - \alpha(R_g + R_p)\right]} 2(R_g + R_p) - 1}{\delta\alpha} = -\frac{\left[2(R_g + B_g) - 1\right](R_g + R_p)}{\left[1 + \left[R_p - \alpha(R_g + R_p)\right]\right]^2},$$

which will decrease more rapidly than (73) with higher parameter α. Thus there is certain level of parameter α^* from which under specific conditions the inequality is satisfied. But the conclusion is that for the government the costs of HBC (credit crunch) can excess the revenues from it.

Now we turn to the model with conditional recapitalization, in which the government provides capital for particular number of projects. In our case the number of the projects equal to n. But the government must provide another amount of capital $E = n\left[R_p - \alpha(R_p + R_g)\right]$ in order to maintain the HBC. So we know that under HBC the total

capital injected to the bank is equal to $C = n(1 + R_p - \alpha(R_p + R_g)$. Now we can calculate the total profit for the government under HBC, which can be written as:

(75) $$(1-\alpha)n\left[(2R_g + 1 - R_p) - 2(B_p - B_g)\right] + \lambda(G(n)) - \left[\lambda(n+E) - \lambda(n)\right].$$

We can see that when the cost $\left[\lambda(n+E) - \lambda(n)\right] - \lambda(G(n))$ are sufficiently high and the function $\lambda''(.) > 0$ is enough convex then the costs may overwhelm the revenues. As we can see the results in both cases are ambiguous, which leaves us with problem.

This issue can be solved by search for the optimal amount of capital C under HBC. To find the optimal value we need to differentiate the profit function and find the optimal C, for which the marginal benefit equals to marginal cost. This can be written as:

(76) $$\frac{\delta \Pi_{Gov.}^{HBC}}{\delta C} = 2(R_g + B_g) - 1 - \lambda'(C(k*)) = 0,$$

where $C(k^*) = k^*(1 + R_p - \alpha(R_p + R_g)$.

Proposition (5): The injected capital C is always greater than n under HBC equilibrium. The HBC equilibrium is obtained if the following inequality is satisfied

$$(1-\alpha)n\left[(2R_g + 1 - R_p) - 2(B_p - B_g)\right] - (n - k^*)\left[2(R_g + B_g) - 1\right] > \lambda(C(k^*)) - \lambda(G(n)) - \lambda(n).$$

The inequality in the proposition 5 implicitly describes the gains and the cost of the HBC. The left-hand side of the inequality represents the gain from having HBC minus the opportunity costs, which are represented by the smaller number of financed projects k^*. The right-hand side of the inequality represents the costs of using more capital then under SBC. Generally we can say that the government has to inject to the bank more capital in order to obtain HBC, this amount of money compensates the credit crunch created by the bank's reserves. As we can see the shape of the cost function $\lambda(.)$ plays important role, because with high convexity the $C(k^*)$ have to be small in order to satisfy the inequality in proposition 5, which decreases the number of funded projects; thus it increases the credit crunch and the costs of having HBC. The conclusion of this chapter is that, when banks use reserves in order to strengthen the budget constraint, the total costs, regarding all the capital injected into the bank sector, are very high.

7.4 Screening and monitoring

In this chapter we describe other ways of obtaining HBC. The attention will be paid on the monitoring and screening functions of bank. We assume that bank can uses some of its capital to increase the ability to distinguish between the good and poor projects[15] before they are financed or increase the exerted effort of firms with poor project in the first period[16]. These both functions increase the parameter α but under the cost, which are represented by the cost function $\psi(\alpha' - \alpha)$, where $\alpha' - \alpha$ denotes the rise in the quality of the portfolio. The properties of the cost functions are following:

(77) $$\psi(0) = 0 \wedge \psi'(.) > 0 \wedge \psi''(.) > 0 .$$

From the previous chapters we know that $\alpha \geq \frac{R_p}{R_p + R_g} \equiv \alpha^{HBC}$ in order to deter bank from asking for bailout. The needed value of the parameter α can be achieved at the cost of $\psi(\alpha^{HBC} - \alpha)$. The advantage of monitoring is that monitoring can be efficient even under SBC on the other we know that $E = 0$ under SBC. The profit function, where the costs of monitoring are input can be written as:

(78) $$\Pi^{SBC} = -C + \alpha(\psi)(C - \psi)R_g + (1 - \alpha(\psi))(C - \psi)R_p .$$

To find the optimal value of α we need to differentiate the profit function respect to ψ and put it equal to zero $\frac{\delta \Pi^{SBC}}{\delta \psi} = 0$, then we have:

(79) $$\frac{\delta \alpha}{\delta \psi}(C - \psi)(R_g - R_p) = \alpha R_g + (1 - \alpha)R_p .$$

The left-hand side describes the marginal revenue from monitoring and the right-hand side denotes the costs, which are represented by the projects, which cannot be financed due to the monitoring costs. From the fact that $\alpha < \alpha^{HBC}$ under SBC, the optimal α^{SBC}, which fulfills the equation (79), should also lie below α^{HBC}, if such α^{SBC} even exists.

Now we would like to continue on the previous chapter and compare the costs of obtaining the HBC by reserves and by monitoring. As we already know the costs of both of these ways are foregone projects. For monitoring the costs can be written as:

[15] This is screening function.
[16] This is monitoring function.

(80) $$\psi(\alpha' - \alpha)R_g .$$

And for setting aside particular amount of capital the costs can be written as:

(81) $$E(\alpha)(R_g - 1) .$$

Proposition (6): For a particular amount of capital C and particular value of α, the bank uses monitoring rather than reserves to obtain HBC if the following is satisfied $\psi(\alpha' - \alpha)R_g < E(\alpha)(R_g - 1)$.

The proof of the proposition is obvious from the fact that revenues under both methods are the same, so the only differences between them are the costs. As another difference may be considered the fact that E is not spent but it is kept in the bank.

Now we should describe the government's gain. We must realize that the optimal amount of capital injected into bank under HBC is defined by (76). Using (76) we state that it is more efficient to use monitoring rather than special reserves to secure HBC if:

(82) $$\psi(\alpha' - \alpha) < E(\alpha) .$$

As we can see there is a difference between the inequality used in the proposition (6) and the (82). The problem is that this difference can cause suboptimal solution to our task, which method to use. Because in the case that:

(83) $$E(\alpha)R_g > \psi(\alpha' - \alpha)R_g > E(\alpha)(R_g - 1) ,$$

the unconditional capitalization is suboptimal way but the method used on the bank's monitoring is optimal.

The government's net gain from using monitoring to obtain HBC is defined as:

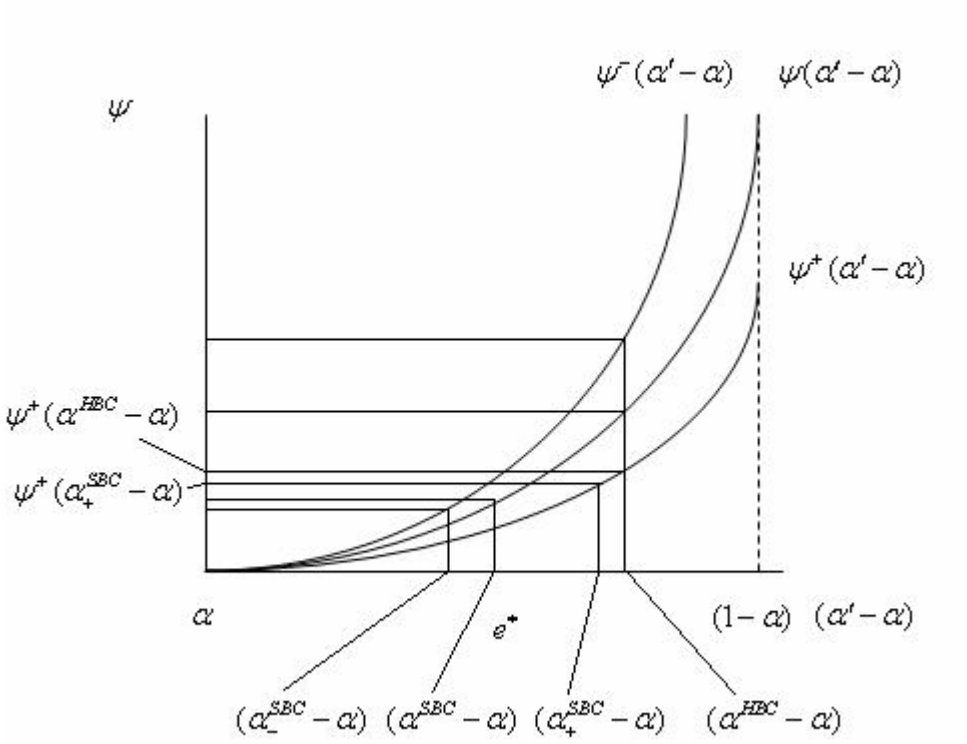
(84) $$k^{SBC}(1-\alpha^{SBC})\left[(2R_g + 1 - R_p) - 2(B_p - B_g)\right] - (k^{SBC} - k^{HBC})\left[2(R_g + B_g) - 1\right]$$

$$-(\psi^{HBC} - \psi^{SBC}) - \left[\lambda(C^{HBC}) - \lambda(C^{SBC}) - \lambda(B(k^{SBC})\right]$$

Now we need to analyze the (84). From (79) and (84) we know that with highly convex costs of monitoring, $\psi'(.)$ is very high, the number of financed projects k^{SBC} will be high and the α^{SBC} will not change a lot; thus the efficiency gain from the HBC will be very high but on the other hand also the costs will be very high so we cannot state that the pay-off will be positive. On the other hand when the costs of monitoring are not very convex, the

$\psi'(.)$ is low, the number of projects k^{SBC} will be lower and α^{SBC} will tend to α^{HBC}. The efficiency from HBC will then be positive, because $\alpha^{HBC} < 1$ and thus $(1-\alpha^{SBC})$ must be strictly positive, but the costs will approach to the zero, so the benefit from the HBC is positive. The scheme 6 depicts the importance of the shape of monitoring costs. The depicted cost functions satisfy all the properties imposed on the cost functions by Berglof-Roland (1998).

Scheme 6: The Monitoring Cost Functions



Source: Author

So we conclude that when costs of monitoring are less convex, the monitoring is optimal method for the government how to obtain HBC. We stressed the importance of the costs of monitoring and its shape in the chapter 4.3, where we argue that any increase of knowledge leads to better evaluating of projects, which hardens the budget constraint. The increase of the knowledge can be caused by the institutional change, technological change or as an international aid program. We especially have in mind the crucial influence of the capital market, which can significantly decrease the cost of information as described in Fama (1970).

7.5 The Hospital Agency

In this chapter we introduce model, which uses special organization to bailout banks. The importance of this model is obvious, because the similar method has been chosen in the USA as solution to the current financial crisis. We have in mind the Trouble Asset Relief Program (TARP). As we have proved in the previous chapters the issue is even more serious, because we have found some evidences indicating the proneness of the U.S. economy to the SBC.

This model is based on the fact that the government establishes the hospital agency, which accepts a proportion of (possibly all) bad loans. These bad loans are moved to the hospital agency at the end of the period 1. Then bank accepts the bailout for these bad loans. This whole process brings additional costs of establishing the hospital agency, which can be represented by T and the costs of bailout of all bad projects $(1-\alpha)n$. Using all the assumptions we would like to find out whether using the hospital agency solution is for the government less costly than previously mentioned bailout of banks. In the both cases the banks will be refinanced and hence there is no improvement of budget constraint. Then under the described conditions as the following proposition tells using the hospital agency is never optimal comparing to the classical bank bailouts.

Proposition (7): For any α, even for $T=0$, for the government is always more efficient to use the bank bailouts than the method using the hospital agency.

The reason is that for the government the net profit under a hospital agency solution is:

$$(85) \qquad n\alpha 2R_g + n\left[\alpha 2B_g + (1-\alpha)2B_p)\right] - n - \left[(1-\alpha)n+T\right] - \lambda(n) - \lambda\left[(1-\alpha)n+T\right].$$

Using the (82) we get that the net gain from using hospital agency solution is:

$$(86) \qquad \lambda(G) - \lambda\left[(1-\alpha)n+T\right] - n(1-\alpha)R_p - T\,.$$

Because we know that $G = n\left[(1-\alpha)-\alpha R_g\right]$ it is obvious that $n(1-\alpha)-n\alpha R_g < n(1-\alpha)+T$ and hence the (86) is negative even if $T=0$.

The conclusion is that for the government is less costly to use bank bailouts then a hospital agency solution, the reason is that when the former method is used the part $n\alpha R_g$ of the bailout is paid by the bank.

We modified previous assumptions and present similar model in Appendix. The difference is that in this model using a hospital agency solution can be more efficient than bailouts.

More interesting question is whether the government can harden the budget constraint using an agency hospital solution. As we can see when all bad loans are taken away from banks the there is no improvement of SBC. On the other hand when only part of these assets is taken away from bank's portfolio the result can be different. Let's define A the amount of the bad loans taken away. The amount of A must make banks reluctant to ask for the bailout and force the firms to exert high effort. This is satisfied if:

(87) $$G - n(1-\alpha) + n\alpha R_g + A = 0,$$

this gives us:

(88) $$\frac{A}{n} = R_p - \alpha(R_p + R_g).$$

The probability that poor project will be bailed out is $\frac{A}{(1-\alpha)n}$, thus the managers of the firms are willing to exert high effort only if:

(89) $$2B_g > B_p(1+p).$$

The properties of the probability function $p(\alpha)$ are following:

(90) $$\alpha = 0 \Rightarrow p(0) = R_p \text{ and } \frac{\delta p}{\delta \alpha} = -\frac{R_g}{(1-\alpha)^2} < 0 \text{ and } p(\alpha^{HBC}) = 0.$$

Proposition (8): If $\alpha > 1 - \frac{R_g}{1 + R_p + R_g - \frac{2B_g}{B_p}}$ then the HBC can be achieved by transferring the amount of $A = n\left[R_p - \alpha(R_p + R_g)\right]$ poor projects to the hospital agency. If $\alpha < 1 - \frac{R_g}{1 + R_p + R_g - \frac{2B_g}{B_p}}$ the government prefers bank bailouts instead of transferring of bad loans to the hospital agency. ¨

If $A > \left[R_p - \alpha(R_p + R_g) \right]$, this would increase the probability of firms being bailed out and when $A < \left[R_p - \alpha(R_p + R_g) \right]$, the banks would ask for bailout, because it is profitable for them. Thus the optimal value must be $A = n\left[R_p - \alpha(R_p + R_g) \right]$.

When $\alpha < 1 - \dfrac{R_g}{1 + R_p + R_g - \dfrac{2B_g}{B_p}}$ the inequality (89) is not satisfied, hence the firms will not exert high effort, this will lead into SBC and as we know under SBC a hospital agency solution is not optimal thus $A = 0$. On the other hand when $\alpha > 1 - \dfrac{R_g}{1 + R_p + R_g - \dfrac{2B_g}{B_p}}$ the inequality (89) is satisfied, hence the firms have HBC.

As we can see the whole model is based on the firm's expectation of being bailed out, which is described by the probability $p(\alpha)$. The lower is the probability $p(\alpha)$ the smaller is the chance of creation of SBC. It is also worth mentioning that with better portfolio (higher α) the probability $p(\alpha)$ decreases.

7.6 The analysis of the solutions

The reason why we pay special attention to this chapter is that during proceeding financial crisis almost all governments are trying to find the optimal method how to get rid of bad loans from banks´ portfolios and how to spur lending. From the previous chapters we also know that the U.S. economy can be prone to the SBC and especially the form of bank sector can add even more issues, hence the solution accepted by the U.S. government should take into account the possible consequences on the SBC syndrome, here we have in mind the incentives of banks to ask for further bailouts. This can be done by imposing HBC on the firms; generally the role of decentralization is seen as the key factor in the hardening of the SBC Maskin and Xu (2001). But the decentralization is a long-run period problem and we focused our attention to the solutions of current financial crisis. Thus we tried to describe the gains and the costs of each method described in previous chapters with special attention to the maintaining of the HBC. In this chapter we have mentioned the basic possibilities of

helping banks in financial distress. These are the capitalization, capitalization using special reserves, monitoring and screening and finally using a hospital agency.

As we could see the recapitalization of the bank can be optimal solution under specific condition. Unfortunately the condition, which has to be satisfied, regards the bank's portfolio health. The more bad loans the bank's portfolio has the higher is the chance that recapitalization would lead to further bailouts. Thus this solution should not be undertaken by the governments, where the parameter α is low.

When we think about recapitalization as a possible solution for the U.S. government, we must take into consideration the analysis of the U.S. bank sector, which we did in the chapter 3.2. The proportion of the bad loans in the U.S. bank sector is still low. However as we proved there is significant increase of the bad loans. Taking into account both these facts we argue that there is increasing probability that recapitalization of banks is not able to impose HBC on the U.S. firms thus if the recapitalization is used in the USA the government can expect future request for bailouts. This brings other costs not mentioning that it can deepen the current financial crisis. On the other hand the recapitalization could be good solution for the credit crunch, which we face on today's financial markets. According to Janda (2008) the government should use credit support programs to ease the economy during the period of the credit crunch. Janda (2008) also stresses that government support program can run into deficit in the case of asymmetric information between financial market participants, but also stresses that positive effects should overweight the negative effects of this program. The only problem is that the current state, where banks are afraid to provide financial resources, is more caused by the lack of credibility than by the lack of financial resources. Generally when we inject new capital to the banks it does not mean that this capital will be used for financing new projects moreover it can happen that banks rather hoard the money that invest them with unsure end.

When we are unsure about the consequences of the recapitalization we can use another method, which imposes the HBC through special reserves, which are set aside by bank. The problematic part of the previous method was that we are not able to say whether $\alpha > \frac{R_p}{R_p + R_g} \equiv \alpha^{HBC}$ or not. We can only observe the behavior of the parameter α and according to this behavior we can state that there is certain probability that we reached over

the line or not. When we realize this fact using the method, which is based on the fact that we precisely know whether $\alpha > \frac{R_p}{R_p + R_g} \equiv \alpha^{HBC}$ or not might be very costly. Thus from our point of view recapitalization should be used by the governments, where the proportion of bad loans is really low and for other governments we offer to use other methods, which can be the method with bank's reserves, monitoring and screening method or hospital agency method. The advantage of the bank's reserve method is that through these reserves bank is able to impose the HBC. But we must be aware of the fact that the financial resources, which are kept in the bank would be otherwise used to finance new project, hence this method can decrease the amount of financial resources provided to the firms. Moreover it can cause credit crunch. The second problem is that the government has to inject more capital to the banks during the initial recapitalization in order to decrease the credit crunch. Unfortunately the amount of capital used by the government is in this case higher than the amount of capital used for banks operating under the HBC. This implies that the costs of imposing HBC are high.

As we have mentioned above one of the problems of current crisis is reluctance of banks to provide financial resources. As we have described in the previous chapters there are two competing causes of this credit crunch. We can suppose that the current credit crunch is caused by the fact that banks are afraid of lending. This state is caused by lack of credibility between financial institutions. In this case, where banks do not lend money and instead of it they hoard the money, we can find out that this policy is quite similar to the bank's reserve method we described. So our conclusion is that banks implicitly use this method, but it is obvious that this method is not the right one even though it should impose the HBC. The second cause of the credit crunch can be the SBC syndrome itself, as we described it in the chapter 5.4. In this case the bank's effort to set aside part of the injected capital imposes the HBC. This should decrease the credit crunch caused by the SBC and we should stabilize the economy but with higher costs. Unfortunately as we have said there still will be some projects, which could not be financed. Thus this method should be used in the economies, where the credit crunch problem is on a high degree. Since the U.S. bank sector suffers more from the credit crunch caused by the lack of credibility using this method could only escalate the problems.

The problem of the bank's reserve method was its expensiveness for the society and the credit crunch, which can cause. Unfortunately the monitoring or screening method has

the similar cost as the previous method, regarding the foregone projects, but under specific conditions this problem can be mitigated. The advantage against the previous model is that this method can be cheaper for the society. The whole method is similar as in the previous case, where banks set aside particular amount of capital from the initial recapitalization, but in this model the amount of capital is not set aside but it is used for improvement of bank's monitoring and screening functions. This implies another difference against the previous model and this is the fact that the money, which is not used, for funding new projects, is spent so it is not kept as a reserve. Generally the whole method is dependant on the costs of monitoring. The less convex this cost function is the more efficient is this method. Thus this method should be used in the states, where the costs of information are low, because the advantage of this method is that even when it does not impose HBC the monitoring can increase the average yield for the whole society under the SBC. The only serious problem is that according our findings there are cases, where monitoring is socially efficient but for banks is inefficient, thus in this situation the government should persuade banks to use monitoring through its powers. We generally support this method even though there are some problematic parts, but we argue that monitoring and screening can impose the HBC under smaller costs than previous solutions and moreover the improvement of the monitoring and screening functions affects the behavior of firms ex-ante rather then ex-post.

If we want to apply this solution on the current situation in the USA, we face the same problems as with the bank's reserve method. The advantage of this method is that the less convex costs of monitoring decreases the magnitude of the credit crunch. So the government investments into improvement of information systems and the efforts to force banks to improve their monitoring and screening functions throughout its governing can significantly decrease the costs of monitoring, through it, it can mitigate the credit crunch. We must not forget the importance of the capital market in this issue, which significantly decreases the costs of information. Because of these all recognitions we think that application of this method is optimal for the U.S. economy. The U.S. capital market plus the legislative norms are able to inform all the market participants and significantly decrease the cost of monitoring. Thus the gain from imposing the HBC is higher than cost of credit crunch, which can be by right policy decreased almost to the zero. So as we can see this problem can solve both problems of current financial crisis – the danger of possible future bailouts and credit crunch.

The last solution described in this paper is a hospital agency solution, which uses special agency established by the government. The purpose of this agency is to transfer the bad loans from the banks´ assets, which in other words means the direct bailout of the firms. As we have seen for the government is always more efficient to have SBC than transfer all the bad loans from the bank's portfolio. The reason is that even when banks are bailed out, some of the costs are carried by the banks, which in the case of a hospital agency transferring all the bad loans is not true. The possible solution is to transfer only part of the bad loans, which brings uncertainty to the decision making of the firm's managers. This uncertainty is represented by the probability that their poor project will be refinanced. The amount of transferred bad loans and the probability depend on the proportion of the bad loans. With the higher number of bad loans the amount of the transferred bad loans must be higher and the probability that the poor projects will be refinanced is also higher, which increases the chance that other bailouts will be necessary.

The advantage of a hospital agency solution is that it does not escalate the credit crunch issue. On the other hand the costs connected with the establishing and working of the hospital agency might be very high. Another problem is that with higher proportion of the bad loans the amount of these loans transferred to the hospital agency rises and as we know the higher is the amount of these bad loans the higher is the probability that poor projects will be refinanced. This process unfortunately leads us to the situation, where using bailouts is socially more efficient. Generally this method might be more sensitive, than the two previous methods, to the situation, where the credit crunch is present. Moreover the total costs might be lower than the costs of the bank's reserves and monitoring methods, in this case we suppose highly convex costs of monitoring, but generally the costs of monitoring are considered to be lower. The main purpose of this model is to show that it is socially inefficient to transfer all the bad loans from banks to the hospital agency and that only partial transfers can be successful.

The application of this model can solve the credit crunch problem but we must realize that current state is caused by the lack of credibility between financial institutions. So the fact that only a part of the bad loans is transferred to the hospital agency does not have to reduce the banks´ fear to providing financial resources to other financial institutions. The reason is that because only a part of the bad loans was transferred, there is still some amount of remaining bad assets in the bank's portfolio. Thus the lack of credibility still lingers in the financial sector.

When we take into account all the institutional and historical features of the U.S. economy and all the analysis of the U.S. bank sector and the circumstance, which happened on the financial market, we decided that from the provided solutions the most appropriate method for U.S. economy is the monitoring and screening method. Behind all the mentioned advantages of this method one of the reasons why we chose this method is that it has long-term positive consequences.

8. Possible extensions

We consider this work only as the stepping stone, from which we would like continue in investigating of SBC, hence in this chapter we would like to describe possible areas, in which our research could continue. Our intention is mainly focused on empirical confirmation of SBC theories.

In the previous sections of this work we have described few models dealing with SBC. Most of the models are already presented in the working papers Dewantripont-Maskin (1995), Berglof-Roland (1997) and Berglof-Roland (1998) and its modifications Perroti (1993) but some of the models were developed by author to show different incentives and consequences of SBC. These new models are enhanced models dealing with decentralized and centralized bank sector, which are described in chapter 4.4 pages 44-48 and model describing problematic value of collateral when financial investment companies are lenders, which is explained in chapter 5.2 on pages 54-55.

The next step in our work is to empirically investigate some of the mentioned models in our work but we would like to even focus on the new models and their relationship to SBC. We know that the state ownership and the motive of paternalism was usually considered to be one of the main incentives of the SBC appearance, which was also stressed by Kornai, Maskin, Roland (2003) or Kornai (2001). From our analysis it is also visible that when huge firms ask for bailout it is hard for state to say no. So from our point of view the empiric analysis of the direct or indirect state relationship between the firms, providers of financial resources and state is interesting topic. We would like to examine whether the state direct or indirect relationship with particular firms improves the firms ability to get bailout. From the transition economies we know that state direct or indirect ownership increases the incentives to bailout these firms Vychodil (2004). Especially we are quite curious whether the consequences of TARP program, which was chosen by the U.S. Government as solution for problems on financial markets, will have any statistical significance on the SBC appearance. Thus empirical analysis of this issue can help us to determine the true incentives of SBC in the mature economies.

We know that according to the size of the bank, the possible loss of the depositors can be more serious for bigger banks, which could lead the bank to refinance poor projects. Thus we would like to test statistically the theoretical model presented in the chapter 4.4, which

deals with this problem. This empirical work is also closely connected with the conclusion of the Dewatripont-Maskin (1995), that more decentralized bank sector is less prone to the SBC. Another important variable, which can influence the firms, banks and state behavior, is reputation. The role of reputation in the SBC syndrome can be considered ambiguous; hence we are interested in its empirical analysis. In our work we state that higher reputation of providers of financial resources can increase the SBC appearance. On the other hand the different recognition dealing with reputation is stated by Deviatov and Ickes (2005), who finds out that reputation of lenders, can harden the budget constraint. Moreover we can extend our area of research even on creditors, trying to find out the possible outcomes of their reputation.

And the third possible area of research is the influence of the stock market prices. We would like to examine the possibility of relationship between the stock prices of particular firms and their bailout strategy. The question is whether the stock prices can inform us about possible bailout; thus whether even the bailout strategy is incorporated into the prices. Another question is whether the more transparent and liquid capital market through its monitoring and screening functions can decrease the SBC appearance. We think that capital market generally provides important information, which decrease the information asymmetry of the SBC syndrome. But there are other possibilities ex. Faure-Grimaud (1996) argue that capital market increases the probability of SBC, the similar conclusion can be found in chapter 4.3 of this work.

The econometric model, which we would like to use for the analysis of the previously mentioned variables is the one described in the Bignebat and Gouret (2008), which is based on the models presented by Van de Ven and Van Praag (1981) and then, it has been developed by Boyes et al. (1989) and Greene (1992, 1998) into models dealing with credit-scoring, from which we can empirically predict the loan default. This model is based on the bivariate probit model, using special research of SBC expectations. Because the area of our research will be the firms listed on the NYSE (New York Stock Exchange), we have two possible ways how to deal with SBC expectations, the first method is to use similar survey as was used in the Bignebat and Gouret (2008) or the second method is to model the expectations of managers in similar way as it is done in Pettersson-Lidbom and Dahlberg (2003). The regressors in our regression will be:

a) The variable that represents the value of the collateral needed by bank, where we assume that with higher the collateral is the smaller is the probability of SBC syndrome.

b) Dummy variable representing the direct or indirect state influence of the firm, where we assume that firms with state direct or indirect influence on their performance are more prone to the SBC appearance.

c) Dummy variable representing the firm's size. As was mentioned above we assume that the bigger the firm is the harder is for bank to say no to the bailouts.

d) The variable that represents the firm's volume of traded shares. The reason why we add this variable to our regression is that we assume that the more traded is the share, the more information regarding firm's performance is known; thus the information asymmetry is decreased.

e) The variable that represents the firm's concentration of ownership. We assume that managers in firms with low concentration of ownership are able to take advantage of their position in firm. This inefficient behavior can lead to SBC syndrome.

To be able to correctly evaluate our estimates we would like to first examine firms from the transitive economy, where the presence of the SBC was already confirmed. This should give us particular feeling about the values of estimates, which could serve us as a benchmark. Then the comparison between the results of the transition and mature economies can answer us the important question, why is SBC considered to be mainly a problem of immature economies.

We outlined the main points, which we think might be of interest, in this chapter. The important fact that we should stress is that we would like to examine all these problems mainly in the mature economies with special attention on the U.S. economy, where the presence of SBC is not as well investigated as in the transition countries.

9. Conclusion

The whole our work tries to make the problem of the soft budget constraint more visible. It seems to us that with the development of transition countries the notion "soft budget constraint" slowly fades away. Especially in the mature economies the problem of the soft budget constraint is often being underestimated. Thus we focus on the U.S. economy with the effort to analyze the possibility that the soft budget constraint can occur even there. The reason why we chose the U.S. economy is that the USA is amongst countries, which has been stricken by the current financial crisis the most, so the expectations of the soft budget constraint presence might be relevant. The main hypotheses are.

a) We ask whether the consequences of the soft budget syndrome can be one of the causes of the financial crises.

b) Whether there are sufficient conditions for creation of the soft budget constraint in the U.S. economy.

c) If there are sufficient conditions, we try to answer the question how high the probability of having the soft budget constraint is.

d) And we also ask whether the solution to the financial crises should take into account also the possible consequences of the soft budget constraint.

To find answer for each of these hypotheses we used micro-economic models, which describe different incentives and consequences of the soft budget constraint. As we know one of the main consequences of the soft budget constraint is that firms, whose performance would be under hard budget constraint terminated, under soft budget constrain are not forced to leave the market. In other words the soft budget constraint distorts the system of exit. Moreover the managers of these firms do expect the refinancing, which affects their economic decision making; these managers then behave inefficiently, which distorts the important economic system – the price system. When we add that refinancing is for banks inefficient and that SBC can create credit crunch, the influence of the soft budget constraint on the financial crises is obvious. The Huang and Xu (1998) identified the SBC syndrome as one of the factors, which participated on the creation of the Asian financial crisis.

The soft budget syndrome is divided into two main streams according to its incentives. The first stream is represented by the Dewatripont – Maskin (1995) concept of

dynamic problem, where the efficiency of providing financial resources ex-ante and ex-post differs. The second stream is represented by Mitchell (1993), where refinancing is not efficient even ex-post, but still it happens, because of the bank's management incentive to stay in the management as long as it is possible. Even though both theories are different they share one similar feature and this is that soft budget constraint syndrome is primarily problem of providing financial resources. Thus it seems to us logical begin our analysis with the providers of the financial resources. The analysis of the U.S. bank tells us that almost 50% of U.S. bank sector is controlled by only 5 banks. From the model, which studies the decentralization of the U.S bank sector we found out that the more the bank sector is decentralized the less the economy is prone to the soft budget constraint. Thus the fact that U.S. bank sector is not perfectly decentralized provides good condition for the soft budget constraint. To confirm the previous finding we also examined the amount of bad loans in the U.S. bank sector. The result of this analysis was ambiguous. The proportion of bad loans to all loans is not high today. However the growth of these bad loans is very steep and has growing trend. This could indicate that the probability that there is soft budget constraint in the current U.S. economy is low but on the other hand with the growing proportion of bad loans even this probability increases. This implies that the soft budget constraint should not be underestimated. We have already spoken about the soft budget constraint consequences, which can spur the financial crises, but we have not spoken yet about the consequences of the financial crises solutions. As we know there are two main problems regarding current financial crisis, the first one is the problem with bad loans in the banks´ assets portfolios and the second one is the credit crunch. As we have described there might be two possible causes of the credit crunch and the selected solution to the current financial crisis might be very dependent on the cause of the credit crunch. From the described solutions we argue that the monitoring and screening method is the most appropriate for the U.S. economy. The reason why we chose this method is that thanks to the U.S. capital market, the costs of information are relatively low, thus investing into monitoring is cheap. Moreover we do think that policy, which supports improvement of the monitoring function, should be applied even in the normal times, when there is no threat of financial crisis, because it is important to force banks to cooperate more because otherwise the problem of the soft budget constraint is hardly solvable.

As we can see the soft budget constraint should not have to be only a problem of transitive and socialistic countries any more. The reason why the soft budget constraint is

usually not considered to be threat in the mature markets is that the monitoring functions are on high level. This is supported by the well developed capital markets, which significantly decrease the cost of information. However the development of the capitalism into corporatism, where the huge international firms have the most important word, can significantly increase the probability of the soft budget constraint even though the monitoring functions are on high level. Thus as we have proved and it has been even empirically proved by other works Pettersson-Lidbom, Dahlberg (2003) the soft budget constraint can be and sometimes even is present in the mature economies.

References

Aghion, Philippe, Bolton, Patrick, and Fries, Stephen, (1996): *Financial Restructuring in Transition Economies,* Discussion Paper 96111. Tilburg: Center for Economic Research, Tilburg Univ.

Alexeev, Michael - Kim, Sunghwan (2008): "The Korean financial crisis and the soft budget constraint"**,** *Journal of Economic Behavior and Organization*, Volume 68, Issue 1, October 2008, Pages 178-193.

Baltagi H. Badi (2008):"Econometrics", 4th Edition, Springer 2008.

Berglöf, Erik - Roland, Gérard, (1995): "Bank restructuring and soft budget constraints in financial transition" *Journal of the Japanese and International Economies* 9: 354-375.

Berglöf, Erik - Roland, Gérard, (1997): ''Soft Budget Constraints and Credit Crunches in Financial Transition.'' *Eur. Econom. Rev.* 41**,** 3–5:807–817.

Berglöf, Erik - Roland, Gérard, (1998): "Soft Budget Constraints and Banking in Transition Economies," *J. Comp. Econ.* 26:1, pp. 18-40.

Berglöf, E. and E.L. von Thadden (1994): "Short-term versus long-term interests: capital structure with multiple investors", *Quarterly Journal of Economics 109*, 1055-84.

Berle, A. A. JR. - Means, G. C., (1932): The Modern Corporation and Private Property.

New York: Macmillan; reprint New Brunscwick, NJ: Transaction Publishers, 1991.

Bignebat, C´eline , Gouret, Fabian (2008): Determinants and Consequences of Soft Budget Constraints: An Empirical Analysis using Enterprise-level Data in Transition Countries, *Economic of Transition, Vol. 16, Issue 3,* pp.503-535, July 2008

Bonin, J. and Schaffer, M. (1995): "Banks, firms, bad debts and bankruptcy in Hungary

1991-4 ", *CEP Discussion Papers 0234*, Centre for Economic Performance, LSE.

Box, G. (1979): „Robustness in the strategy of scientific model building, In Launer, R., Wilkinson, G. (eds): Robustness in Statistics, 1979.

Boyes, W. J., Hoffman, D. L. and Low, S. A. (1989):, "An econometric analysis of the bank credit scoring problem", *Journal of Econometrics, vol. 40*: pp. 3–14.

Coricelli, F. and Djankov, S. (2001): "Hardened budgets and enterprise restructuring: 27 theory and an application to Romania ", *Journal of Comparative Economics*, vol. 29: pp.

749–63.

Deviatov, Alexei, Ickes W. Barry (2005): "Reputation and the Soft-Budget Constraint" *Working Paper No 78, CEFIR / NES Working Paper series,* Centre for Economic

and Financial Research at New Economic School.

Dewatripont, Mathias - Maskin, Eric, (1995): "Credit and Efficiency in Centralized and

Decentralized Economies," *The Review of Economic Studies* 62:4, pp. 541-55.

Dewatripont, M. and G. Roland (1997): "Transition as a process of large-scale institutional change", in D. Kreps and K.Wallis (eds.), Advances in Economic Theory and Econometrics, Cambridge: Cambridge University Press.

Dewatripont, Mathias - Gerard Roland, (2000): "Soft budget constraints, transitive and financial systems" *Journal of Institutional and Theoretical Economics*, 156 (1): pp. 245-260.

Fama, Eugene (1970): "Efficient Capital Markets: A Review of Theory and Empirical work," *Journal of Finance, 25*, 383-417.

Faure-Grimaud, A. (1996): "Soft budget constraint and stock price information", mimeo, LSE.

Greene, W. H. (1992): "A statistical model for credit scoring", *Working Papers 92-29*, New

York University, Leonard N. Stern School of Business, Department of Economics.

Greene, W. H. (1998): "Sample selection in credit-scoring models", *Japan and the World*

Economy, vol. 10: pp. 299–316.

Hanousek, J. – Kočenda, E. (2003): "The Impact of Czech Mass Privatisation on Corporate Governance", *Journal of Economic Studies*, Vol. 30 No. 3/4, 2003, pp. 278-293.

Huang, H., Marin, D. and Xu, C. (2004):"Financial crisis, economic recovery, and banking development in Russia, and other FSU countries", *Discussion Papers 79*, Humboldt University of Berlin.

Huang, H. and C. Xu (1998): "Financial Institutions, Contagious Risks and Financial Crises", mimeo, London School of Economics.

Hodgson M. Geoffrey, (2006): „What are institutions?", *Journal of Economic Issues,*Vol. XL No. 1, March 2006

Janda, K. (2008): " Which Government Interventions Are Good in Alleviating Credit Market Failures? " *IES Working Paper 12/2008*. IES FSV. Charles University.

Jonáš, J. (1997): Bankovní krize: zkušenosti a příčiny. VP č. 78, Institut ekonomie ČNB.

Kornai, Janos (1979): "Resource-constrained versus demand-constrained systems", Econometrica, *Vol.* 47, pp. 801-819.

Kornai, Janos (1980): Economics of Shortage, Amsterdam: North-Holland.

Kornai, J., (2001): „Hardening the budget constraint: The experience of the post-socialist countries", *European Economic Review* 45 (2001), s. 1573-1599.

Kornai, J. - Maskin, E. - Roland, G.,(2003): „Understanding the Soft Budget Constraint"

Journal of Economic Literature, 41, 1095–1136.

Kouba, K., (2004): „Transformace a privatizace v původních představách a třináct let poté", v "Privatizace bez kapitálu: Zvýšené transakční náklady české transformace", Národohospodářský ústav Josefa Hlávky, Praha, Studie 4/2004, s. 5-46.

La Porta, Rafael - Lopez-de-Silanes, Florencio – Shleifer, Andrei, (2002): " Government Ownership of Banks" *The Journal of Finance*, Vol. 57, No. 1. (Feb., 2002), pp. 265-301.

Maskin, Eric (1999): "Recent Theoretical Work on the Soft Budget Constraint," *American Economic Review*, May 1999.

Maskin, Eric - Chenggang Xu, (2001): "Soft Budget Constraint Theories: From Centralization to the Market," *Economics of Transition* 9:1, pp. 1-27.

Mejstřík, M. (1999): Správa velkých akciových společností: Teorie a česká praxe, working paper IES, ies.fsv.cuni.cz.

Mitchell, Janet (1993): "Creditor Passivity and Bankruptcy: Implications for Economic Reform," in Colin Mayer and Xavier Vives, Eds. Capital Markets and Financial Intermediation, Cambridge University Press, 1993.

Mitchell, Janet, (1997): Strategic Creditor Passivity, Regulation, and Bank Bailouts, The *Davidson Institute Working Paper Series*, No. 46. Univ. of Michigan Business School, 1997.

Mitchell, Janet (1998): "Strategic Creditor Passivity, Regulation, and Bank Bailouts," *CEPR Discussion Paper No. 1780*.

Mitchell, Janet (1999): "Theories of Soft Budget Constraints and the Analysis of Banking Crises," mimeo, ECARE (Brussels).

Perotti, Enrico, (1993): ''Bank Lending in Transition Economies.'' *J. Bank. Fin.* **17,** 5:1021-1032, Sept.1993.

Pettersson-Lidbom, Per – Dahlberg, Matz , (2003): „An Empirical Approach for Evaluating Soft Budget Constraints", *Working Paper Series 2003:28*, Uppsala University, Department of Economics.

Qian, Yingyi, - Roland, Gérard, (1993): Regional Decentralization and the Soft Budget Constraint: The Case of China*, Discussion Paper 1013*. Centre for Economic Policy Research, 1994.

Seifert Jan (2007): "Privatizace v České republice a corporate governance", Bachelor´s Thesis, Institute of Economical Science, Charles University in Prague.

Schaffer, M. (1989):"The credible commitment problem in the Center-enterprise relationship", *Journal of Comparative Economics 13*, 359-382

Shen, Yu-Chu & Eggleston, Karen, (2008): "The Effect of Soft Budget Constraint on Access and Quality in Hospital Care", *NBER Working Papers 14256*, National Bureau of Economic Research, Inc.

Švejnar, Jan (1993): The past and present of Czechoslovak privatization, Praha, 1993.

Van de Ven, W. P. M. M. and Van Praag, B. M. S. (1981):, "The demand for deductibles in private health insurance : a probit model with sample selection ", *Journal of Econometrics*, vol. 17: pp. 229–52.

von Thadden, E.L. (1995):"Bank finance and long term investment", *Review of Economic Studies 62*, 557-575.

Vychodil, O., (2004): "Dopady postprivatizační koncentrace vlastnictví na výkonnost českých podniků" v "Privatizace bez kapitálu: Zvýšené transakční náklady české transformace", Národohospodářský ústav Josefa Hlávky, Praha, Studie 4/2004, s. 47-83.

The overview of the used annual reports and statistical yearbooks and internet pages

Statistické ročenky České republiky 1992 až 1999. Český statistický úřad, Scientia v jednotlivých letech.

Výroční zprávy České národní banky 1995, 1999.

Výroční zprávy FNM za roky 1992 až 1998.

http://portal.justice.cz/ms/ms.aspx?o=23&j=33

www.imf.org

www.mpo.cz

www.federalreservesystem.gov

www.propublica.org

www.ustreas.gov

www.gao.gov

http://siteresource.worldbank.org

Appendix

Now let's return back to the model presented in the chapter 6.5, where all bad loans were transferred to the hospital agency. We modify the initial conditions and use these new assumptions in the Berglof – Roland (1998) model to show that under specific conditions using the special agency can be socially less costly that using bailouts.

The first new assumption will be that all bad loans $(1-\alpha)n$ will be financed, but the cost of these bad loans will be only $(1-\alpha)n\theta$, where θ is a discount parameter $\theta \in (0,1)$. The second new assumption will be that the government is able to sell the bad loans in the future for $(1-\alpha)nR_f$. Then we have that the government profit is:

(91)

$$n\alpha 2R_g + (1-\alpha)nR_f + n\left[\alpha 2B_g + (1-\alpha)2B_p)\right] - n - \left[(1-\alpha)n\theta + T\right] - \lambda(n) - \lambda\left[(1-\alpha)n\theta + T\right]$$

.

And the net benefit from using a hospital agency solution can be written as:

(92) $$\lambda(G) + n(1-\alpha)(R_f - R_p) + n(1-\alpha)(1-\theta) - \lambda\left[(1-\alpha)n\theta + T\right] - T\,.$$

We assume that the government is able to sell the bad loans for $R_f = R_p$ and that the costs of establishing the special agency are less than the saved financial resources ($T < (1-\alpha)(1-\theta)n$). Using these assumptions we get that the net benefit from using a hospital agency solution is:

(93) $$\lambda(G) + n(1-\alpha)(1-\theta) - \lambda\left[(1-\alpha)n\theta + T\right] - T\,.$$

Using the fact that $T < (1-\alpha)(1-\theta)n$, we can only find the situation, where $\lambda(G) - \lambda\left[(1-\alpha)n\theta + T\right] = 0$ and the net benefit will be strictly positive. So we get:

(94) $$n(1-\alpha) - n\alpha R_g - (1-\alpha)n\theta - T \geq 0\,,$$

this can be rewritten as:

(95) $$\theta \leq 1 - \frac{n\alpha R_g + T}{(1-\alpha)n} \equiv \theta^*\,.$$

We know that $\frac{\delta\theta^*}{\delta\alpha} < 0$, so with the increasing number of good projects according to the discount offered to the government must be higher, but higher α increases also the saved financial resources $(1-\alpha)(1-\theta)n$, thus the total effect on the parameter θ is unknown.

Thus as we can see the solution using special agency can be under specific conditions efficient. But we must be aware of the fact that with lower price of the bad loans R_f the discount θ must be lower moreover the whole result can be even different.