

Univerzita Karlova v Praze
Fakulta sociálních věd

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**Three essays on Joseph Stiglitz, information asymmetry,
and credit rationing**

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Prohlášení


Prohlašuji, že jsem rigorózní práci vypracoval samostatně a použil pouze uvedené prameny a literaturu

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Martin Pospíšil

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Abstract

This thesis contains three essays related to the work of economist Joseph Stiglitz. The first essay describes the contribution of Stiglitz to economic theory by analysing problems of information asymmetry, new Keynesian and institutional economics, rationality, and market theories. Shortcomings of neoclassical economics are described and possible solutions are outlined. The last part of this essay summarizes the main critique of Stiglitz's work.

The second essay applies the topic of information asymmetry by discussing whether the current level of economic development leads to convergence or divergence in the technology and information levels. The conclusion is that even though globalisation affects the level of technology and information, we do not see convergence as predicted by several theoretical models and information asymmetry remains an important element in the economy.

The last essay links the Stiglitz-Greenwald theory of credit rationing using recent Czech data from years 2007-2009. Data confirm that credit rationing increases, information asymmetry increases, and the transmission mechanism does not function well during economic decline. I conclude that Czech banks increase their screening of clients and consequently credit rationing in the times uncertainty leading to ambiguous development of interest rates. Recent Czech data can confirm Stiglitz-Greenwald monetary theory.

Abstrakt

Tato práce obsahuje tři eseje vztahující se k dílu ekonoma Josepha Stiglitze. První esej popisuje Stiglitzův přínos k ekonomické teorii s důrazem na problémy spojené s informačními asymetrií, novou Keynesovskou a institucionální ekonomikou, racionalitou a teorií trhů. Jsou popsány nedostatky neoklasické ekonomie a navrhnutá možná řešení. Závěrečná část shrnuje nejčastější kritiku Stiglitze.

Druhá esej aplikuje téma informačních asymetrií na diskusi, jestli současný stupeň ekonomického vývoje vede ke konvergenci nebo divergenci technologických a informačních úrovní. Závěr je, že ačkoliv globalizace ovlivňuje technologii i informace, nedochází ke konvergenci, kterou předvídají některé teoretické modely, a informační asymetrie zůstává významným faktorem v ekonomice.

Poslední esej propojuje teorii Stiglitze a Greenwalda o přidělování kreditu s novými českými daty z let 2007-2009. Data potvrzují, že dochází ke zvýšenému omezení úvěrů (credit rationing), zvyšují se informační asymetrie a transmisní mechanismus nefunguje dobře během hospodářského poklesu. Docházím k závěru, že české banky zpřísňují prověřování klientů a přidělování kreditu, což vede k nejednoznačnému vývoji úrokové míry. Současná česká data tak mohou potvrzovat Stiglitz-Greenwaldovu měnovou teorii.

To all my teachers and classmates

1. General Introduction¹

My starting point is that we live in an inherently imperfect world. The concept of perfect competition, perfect information, and the equilibrium is very much limited. Therefore, the information asymmetry causes significant limitations for neoclassical economic theory based on these simplified assumptions. The fact that human beings are not rationally calculating machines assessing all available information is important to understand. It has become obvious that not only the general public but economists as well have become dissatisfied with the recent state of the science.

In the work, I will assess the contribution of Joseph Stiglitz to the economic theory. Stiglitz won the Nobel Prize for Economics in 2001, together with George A. Akerlof and A. Michael Spence, for his research on information asymmetry. Beside his academic research, he was involved in the President Bill Clinton administration as a member and later the chairman of the Council of Economic Advisors (CEA)². However, he is critical to the results of the US economic policy in the 1990s; even though he appreciates economic successes of the Clinton administration such as the reduction of the US budget deficit, robust non-inflationary economic growth, low unemployment, strong investment, or economic stability, he grades the administration harshly³. I am interested in his work mainly because he tries to develop an economic theory that is closer to reality⁴. Over time, it has become clear that neoclassical

¹ This thesis consists of three essays. First two were part of my diploma thesis defended at the Charles University, the third essay (empirical) is a diploma thesis defended at the University of Economics, Prague. The second essay also contributed from my coursework at the London School of Economics and CERGE-EI. All comments and suggestions to these theses were incorporated in this version. The referee reports are attached in the appendix.

² The Council of Economic Advisers (CEA) is a group of economists set up to advise the President of the United States. It is a part of the Executive Office of the President of the United States, and provides much of the economic policy of the White House. The Council's three members are nominated by the President and approved by the Senate (<http://www.whitehouse.gov/cea/>, downloaded 7th July 2007).

³ The critique comes especially due to the “deregulation mantra” – as Stiglitz calls the Clinton administration’s attempts to reduce the role of the state in certain economic areas.

⁴ To mark Stiglitz’s 60th birthday in 2003, a group of his teachers, students and co-authors wrote essays in his honour. The outcome was named “Joseph Stiglitz and the economics for an imperfect world”. Indeed, Stiglitz claims that the world is not perfect, neither are human beings.

theory of market must be supplemented or even substituted with some more realistic theory. The key assumption is that market is not perfect; everything else is included, Stiglitz says. My interest in his work started already with my interest to the transition economics. Stiglitz wrote several influential papers on the transition in the Central and Eastern Europe and as one of few top economists recognised the importance of institutions in this process.

Studying economics is to a certain extent unsatisfactory. Mainstream economics accepts value judgments, the so-called Paretian⁵ judgment. Many economists believe they are scientists like mathematicians or physicians. However, one definition of science says that science is supposed to be objective. It is then difficult to be scientific when the subject matter, the individual decision-maker, lacks objectivity. Karl Popper believed in the unity of methods⁶, he believed that the study of natural phenomena also apply to the study of social events⁷. Economics is not like physics, even though many mathematical economists would like it to be so. Still prevailing paradigm⁸ (that market at least in the longer run tends towards equilibrium) cannot explain many economic problems⁹. Most of economic models are to a large extent simplified and a vast extent of modern economics is prepared for developed markets only. Even though authors usually mention this simplification at the beginning of their work, later they neglect it. Economics have become applied mathematics: derivations, integrations, optimisation, utility maximisation, rationally behaving consumer form the core of modern economics. Human being has often been forgotten.

I am aware of the limitation of perfect competition and I believe that most of economists are aware of these limitations as well. This work however, puts emphasis on one the strongest microeconomic assumptions: symmetry of information. There are factors in the system we will never be able to understand, some information is inherently private, some

5 Named after economist Vifredo Pareto

6 Popper (157, p.130)

7 Soros (1994, p.11)

8 Namely in the financial economics

9 The author is persuaded that the recent financial crisis, which started in 2007, cannot be explained using standard economic thinking based on equilibrium.

information is purely subjective¹⁰. Information asymmetry is what economists call market imperfections. The model of asymmetric information has far-reaching consequences not only for the financial market but for the real economy as well.¹¹ Economic theories do matter. Policies, politicians, and decision-makers are guided by economic theories, especially when there is a lack of evidence. Therefore, we should try to make these theories as realistic as possible. Albert Einstein is quoted for saying that everything should be made as simple as possible, but not simpler. I believe that this holds for economics as well.

1.1. Structure of the work

This thesis contains three essays related to the work of economist Joseph Stiglitz. The first essay describes the contribution of Stiglitz to economic theory by analysing problems of information asymmetry, new Keynesian and institutional economics, rationality, and market theories. Shortcomings of neoclassical economics are described and possible solutions are outlined. The last part of this essay summarizes the main critique of Stiglitz's work.

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The last essay links the Stiglitz-Greenwald theory of credit rationing using recent Czech data from years 2007-2009. Data confirm that credit rationing increases, information asymmetry increases, and the transmission mechanism does not function well during economic decline. I conclude that Czech banks increase their screening of clients and consequently credit rationing in the times uncertainty leading to ambiguous development of interest rates. Recent Czech data can confirm Stiglitz-Greenwald monetary theory.

¹⁰ The God's presence, for example. The existence of God cannot be proofed nor neglected. That means that the existence of God is subjective information.

¹¹ The simple example is the recent crisis. Starting as purely financial crisis, the development starkly hit the real economy very soon.

2. Life and Work of Joseph Stiglitz

2.1. Joseph Stiglitz

Joseph Stiglitz is a well-known economist, author of many books, papers, and works¹². Among the most important is a book on public finance “Economics of the Public Sector”, in which he clarifies the principles of the functioning of a correctly managed and cautious state¹³. Stiglitz is aware of the importance of markets in the economy, he says that “[t]he market has been an enormous success. It has brought prosperity beyond the wildest dreams. It has put the middle class at the centre of our societies. But it has not, as some claim, ended redistributive politics.”¹⁴ To put it simple, Stiglitz opposes neoliberal economic policies of fast unregulated privatisation, or unfettered deregulation.

His critiques – mostly laissez-faire economist – disagree with him mostly because Stiglitz emphasizes the role of government in society, although he opposes social engineering but argues that leaving certain decisions upon individual decision-makers would lead to a kind of society that would be unacceptable to most of population. Stiglitz criticizes conservative (Reagan style) policies of low taxes and the attempts to decrease the welfare state. As a result, he says that the US and others following its example can become rich countries with poor people¹⁵. Stiglitz have always preferred the Scandinavian socio-economic model to the US model. He notes:¹⁶

[o]f course, government, like the private sector, must strive for efficiency. But investment in education and research, together with a strong safety net, can lead to a more productive and competitive economy, with more security and higher living standards for all. A strong safety net and economy, close to full employment provides a conducive environment for all stakeholders – workers, investors, and entrepreneurs – to engage the risk-taking that new investments require.

12 At the date of submission of my diploma thesis (June 2009), Stiglitz was the highest ranked economist in the world in RePEc. See <http://ideas.repec.org/top/top.person.all.html>

13 Martinova (2003, p.24)

14 Stiglitz (2003a, p.317)

15 Stiglitz (2006a, p.1)

16 Stiglitz (2006a, p. 2)

Stiglitz's views are grounded in his personal experience. He came of age in the 1960s and he strongly believes in civil rights and equal opportunity – and that government can be the solution rather than the cause of social and economic problems¹⁷. Stiglitz studied at the Amherst College, and then he went to the Massachusetts Institute of Technology (MIT), where he studied for his PhD from 1966-1967. Between 1969 and 1970 he was a Fulbright research fellow at the University of Cambridge. Later he held professorship at Yale, Stanford, Oxford, and Princeton. Since 2001, Stiglitz has been a Professor at Columbia University. In Prague, he is a member of The Executive and Supervisory Committee (ESC) of CERGE-EI. Stiglitz's academic life has been fulfilled with outstanding economists. During his studies in Amherst, MIT, and Cambridge, he was taught by outstanding lecturers, including at least four winners of the Nobel Prize: Paul Samuelson, Robert Solow, Franco Modigliani, and Kenneth Arrow (his teacher at MIT) who “opened him, in many ways, the field of information economics”¹⁸. Later on, Stiglitz was influenced by Nicholas Kaldor, Joan Robinson, and Frank Hahn. Even after leaving the MIT he was long known as the best critical reviewer of Paul Samuelson's articles.¹⁹

2.2. Stiglitz's contribution to the economic theory

Stiglitz influenced the whole bundle of economic disciples. It is impossible to cover all areas of Stiglitz's interest. Apart from information asymmetry – for which he was awarded the Nobel Prize – we can mention (international) macroeconomics, public finance, development economics – including several works about the transition in Eastern Europe. Arguably, Stiglitz's most important contribution to economic theory is his research on information asymmetry. He focuses on screening, a technique used by one economic agent to extract otherwise private information from another. His critique of neoclassical economics opposes the assumption of perfectly efficient markets, rational and fully informed consumer, and immediate market-clearing process. With Bruce Greenwald they showed that “whenever

17 Eichengreen (2004, p.3). Barry Eichenreen is a professor at the University of California, Berkeley.

18 Stiglitz (2003a, p.xxxiv)

19 Martincova (2003, p.24)

markets are incomplete and/or information is imperfect (which is virtually in all economies), even competitive market allocation is not constrained Pareto efficient.”²⁰

For microeconomics, there are important topics of adverse selection, signalisation, and screening. If we accept the assumption of asymmetric information, several questions arise. One of the issues is the role of price in the economy. The assumption of perfect competition says that the price reflects all information on the market. If we start to implement the concept of information asymmetry, the price does not have to play this role anymore and can be difficult to work with the price in economic models then. So far, information asymmetry has been applied to problems that include labour markets, credit problems, understanding business cycles, and monetary economics among other issues.

For Stiglitz, the problem lies on finding an appropriate balance between markets and government²¹. For example, he argues that the international community, through institutions like the World Bank²², has a collective responsibility for the creation of one global public good – knowledge for development. Hage (2000) notes that in Stiglitz’s book *Whither Socialism* (1996), Stiglitz mathematically and formally demonstrates the potential efficiency-enhancing properties of the state based on the Greenwald-Stiglitz theorems (by establishing) the constrained Pareto efficiency of market economies with imperfect information and incomplete markets. Stiglitz hopes to²³ find solutions guided by this new set of mathematical theorems to replace the theorems of Arrow²⁴-Debreu²⁵ and Lange²⁶-Lerner²⁷. Together with

20 Greenwald and Stiglitz (1986)

21 See Stiglitz (1996, p.267)

22 However, he is critical to these institutions. His critique of globalisation, or international institutions such as the World Bank or the IMF can be found for example in his book *Globalisation and Its Discontents*

23 Joseph Stiglitz has criticized the Lange-Lerner theorem for replicating many of the alleged errors of neoclassical economics. He suggests that because of economic problems resulting from costs of information and missing markets, market economies solve problems in a manner different from that described by the neoclassical analysis. Therefore, according to Stiglitz, the Lange-Lerner Model is a poor description of how the price mechanism will work in a socialist economy to the same extent that neoclassical economics is a poor description of market capitalism

24 Kenneth Arrow won the Nobel Memorial Prize in Economics with John Hicks in 1972. He contributed to the neo-classical economic theory. His most significant works are his contributions to social choice theory, notably "Arrow's impossibility theorem", and his work on general equilibrium analysis. He has also provided foundational work in many other areas of economics, including endogenous growth theory and the economics of information

Karl Shells, he pointed to the fact that in the future, still growing markets will generally be exposed to an unstable dynamics. Stiglitz argues that markets are efficient and stable only under very strict conditions. He even writes that:

[O]ne of the great intellectual achievements of the mid-twentieth century (by Gerard Debreu of the University of California at Berkeley and Kenneth Arrow of Stanford, both of whom received Nobel Prizes for this achievement) was to establish the conditions under which Adam Smith's "invisible hand" worked. These included a large number of unrealistic conditions, such as that information was either perfect, or at least not affected by anything going on in the economy, and that whatever information anybody had, others had the same information; that competition; and that anyone could buy insurance against any possible risk.²⁸

2.3. Rationality and markets

„Successful capitalist institutions are well based in the developed countries and there is the temptation to take them for granted even when thinking about transition of developing countries where those institutions are missing. The policy of liberalisation, stabilisation, and privatisation that is not supported with sufficient institutional framework does not have to be successful “

G. Roland

The problem of rationality is not a subject of this thesis²⁹, however it is closely linked with Stiglitzian economics. It is because sometimes people do not behave rationally³⁰ which has an effect on the economy as a whole.

25 Gérard Debreu was a French-born economist and mathematician, a professor of economics at the University of California, Berkeley, where he began work in 1962, he won the 1983 Nobel Memorial Prize in Economics. In 1954, he published a breakthrough paper titled Existence of an Equilibrium for a Competitive Economy (together with Kenneth Arrow), in which they provided a definitive mathematical proof of the existence of general equilibrium, using topological rather than calculus methods.

26 Oskar Lange was a Polish economist and diplomat. Despite being an ardent socialist, Lange deplored the Marxian labour theory of value, being very much a believer in the neoclassical theory of price. In the history of economics, he is probably best known for his work *On the Economic Theory of Socialism* published in 1936, where he famously put Marxian and Neoclassical economics together.

27 Abba Lerner contributed to the Lange Model. While living in the US, he was an intellectual opponent of Milton Friedman

28 Stiglitz (2003a, p.13). In the book, Stiglitz does not criticize Adam Smith himself but rather neoliberals who simplified Smith's work into the blind belief in unfettered markets. Smith himself was much more aware of the limitations of the market.

29 My colleague at the Charles University in Prague Vit Horak wrote a nice master thesis: Rationality of Human Action and Preferences: A Criticism of Subjectivist-Teleological Tenets of Economics and an Outline of a Remedy. He clears up the notion of rationality, shows the possibilities of its meaning, and points out at the radicalism of any assumed causality it may encompass. Horak uses the critical conclusions to outline a preference framework that would not repeat the identified mistakes, which would, however, set out from the subjectivist-teleological perspective as well.

Market is an institution. This is a crucial point because institutions form society and influence the overall economic and societal performance. Institutions matter and what also matters is that they are different. A market as an institution in the Czech Republic is clearly different from the market in the UK not only because there are different types of players but mostly because these players follow different rules, both formal and informal. And even if we could apply all formal rules, legislation, legal enforcement we would not get the same result of market players' behaviour. Informal institutions and rules explain this. They are not written in any Codex or Act; however, people follow them in tradition. In fact, this is the core concept of modern social sciences – path dependency. Any studies of business and economic behaviour must take this into account. However, neoclassical price theory does not. Snehota³¹ writes:

More recently, research on business strategy has focused on various aspects of market behaviour and generated a number of observations that are difficult to link to the economist's conception of market as a price mechanism.

Behavioural economists like Tversky and Kahneman (1980) argue that people are intelligent but they are not rational. The approach towards individual behaviour can be of different types. The first type is cost-benefit analysis (CBA) where players maximise the following equation

$$(1) \quad V_i = \theta R_i - C_i,$$

where V_i is net benefit of a decision, θ is probability of success, R_i is gross benefits and C_i is cost.

Another approach to the individual decision-making process is the opportunity cost concept. If we want to go to a cinema, not only we pay for the ticket, but we also implicitly lose 2 hours of our time. Third approach is called “mental accounting” and is based on the principle that an individual evaluates gains and losses separately. Moreover, losses have a greater impact. For marketing purposes, firms try to integrate consumer's losses and segregate

³⁰ As an example might serve Coca-Cola. Everyone buys it but it is not because it would taste better than other soft drinks but because it is supposed to taste better.

³¹ Snehota (1990, p.20)

their gains³². Fourth approach to individual decision-making is the concept of anchoring. An individual usually starts doing mental accounting from a fixed point ('anchor') which is usually the status quo. People also value the fairness of companies. Finally, there is one important notion that comes from the game theory and is not so simple to understand. There are many situations in which individual rationality can lead to undesirable outcomes for the group (society)³³. The conclusion is that we cannot count on an outcome being optimal given the decentralised decisions of self-interested individuals³⁴. Based on this notion, Stiglitz is in favour of a bigger role of the government in the society.

2.4. Institutional economics³⁵

Stiglitz's economic views stand between institutional and new Keynesian economics. Therefore, it is justified to describe both economic schools in more detail. The World Bank (2002) defines institutions as the rules of the economic game. These include both formal rules and informal norms. As institutions "place restrictions on undesired kinds of individual behaviour" (Roland 2001, pp. 37), they can reduce uncertainty. Institutions might be solutions to asymmetric information problems as they secure property rights through legal and judicial systems, competition policy, financial systems and political institutions (Matos, 2005). Institutions determine transaction costs, and those subsequently explain economic performance. Adaptively efficient institutions, which "encourage trial and eliminate errors", enhance economic performance (North, 1997b, p. 4).

Institutionalism is based on the premise that institutions play a vital and relatively independent role in the forming of political, social, or economic behaviour. However, institutional economists do not have a good reputation when trying to reach a consensus about the basic pillars of institutional economics. Miloch (2005, p. 7) even argues that

32 Many people tend to prefer more small gains than one big gain.

33 See for example R. Gibbons: Game Theory for Applied Economists, Princeton University Press, 1992.

34 On the other hand, this conclusion lies on the ground that we have the right definition of rationality.

35 The term "institutional economics" was announced by Walton Hamilton at a meeting of the American Economic Association in 1918 (Hamilton, 1919). He claimed that institutional economics alone could unify economic science by showing how parts of the economic system related to the whole (Hamilton, 1919, pp.309-11). Old institutionalism started off as a reaction against the lack of realism and awareness of historical evolutionary processes in neoclassical economics. It was therefore sharply opposed to neoclassical thought.

institutionalism lacks a standard textbook. Institutionalism criticizes neoclassical economics for the following reasons:

- static
- abstract-deductive
- without respect to historical time and institutions
- formal, mathematical
- perfect competition
- economic man

For Hamilton (1919, pp. 309-311) the ‘most important’ omission of the neoclassical theory was its neglect of ‘the influence exercised over conduct by the scheme of institutions under which one lives’. The original institutional approach understood institutions as a special type of social structure with the potential to change agents, including changes to their preferences. Geoffrey Hodgson (2000, p.318) uses following five propositions of institutional economics, which are based on Hamilton’s approach to institutionalism:

1. Although institutional economists are keen to give their theories practical relevance, institutionalism itself is not defined in terms of any policy proposals.
2. Institutionalism makes extensive use of ideas and data from other disciplines such as psychology, sociology, and anthropology in order to develop a richer analysis of institutions and of human behaviour.
3. Institutions are the key elements of any economy, and thus a major task for economists is to study institutions and the processes of institutional conservation, innovation and change.
4. The economy is an open and evolving system, situated in a natural environment, effected by technological changes, and embedded in a broader set of social, cultural, political, and power relationships.
5. The notion of individual agents as utility-maximising is regarded as inadequate or erroneous. Institutionalism does not take the individual as given. Individuals are affected by their institutional and cultural situations. Hence, individuals do not simply (intentionally or unintentionally) create institutions.

There is an important disagreement between the old and new school of institutional economics. Both types of institutionalism keep a distance from the assumptions of perfect rationality, perfect foresight and zero transaction costs. However, old institutionalists even dismiss several assumptions that are important for the new institutional economics – those that are common with neoclassical economics. On one hand, new institutional economics emphasises the need for “formalization, institutions created by individuals, spontaneous process, and limited role of the government.” On the other hand, the old institutional economics emphasised “informal techniques, institutions that predetermine individuals, habits

and social norms, collective decision-making, and much bigger role of the government in the society.³⁶

The essential feature of the 'old' institutional economics (OIE) is the recognition that, for the purposes of economic analysis, individual purposes and preferences are to some degree socially formed (Hodgson, 2004, p.257). The single most important defining characteristic of the old institutionalism is proposition (5). Among other schools, the NIE is distinguished from the old institutional economics principally in these terms. Other criteria do not demarcate the old institutionalism so readily (Hodgson, 2000, p. 318). The main feature of OIE is the rejection of the ontological and methodological presumptions of classical liberalism; individual is no longer taken as given. OIE proponents argue that mostly one person's rights are another person's obligations, i.e. an unavoidable trade-off of rights and duties for different groups or individuals exists. 'Old institutionalists criticize the performance of markets for the inequities they create in the distribution of income, wealth, and economic opportunity; the exercise of monopoly and other types of economic power; financial manipulation and productive inefficiencies; macroeconomic instability and unemployment; the blocking of technological and instrumental advance; and various forms of "waste" such as competitive salesmanship'³⁷.

The ancestor of OIE - Thorstein Veblen – criticized the concept of 'rational economic man' and paying too much attention to the question of equilibrium in "static state". Instead, he puts stress on the processes of economic evolution and technological transformation. Veblen thought individuals act as being influenced by relations of an institutional nature. He emphasized inertia and habit instead of calculating agent of neoclassical theory. Institutions by Veblen³⁸ are 'settled habits of thought common to the generality of men'.³⁹

The significant difference between neoclassical and institutional economics is efficiency. Neoclassical economics is based on allocation efficiency. However, for a long-

36 Rutherford (1996, p.174)

37 Schmoller (1978, p.130)

38 Veblen (1909, p.239)

39 http://uk.geocities.com/balihar_sanghera/oniekatyanewandoldinstitutional.html (downloaded 03/01/2005)

term growth the adaptive efficiency – the field of institutional economics – is more important (North, 1990, p. 80-81). The core of today's world economy is to create value for shareholders, for customers, for people. It is the value that matters, not the allocation.

Inefficient allocation of resources due to irrational administrative system largely contributed to the collapse of the centrally planned economy. North (1994, p. 367) argues, “adaptive efficiency is the result of long-lasting evolution. We do not know how to create adaptive efficiency in a short-run“. North emphasizes adaptive – rather than allocation–efficiency. Efficiency is not a clearly defined concept as it includes the trade-off between rights and responsibilities of various groups and individuals (Peukert, 2001, p. 110-111).

2.4.1. The Washington Consensus

How do institutions matter for the development of the economy? We describe one set of policies that underestimated the role of institutions in the economy. Washington consensus is the set of policies for promoting economic growth that was first prepared for Latin America. Nonetheless, it affected the transition paradigms of the Central and Eastern economies. In this particular case, neoclassical theory, associated with Washington consensus faced a theoretical crisis. These paradigms were not suitable for the former command economies, as they did not take into account different historic and institutional differences in transition countries. John Williamson known for his liberal approach to economics firstly presented the Washington Consensus. He admits that the consensus has not brought expected results and argues that “second generation reforms” were needed, involving the strengthening of institutions to allow full advantage to be taken of the first-generation reforms (Williamson, 2002).

It is interesting to note Joseph Stiglitz who was the main critic of John Williamson, sees the biggest problem of the transition in institutional factors too. Stiglitz argues that an underestimation of the institutional framework, especially the capital market, was one of the biggest problems of the transition especially in the Czech Republic and in Russia (Stiglitz, 2002a). Stiglitz criticized the assumption that privatisation creates the demand for the market infrastructure on its own (Stiglitz, 2002a, pp.163-4).

Washington Consensus did not succeed because it did not involve institutions. “If institutional change is slow, the time horizons for structural adjustment programs need to reflect this. Adjustment that would sustainably improve development prospects simply cannot

happen over three or five years — the typical duration of these programs.” (Rodrik and Subramanian, 2003, p. 34).

2.5. *New Keynesian economics*

„On of the biggest tricks of neoclassical economics is ... that it takes labour as any other production factor.“⁴⁰

Apart from being an institutionalist, Stiglitz is also considered to be a new Keynesian economist. New Keynesian economics is the school of modern macroeconomics that evolved from the ideas of John Maynard Keynes. New Keynesians responded to the new classical critique of original Keynesianism, which took place in the 1970s. The primary disagreement between new classical and new Keynesian economics is over how quickly wages and prices adjust. New Keynesians believe that market-clearing models cannot explain short-run economic fluctuations, and so advocate models with “sticky” wages and prices⁴¹. However, new Keynesian economics is a heterogeneous school and its adherents do not necessarily share a single view on economic policy. Some prefer monetary policy (like for example Gregory N. Mankiw⁴²), others prefer fiscal policy (Stiglitz). Generally, new Keynesians suggests that an economic recession does not represent the efficient functioning of the market. The key elements of this economic school are sticky prices, menu costs, coordination failures, and efficiency wages, which provide a rationale for governmental intervention⁴³. Stiglitz disagrees with laissez faire approach and says that “[b]y and large, the Keynesian medicine has worked; downturns are shorter and shallower, upturns are longer.”⁴⁴ Over last years, however, Stiglitz consistently criticizes inflation targeting which is the core of modern new Keynesian economics. He argues:

Inflation in many countries is, for the most part, imported. Raising interest rates won't have much impact on the international price of grains or fuel. So long as developing countries

40 Stiglitz (2002a)

41 Mankiw (1995)

42 Gregory N.Mankiw (1958) is American economist who studied the theory of menu costs, rigid prices. Not only for economics students, his blog is very informative: <http://gregmankiw.blogspot.com/>

43 Ibid (2007)

44 Stiglitz (2003a, p.198)

remain integrated into the global economy [...] domestic prices of rice and other grains are bound to rise markedly when international prices do.

Most importantly, both developing and developed countries need to abandon inflation targeting. The struggle to meet rising food and energy prices is hard enough. The weaker economy and higher unemployment that inflation targeting brings won't have much impact on inflation; it will only make the task of surviving in these conditions more difficult.⁴⁵

The role of the US Central bank – Federal Reserve is to take into account both the unemployment and the inflation. However, modern central-banking laws give the central bank rather one single target – and that is a stable price level⁴⁶. Because Stiglitz perceives unemployment as a bigger problem than inflation⁴⁷, he is not happy with the current development. In the article “Employment, social justice and societal well-being⁴⁸”, he shows that the economic policy based on the neoclassical labour market necessarily leads to the worsening of the position of employees because of long-lasting market failures. Stiglitz’s vocabulary contains words such as full employment, better working conditions, stakeholders⁴⁹ rather than only shareholders.

2.6. Critique of Joseph Stiglitz

Joe, as an academic, you are a towering genius. Like your fellow Nobel Prize winner, John Nash, you have a "beautiful mind." As a policymaker, however, you were just a bit less impressive.⁵⁰

Kenneth Rogoff

Economists in general can be divided according to their view on the role of state in the economy. On one hand, there are scholars who see the market solving almost all economic problems and they limit the role of the state to the minimal activities, such as defence, safety, basic schooling (for example Walter E. Williams). On the other hand, there are economists who believe in a bigger role of the state.

⁴⁵ Stiglitz, The Failure of Inflation Targeting, Project Syndicate. Available at <http://www.project-syndicate.org/commentary/stiglitz99>

⁴⁶ The exception is the European Central Bank that inherited its two-pillar structure after the German Bundesbank

⁴⁷ As many other Keynesians

⁴⁸ International Labour Review, Vol. 141 (2002), No 1-2

⁴⁹ Not only owners but also employees, suppliers, creditors etc.

⁵⁰ Rogoff (2002)

George Stigler belongs to the first groups of economists. He does not share Stiglitz's approach to the role of the state in the economy. In particular, he criticizes the concept of information asymmetry. Even though Stigler understood the importance of information, he argued that if we take into account the real costs linked with information, the standard assumptions of economics will still hold⁵¹. For a Czech reader it is interesting to read a critique of Stiglitz by Vaclav Klaus⁵² who rather follows Stigler's views:

“Professor Stiglitz – as a theoretician – came up with a concept of “asymmetric information” with a new argumentation showing imperfect efficiency of markets. This inefficiency arises from the fact that asymmetric – and therefore imperfect – information affect the market. Therefore, we all (I would say us, serious economists) have put this into our standard economic argumentation. I clearly say yes to this. However, something very different is the question whether this automatically means the need for the state intervention. The fact that markets are often inefficient does not automatically lead to a conclusion that it is – as itself – a reason to a greater extension of state intervention. It is also the state (government, bureaucrats) who faces asymmetric – therefore imperfect – information. This was the critique of socialism and of the central planned economy was for decades based on the principle that the market is the best “information” system.

Economics reveals various market imperfections for centuries. The concept of information asymmetry is one of these and I would not say that it is the most important one. When Stiglitz says that “the basic information framework must be regulated by the state”, it is more or less funny as we have already lived in such a world already. When he wrongly arguments against the theory of information – which is in economics closely linked with another Nobel Prize holder George Stigler of Chicago – Stiglitz does not, according to me, understand some part of Stigler's theory. When he says that it is impossible “for the firms to collect all possible information”, then he does not understand market. Nobody ever has or can have all information because information is costly. That is why all economic subject must compare costs and benefits of information and find his own equilibrium. And this equilibrium is not at the all-information point but in the “optimal-amount-of-information point. Stigler knows it, Stiglitz doesn't. And it is silly to think that the state should provide the subject with “overoptimal” information. And partly sad.”

Stiglitz follows John Maynard Keynes, saying that the aim of economic policy is to maintain full employment, he is a Keynesian economist. However, for his expansive fiscal solutions of economic problems, he is often criticized even by his former colleagues. For example Kenneth Rogoff (2002) writes:

Let's look at Stiglitzian prescriptions for helping a distressed emerging market debtor, the ideas you put forth as superior to existing practice. Governments typically come to the

51 Stigler (1961)

52 Klaus (2002)

IMF for financial assistance when they are having trouble finding buyers for their debt and when the value of their money is falling. The Stiglitzian prescription is to raise the profile of fiscal deficits, that is, to issue more debt and to print more money. You seem to believe that if a distressed government issues more currency, its citizens will suddenly think it more valuable. You seem to believe that when investors are no longer willing to hold a government's debt, all that needs to be done is to increase the supply and it will sell like hot cakes. We at the IMF—no, make that we on the Planet Earth—have considerable experience suggesting otherwise. We earthlings have found that when a country in fiscal distress tries to escape by printing more money, inflation rises, often uncontrollably. Uncontrolled inflation strangles growth, hurting the entire populace but, especially the indigent. The laws of economics may be different in your part of the gamma quadrant, but around here we find that when an almost bankrupt government fails to credibly constrain the time profile of its fiscal deficits, things generally get worse instead of better.

Interestingly, Rogoff (2002) compares Stiglitz to Laffer:

No, instead of Keynes, I would cloak your theories in the mantle of Arthur Laffer and other extreme expositors of 1980s Reagan-style supply-side economics. Laffer believed that if the government would only cut tax rates, people would work harder, and total government revenues would rise. The Stiglitz-Laffer theory of crisis management holds that countries need not worry about expanding deficits, as in so doing, they will increase their debt service capacity more than proportionately.

In his bestseller *The Roaring Nineties*, Stiglitz offers a coherent critique of the policies of financial liberalisation pursued by Ronald Reagan, George H.W. Bush, and Bill Clinton. He argues that the Clinton administration placed too much faith in the markets. Of course, Stiglitz's perspective contrasts with many members of the Clinton administration. One of them is Robert Rubin⁵³. Rubin as the Secretary of the Treasury made tremendous influence on the economic policy in the 1990s. It was Rubin who insisted on deficit reduction and, according to Stiglitz, convinced the President to place his faith in the hands of markets. However, as Eichengreen⁵⁴ notes, Rubin's own memoirs, *In an Uncertain World*, reveal a deep and abiding scepticism of the efficiency of financial markets. Anyway, Stiglitz writes⁵⁵:

During the 1990s, with America's economy seeing triumphant, others were tempted to follow its lead. [...]. The U.S. Treasury said, for instance, that others should follow America's

53 Robert Edward Rubin (born August 29, 1938) is an American banker who served as the 70th United States Secretary of the Treasury during both the first and second Clinton Administrations. From January 20, 1993, to January 10, 1995, Robert Rubin served in the White House as Assistant to the President for Economic Policy. In that capacity, he directed the National Economic Council, which Bill Clinton created after winning the presidency. Rubin served as Treasury Secretary from January 10, 1995 to July 2, 1999, succeeding Lloyd Bentsen. Under Rubin's tenure, national deficits turned into surpluses (policy sometimes referred as Rubinomics).

54 Eichengreen (2004, p.3)

55 Stiglitz (2003a, p.xiv)

lead in corporate governance and accounting. They were correct in advocating good corporate governance and accounting; they were not correct in thinking we have found the right model

Stiglitz's work in the Clinton administration was as well focused on environmental issues, which included serving on the Intergovernmental Panel on Climate Change. He was involved in some legislation work as well.⁵⁶ Even though Stiglitz says that he is enormously proud of what President Clinton and his administration accomplished⁵⁷, he remains to be a stark critique of used economic policy. In the preface of *The Roaring Nineties*, Stiglitz writes:

[I]f I seem to grade the administration harshly, it is partly because of the high hopes that we had as we entered early in 1993⁵⁸.

Paul Krugman, a liberal economist, calls 1990s as the success of Robert Rubin and argues that “by decade’s end ‘Rubinomics’ was triumphant,” and that “at the beginning of the new millennium, then, it seemed that the United States was blessed with mature, skilful economic leaders”⁵⁹. US economic expansion in the 1990s was extraordinary; it was not only its strength, but mainly the stable, non-inflationary economic development.

Analysing the Clinton administration, the right question is whom Bill Clinton preferred; Joseph Stiglitz or his “opponents” like Robert Rubin or Lawrence Summers⁶⁰. Obviously in terms of economic policy, the US Treasury (Rubin, Summers) has by nature more influence than the Council of Economic Advisors (Stiglitz), which serves only as an advisory institution. However, this does not say anything about personal views of President Clinton. However, in Clinton’s memoirs⁶¹, the name Robert Rubin is mentioned on 21 pages, Lawrence Summers on 13 pages, while Joseph Stiglitz is mentioned only once, even though Bill Clinton calls him familiarly “Joe”.

56 A law for toxic wastes at which Stiglitz cooperated, was never passed.

57 Stiglitz (2003a, p.xxix)

58 Stiglitz (2003a, p.xxix)

59 Krugman, 2003, *The Great Unravelling*, pp. xxi-xxii.

60 Lawrence "Larry" Summers is an American economist and academic. He is the 1993 recipient of the John Bates Clark Medal for his work in macroeconomics, was Secretary of the Treasury for the last year and a half of the Clinton administration, and served as the 27th President of Harvard University from 2001 to 2006. Stiglitz and Summers have had bad relationship., Summers even successfully petitioned for Stiglitz's removal from the World Bank Chief Economist position in 2000

61 Clinton (2005)

2.7. Concluding remarks

In conclusion, Stiglitz as an institutional economist stresses out the role of institutions in modern world. He understands that neither countries, nor institutions are the same in contrast to the neoclassical theory. Stiglitz opposes social engineering but he is right in claiming that the policies we adopt today do shape our society. Leaving certain activities absolutely upon individuals would lead to a form of society, which is unacceptable for most of people. Stiglitz is right when he emphasizes the need for a collective action in certain issues, the necessary support of the non-governmental sector and other institutions in the broader sense, institutions that do not follow the simple profit-maximisation process⁶². Even though I disagree with some Stiglitz's statements⁶³, I largely value his contribution to the economic theory. What I consider important is the stress of economics as a science about people and their needs. Economics is then not only a simple utility-maximisation method subject to a budget constraint but more complex and more human-oriented social science.

Joseph Stiglitz wants to be heard. However, his arguments are sometimes controversial⁶⁴. For example, he appreciates the Chinese economic system⁶⁵, disagrees with the IMF policy, criticizes the Clinton administration, opposes the privatisation techniques used in the Central and Eastern Europe; this all makes Stiglitz an influential thinker in today's world. Moreover, his views on globalisation have many supporters in the anti-globalisation movement. Finally, he is critical of both the Clinton administration and the World Bank, both institutions where Stiglitz served and could have changed or at least could have influenced its policymaking.

To a Czech reader, this ambiguity of an economist first responsible for a policy making in 1990s and later becoming a critique of this economic policy, Stiglitz might remind

62 He often cites Herbert Simon of Carnegie Mellon University who was awarded the Nobel Prize for important contributions to the theory of organisational behaviour

63 For example, the author does not fully agree with Stiglitz evaluation of Czech privatisation process and with Stiglitz's positive approach to Chinese socio-economic system. Moreover, Stiglitz overly criticizes otherwise relatively successful President Clinton's economic policy

64 For example his critique that the budget reduction went too far while still in 1997 he praised this economic policy.

65 See for example China's New Economic Model (2007). There Stiglitz argues: "The old [Chinese] economic model has been resounding success, producing almost 10% annual growth for 30 years and lifting hundreds of millions of Chinese out of poverty (p.1)

of Tomas Jezek. Jezek was a co-promoter of the voucher privatisation, the Minister of Privatisation, and later the Chairman of the Fund of National Property. Jezek⁶⁶ stood at the roots of Czech privatisation. However, today he criticizes that time political representation and insufficient regulation of the whole privatisation process.^{67,68} Jezek too criticizes insufficient regulation and the economic policy of the Klaus' government in the 1990s. Jezek points at problems linked to the Czech voucher privatisation: bad regulation of investment funds, lacking legislation. This is very interesting as both economists come from the opposite part of economic thought. Stiglitz is a Keynesian, on the other hand, Tomas Jezek is a convinced liberal.

Stiglitz speaks about important issues that might not get so much attention without him. For Stiglitz as well as for many others, it is hard to share the conservative view that “poverty is an inherent part of a human fate”⁶⁹. Stiglitz's views on the fiscal policy are clear. As a Keynesian, he proposes fiscal expansion in economic downturn. “I believe strongly in the importance of investment, especially in new technology, for long term growth,” he says and adds, “in the short run, deficits may be absolutely essential for the recovery.”⁷⁰ Interestingly 28 pages later in the same book he writes that “[o]ur growth today should not be at the expense of the well-being of future generations.” This is quite inconsistent, debts have to be repaid and using budget deficit is in fact living at the expense of future generations.

However, new Keynesian economy today has evolved into fiscally conservative policy. While in the US, the Republicans – a conservative party – have shifted towards deficit financing policies and they abandoned the responsibility for maintaining the budget deficit low. In fact, the U.S. under conservative government have today one of the largest deficits ever, and the trend set by the Clinton administration, i.e. balanced or near-balanced budget

66 We might add that Jezek does not agree with Stiglitz on most of the issues. Speaking about Czech privatization, Jezek even thinks that Stiglitz is “an alien” (personal interview with doc. Jezek). Jezek probably thinks that Stiglitz does not understand problems linked to the transformation of formerly command economies because Stiglitz has lived all his life in the US

67 Jezek (2007)

68 With a little irony, we can one more thing that Jezek and Stiglitz have in common. Professor Klaus strongly disagrees with both. For example, Jezek's book *Zrození ze zkumavky* (2007) – one of the most important books written about the Czech transformation process – was strongly opposed by Klaus

69 Loužek 2007, p. 8

70 Stiglitz, 2003a, p.270

has been reversed. To put it simple, Democrats are today much more fiscally responsible than the Republicans.

To sum it up, Joseph Stiglitz raises important issues; without Stiglitz's awareness, some of them would not get attention they deserve. Stiglitz is might be right in promoting some collective action, supporting NGOs, cooperative activity, he points at other goals of a firm than a simple profit maximisation and he uses the word stakeholders rather than shareholders. These are all things that neoclassical economics often omits because they do not fit in its framework. Joseph Stiglitz is worth reading.

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3. Information asymmetry

3.1. Neoclassical economics

Neoclassical economics is based on certain assumption including well-defined property rights and stable economic environment. These assumption are, however, often unstated. Mainstream microeconomics has the following properties (Pareto⁷¹ judgments)⁷²:

1. Each individual is the best judge of his own welfare or utility
2. Society is perceived unorganically, i.e. as a sum of individuals. Therefore the society is formed by individuals only⁷³
3. If there is a possibility to reallocate resources leading to the increase of utility of one individual without a decrease of somebody else's utility, it leads to the increase of welfare in the whole society.

For economics for a long time, one of the postulates on which the theory was based was complete knowledge⁷⁴. However, this neoclassical economic analysis cannot explain institutional change. For example, the transition of a centrally planned economy during the transition period full of new deregulation, regulation, new legislation, and cultural change; this is a good example of institutional change where the neoclassical economics' implications may not hold. Post-communist countries have gone through simultaneous, extreme and systemic uncertainty. Such process cannot be compared to anything that the democratic states have undergone in the past. Therefore, standard economic policies that worked in developed countries do not work in a transition country. The American economist Armen Alchian⁷⁵

71 Vilfredo Pareto (1848-1923) was an Italian economist, philosopher, and sociologist. He was focused among other things on the analysis of individual decision-making and income distribution

72 Following Cullis and Jones (1998, p. 2). The author was lucky enough to be taught by Professor Jones one year at the University of Bath, UK.

73 We speak about economic objectivism that allows for the summing up of utilities and costs of various individuals. On the other side stands economic subjectivism that dismisses the option of summing up individual utilities. Most libertarians, Austrian economic school scholars, such as Murray N. Rothbard. He (1979) argues that "the sole concept of social costs and utilities is wrong." Contrary to Rothbard, Jan Sokol (in Fukuyama 2004, p. 124) says: "We can see another weakness of recent social thinking, this simplified perception of a man and the society. Individualistic model of society as a sum of otherwise selfish individuals who behave rationally in their materialistic interest does not by far describe the true human behaviour in the society"

74 Soros (2008, p.5)

75 Armen Alchian (1914) is an American economist who focuses on the property rights theory, transactional costs and he is the founder of new institutional economics

argues that people are not able to solve the economic problem of utility maximisation when they face uncertainty (Alchian, 1965). Also, Douglass North (1994, p. 359)⁷⁶ starkly criticizes neoclassical economic theory that is focused only on “the fundamental assumption of scarcity, competition, and analytical tools of neoclassical microeconomics”.

3.2. Theories of market

*Any object or phenomenon can be observed and approached from different angles, and the different perspectives result in different pictures of the landscape*⁷⁷

Using the idea of the preceding quotation we realize why economics is such an unclear science. Wearing different “glasses”, we see different things. Sometimes economists use oversimplifications, sometimes on the other hand. economic models are too sophisticated to be explained. As seen from the first essay of this dissertation, Stiglitz wants to bring the economic theory back to the reality. He tried most of his life to build an economic paradigm that would describe how people actually behave and not how people should behave to achieve perfect market efficiency. Therefore, it is crucial to understand that using different perspectives we yield different conclusions, some features are brought to the forefront, some features are omitted for simplification. Moreover, any model is only a model. It is supposed to be a simplification. The model is not supposed to explain everything; it should help to understand a certain process of behaviour. When engineers are fine-tuning the aerodynamics of a car, they do not need a car that actually works. What they need is a model of a car with approximately the same characteristics as the real, working car. The same is with economic models. The question is not whether the assumptions we make are too simplified but whether we still see, what we want to see and whether the model is suited for the purpose at hand and what guidance it offers. The perspective affects explanation in that it points to features and phenomena that need to be explained. It matters especially when we face complex phenomena (Hayek, 1978).

⁷⁶ Douglas North was awarded together with Robert William Fogel the Nobel Prize in 1993. North focuses on institutional economics and economic history.

⁷⁷ Snehota (1990)

What is a market? Such a question should be asked by everybody interested in economics, business, or in general any social science focused on behaviour of human beings. People using the word market in every day language do not seem to care much about the notion of the market. Market can be approached from different perspectives. As we commonly use the notion market, we should understand what it means.

As Snehota (1990, p. 16) puts it, even though economics is generally credited for the most consistent and complete conception and theory of markets, it is not easy to find a summary statement of the market conception in economics. Douglass North (1977, p.710) observed, “it is a peculiar fact that the literature of economics and economic history contains so little discussion of the central institution that underlies neo-classical economics.” A critique of neoclassical theory says that the theory does not have a proper market theory but rather a theory of price. It is because neoclassical theory sees the market as a tool for optimization of individual’s scarce resources, limited budget. Neoclassics proved that the market is the price determination mechanism. Neoclassical perspective of the market sees the product as the parameter of the market while price is a variable. Each product has a different market. Neoclassical microeconomics allows for the testing of the influence of substitutes and complements on the product but does not go much further. Moreover, neoclassical economics emphasizes the price as a tool for revealing information. It is generally accepted among neoclassical economist that price carries the most of (may be all available) information. Therefore, the relationship between buyer and seller is strongly limited to carrying exchange transactions and price signalling (Snehota, 1990, p.17). The principle of screening and signalling is a part of Stiglitz’s contribution to the economic theory. Following the neoclassical assumption of perfectly rational individuals, price – if not distorted by market imperfections – allows the market to clear and reach equilibrium⁷⁸. In general, the relationship

⁷⁸ We speak about Walrasian equilibrium. Together with the Nash equilibrium used in the game theory, they form the two most important equilibriums in modern economics. The equilibrium issue is also controversial. Many economists argue that we have to assume equilibrium; otherwise, we would not be able to predict much in economics. If we relax the perfect competition assumption, then we leave the Walras equilibrium and we have to use the game theory to reach the Nash equilibrium if possible. However, with game theory we are able to predict much less than in the situation with perfect markets.

between buyer and seller is in neoclassical economics vastly underestimated. These buyer-supplier relationships are crucially important especially for small and medium enterprises⁷⁹.

Neoclassical theory assumes that individuals are rational, perfectly informed, and have rational expectations. Modern microeconomics argues “it does not matter that some individuals are not rational, it is important that significant part of people are rational”. To put it simple I the tradition of institutional economics, the neoclassical price theory is coherent and strong but the neoclassical market theory is weak. Neoclassical market theory is not supported by empirical observation. This simplified neoclassical perspective has been challenged and criticized many times: Individuals are simply not rationally calculating machines.

Economist Chamberlain⁸⁰ (1933) was one of the first scholars allowing the product to be a variable rather than a parameter of a market. Later on, institutionalists emphasized the importance of rules both formal and informal during a transaction. Game theory allowed for deeper understanding of the difference between one-shot and repetitive (finite and infinite) games (i.e. transactions). It has been observed that many transactions are repeated and additional information apart from price play important role in the relationship between buyer and seller. The real economy is based on networking. People make large transactions with people they predominantly know or about whom they have some reference. It is straightforward that such a relationship reduces costs (transactional) and creates an opportunity for higher flexibility⁸¹.

Over time, economists (Richardson 1972, Coase 1988, Linderberg and Frey 1993) understood that continuous interactions between market players are the key supplement to price mechanism. Others like Joseph Schumpeter⁸² (1934), Douglass North (1990), or

79 For example, the author of this thesis was doing a research for a possible market entrant – a big supplier of automotive components. During many interviews with distributors of automotive components (garages) on the market, the main reason for not changing a supplier was the garage-supplier relationship. In conclusion, on the market where the quality of good is very important, the players value this relationship much more than price. However, neoclassical economics cannot fully incorporate the value of buyer-supplier relationship in its framework.

80 Chamberlain, E. H. (1933). *The Theory of Monopolistic Competition*. Cambridge, Mass: Harvard University Press.

81 For example flexible contract, longer repayment period, liquidity support.

82 The concept of creative destruction is being raised many times during the 2008 financial crisis.

Langlois and Robertson (1995) challenged the view that markets are stable or that changes of the market come from the external environment (changes in the production function, changes in preferences) only. In contrast, they argue that changes can come and usually come from inside of the market – so that changes in preferences and changes of production function and technologies emanate mostly within markets not outside them.

3.3.Economics of information

Motto: “[s]ubstantial portions of economic theory would not survive if economic agents could not be assumed to have transitive preferences.”⁸³

For understanding Stiglitz’s work it is important to define the basic assumptions of mainstream microeconomics that is being challenged by Stiglitz and to which Stiglitz tries to find an alternative. Stiglitz says:

These standard models made economics a part of technical sciences and all individuals in the economy became engineers. Each individual maximizes utility (firms maximize profit) subject to several assumptions (subject to budget constraint in the environment of perfect information. Modern microeconomics textbooks take into account information asymmetry however, the extent is not sufficient⁸⁴.

The following part therefore, shows how modern microeconomics deals with information asymmetry and how it is implemented in the microeconomic general equilibrium. For more than a century economics was focused on models in which the core assumption was the perfect information. The basic hypothesis of modern microeconomics is that individual decision-maker is rational. Rationality in economics can have the following properties⁸⁵:

1. Individual decision-maker is aware of all possible alternatives and does not take into account any alternative that is not for him available⁸⁶

⁸³ Mas-Collel, Whinston, Green (1995, p.7)

⁸⁴ See for example Mas-Collel, Whinston, Green 1995, p.709, Chapter 19.F Incomplete Markets. Authors describe not only uncertainty but also asymmetric information without leaving strongly mathematic microeconomics. The description of this approach follows.

⁸⁵ Based on ing. Ivo Koubek’s (Charles University lecturer),

⁸⁶ Advanced microeconomics, especially game theory is extending this rationality, which might contradict this assumption. For example the Rubinstein’s model in game theory yields the conclusion that: “Changing behaviour that would happen in contingencies that in fact will never arise can change behaviour in contingencies that do happen. Because it changes people’s behaviour in a way that make sure such contingencies never do arise

2. The decision-maker takes into account all information that is available or is worth searching for to estimate the consequences of his decision in each available alternatives
3. Following 1. and 2. the decision-maker ranks the alternatives according to her preference while this rank has certain assumptions (complete, transitive, continuous)
4. The decision-maker chooses the alternative which is the highest in his rank (therefore he prefers this alternative to all other alternatives and their consequences)

The key assumption is however the following⁸⁷:

There is also the so-called apparent irrationality. The costs linked with searching for such information are much higher than expected benefits from possessing such information. Therefore, customary behaviour can be the behaviour how to rationalize time and resources. However, the fact that some decision-makers are behaving irrationally, it is no big obstacle for accepting our hypothesis if in general there is a sufficient number of decision-makers behave rationally.

Information asymmetry, imperfect information and its consequences was the core of Stiglitz's research for more than twenty-five years. The simple outcome of this work can be summarized – as Stiglitz did in his lecture on receiving the Nobel Prize ⁸⁸ – such that information is a public commodity. Therefore, it is improbable that a private market will secure effective allocation of resources when information is an endogenous factor.

Information asymmetry is such a wide topic that it is impossible to cover it in one thesis. Generally speaking, information asymmetries influence our daily life. Appointment at a general physician, reading a newspaper, having a lunch in a restaurant, or investing on the financial markets; these are actions influenced by information asymmetry. Stiglitz (2001a, p. 472) believes that information economics represents a fundamental change of economic paradigm.⁸⁹ Economics is nowadays more than ever focused on the seeking the optimal balance between government and market and information plays an important role in this process.

⁸⁷ Based on Koubek (2007)

⁸⁸ Stiglitz (2001b)

⁸⁹ The author of this thesis worked for a global management consulting company. These companies largely benefit from the fact that management of companies does have neither perfect nor complete information about the market. Information is costly and the internet has not changed much on this.

Imperfection stands in stark contrast with perfection. The assumption of perfection is what makes mainstream economics hard to accept by the public. Assumption of perfect markets, perfect information, and full rationality are very far from reality. The key assumption of Stiglitz's economics is that markets are not perfect and everything else follows. Information asymmetries are market imperfections and they lead to market failures. Stiglitz even confronts Adam Smith and his most famous thesis, that free markets lead to effective allocation, as if by invisible hand⁹⁰. Stiglitz says that this thinking leads to a minimalist role of state in society. Professor Miłoch however, argues that this understanding of Smith⁹¹ is emanating from the misunderstanding of Smith's work.

To summarize mathematically what has previously been revealed literally, we can define rationality as follows:

Definition: The preference relation \succsim ⁹² is rational if it possesses the following two properties:

- (i) Completeness: for all $x, y \in X$, we have that $x \succsim y$ or $y \succsim x$ (or both).
- (ii) Transitivity: For all $x, y \in X$, if $x \succsim y$ and $y \succsim z$, then $x \succsim z$.

Therefore, rationality simply assumes that the individual has a well defined preference relation between any two possible alternatives. Stiglitz argues that microeconomics pretends that vast majority of people in general fulfil the above-mentioned assumptions of rationality.

Symmetric information means that all decision-makers possess the same information⁹³. When we allow for asymmetric information, conceptual problems arise.⁹⁴ Let us suppose that we have I consumers⁹⁵. With given probabilities $\pi_{si} = (\pi_{1i}, \dots, \pi_{Si})$, the state $s = 1, \dots, S$ occurs.

90 Smith 1976

91 Both of free-marketers and their critiques

92 The preference relation \succsim is a binary relation on the set of alternatives X , allowing the comparison of pairs of alternatives $x, y \in X$. We read $x \succsim y$ as "x is at least as good as y".

93 Another term that modern economics uses to simplify the reality. The substitution of "all" with "all concerned", modern economics avoids the critique of unrealistic assumption of all possessing the same information.

94 Mass-Collell, Whinston, Green 1995, p.716

95 Each consumer is different and we expect to have positive number of consumers, i.e. $i = 1, \dots, I$.

As soon as the state s occurs, we have one spot market. On this market, the first commodity (good or service) is traded against the second commodity (money – this commodity can be for simplicity normalised to 1). Consumption is a vector $x_i = (x_{1s}, \dots, x_{si}) \in \mathbb{R}^{2S}$ and is optimised by the consumer also according to the extended Neumann-Morgenstern utility function:

$$U_i(x_i) = \sum_s \pi_{si} u_{si}(x_{si})^{96}$$

The consumer has got the initial endowment, which is state dependent (dependent on $s = 1, \dots, S$) $\omega_i = (\omega_{1i}, \dots, \omega_{Si}) \in \mathbb{R}^{2S}$. Moreover, we assume that the signalisation function $\sigma_i(\cdot)$ associates the real number $\sigma_i(s) \in \mathbb{R}$ to each of the states $s \in S$. Let's suppose now that the state s occurs at the beginning of the period. That means that we also suppose that as soon as the state s occurs, the consumer is given the endowment ω_{si} and the signal $\sigma_i(s) \in \mathbb{R}$. This in fact means that the consumer is able to distinguish between the two states $s, s' \in S$ only if $\sigma_i(s) \neq \sigma_i(s')$ ⁹⁷. After the consumers receive the signal, the spot market opens. In the end of each period, the state of the world is being revealed and consumption takes place.

3.4. Information asymmetry

For the work with the previous assumption under the assumption of perfect information, please see Mass-Collell, Whinston, Green (1995), Chapter 19H. We are more interested in the case where the information is not symmetric. Asymmetric information would mean that the signalisation function $\sigma_i(\cdot)$ is private and are not necessarily the same among the consumers. If the state s occurs, each consumer receives $\sigma_i(s)$ and uses his signalisation

⁹⁶ $u_{si}(\cdot)$ represents consumer's Bernoulli utility function i in a state s

⁹⁷ Purely mathematically, it is necessary that the endowment vector $\omega_i = (\omega_{1i}, \dots, \omega_{Si}) \in \mathbb{R}^{2S}$ is measurable to the signalisation function. That means $\omega_{si} = \omega_{s'i}$ anytime $\sigma_i(s) = \sigma_i(s')$. We can therefore write ω_{si} as $\omega_{\sigma_i(s)i}$. Therefore, the consumer's endowment i does not reveal other information about the state of the world which were not revealed by the signal

function $\sigma_i(\cdot)$ to refresh the probabilities and utility functions. This defines the spot economy where we can find out the market-clearing spot price⁹⁸ for as $p(\sigma_1(s), \dots, \sigma_I(s))$.

We can see that $p(\sigma_1(s), \dots, \sigma_I(s))$ depends on each individual's signal⁹⁹. The price function $p(s) = p(\sigma_1(s), \dots, \sigma_I(s))$ does not have to be measurable to individual signalisation functions $\sigma_i(s)$. Hence, two states $s, s' \in R$ are not able to be distinguished by the consumer (i.e. $\sigma_i(s) = \sigma_i(s')$). These two states are – however – able to be distinguished by the market (i.e. $p(\sigma_1(s), \dots, \sigma_I(s)) \neq p(\sigma_1(s'), \dots, \sigma_I(s'))$). Mas-Colell, Whinston, Green (1995, p. 716) mathematically show, that it is rational for the consumers to take into account information revealed by the prices when consumers decide about their consumption on different spot markets. Therefore, we can perceive price as public signalisation function and every consumer can combine it with her own private signalisation function. That means that when the state s occurs, the consumer also knows that the situation $E_{p(s), \sigma_i(s)} = \{s'; p(s') = p(s) \& \sigma_i(s') = \sigma_i(s)\}$ occurs. Consumer refreshes his estimates of probabilities of the state $s' \in E_{p(s), \sigma_i(s)}$ to

$$\pi_{s'i} \left| p(s), \sigma_i(s) = \frac{\pi_{s'i}}{\sum_{(s'), s' \in E_{p(s), \sigma_i(s)}} \pi_{s'i}} \right.$$

If the refreshed utility function $p(s)$ clears the market for all s , we say that the price function $p(\cdot)$ is the rational expectations equilibrium price function¹⁰⁰.

3.5.Applications of information asymmetry

Many believed that with the increasing internet penetration, globalised network, where everybody can get any information at any time, there would be a shift towards the assumptions of neoclassical economics. People would be fully informed, they will behave more rationally, they will be aware of all available alternatives. This shift has not happened.

98 Spot price (commodity or stock price) is a price that is quoted for an immediate deal. On the other hand, the forward price is set today, however the delivery occurs in the future.

99 We say that the market aggregates information of the market participants.

100 Rational expectations equilibrium price function. For accurate definition, see Mas-Colell, Whinston, Green (1995, p. 721)

The concept of information asymmetry is also very useful when we study markets. For example, it is interesting to apply the concept of information asymmetry in the centrally planned economy (CPE). In the CPE, the price does not carry about the information as in the market information; the opposite is true. In the CPE, the price is rigid, set by the planning centre and most of all, it does not represent the interaction of demand and supply

There are many other implications emanating as a result of information asymmetry: adverse selection¹⁰¹, signalling¹⁰², moral hazard¹⁰³, or screening¹⁰⁴. There is also the problem of information asymmetry after signing or agreeing a contract (the so-called post-contractual behaviour); this opens the principal-agent topic. Information asymmetry can also be the explanation of the so-called home bias arguing that investors prefer to invest in a country that they know (their home country) rather than in a country when the returns might be higher.

Information asymmetry forms the basis of Joseph Stiglitz's models. For example in his work *Dividend Taxation and Intertemporal Tax Arbitrage*,¹⁰⁵ he – together with Anton Korinek – created a life-cycle theory of a firm which analyses the effects of dividend tax policy on aggregate investment. They prove that that new and young firms have bigger problem with finding capital and therefore they invest less with increasing dividend tax rate – this is intuitive and with a relation to the traditional view on dividend tax policy. However, they prove that for internally growing and matured is the dividend tax policy irrelevant. And

101 Adverse selection is the result of information asymmetry between the seller and the buyer. It is for example the bias to get less credible applicants for credit in the banking sector or the bias to get clients that are more vulnerable to indemnity in the insurance sector

102 Signalling is the notion that one side of the contract (agent) reveals meaningful information about himself to the other side of the contract (principal). On the labour market, it was for example economist Michael Spence (1943) who studied the theory signalling. Signalling assumes that the agent is active and reveals the information

103 Moral hazard is the situation when the insured person behaves in a different way than if he had not been insured and would have to pay for the damage/loss on his own

104 Screening is also the strategy how to avoid asymmetric information. The author of this concept is also Michael Spence. There is however the assumption that the less-informed (principal) is active (plays first in the game theory notation)

105 Korinek and Stiglitz (2006). This model is however hardly applicable to the Czech economy. It assumes that the only source of capital for firms are capital markets. In the continental Europe – including Czech economy – it is mostly banking sector that provides firms with capital. The model also assumes that the firm maximises its value $V(M_0)$ which is in the model discounted flow of dividends D_t facing dividend tax rate τ :

$$V(M_0) = \max_{\{D_t, I_t, M_{t+1}\}_{t=0}^{\infty}} E \left\{ \sum_0^{\infty} \beta^t (1 - \tau) D_t \right\}, \text{ where } I_t \text{ is investment and } M_{t+1} \text{ is the money in the period } t+1$$

because internally growing and matured firms dominate aggregate investments, the dividend tax policy or expected change of this tax rate do not give significant influence on aggregate investment and output.

3.6. Markets and information asymmetry

The place that is crucially dependent on information are financial markets. Financial markets are the meeting point between the supply and demand for capital (in the form of debt and equity). Moreover, Merton and Bodie (2007) extend the definition and they distinguish six functions of financial markets:

- To supply and manage means of payments
- To collect savings for investment
- To transfer economic wealth through time and space
- To offer risk management instruments
- To produce/diffuse information
- To restrict the conflicts caused by asymmetric information

Schmukler (2004) argues:

One of the primary potential benefits of financial globalization is the development of the financial sector, enhancing the provision of funds for productive investment opportunities. Financial globalization helps improve the functioning of the financial system through two main channels: by increasing the availability of funds and by improving the financial infrastructure, which can reduce the problem of asymmetric information. As a consequence, financial globalization decreases adverse selection and moral hazard, thus enhancing the availability of credit.

This is basically in line with neoclassic. The neoclassical idea is that financial markets are self-correcting and tend towards equilibrium. However, Solow (2008, p.7) challenges this notion:

There is a two-way connection between the facts and opinions prevailing at any moment in time: on the one hand, participants seek to understand the situation (which includes both facts and opinions); on the other, they seek to influence the situation (which again includes both facts and opinions).

Successful market economies develop because a society created framework conducive for their development. Institutions are vital for a well-working economy¹⁰⁶. Douglass North was an elegant scholar of this view; in his analysis of the development of market economies, he points out the importance of supporting institutions to the market. Successful market economies develop because a society created framework conducive for their development. On the contrary, where these supporting institutions are not created nor do function properly, market economy does not evolve.

Information plays a crucial role on the financial markets. When information is imperfect and markets are incomplete¹⁰⁷ markets are not constraint to be Pareto-efficient. This is the contradiction to the fundamental theorem of welfare economics says that competitive equilibrium leads to efficient resource-allocation. The current economic crisis started as a microeconomic failure and transformed into a macroeconomic problem. The crisis was to a large extent caused by the information asymmetry. Mismatch between private rewards and social benefits is very much linked with market failures. Moreover, the fact that banks all around the world are unable or rather unwilling to lend money to their clients proves that information asymmetry plays large role in every day life.

Stiglitz (1989, p.197) notes that market failures may be ameliorated by non-market institutions. It is also obvious that capital markets have not functioned well over past few years. They basically did not fulfil their functions mentioned above. Financial markets were unable to diversify risk, they produced and diffused wrong information and they did not restrict the conflicts caused by asymmetric information, rather they created the conflicts¹⁰⁸.

Soros¹⁰⁹ comes with the concept of reflexivity. He argues that market participants can not base their decision on information (knowledge) alone. Participants' perceptions have ways of influencing not only market prices but also the fundamentals that those prices are supposed

106 Douglass North was awarded the Nobel Prize in 1993 "for having renewed research in economic history by applying economic theory and quantitative methods in order to explain economic and institutional change" (source: http://nobelprize.org/nobel_prizes/economics/laureates/1993/index.html, downloaded December 10, 2008).

107 Which means always, as Stiglitz points out (for example during his speech at The Nobel Prize Laureate Meeting at Lindau in August, 2008).

108 Another application of the theory of asymmetric information is in Chapter 4.

109 Soros (1994 and 2008)

to reflect. He argues¹¹⁰ that the decision-maker's thinking plays a dual function. On the one hand, they seek to understand their situation (cognitive function). On the other hand, they try to change the situation (participating or manipulative function). The two functions work in opposite directions and, under certain circumstances, they can interfere with each other. This is called the reflexivity.

Another application of information asymmetry is mergers and acquisitions. There are very few successful companies in today's global economy that do not have to grow or change in order to maintain and strengthen their market position. There is an ever-increasing tendency to achieve this growth and change through acquisition. One of the greatest challenges to the acquisition process is the fact that the acquirer and the acquired do not really know enough about each other's business despite the determination to make the acquisition (see Figure 1). We call this information asymmetry and it is one of the reasons acquisitions fail¹¹¹.

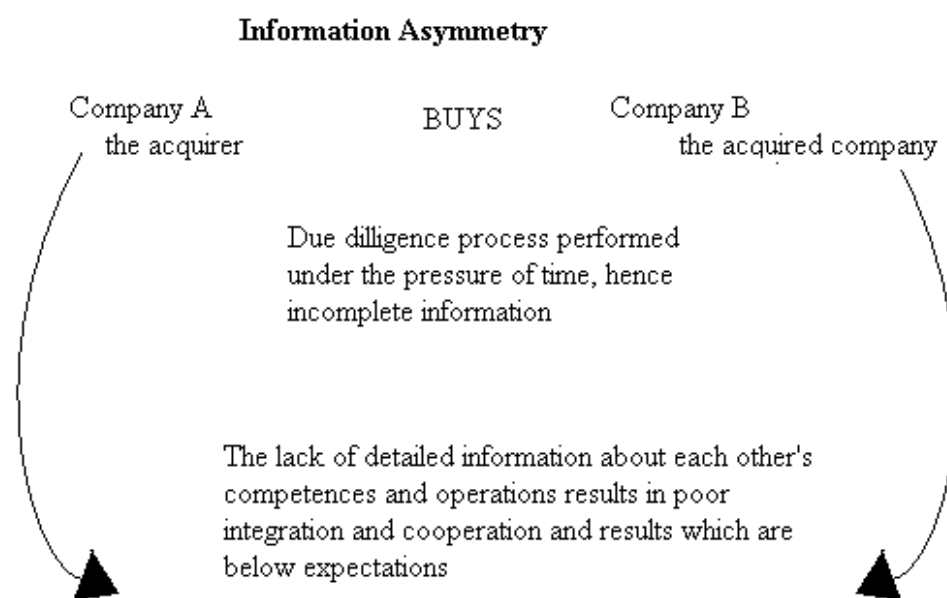


Figure 1: Information asymmetry in Mergers and Acquisitions. Even in specialised institutions such as investment banks, there is no guarantee that there is enough information

110 Soros (2008, p.viii)

111 <http://www.aegisgroep.nl/frameset1.htm?stratned.htm~Aegiscontent>

about the acquired company. That is one of the reasons why many M&As fail. Source: www.aegisgroep.nl

3.7. Information asymmetry and technology¹¹²

In this part, I will try to assess the effects of globalization on the levels of technology and information in different parts of the globe. Current stage of globalisation allows for the transmission of knowledge at a pace never seen before. New technologies, communication channels like the Internet, or cheap travelling allow people and regions to share knowledge, information, and technology. This part asks whether this unprecedented level of development leads to a convergence or a divergence in the technology and information levels. I will emphasize the concept of information asymmetry with respect to disruptive innovation and reverse-engineering. In order to satisfy my research aims, I will first describe the current state of globalisation, the New economy, and the effect of increased trade on technology and information levels. Then, I will present some theoretical models: I will analyse the Solow growth model (which forms the basis of any international growth theory), largely used in macroeconomics. The central conclusion of the model is that long-run growth of output per worker depends only on technological and information progress. Therefore, the model links the convergence of the technology and information levels with wealth-creation. Then, I will present alternative views on technology growth including the total factor productivity. I discuss the endogenous growth theories, and the theory of free market. In the second half of this part, I will describe whether convergence in technology and information levels occurs and if it does not occur, then what are the reasons for the divergence. Moreover, I will try to find the link between information, technology, and the level of innovations. Finally, I will discuss the role of multinational companies and government in technology diffusion.

There is a significant role of the multinational companies in technology convergence. The role of government is more limited. We will discuss it as well. The conclusion of this part is that current level of globalisation is affecting the level of technology and information more than ever before. However, we do not see technology and information convergence as predicted by several theoretical models. On the other hand, countries with lower level of technology and information can benefit from the concepts of disruptive innovation or reverse-engineering.

¹¹² A revised version of the paper submitted at the London School of Economics in January 2009

3.8. *Contemporary globalisation*

First, we should define the current state of the world that we call globalisation. During recent years, we are experiencing already the third wave of globalisation¹¹³. Hatzichronoglou¹¹⁴ notes that before this period of globalisation there was a period of internationalisation during the 1950s and 1960s, however the complex stage of globalisation corresponds to changes that took off in the 1980s, including deregulation and liberalisation¹¹⁵. Globalisation is the closer integration of the countries in the world because of lower transportation and communication costs. Globalisation makes everybody in the world interdependent. It means more than just the freer movement of goods, services, capital, and people but also the freer and faster movement of ideas. Today, in the era of the internet, we can immediately share new technology innovations; we can read scientific articles that lead to technology spill over around different regions.

The economy has changed since 1990. The technological innovation and especially the computer revolution, the Internet had become a part of the world's economy. The so-called New economy, that took place in the 1990s, represents among others just-in-time production, a shift of production of goods to the production of ideas, and technology innovation. In the US, manufacturing had shrunk to 14 percent of total output and even smaller proportion of total employment and there are now four-times less unskilled jobs than in 1950s. Since 1980s, new technologies came up, clustered around technology and new media, as well as around biotechnology and new materials¹¹⁶. These new technologies have led to a series of product (computers, CD-ROMs) and process innovations (e.g. the use of information within organisations, Just-in-time production), as well as to the rise of entirely new companies and industries¹¹⁷.

113 First wave of globalisation took place between 1850-1914. After the post-WWI retreat another wave of globalisation took place between 1945-1980

114 Hatzichronoglou (1999, p.7)

115 Apart from these changes that took off in 1980s, the World Bank (2001) mentions other: De-regulation and liberalisation in developed and developing countries, advances in information technology, fall in cost of communications, partial integration of world financial markets, changing relationship between investors and managers, focus on "shareholder value"

116 For more, see Rob van Tulder and Gerd Junne, *European Multinationals and Core Technologies* (London, and Sons, 1988)

117 Stubbs and Underhill (2006, pp.321-323)

Stiglitz (2003a, p.1) argues that historically the whole process of globalisation has been marked by asymmetries. Globalisation is very much linked with increased capital flows. Intuition would say that capital inflow brings about technology inflow and therefore globalisation leads to technology convergence. Theories of “divergent” development, on the contrary, predict that the economy durably divides the world into winner and loser places, where some places would always be appreciably richer than others would

With respect to information asymmetry theory, we should be asking the following questions: Has the new economy led to convergence or divergence in technology and information levels? Has it led to higher level of innovation? It is certain that the current development opens new ways for the developing countries to close the gap in technology and information levels. New technologies like Internet and cheap travelling and transport reduce boundaries in technology and knowledge spill over. In general, the Internet makes all players on the market more informed. Counter intuitively, it does not mean that it makes individuals better informed¹¹⁸. The boom of high-technology industry in the 1990s which was linked with ongoing globalisation produced innovations that profoundly altered an economy’s mix of firms, industries, and jobs (as predicted by Luker, 1997)

3.9. Trade and developing countries

We can see globalisation of goods market, markets with services, and financial markets. In all these markets, players are more demanding, markets are more matured, saturated, more sophisticated. Do we see globalisation of technology and information? Today more than ever before, both the external and internal environment is evolving and therefore it affects the level of technology distribution around the world. That includes the evolution of technology parks, knowledge transmission, or innovation. The advances in information technology allow for easier communication. New technologies allow for better communication between regions, between companies, better expertise sharing¹¹⁹. New technology makes it easier to send information across the world at negligible cost. With the

118 In game theory, we distinguish a perfect-information game (i.e. a game where all players move sequentially and all past actions are observable) and a complete information game (i.e. every player knows the payoffs and strategies available to other players)

119 In the past, the problem was not that the company did not have knowledge in the company. The problem sometimes was that the company did not know that they had certain knowledge in the company. Recently employees start putting their knowledge online, they share their professional interests and they allow for information sharing.

deregulation of the markets and better information technology developed over the last two decades, one would expect the technology and information levels to converge.

The issue of globalisation is very linked with some central questions of macroeconomic theory.¹²⁰ Therefore, we ask: How is the world's technology knowledge distributed around different regions? Trade in general should lead to convergence in technology and information. In 1990s, the age of outsourcing started; firms began to focus on their core competencies by outsourcing certain activities¹²¹. This largely affected technology and information convergence. Both old and new trade theories¹²² conclude that trade improves economic performance. David Ricardo's famous theory of comparative advantage suggests that the bigger the trade the higher level of specialisation. This would suggest – contrary to the first notion – that globalisation would not lead to technology convergence, as regions would become much more specialised in what they produce.

Globalisation can promote technology and innovation. Free trade in general brings about transfer of technologies from one region to another, which leads to higher innovation. With increasing globalisation, the number of joint ventures (JVs) increased. JVs can be an effective type organisation for technology and information sharing¹²³. The developing countries regularly ask whether they really benefit from the current way of globalisation, whether they have access to technologies that developed countries have, and if not whether they can succeed without this technology. The unfinished Doha Round of trade negotiation harms regions that could benefit from technology spillovers¹²⁴.

120 Like for example: Why are some countries poorer than others are? Why is there unemployment? What are the sources of economic growth?

121 See C.K. Prahalad and Garry Hamel, 'The Core Competence of the Corporation', Harvard Business Review (May-June 1990): 79-91

122 Old trade theory is based on the assumption of absolute and comparative advantages, first analysed by Adam Smith and David Ricardo in 18th and 19th centuries. New trade theory is the economic critique of international free trade from the perspective of increasing returns to scale and the network effect. It also takes into account changing technology and imperfect competition.

123 Some companies such as China and to some extent India require or required foreign companies to create JVs with domestic companies. One of the reasons was information and technology sharing

124 As of 2008, talks have stalled over a divide on major issues, such as agriculture, industrial tariffs and non-tariff barriers, services, and trade remedies (Fergusson, 2008).

Most of the trade is taking place within regions (EU, US, Asia), and not between the regions. Developing countries even extend great effort to adopt existing technologies, often they have to face several measures from the developed countries or international organisations in terms of intellectual property rights (Trade related property rights, TRIPs). It is also true that many poor countries in the past succeeded to become technological centres of the world (India, South Korea, or regions in China). However, the spillover of technology is not only between countries and regions but also within countries. For example India's Silicon Valley: Bangalore has reached incredible level of technology, while the villages and remote places remain extremely poor and the level of technology there is nonexistent.

3.10. Theory of technology and information

The notion is that knowledge is a public good. That means that marginal costs of somebody else using the knowledge are zero. Ultimately, any restriction of the usage of knowledge (such as Intellectual property rights) introduces inefficiencies in the economy. The ultimate assumption of our theory is that the production of technology and information is very different from the production of normal goods. The technology is very much linked with the technology growth. Robert Solow in 1957¹²⁵ tried to decompose the technological growth and argued that most of economic growth was not related to increases of inputs (labour, capital) but to increases in productivity. This paper was the beginning of the discussion about the sources of economic growth itself. Later in 1962, Kenneth Arrow published a paper about *learning by doing*¹²⁶ simply stating an intuitive but for economics long omitted fact that during a production process one learns. One of the consequences is explicit expenditure to research. Externalities have impact on the technology growth.

Traditional economics has focused on the allocation of inputs amongst sectors, on the barriers of movement of capital, labour, or the distortions of the allocation of capital and labour across sectors and countries. Moreover, standard economics argues that in optimum the economy produces on the production possibility frontier; however, this is not always true. Another set of ideas important to technology is linked with the work of Kenneth Arrow and

125 Technical Change and the Aggregate Production Function, Robert M. Solow. The Review of Economics and Statistics, Vol. 39, No. 3. (Aug., 1957), pp. 312-320

126 Arrow, Kenneth J. (1962). "The Economic Implications of Learning by Doing". Review of Economic Studies 29: 155-73

Gerald Debreu proving the conditions under which the competitive equilibrium was Pareto efficient. One of the assumptions was that technology was fixed (i.e. not endogenous). However, the exogeneity of technology is only a theoretical concept. In reality, technology is endogenous which might result into market failures. The starkest conclusion is that when technology is endogenous – which is always the case – market outcomes are in general not efficient. The goal of economic policy is therefore to increase the ability of the economy to learn which would lead to economy that is more productive and it would increase the standard of living. Stiglitz even argues, “creating a learning society should be one of our major objective in economic policy.”¹²⁷

3.10.1. Definition of technology

First, we should define the term technology. According to Kemeny (2008, p.3) technologies are rules and ideas that direct the way goods are created. In the framework of endogenous technology change, technology has three major characteristics¹²⁸ :

1. Technology is non-rival in the sense that the marginal costs for an additional firm or individual to use the technology are negligible.
2. The return to investments towards new technology are partly private and partly public;
3. Technological change is the outcome of activities by private agents who intentionally devote resources towards the invention of new products and processes¹²⁹ .

Technology, information and the process that produces it, research and development (R&D), are typically characterized as homogeneous entities. In reality, the typical industrial technology is composed of three elements: a generic technology base, supporting infra-technologies, and proprietary market applications (innovations)¹³⁰. It is crucial for our analysis to define whether technology is a public good. Public goods have two distinct aspects: they

¹²⁷ A part of his speech during the inaugural Kenneth J. Arrow lecture at the Columbia University “Helping Infant Economies Grow: Promoting Innovation and Learning in Developing Countries”. November, 12th 2008

¹²⁸ The theory of endogenous technical change views technology as knowledge. It was proposed by Aghion and Howitt (1992), Grossman and Helpman (1991), Romer (1990), and Segerstrom, Anant, and Dinopoulos (1990).

¹²⁹ Summarized in Keller (2001)

¹³⁰ Tassej (2005, p.10)

are non-rivalrous (one's consumption does not affect consumption of the other) and non-excludable (costs of keeping non-payers from consuming the good is prohibitive). Tasse (2005, p.11) argues that a generic technology base and supporting infra-technologies have public good characteristics, while innovation does not. Stiglitz argues that knowledge is a classical example of public good¹³¹. Thomas Jefferson used the example of a candle: When we take a candle we can light another candle, the first candle still continues to glow¹³². The light of a candle can thus be transmitted from one person to the next and not diminish and not diminish as it goes on. Romer (1990) emphasises that all types of knowledge share one essential feature: they are nonrival. That is, the use of an item of knowledge, whether it is the Pythagorean Theorem or the soft-drink recipe, in one application makes its use by someone else no more difficult¹³³. An immediate implication of this fundamental property of knowledge is that production and allocation of knowledge cannot be completely governed by market forces (Romer, 1996, p.112). However, while knowledge might be nonexcludable, technology is excludable: There might be legal constraints (patents, TRIPs¹³⁴) that create significant legal constraints to the technology usage. Therefore, technology is not a pure public good.

There are also large externalities associated with technology and information¹³⁵. New technologies, new information create significant positive externalities to the while business and economy. Direct international learning about a new technology means that a blueprint is known not only to a firm in the country where the blueprint was first developed (or firms, if there are domestic spillovers), it also becomes known to firms in other countries. Such learning involves a positive externality—hence: spillover--if the technological knowledge is obtained at less than the original cost to the inventor.¹³⁶ Therefore, Stiglitz (2003a, p.7) believes that the government should support the creation and adoption of new technologies. As Kemeny (2008, p.4) orthodox economic models assume technology to be "universally and

131 For example in Stiglitz 2003a (p.3)

132 Stiglitz (2003a, p.3)

133 On the other hand, conventional private economic goods are rival. If someone consumes it, he affects the consumption of somebody else.

134 Trade related property rights

135 Whenever there are externalities, or public good, market outcomes will not be efficient.

136 Keller (2001, p.6)

freely available" even though they are in reality not. Keller (2001, p.5) concludes that technology is partially private, partially public goods. That implies that while there is a force that might be strong enough to sustain the private incentive to innovate (the private return, which is often a temporary monopoly), technological investments may also create benefits to firms and individuals external to the inventor by adding to their knowledge base (the public return). These benefits are usually called knowledge spillovers.

3.10.2. The Solow model¹³⁷

In the 1950s and 1960s it was thought that it is capital that developing countries lack to catch up with developed countries. However, it is more recognised nowadays that what separates developed from less developed countries is also a gap both in knowledge and in technology.¹³⁸ Developing countries realised soon that it is not only capital that they lack to catch up with the developed world. In 1956, Prime Minister Jawaharlal Nehru addressed fellow citizens at the site of the first Indian Institute of Technology (IIT) by suggesting “...here...stands this fine monument of India, IIT, today representing India’s urges, India’s future in the making.” (Kemeny, 2008, p.1). Therefore, what is needed in order to make less developed countries into more developed countries was to transfer technology¹³⁹.

The Solow growth is the starting point for almost all analyses of growth. The principal conclusion of the Solow model is that the accumulation of physical capital can not account for either the vast growth over time in output per person or the vast geographic differences in output per person¹⁴⁰. However, the Solow model treats potential sources of real incomes as exogenous and thus not explained by the model or absent altogether. Therefore neither technological progress nor externalities¹⁴¹ (positive or negative) from innovation or from globalisation are captured by the Solow model.

137 The Solow model is sometimes called the Solow-Swan model. It was developed by Robert Solow (1956) and T.W. Swan (1956). Mathematically is described in the annex.

138 Stiglitz (2003a, p.2)

139 Stiglitz (2003a, p.2)

140 Romer (2001)

141 An externality is an effect of a purchase or use decision by one set of parties on others who did not have a choice and whose interests were not taken into account. An example of a negative externality from free trade: Countries that have preferential access to the

The Solow growth model can help us to explain the differences in output per worker via the differences in the effectiveness of labour¹⁴². The overall conclusion of is that only differences in the effectiveness of labour (A) have any reasonable hope for accounting for the vast differences in wealth across time and space¹⁴³. However for the Solow model, the effectiveness of labour (technology, A) is exogenous. Therefore to understand cross-country differences in real incomes, one would have to explain why firms in some countries have access to more knowledge than firms in other countries, and why greater knowledge is not rapidly transferred to poorer countries¹⁴⁴. The conclusion of the Solow model is in the long run the growth of output per worker depends only on technological progress¹⁴⁵. However, the Solow model assumes that new technology is instantaneously available to everyone (Kemeny, 2008, p.3). Developing countries lack capital and one unit of capital brings them higher growth than to developed countries and in the long run there is convergence of GDP growth per capita though this converge does not necessarily lead to the same GDP per capita in developed and developing countries.

The Solow model can conclude that the income differences can arise because some countries are not yet employing the best available technologies. Whether these differences shrink over time affects the convergence of output per worker. Empirics suggests that initial income is not so important and that the capital is not flowing rapidly from developed to developing countries as Lucas (1990) proves. However over past 20 years, there was significant decrease in the so called home bias (the fact that investors preferred to invest in their home country even though abroad they might achieve higher returns) and the flow of capital to developing countries has increased. Young (1994) uses detailed growth accounting to argue that the unusually rapid growth of Hong Kong, Singapore, South Korea, and Taiwan

European market (for example former colonies) might benefit from technology spillovers. When free trade is achieved, all countries have the same access and those countries are losing their advantage. Example of a positive externality: Silicon Valley. Knowledge spillovers lead to higher level of innovation.

142 Generally, the Solow model identifies two possible sources of variation – either over time or across the world – in output per worker: differences in capital per worker (K/L) and differences the effectiveness of labour (A).

143 Romer (2001, p.23)

144 There are other interpretations of A: the education and skills of labour force, the strengths of property rights, the quality of infrastructure, and cultural attitudes towards entrepreneurship (Romer, 2001, p.25).

145 However, short-run growth can result from either technological progress or capital accumulation (Romer, 2001, p.27).

over the past three decades is almost entirely due to rising investment, increasing labour-force participation, and improving labour knowledge (education), and not to rapid technological progress and other forces affecting the Solow residual. On the other hand, South Korea has become a major producer in high-technology and electronics and its innovations come from there as well.

The Solow model cannot account for why some economies remain more productive than others do. Stiglitz (1989, p. 197) argued that the predictions of the standard neoclassical growth model, of a convergence of growth rates in per capita income, with permanent differences in per capita consumption being explained by differences in savings rate and reproduction rates, do not seem to have been borne out¹⁴⁶. Technology and information is important in income levels across regions. The accumulation of capital cannot explain all of the cross-regional income differences. Keller (2001, p.7) suggests that the higher is the relative importance of non-codified knowledge, the more are technology creation and diffusion geographically centralized. It is natural to extend the Solow model and to model the growth of technology (A) rather than to take it as given. Endogenous growth theorists propose general equilibrium models in which technological inputs, such as human capital and research and development (R&D) drive an economy's overall growth rate. The extent of this essay does not allow for full description of the model¹⁴⁷. They are called endogenous because they explain economic growth from within the model. Mankiw (1995) and Parente and Prescott (2000) think of technological knowledge as a global pool of knowledge, available to firms and individuals in all countries.

The issue of technology convergence is also very important for the free trade talks. If technology convergence will not be achieved after the liberalisation of trade, then there will be significant winners and losers of trade liberalisation. The liberal perspective praise free market and the invisible hand ensuring efficiency and equitable distribution of goods. The optimal role of governments and institutions is to provide the smooth and relatively unfettered operation of markets. In contrary to the liberal theory stands mercantilism. According to mercantilists, the world trade is about competition among states, which try to maximize their

146 However, I believe that the main difference of the divergence is the production function $F(K)$ of particular countries rather than only savings rate and population growth

147 For full description of the R&D model see Romer (2001)

power and position in the global market; the welfare of the state is being maximized through self-sufficiency. Trade quotas, subsidies, and tariffs are the basis of mercantilist economic policies. Main assumption of neoclassical theory is that free trade benefits all. International economics theory (e.g., Krugman and Obstfeld 2003) often stresses that the ‘winners’ from trade liberalization outweigh the ‘losers’. Theoretically, freer technology usage could yield a lot for the poor in developing countries. A substantial liberalisation of technology diffusion can lead to:

- better allocation of resources,
- higher incomes
- increased purchasing power in developing countries and globally
- help developing countries escape poverty.

3.10.3. Total factor productivity

Total factor productivity (TFP) is a variable which accounts for effects in total output not caused by inputs. For example, a production with a certain type of technology or information might tend to have higher output, because workers are used to this type of technology. Variables like technology or local habits do not directly relate to unit inputs, so technology might be considered a total factor productivity variable. We do have indications that countries vary in their total factor productivity (TFP), and that these differences are related to economic growth (Prescott 1997). However, there is no agreed upon way of evaluating technology’s contribution to TFP (Prescott 1997). Kemeny (2008, p.8) argues that the total factor productivity remains exogenously determined black box. Most observers consider that accounts for some significant proportion of TFP, but we lack an accepted method for decomposing TFP, or even an accepted theory of its constituents (Prescott 1997). Keller (2001, p.6) argues that if technological knowledge is global and countries differ in their resistance to adopt it, then total factor productivity is country-specific, and bilateral or spatial characteristics should play no role for the distribution of technological knowledge in the world. For information asymmetry these are important notions.

3.11. Contemporary evidence on convergence¹⁴⁸

Countries and regions differ in the level of innovation. The question is how to measure it. There are similar problems as when we wanted to measure technology. Kemeny (2008, p.3) argues that to measure only R&D expenditures is not accurate as we would miss innovative efforts when imitating and adapting products and services which in turn reduce the innovation effort in developed countries (Jovanovic 1995).

The most used variable that compares convergence between regions is GDP per capita (income per capita). The biggest problem of income per capita is that it does not and cannot capture all consequences. It is not able to capture environmental damages, unethical behaviour, usage of child labour, or bad working conditions. Moreover, it is not able to capture the level of technology and information used in the production process. Kemeny (2008, p.2) notes that as technology is latent in the economy, embodied in products and services, it is very hard to measure it and therefore it is very difficult to measure technology gaps or information asymmetry between regions. Kemeny argues (2008, p.3) that country's technology positions are relatively stable over time and that most countries did not leap from one level to another.

Moreover, it is no longer true that the most advanced technology is in the US and Western Europe. For example, South Korea, Japan, or Singapore have much more developed modern technology use. One of the central ideas that have emerged in the last 10 years has been that successful development requires not only closing the gap in resources between the developed and less developed countries but also closing the gap in technology, in knowledge¹⁴⁹. Strong diffusion of technology is a force towards convergence, because it equalizes differences in technology across countries. Conversely, the absence of international technology diffusion favours divergence¹⁵⁰. Developing countries spend relatively less on

148 In part, the current wave globalization can be compared to the Atlantic economy at the end of 19th century. About 85% of the factor price differences between many regions of Europe and the Americas were wiped out between 1870-1914 (Source: Professor Storper's lectures at the London School of Economics). However, this model has different prediction about convergence. The econometric evidence shows that the majority (60%) of the convergence was due to labour migration, and a smaller proportion was due to trade (25%), and the rest due to residual factors.

149 Stiglitz (2003a, p.2)

150 Keller (2001, p.2)

R&D. Therefore, they rely even more on foreign sources of productivity growth than developed countries.

The level of innovation is generally dependent on three factors: Technology competition, flexibility, and the public sector. In the 1990s, the technology competition involved technological innovation and led to the so-called IT revolution. Moreover, the 1990s was a decade of smooth advances in technology as the large decrease in prices of microchips allowed computers to become really personal. Flexibility involves technology competition on the goods and services market, flexible labour market, easy access to capital sources. As technology has the partially public/private good characteristics it affects innovation through the channel of externality. Keller (2001, p.5) uses an example that the design of a new product might speed up the invention of a competing product, because the second inventor can learn from the first by carefully studying the product, or even the production design.

The technology and information is unequally distributed across the globe in its use and its creation both affecting the global division of labour.¹⁵¹ The unequal distribution of technology does not necessarily mean that the world is worse off. One of the advantages of the unequal technology and information levels is the concept of disruptive innovations. The developing countries are considered imitators of products and technologies from the developed world. They can find new ways of efficiency, cost-cutting, and innovation. Therefore, it is not true what Kemeny (2008) tries to suggest that it is only the developed countries that pursue innovations. It is not always necessary to possess the highest available technology to become successful. The concept of disruptive innovation stresses the importance of different technology and information levels. Countries with lower technology and information levels want to reach the same standard of living. Therefore, they use the technology they have available and find new ways of efficiency, cost-cutting, and innovation¹⁵². It might also be possible to acquire the technological knowledge embodied in

151 Professor Storper lecture notes (Storper, 2008)

152 Think for example of the Indian automaker Tata and its Tata Nano

an intermediate good by taking it apart and reverse engineering it. This would require importing one unit of a particular good, but not a substantial quantity of them.¹⁵³

3.12. Multinational companies and the government in technology and information asymmetry

Many multinational companies seek to produce and market the same product in the same way all over the world. This has opened a heated debate on the role of multinational companies in the global market, and the possible consequence of exploiting countries' comparative advantage. Due to the ongoing internationalisation, multinational companies have tilted the balance of power among key players in the world market in their favour. As consequence, multinational companies have the power to close the gap in technology in the world. They can bring technologies. However, shall the government require investors to bring technologies and information, not only allow them to use the local cheap labour? Or shall it be the multinational developing banks? How easy is to transfer a technology from one region to another? Some technologies depend on local knowledge, and the network of human relations¹⁵⁴, or institutional organisation of technology-production routines. All these assets are difficult to transfer.

Storper and Venables (2004) describe the development of face to face communication in globalisation and argue that it is also important to stress out the importance of face to face communication in the high-technology industry. As Storper and Venables (2004, p.356) point out: "In parts of the financial services and high-technology industries, local networks intersect with long-distance contact systems. In almost anything related to business-government elations, networks have strongly national and regional cast". Eaton and Kortum (1999) and Keller (2001) show that the major sources of technical change leading to productivity growth in OECD countries are not domestic; instead, they lie abroad. Keller (2001, p.5) defines two basic mechanisms for international economic activities to lead to technology diffusion:

1. Direct learning about foreign technological knowledge.

¹⁵³ A good example of reverse-engineering was the Cold war. Even though the technology spillover between the democratic world and the Soviet bloc was minimal, reverse engineering helped both blocks to catch up with the technology of the other bloc.

¹⁵⁴ Professor Storper, lecture notes GY409, London School of Economics, 2008

2. Employing specialized and advanced intermediate products that have been invented abroad.

Social returns of technology diffusion are high. Scholars offer strategies leading to better technology transfer.¹⁵⁵ Keller (2001) discusses the concept and empirical importance of international technology diffusion from the point of view of recent work on endogenous technological change. Sometimes the reason for productivity increases lies in purely domestic activities, such as the learning effects resulting from cumulative production for domestic demand. However, productivity also increases due to learning through the interaction between foreign and domestic firms¹⁵⁶.

Therefore, when we speak about technology diffusion we have take into account the importance of government. The government can support research, education and innovation. The government has been active their core competencies by outsourcing certain activities their core competencies by outsourcing certain activities. Joseph Stiglitz often uses the example of the first telegraph line in the US between Baltimore and Washington in 1840s and the example of the Internet, both owing its origin effectively to the government¹⁵⁷. Much of the technologies that increase the well-being of the countries are based in ideas that have been originally produced by government-supported research.

What should the government or international institutions do to achieve converge of technology level rather than divergence across regions? The government can and should support new technologies. However, how does the government know that are the new technologies? What technologies are to be supported and what are not to be supported? Should the government pick up winners on the market? Stiglitz even argues that all industrial policies are in fact technology policies. The reasons that are quoted by scholars who support government involvement in the technology development is: information asymmetry. Players do not possess all the information to create new technologies. The heated debate about whether it makes a difference for a country to microchips or potato chips did not reach a clear

¹⁵⁵ For six principal points linked with strategies that could lead to better technology policy are summarised in Stiglitz (2003a, pp. 9-11).

¹⁵⁶ Keller (2001, p.3)

¹⁵⁷ For example Stiglitz (2003b, p.7).

outcome: According to Professor Mike Baskin it does not make differences whether a country produces micro-chips or potato-chips, while Stiglitz argues that it matters what a country produces. On the other hand, Stiglitz argues that it matters and that the government should do a certain planning in industrial policies. There is common agreement that the government should support basic research. The consensus on the support of applied research is not so widespread. Stiglitz argues that government should support even applied R&D. TRIPS (Trade related intellectual property rights) give a monopolistic power over a certain idea. Any monopoly results in inefficiencies. Stiglitz¹⁵⁸ argues that:

“The reason we do it is that we believe there are trade-offs. There may be advantages by accepting the loss of static efficiency in order to have enhanced incentives for innovation. We recognize that there is a trade-off between short-run and long-run concerns. But we have to recognize that intellectual property rights do result in inefficiency in the economic system.”

3.13. Conclusion

In the past, it was thought it is capital that developing countries lack to catch up with developed countries. However, it is more recognised that what separates developed from less developed countries is also a gap both in information and in technology. From the perspective of partially-codified knowledge, it appears that not only passive spillovers (embodied technology in intermediate goods), but also active spillovers are linked to the patterns of international economic activity, instead of being uniformly distributed (or distributable) throughout the world¹⁵⁹. Overall, the speed of changes that we can see today will be affected by the current economic crisis, but neither globalisation nor the advances in new technologies will be stopped. It will still lead to more flexible and innovative technology.

The unequal distribution of technology does not necessary mean that the world is worse off. One of the advantages of the unequal technology and information levels is the concept of disruptive innovations or reverse-engineering. Trade, technological innovations, information are increasingly important and are transforming the global economy. The international diffusion of technology and information is a major determinant of per capita income in the world. International economic activity is therefore important not only because of trade itself but also because of the transfer of technologies throughout the world. For

158 Stiglitz (2003a, p.3)

159 Keller (2001, p.7)

developing countries, learning through this international economic activity leads to greater adoption of technology from abroad and consequently to higher income per capita. The conclusion is that current level of globalisation is affecting the level of technology more than ever before. However, in general we do not see technology and information convergence as predicted by several theoretical models. Therefore, information asymmetry remains an important factor in the economy. There is a significant role of the multinational companies in technology convergence. The role of government is more limited but there should be less regulation from the developed countries if the desire is to achieve technology and information convergence.

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3.15. Annex

3.15.1. The Solow growth model

The production function in the Solow model takes the form

$$Y(t) = F(K(t), A(t)L(t)), \quad (1)$$

where Y (output), capital (K), labour (L), knowledge/effectiveness of labour (A)¹⁶⁰, and t denotes time¹⁶¹.

Solow expects that labour and knowledge grow at constant rates

$$\dot{L}(t) = nL(t) \quad (2)$$

$$\dot{A}(t) = gA(t) \quad (3)$$

where n and g are exogenous parameters¹⁶².

3.15.2.R&D models

R&D models were developed by P. Romer (1990), Grossman and Helpman (1991) and Aghion and Howitt (1992). The production of new ideas in these models depends on the quantities of capital and labour engaged in research and on the level of technology:

$$\dot{A} = G(\alpha_K K(t), \alpha_L L(t), A(t)) \quad (5)$$

In our case we will assume Cobb-Douglass production function:

¹⁶⁰ For our purpose we will treat A(t) as knowledge as we try to explain the convergence of technology levels in different parts of the globe.

¹⁶¹ It becomes clear that time enters the production function indirectly through K, L, and A. Moreover output changes over time only if inputs change. If there is technological progress, the amount of output increases only if the amount of knowledge A increases. Finally A and L enter the production function multiplicatively. AL is called the effective labour. Technological progress that enters via this effective labour is called labour-augmenting, or Harrod-neutral.

¹⁶² A dot over a variable denotes a derivative with respect to time (f.e. $\dot{X} = \frac{dX(t)}{dt}$). This and equations (2) and (3) imply that A and L grow exponentially. This is arguable. L does not grow exponentially in reality (especially in developed countries).. Whether A grows exponentially is unclear. I suppose that A might have grown exponentially in the last 200 years. Especially IT revolution caused the exponential growth over past 50 years. Whether it will continue to grow in this pace is in jeopardy. Moreover, the Solow model expects constant n and g (constant population growth and technological progress.).

$$\dot{A}(t) = B[\alpha_K K(t)]^\beta [\alpha_L L(t)]^\gamma A(t)^\theta \quad (6),$$

where B is a shift parameter, $\beta \geq 0$, $\gamma \geq 0$. Therefore we have two endogenous variables K (as in the Solow model) and A. Because we might be able to see the result of convergence or divergence of output, we might make a conclusion about the convergence or divergence in the level of technology using these growth models. We rearrange the model¹⁶³ and get finally get the expression for the growth rate of A (technology):

$$g_A(t) = c_A K(t)^\beta L(t)^\gamma A(t)^{\theta-1} \quad (7)$$

3.15.3. Assumptions about parameters

Now, we have to make the assumption about the parameters. The question is how increases in technology (\dot{A}) affect the production of new technology (A). If $\theta = 1$, \dot{A} is proportional to A, if $\theta > 1$ increase in A leads to higher production of new technology and vice versa¹⁶⁴. We expect that $\theta > 1$ in developing countries and $\theta < 1$ in developed countries. The degree of returns to scale to K and A in technology production is $\beta + \theta$. Therefore the key determinant of the globalised economy is how $\beta + \theta$ compares with 1.

Finally, I would like to show that the *Solow residual* captures the technological progress in the model:

$$\frac{\dot{Y}(t)}{Y(t)} - \frac{\dot{L}(t)}{L(t)} = \alpha_K(t) \left[\frac{\dot{K}(t)}{K(t)} - \frac{\dot{L}(t)}{L(t)} \right] + R(t) \quad (4),$$

¹⁶³ For all the steps see Romer (2001, p.96-110)

¹⁶⁴ To put in economic terms, there are increasing returns to scale if $\theta > 1$

where $\alpha_K(t)$ is the elasticity of output to capital ¹⁶⁵, $R(t)$ is *the Solow residual* which captures all sources of growth other than contribution of capital accumulation via its private return. The growth levels are inversely related to initial income.

¹⁶⁵In general for a variable X:

$$\alpha_X(t) = \frac{X(t)}{Y(t)} \frac{\partial Y(t)}{\partial X(t)}$$

4. Banking crisis – Czech Republic case study¹⁶⁶

4.1. Introduction¹⁶⁷

In the times of the biggest financial crisis since the Great Depression, the research and empirics on credit markets becomes much more important than ever. Due to recent changes in the economic system, it is necessary to rewrite economic textbooks and to make the attempt to understand modern economy better. Much is being changed in terms of new financial supervision and regulation. Banks are being reorganized and systemic risk will have to be examined in a better way, central banks will need to adjust their policies. For the deeper understanding of the economic system and its relationships, it is useful to examine the monetary transmission mechanism from a new perspective. One option is to use Joseph Stiglitz and Bruce Greenwald's framework for the new economic paradigm concerning the monetary policy they have developed. The reason why I use this paradigm is that it offers a unique perspective on the banking system. Instead of focusing primarily on the role of interest rate and money supply, this paradigm stresses the role of credit in the economy. Therefore, the main aim of this paradigm is to deepen the existing knowledge about transmission of the interest rate pass-through by focusing on the credit side of the economy.

Thus, understanding the forces inside the black-box of the transmission mechanism is important for effective implementation of monetary policy. This "credit channel" of monetary policy is linked with the funding of the businesses. Monetary policy shocks have disproportionately large effects on business funding through this mechanism. The traditional supply side of the credit market (i.e. banks) is also influenced by its expectations of the evolution of credit demand and the ability of borrowers to repay their obligations. Financial stability thus plays an important role and the current financial instability on world markets leads to a decrease in bank lending to firms. Therefore, it influences the transmission mechanism.

¹⁶⁶ The author would like to thank doc. Pavel Mertlik and doc. Jiri Hnilica and for their valuable comments on this thesis

¹⁶⁷ Previous version of Chapter 4 of this thesis was submitted at the Charles University in June 2009

While several studies deal with the macroeconomic impact of interest rates (Kieler & Saarenheimo, 1998), there is still insufficient research on the microeconomic level. Corporate investment dynamics in the Czech context have been tested by Lizal & Svejnar, (2002) and Filer, Hajkova, & Hanousek (2004). Pruteanu (2004) tried to find out whether banks credit-rationed Czech enterprises during 1997–2002. More recently, Horvath (2006) examined a panel of Czech firms, finding evidence that balance sheet indicators matter for the interest rate charged by banks on firms. Benito & Whitley (2003) examine this problem in the context of the UK.

In this essay, I will try to link the Stiglitz-Greenwald theory of credit rationing using microeconomic CEE banking data over years 2007 and 2009. It is of a big interest to test the behaviour of banks, firms, and households in the recession times. For the deeper understanding of the credit side of the banking system it is however necessary to analyse banks from a more detailed perspective. Therefore, a significant part of the thesis is focused on the microeconomic analysis of commercial banks' balance sheets. This analysis then allows finding the reasons how did the banks change their behaviour, their approach to clients, businesses when supplying credits and what measures have they taken to cope with the crisis. I also analyse various steps that the banks took to deal with the financial crisis. While the crisis started as primarily financial, it was due to this information asymmetry/uncertainty (when banks could not screen and understand their clients properly) that this financial crisis turned into an economic one. The thesis is divided into two subparts. The first one describes the Greenwald-Stiglitz monetary paradigm and analyses it with respect to Czech microeconomic data. The second part extends this analysis and focuses on the balance sheet development and credit behaviour of five biggest banking groups in the Central and Eastern Europe. The result of this thesis can help to understand banks' approach to their clients, the monetary transmission mechanism, and the behaviour of the banking system in general.

4.2. New paradigm in monetary economics

Together with Bruce Greenwald, Joseph Stiglitz is the author of fundamentally new approach to monetary policy based on information asymmetry¹⁶⁸. Contrary to the prevailing

¹⁶⁸ The theory is summarised in the book *Towards a New Paradigm in Monetary Economics* (Stiglitz & Greenwald, 2003)

theory of monetary economics, this new approach does not emphasize the role of money in transactions but more broadly, it stresses the role of credit in economic transactions¹⁶⁹. This paradigm works with the supply and demand of loanable funds and it tries to understand how banks and other institutions in the economy use information to assess the ability to repay the loan. Their aim is to understand how banks and other institutions in the economy transform the information to evaluate the credit-ability. The theory explains factors influencing the willingness and ability of banks to provide loans. It also tries to understand the link between the credit in the economy and variations of output; the theory describes the implications for the economic policy. Moreover, the theory analyses how the changes in the economy – for example the changes linked with the so-called New economy – will influence the structure of the system and its stability. Authors describe conditions under which monetary policy on its own is not effective in bringing the economy back to the state of full employment. They predict that in the future, this situation will be even more common. That is why this theory is of an interest in recent times. Nowadays, banks increase their credit rationing, they face higher information asymmetry and therefore decrease loans, which has an effect on the real economy.

Investments and inventories are the core movers of output changes in the reaction to the monetary policy. Stiglitz and Greenwald – in contrast to the theory of real business cycles – believe that money (at least in the short run) – play a big role in the economy. They as well as monetarists put money in the centre of the economic activity. However, Stiglitz and Greenwald (2003) argue that the classical theory of transaction demand cannot sufficiently explain the importance of money. They – to the contrary – say that the key for understanding of the monetary economics is the demand and supply of loanable funds. This demand and supply of funds is linked with information asymmetry and the role of banks. The loanable fund market is not identical to markets with ordinary commodities. The critical point is that some loans on the loanable fund market will not be repaid. The central role of the bank then is to realise which applier for a loan will default. Stiglitz and Greenwald argue that the institutional structure of the banking system should be researched more thoroughly when the

¹⁶⁹ It should be noted that their paradigm is close to post-Keynesian approach to the nature of money (Mertlik, 2009). In the post-Keynesian theory, the source of money is created by demand of businessmen. Loans create deposits and deposits create reserves. Central bank plays two roles: lender of last resort and inflation supervisor. Crediting by commercial banks and their credit policy in post-Keynesian economics is considered as credit rationing.

monetary policy is applied. Moreover, there are differences between the ability of the monetary policy to perform well in various countries and these differences could be explained with different institutional structure of the banking sector. The whole Stiglitz-Greenwald theory emphasises the role of institutions in the economy and it is thus a contribution to the institutional economics¹⁷⁰.

4.3. Banking system

Banks hold a central position within today's economies. They fulfil important transformation functions and other elementary services for market participants. The banking business can principally be divided into Retail-, Wholesale- and Private Banking segments. These segments address the specific needs of different customer groups. Banks provide on-balance-sheet products such as loans and deposits and a range of additional services, such as transaction processing or advisory services. Some banks provide the complete range of products for all segments; others focus on selected product and/or customer segments. Products and services are exchanged for money and banks are intermediaries in this cycle of monetary transactions. Banks process payments and provide a balance between investment and financing needs. Banks are service providers – they produce banking services, which they sell to market participants, their core business is to collect deposits and to transform them into the real economy.

There have been certain trends in the banking industry over past years. Retail banking is the mass business of banks characterized by high product and service standardization and limited advisory. Financially better off individuals and larger corporations require more customized products and advise – and they are able to pay for it. Additionally to their basic elementary functions – transforming durability of assets, exchanging currency, taking deposits and granting financing – banks have four very important transformation functions. Only by transforming volumes, maturities, risk and information, banks can fulfil the needs of different market participants with respect to depositing/investing and financing.

Accounts of banks are quite different from financial statements of companies from other industries. A bank's balance sheet shows its lending and deposit business; its assets have

¹⁷⁰ Therefore, it is difficult to attach Joseph Stiglitz to one single economic school. Generally, he stands between new institutional and new Keynesian economics

to be backed by certain amounts of equity. Banks have no turnover – their revenue is the sum of net interest income, net fee income, net trading income and net other operating income. Banks provide loan and deposit products, which they take on their own balance sheets. There are off-balance items such as derivatives, guarantees that play a significant role in the risk-management of banks. Additionally, banks also provide off-balance-sheet services (processing, advising, etc.) in the areas of lending, depositing and transacting. The income of banks typically consists of interest income generated from on-balance-sheet products and commission income from services¹⁷¹. For all these differences, information asymmetry is a crucial phenomenon in banking.

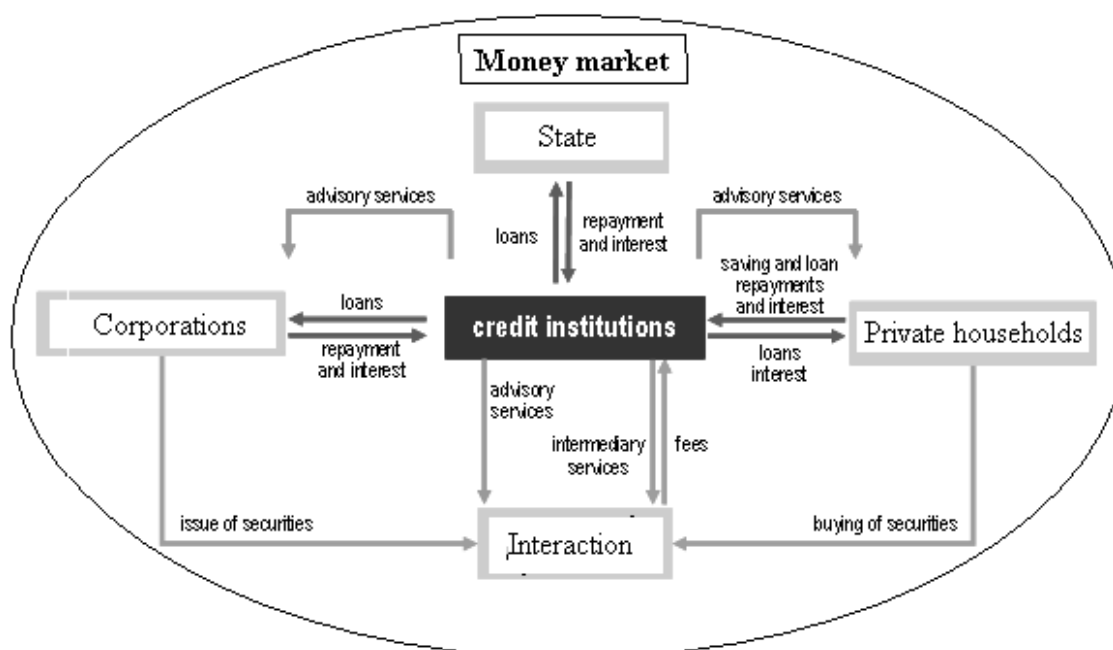


Figure 1: Credit institutions and their role in the economy. Source: Deutsche Bank, Roland Berger Strategy Consultants

171 Source: Roland Berger Strategy Consultants

CORE TRANSFORMATION FUNCTIONS OF BANKS			
Volume transformation Deposit needs and loan needs don't meet (typically small household deposits and larger loans)	Maturity transformation Diverging needs of parties about the maturity of contracts (typically short-term deposits and long term loans)	Risk transformation Risks, e.g. loan default risks are diversified and spread over a large number of depositors	Transformation of information requirements Providing market participants with information (e.g. informing them about funding needs and possibilities)
ELEMENTARY FUNCTIONS			
Transportation function – moving liquid assets and liabilities between participants (e.g. money transfers)			
Exchange function – mainly currency exchange; exchange of different asset classes			
Deposit function – safekeeping of valuable assets and liquid assets			
Financing function – providing market participants with means of financing and liquid assets			

Figure 2: Core and elementary functions of banks in modern economy. Source: Deutsche Bank, Roland Berger Strategy Consultants

4.4. Credit rationing

The key to understanding the behaviour of banks is to understand the supply of loanable funds (credit availability). In this part of the thesis, I follow the work of Joseph Stiglitz and Bruce Greenwald. In the Stiglitz-Greenwald model, banks are considered to be risk averse. Stiglitz and Greenwald (2003, p. 44) justify this assumption that banks face limits on their ability to diversify and divest risks, e.g. they are equity constrained. Bank's risk averse behaviour has implications which depart from the standard neoclassical assumptions¹⁷².

Generally, there are several motives for holding money. Keynes mentioned three: Precautionary, speculative, and transaction motive. However, monetary authorities can influence money supply only via narrower aggregates, such as M1, M2. Moreover, the velocity of money has changed dramatically over past twenty years and the relationship between money and income has not been stable recently. The changes were dramatic during the recent financial crisis as well and also because of the information asymmetry.

¹⁷² One of them is perfect risk-sharing. In a complete market with perfect information and without solvency constraint, risks are effectively spread throughout the economy and banks act in risk-neutral manner.

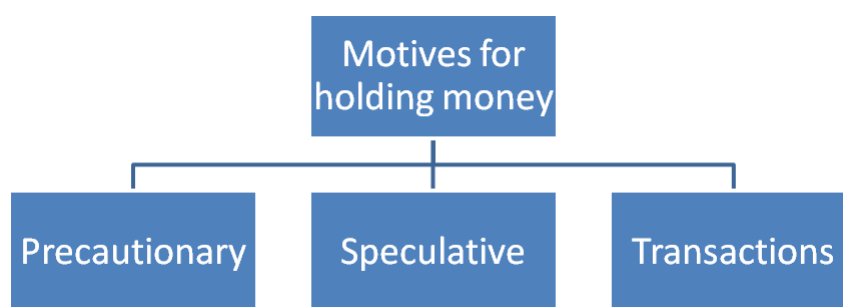


Figure 3: *Motives for holding money according to Keynes. Source: Stiglitz and Greenwald (2003)*

Joseph Stiglitz together with Andrew Weiss pioneered the credit-rationing concept. In 1981 they published a paper concerning the unwillingness of banks to lend even though they have sufficient funds and the demand for loans is higher than equal the supply of loans. The explanation is that further increase of lending would decrease banks' profitability. Stiglitz and Greenwald focus their attention on demand deposits. The pre-condition for the theory of credit-rationing is the imperfection of capital markets. Information asymmetries mean that a bank might behave in a different way than the standard economics would predict. Standard neoclassical economics says that when there is an excess of demand for credit then the unsatisfied applicant for the credit will ask for a higher interest rate¹⁷³, and the equilibrium on the loan-market will be achieved. However, a bank that maximises the expected return might refuse to provide such an applicant with a loan as the applicant is signalling that – as he is willing to accept a higher interest rate – he is more vulnerable to default. The central determinant of the economic activity is the ability and willingness to bear the risk linked with the provision of loans. Interest rate is not like a conventional price. It is a promise to pay an amount in the future. As there is no simple relationship between the interest rate and the performance of the economy, the balance sheet of the commercial banks has to be analysed thoroughly.

Financial development leads to changes in the financial system. A well-functioning financial sector provides funds to borrowers (households, firms, and governments) who have productive investment opportunities. As discussed in Mishkin (2003), financial systems do not usually operate as desired because lenders confront problems of asymmetric information; lender knows less about the particular project than the borrower does. Asymmetric information can lead to adverse selection and moral hazard. Adverse selection means that

¹⁷³ To borrow for higher interest, respectively

low-quality borrowers are the ones more likely to seek out funds in the market. Low-quality borrowers are the ones less concerned about paying back a loan. As argued by Stiglitz and Weiss (1981), adverse selection might lead to credit rationing, in the sense that lenders are not willing to lend even at high interest rates; lenders realize that low-quality borrowers are the ones most attracted to high rates. Moral hazard means that, after obtaining the funds, borrowers have incentives to take risky positions or to use the funds in certain ways that are not beneficial to lenders. Thus, borrowers can obtain large gains if their bets pay off and can default otherwise.

The core of the work on monetary policy by Stiglitz and Greenwald is that monetary institutions and policy have important real effects but for reasons different from those of the standard theory¹⁷⁴. Stiglitz and Greenwald argue¹⁷⁵ that interest rate is not the opportunity cost of a large fraction of the money supply and this fraction seems to be increasing over time. One of crucial distinction of this Stiglitz-Greenwald monetary theory is therefore the significance of information in credit. As Stiglitz and Greenwald (2003, p. 11) note, a central feature of the Arrow-Debreu model of markets is the anonymous nature of markets. Supply and demand is entirely anonymous. However, credit is very different. The terms on which credit will be supplied will depend on judgments about the likelihood that the loan will be repaid. Credit is individual and the information relevant for providing the credit is highly specific¹⁷⁶.

4.5. Financial crisis

Recent financial crisis has had large effects on the real economy. On the other hand, it offered a unique chance to study economic theories and their validity in times of economic recession. It is natural to ask whether aggregate fluctuations can be understood using a Walrasian model (a competitive model without any externalities, asymmetric information, missing markets, or other imperfections). Stiglitz-Greenwald offer approach that is more realistic.

174 (Stiglitz & Greenwald, 2003, p. 10)

175 (Stiglitz & Greenwald, 2003)

176 For example, a lender who has dealt with a particular borrower for a long time possesses tacit information about the borrower. Such a borrower might then face a lower interest rate.

The economic crisis started in October 2008 with the turmoil on the financial markets. Since then, financial markets have become extremely correlated (see Figure 7). Central and Eastern Europe was hit soon. Intuitively, Czech interest rate was affected with the financial crisis. As the economy enters a recession, both the aggregate demand and aggregate supply curves contract. The effect on the price level is not clear (see Figure 4). However, over time, inflation disappears and deflation can become a threat to the economy.

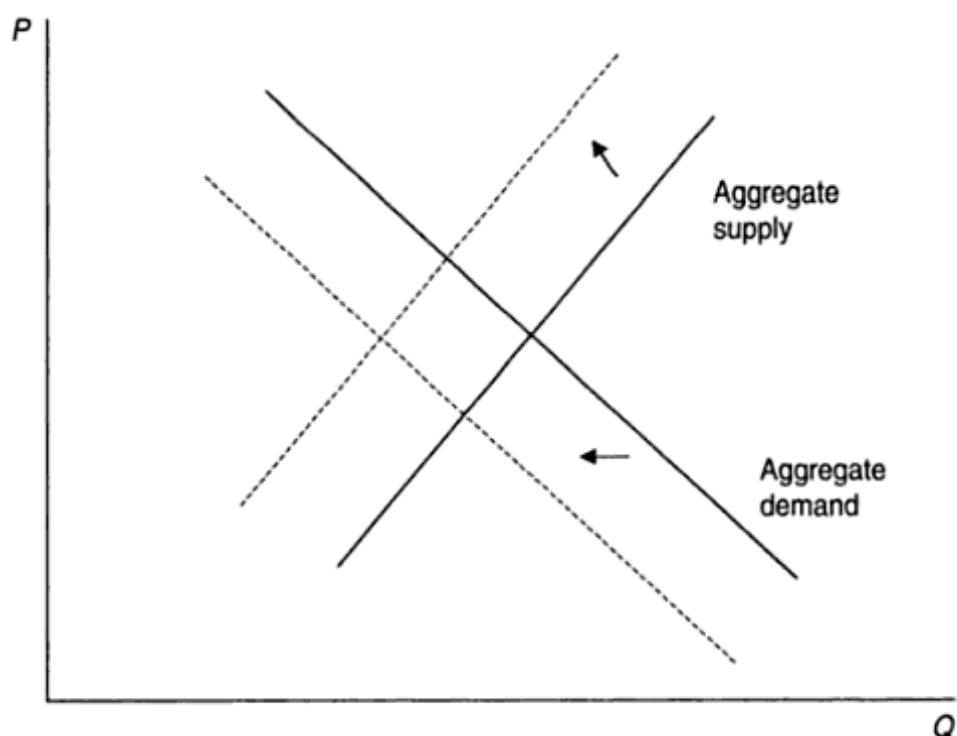


Figure 4: *Effect of recession on aggregate demand and supply curves. Source: Stiglitz and Greenwald (2003)*

The financial crisis threatens credit availability to both big and small businesses due to higher uncertainty on the market, incomplete transmission mechanism and information asymmetry (credit rationing). During crisis, confidence decreases, screening of credit applicants by banks increases, long-term interest rates rise. From Figure 6 we can clearly see that the transmission mechanism is not perfect in the Czech Republic. Czech central bank was steadily decreasing interest rates (Figure 5); on the other hand, some long-term interest rates increased as a consequence of higher credit rationing.

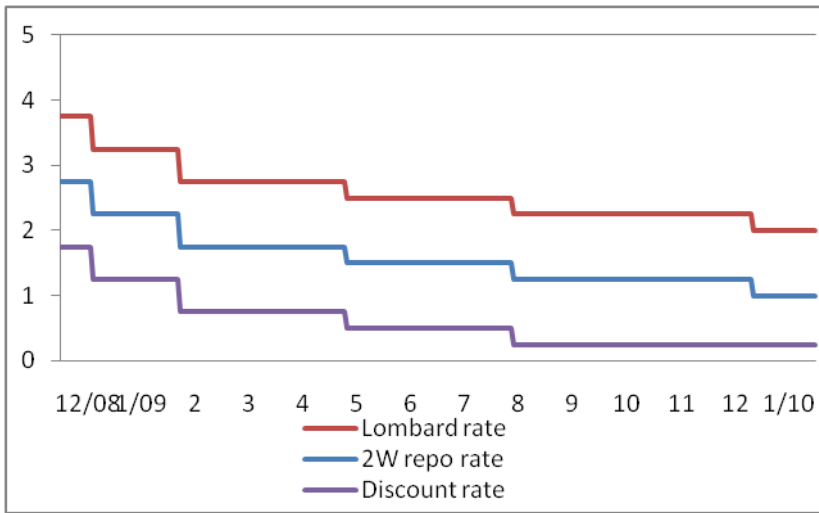


Figure 5: Czech National Bank's interest rates. Source: CNB

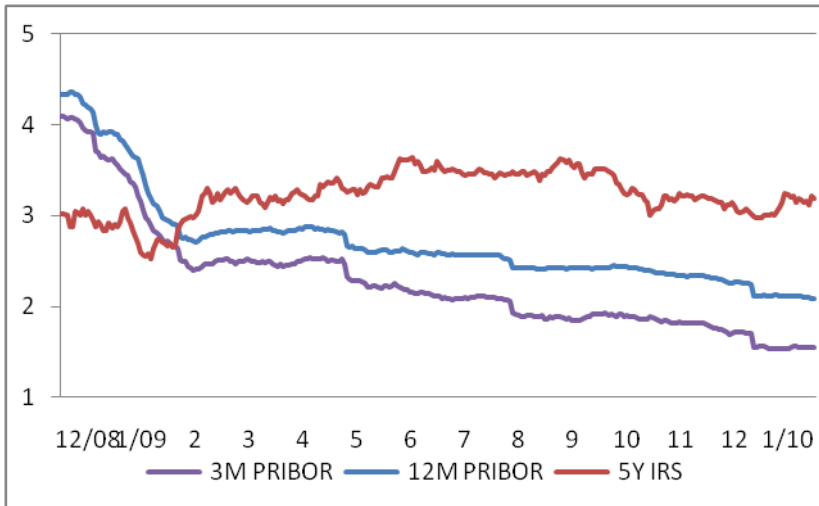


Figure 6: Czech market interest rates. Source: CNB

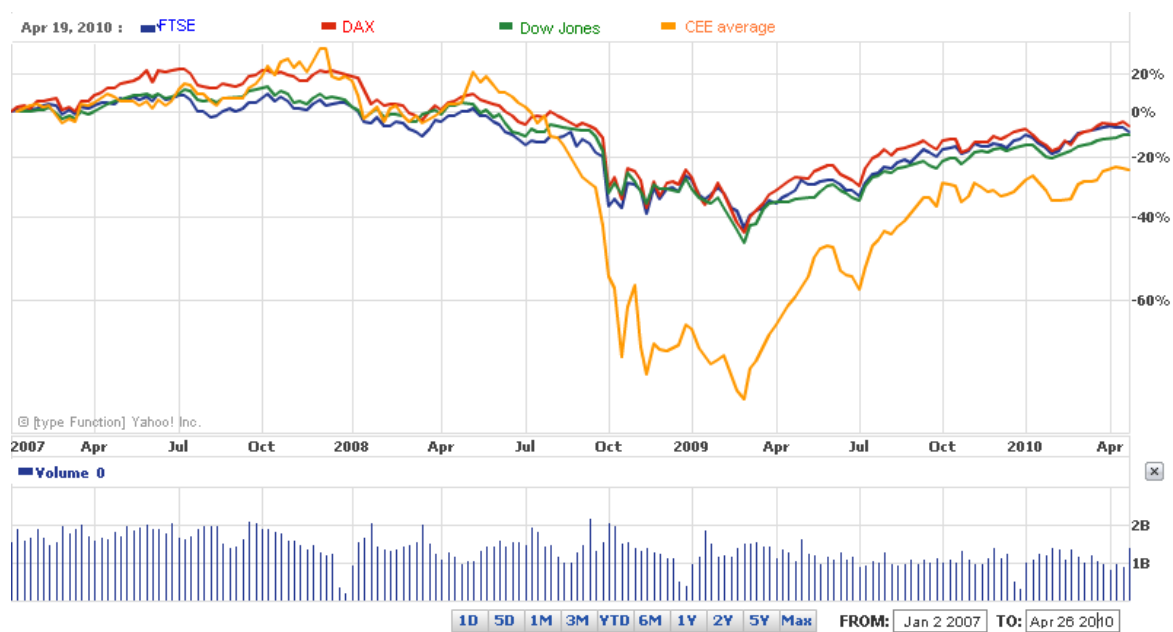


Figure 7: Development of financial markets, FTSE, DAX, Dow Jones and CEE average (in percentage, January 1st, 2007=100%). Source: yahoo.finance.com, author's calculations

Recession has two consequences. First, the number of good opportunities falls; this is intuitive. As demand slumps, there are fewer opportunities, fewer good investments that would be recovered with the same internal rate of return (IRR). Moreover, investors have less cash and thus less credit is available. Therefore, there is lower general demand. On the other hand, several good investment opportunities become cheaper and can be bought for very low price. From Figure 7, we can clearly see that the CEE average stock index outperformed all three important indices (London FTSE, Frankfurt DAX and New York Dow Jones) during some periods before the Lehman fall, while extremely underperforming after the fall. Therefore, the uncertainty in the CEE region was extreme and one of the reasons was large information asymmetry.

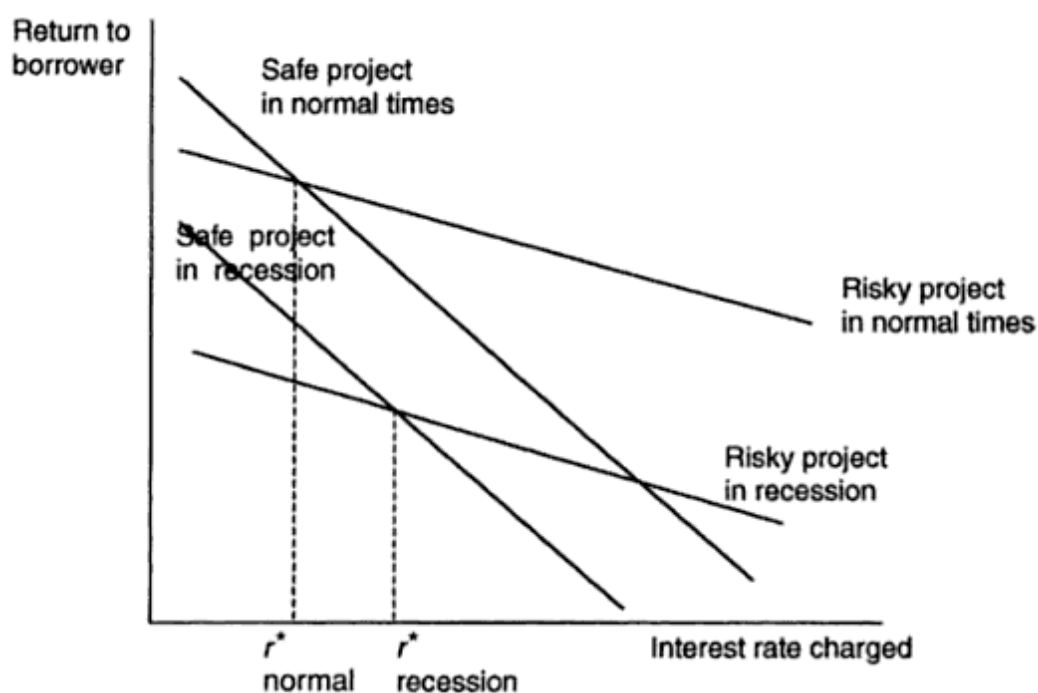


Figure 8: *The effect of a recession on real lending interest rates. Source: Stiglitz and Greenwald (2003, p.32)*

While standard theories predict that interest rate should fall in a recession, credit rationing theories explain why the real lending interest rate may well increase (see the move from r^*_{normal} to $r^*_{\text{recession}}$ in Figure 8). r^* is the highest rate the lender can charge without the borrower switching to the risky project. Lender's expected returns are higher with the safe project than with the risky one.

In theory, when there is an excess demand for credit, an unsatisfied borrower might offer the bank a higher interest rate. The bank would refuse a customer who offers this higher interest rate reasoning a bad risk. As the economy goes into boom, the returns to all projects may increase, real interest rate should rise. However, in some cases the real interest rate moves counter-cyclically rather than cyclically. Stiglitz and Weiss (1981) have shown that there may be instances where the entrepreneurs' returns to risky projects increase relative to safe projects in booms, so the bank's optimal interest rate at which their expected returns are maximised actually falls¹⁷⁷ (See Figure 8). From the real interest rate data (Figure 9), we can

¹⁷⁷ And thus the market equilibrium interest rate charged to borrowers actually falls

see that this theory holds. Real interest rates¹⁷⁸ to newly extended loans increased. When the economy is credit rationed, it is the quantity of loans, not just the interest rate charged that matters.

It is important to note that the PRIBOR rate is only a quotation. Real interest rates might look – especially during recession times of economic uncertainty – different. During the peak of financial crisis (after Lehman Brothers filed for bankruptcy protection in September 2008), there were significant mark-ups to the quoted Czech interest rates. Moreover, certain long-term interest rates (e.g. 1Y PRIBOR) are rather virtual numbers. They are quoted but no bank would lend for this long. The usual period for these loans is 14 days (maximum 3 months). Therefore, the picture is distracted by uncertainty. At this point (May 2010) there is already enough liquidity on the Czech market (in contrast to the aftermath of the fall of Lehman Brothers). However, this liquidity is short. Households have been shifting their deposits from fixed accounts to savings accounts in reaction to uncertainty (Mertlik, 2009).

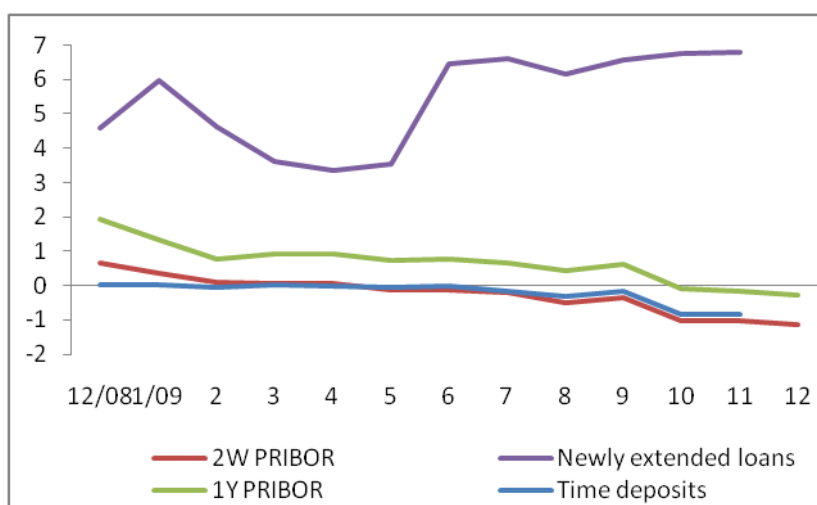


Figure 9: Ex ante real interest rates in the Czech Republic. Source: Czech National Bank Inflation Report 2010

I

From Figure 9 we can see that the interest rate on the new extended loans dramatically increased during 2009, which is in line with the Stiglitz-Greenwald theory. The real interest rate charged may increase and decrease with changing economic circumstances. With credit

178 Ex ante real interest rates: nominal interest rates on loans are deflated by the industrial producer price inflation forecasted by the CNB; nominal interest rates on deposits and PRIBOR rates are deflated by the consumer price inflation expected by financial market analysis (Source: CNB Inflation report)

rationing, the equilibrium interest rate (the rate which maximises expected returns for the lender) is below the level at which the demand for loanable equals the supply. A leftward shift in the supply curve for loanable funds leads to less lending but no change in the interest rate. The extent of credit rationing is increased. That is because expected returns actually decrease when the interest rate exceeds r^* , the supply of loanable funds decreases (see Figure 20). From Figure 9 we can clearly see that while both PRIBOR rates were gradually decreasing, the interest rate on newly extended loans increases confirming higher risk premium for these loans (and implicitly confirming higher uncertainty and information asymmetry).

The simplest adverse selection model of credit rationing would argue that (assuming only two types of borrowers) the "safer" borrowers drop out at interest rate r^* (see Figure 10), so that if the lender charges more than r^* , he gets only the riskier, lower expected return borrowers. Hence, r^* is the interest rate charged by the lender. If worsening economic conditions (such as the 2008 financial crisis) imply that the safe borrower actually drops out of the market (decrease in the demand for loans) at a lower rate than before, the lenders might lower the real interest rate charged. In the adverse incentive model, in with the riskier project becomes more attractive at higher interest rate. Higher interest rates reduce the expected return to the investor on a riskier project by less simply because that there is a lower probability that she will actually pay the higher interest rate (higher probability of default). If an economic downturn lowers the expected return to the riskier project more than the safe project, then the critical interest rate at which borrowers switch is increased. Hence, lenders may increase the interest rate charged without worrying of a switch to greater risk taking (see Figure 8).

These two effects go against each other. Under different circumstances, different effects might prevail. However, there is in general a systematic force that leads to the increase of real interest rate charged as the economy goes to a recession. This hypothesis is confirmed when we look at Figure 9. There was a sharp increase in Czech real interest rates after the collapse of Lehman Brothers¹⁷⁹ in September 2008 and the start of the worldwide financial

179 Lehman Brothers Holdings Inc. was a global financial-services firm that, until declaring bankruptcy in 2008, did business in investment banking, equity and fixed-income sales, research and trading, investment management, private equity, and private banking. On September 15, 2008, the firm filed for Chapter 11 bankruptcy protection following the massive exodus of most of its employees and clients, drastic losses in its stock, and devaluation of its assets by credit rating agencies. The filing marked the largest bankruptcy in U.S. history. The following day, the British bank Barclays announced its agreement to purchase, subject to regulatory approval, Lehman's North American

crisis. On the other hand, the real interest rate has decreased at the first half of 2009 signalling an increase in confidence on the market.

Interest rate respects the probability of repayment of the loan. In the crisis, the probability of default decreases and interest rate rises. In Figure 14, we can see a steady increase especially since summer 2007. On the other hand, there has been a decrease in the first half of 2009 with the exception of longer-term fixation loans. While loans to businesses do not confirm that the decrease of loan provision would be caused by supply of loans (i.e. significantly higher restriction of banks to borrowers), the situation on the household market looks different. There has been a significant decrease in the provision of loans to the household sector (see Figure 18), we might believe that in this sector the decrease in supply was actually bigger than the decrease in the demand for loans, confirming the Stiglitz-Greenwald theory of credit rationing.

It is necessary to note that in reality, the client can seldom offer the bank the interest rate. It is the bank that screens the client, analyses his financial history, his business plan, and potential of the whole business industry. Bank therefore offers the interest rate without any discussion with the client. The only exception might be a restructuralisation of claims. If a firm is unable to repay its debt on time but it has a positive belief about future income streams, it might offer the bank a higher interest rate for this delay in repayment. However, for a new client the bank typically an interest rate on his loan without any discussion with the client (Mertlik, 2009).

4.6. Loanable funds

The loanable funds theory was first developed by Robertson¹⁸⁰ in the 1920s. In his model, the interest rate is determined as the intersection of a downward sloping demand and upward sloping supply curve of funds (see Figure 10). There is no money illusion and both demand and supply depend on real interest rates. As the economy moves into recession, the demand curve (derived from the demand for investment goods) shifts to the left, while the supply of funds (from savings) also shifts to the left (savings fall in response to decreasing

investment-banking and trading divisions along with its New York headquarters building. On September 20, 2008, a revised version of that agreement was approved by Judge James Peck.

180 (Robertson, 1922)

income). However, the decrease in demand is usually bigger and there is decrease in real interest rate, which supports investment.

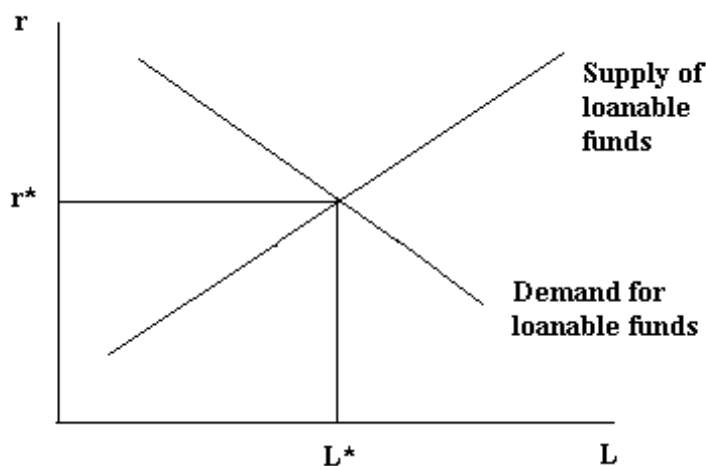


Figure 10: Loanable funds model, no credit rationing. Source: Stiglitz, Greenwald (2003)

On the other hand as described, what matters is not just a supply of savings but also a supply of credit. Financial institutions therefore play a pivotal role in determining the supply of credit. There are large changes in the supply of credit over the business cycle (see Figure 9 and Figure 12). The decrease in the supply in recession may outpace the decrease in the demand for funds. So that even if interest rates were determined by the intersection of the supply and demand for funds, the real interest rate facing borrowers could rise.

The demand for loans might be approximated with fixed capital formation. Czech data suggest that fixed capital formation has been steadily decelerating since the beginning of 2007 (see Figure 11); after September 2008 the deceleration was significant. Therefore, demand for loans has been decreasing over most of 2008 in the Czech Republic. Whether the supply of funds of was decreasing is arguable. However, interviews with businesspersons confirm that banks were stricter in their lending, which would confirm the theory of credit rationing in recession. Even though there has been decline of loans (see Figure 11, Figure 12, and Figure 18), the decline is driven mostly by demand rather than supply. We can guess this from barriers to economic growth (see Figure 13). Growth in investment demand slowed noticeably in 2008. The main factors behind this weakening is decreased demand (see Figure 15). It is difficult to say to which extent the amount of loans is influenced by demand or by supply. However, it is clear that there has been a move towards higher strictness in loan provision.

In the Czech Republic, on average, 2/3 of loans are short-term loans (up to 3 months). These loans finance mostly inventories. During recent economic slowdown, firms have lower requirements to finance their working capital. Therefore – counter intuitively – banks have problems with finding a client (business) who would need a loan (to finance his inventories). Financing of investment has decelerated. Most of investment projects, which have already been started are financed and will be finished. On the other hand, certain products (such as credit lines) are not used by clients. Alternatively, a client has an open credit line at the bank but does not use. This creates certain obstacles for a good risk-management of the bank (as credit line is an off-balance item) (Mertlik, 2009).

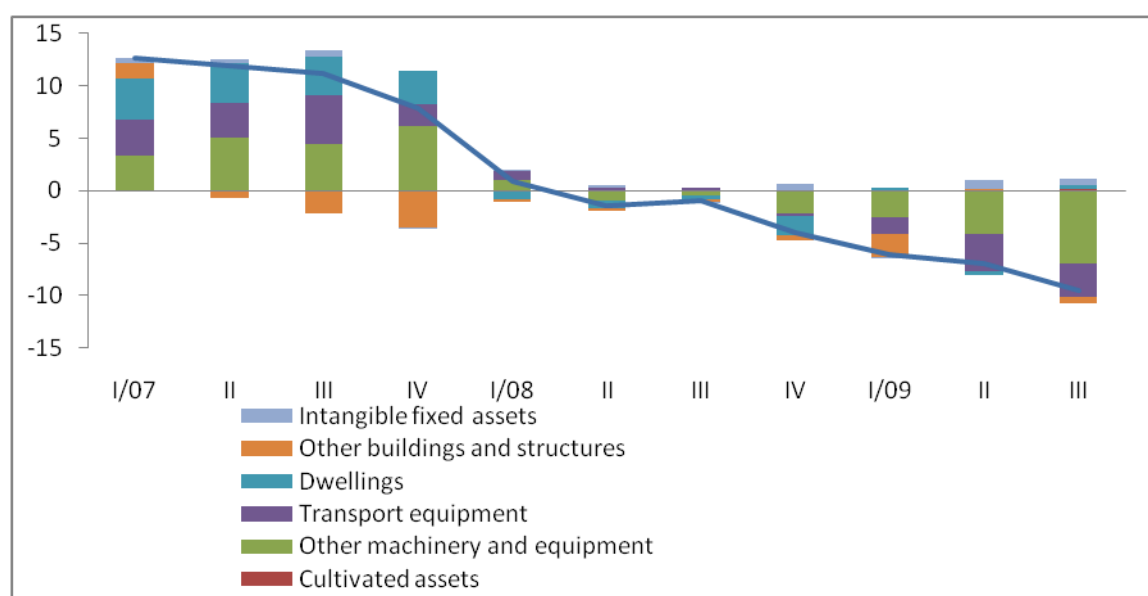


Figure 11: Fixed capital formation. Source: CNB Inflation Report 2010 I

The downward trend in investment activity continued into 2009 Q3, confirming the impact of the crisis on investment despite fiscal and monetary stimuli in the economy.

4.7. GDP fluctuations

Economic fluctuations in general are distributed very unevenly over the component of output. Inventories are the first to be affected in recessions¹⁸¹. Even though inventories generally account only for a small fraction of GDP, its fluctuations account for almost one-third of the shortfall in growth relative to normal recessions. Inventory accumulation is on

¹⁸¹ It is important to note that inventories are also the most difficult to be measured. Several corrections take place until Czech Statistical Office publishes the final results (Mertlik 2009).

average large and positive in peaks, and large and negative at troughs (Romer, 2001, p. 148). In the standard GDP equation

$$(1) \quad GDP = C + I + G + NX ,$$

consumption, government expenditure, and net exports are relatively stable over time. Investments play the biggest role in output variations. Residential investment (housing) and non-residential fixed investment (business investment other than inventories) also generally account for disproportionate shares of output fluctuations. In the Czech data, we cannot see the deceleration gross fixed capital formation until the 4th quarter of 2008 (Figure 11) but in the 4th quarter of 2008 the growth reached 0%. Gross value added formation weakened noticeably in most branches at the end of 2008. It can be predicted that data for 2009 would be even much worse in this respect. Government expenditure remained relatively stable. However, we might expect significant decrease in government spending as the Czech budget is approaching a difficult situation¹⁸². The downward trend in orders in industry accelerated sharply in last quarter of 2008. Economic growth slowed in 2008 and the main driver of economic growth was household consumption expenditure. Household consumption growth rose slightly at the end of 2008. Business confidence remains low.

Even though there has been a steady growth of monetary supply (M2 growth fluctuated around 8% over past year), there has been a significant delay in the transmission mechanism. Over time, however interest rates on some deposits fell. Loans for house purchase rose more slowly than consumer credit for the first time in six years in 2008. New loans to households decreased. The interest rate on large loans to non-financial corporations fell. From this respect, Czech data only confirm the empirical research of the behaviour of output components in recessions. The empirical testing by (Romer, 2001) suggests that consumer purchases of non-durable goods and services are relatively stable. This is in contradiction to the Czech data. Aggregated Czech data suggest that households are reducing their expenditure on services over time (CNB, 2010)

¹⁸² There will have to be a significant change in the Czech public budget structure, planning, and consolidation of Czech public budgets is necessary in the near future.

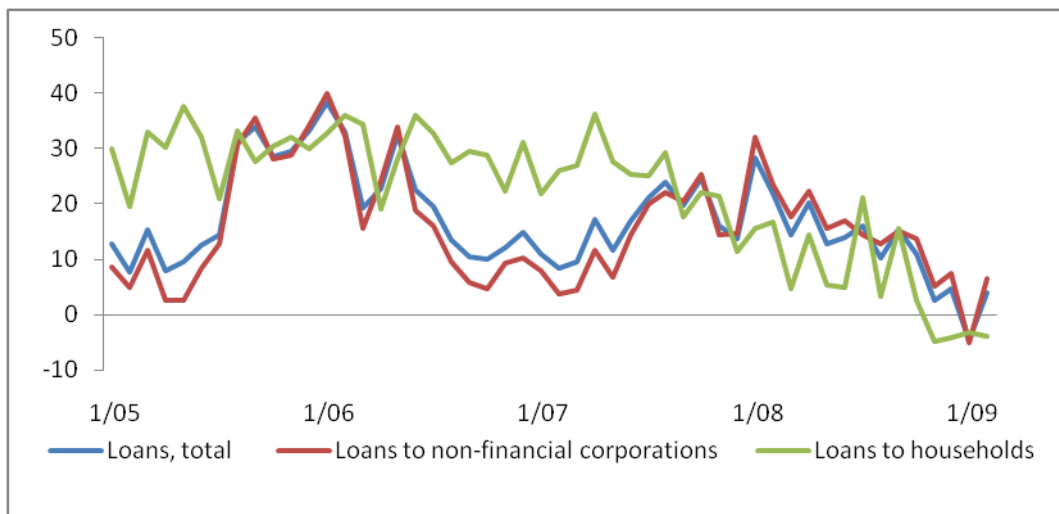


Figure 12: Newly extended loans. Source: CNB Inflation Report 2010 I

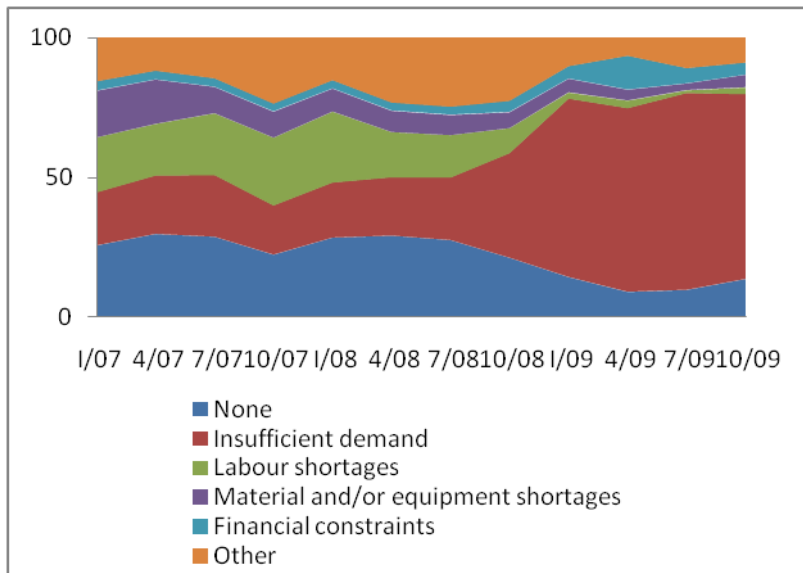


Figure 13: Barriers to growth on the Czech market. Source: CNB Inflation Report 2010 I, Czech Statistical Office

Figure 13 on the other hand suggests that for business in the Czech Republic, financial constraints do not represent a significant barrier to growth. Financing has been a problem in the first half of 2009, however since 2008, the largest obstacle for business growth is the insufficient demand. This casts some doubts to the credit rationing theory.

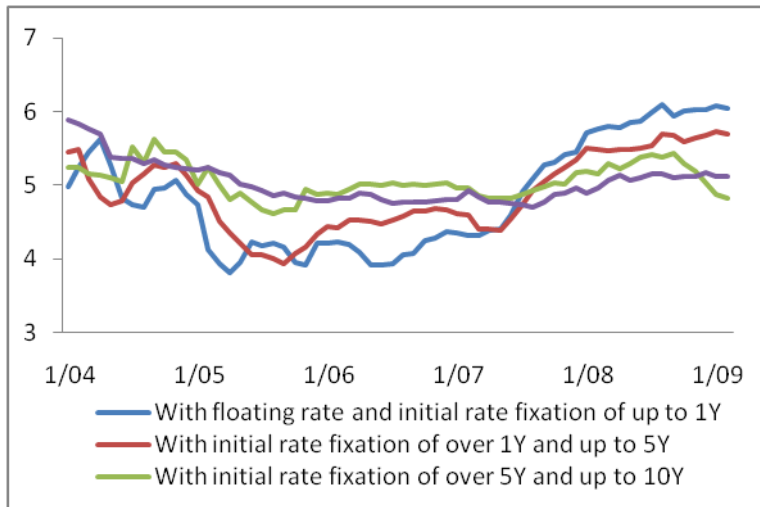


Figure 14: Interest rates on lending for house purchase, Czech data. Source: CNB Inflation Report 2010 I, Czech Statistical Office

The decrease in consumer's confidence might lead to the decrease of demand for loans. Consumers feel less certain, they are not willing to consume as much as before which further leads to economic downturn. The demand for loans is affected. Moreover, there is credit rationing from the household-side of the economy as well. Even though some banks offer high real interest rates, households and firms do not deposit their cash. The reason is again uncertainty and low confidence in the economy (see Figure 7). This leads to lower quantity of loanable funds (Mertlik, 2009).

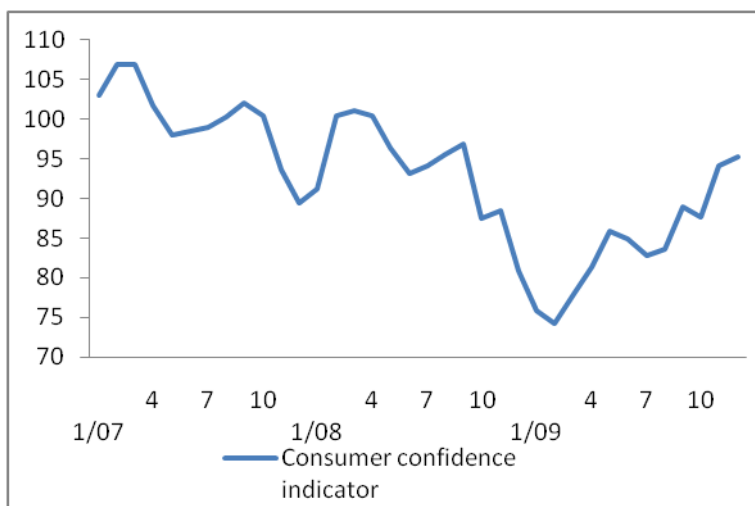


Figure 15: Consumer's confidence. Czech data, 2005 average=100. Source: (CNB, 2010), Czech Statistical Office

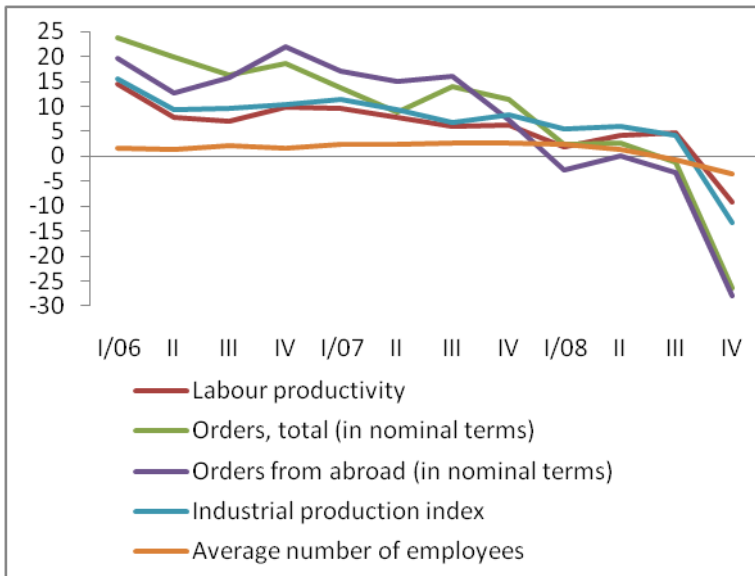


Figure 16: Indicator of development in the industry. Czech data. Source: CNB Inflation Report 2010 I

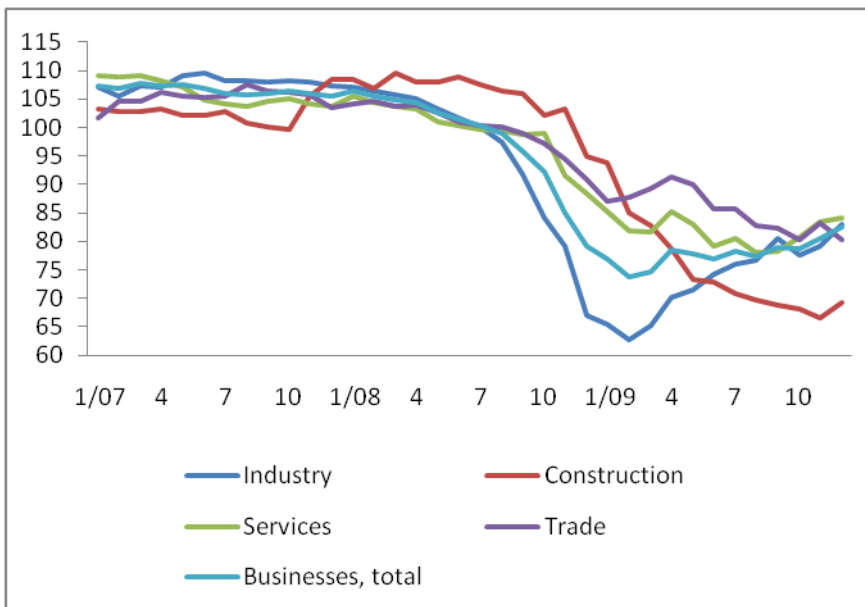


Figure 17: Business confidence. Czech data. Source: CNB Inflation Report 2010 I

When confidence is decreasing (see Figure 17), it leads to higher uncertainty. Banks increase their screening and credit rationing becomes regular. Business confidence in industry is rising in industry and services.

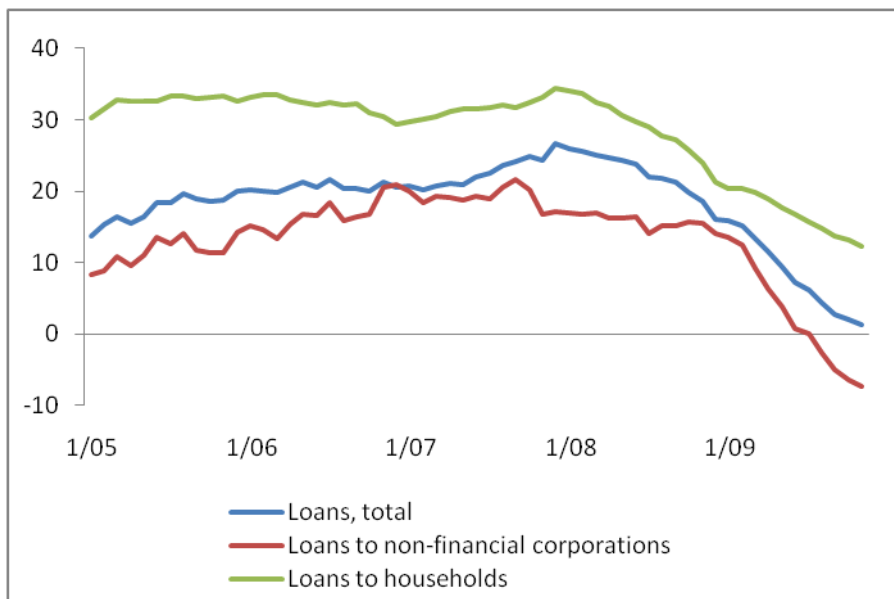


Figure 18: Loans to households. Czech data. Source: CNB Inflation Report 2010 I

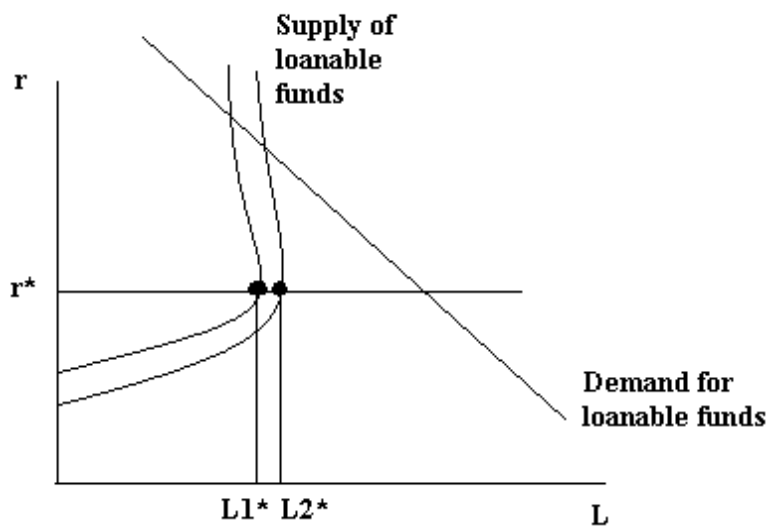


Figure 19: Loanable funds model with credit rationing. Source: Stiglitz and Greenwald (2003)

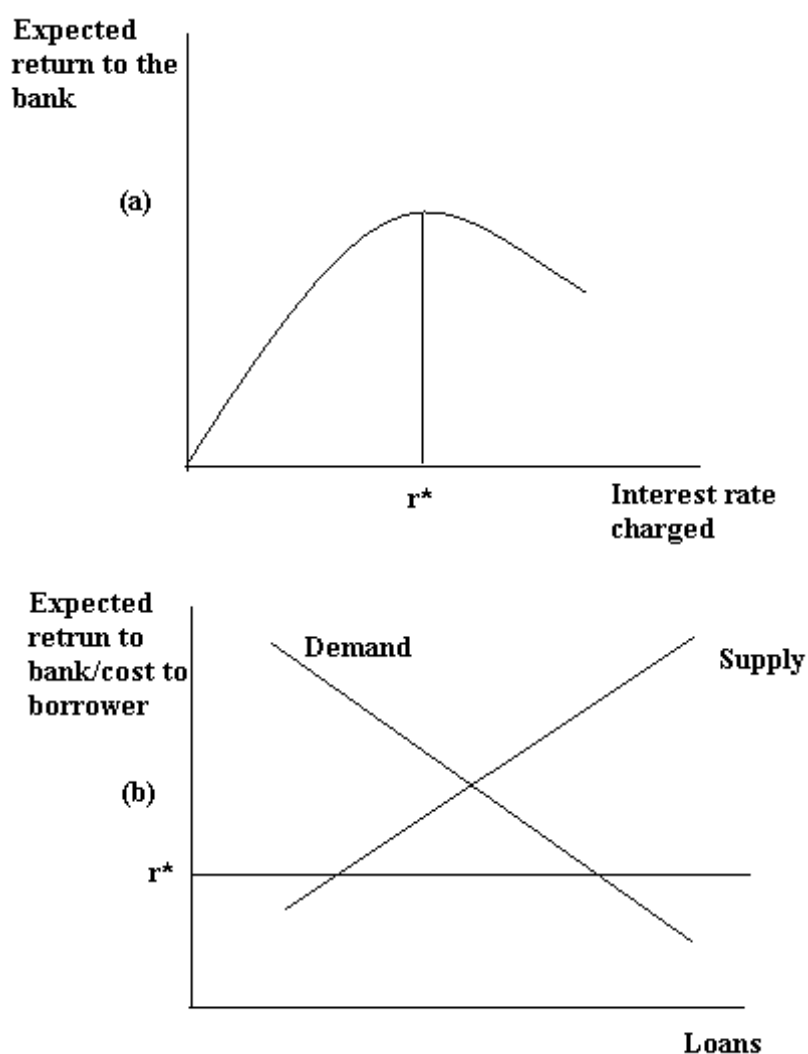


Figure 20: *Expected return to bank according to Stiglitz, Greenwald (2003).*

The interest rate, which maximizes expected return to the bank:

- (a) there exists an interest rate which maximizes the expected return to the bank
- (b) At “equilibrium” interest rates, the demand for credit (loans) exceeds supply

Market equilibrium is characterised with credit rationing. That is if demand and supply curves intersect at an interest rate above r^* , r^* is still the equilibrium interest rate. In r^* , lender's expected return is maximised (Figure 20). Lenders have no incentive to raise interest rate above r^* because doing so would lower their return (Figure 20). In credit markets, in general there is more uncertainty.

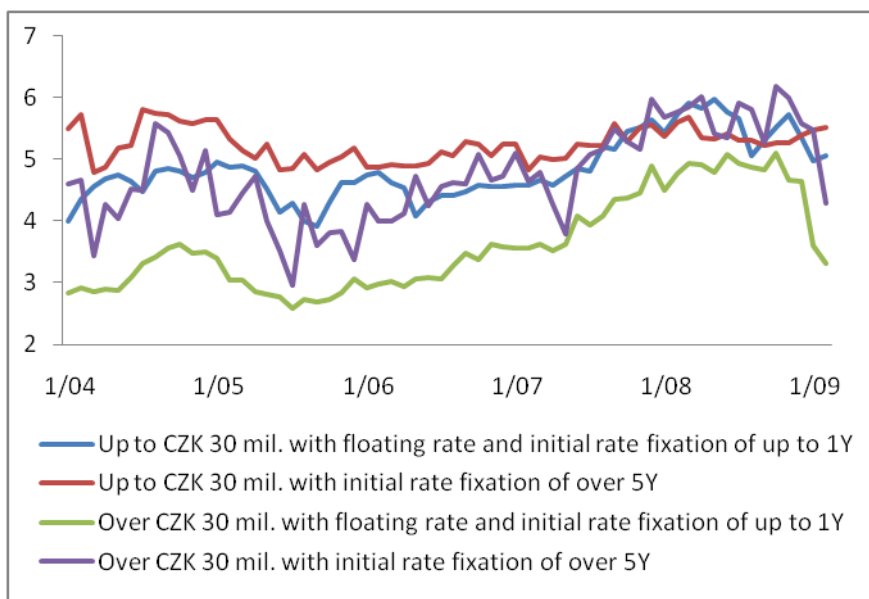


Figure 21: Interest rates on loans to non-financial corporations. Czech data. Source: CNB Inflation Report 2010 I

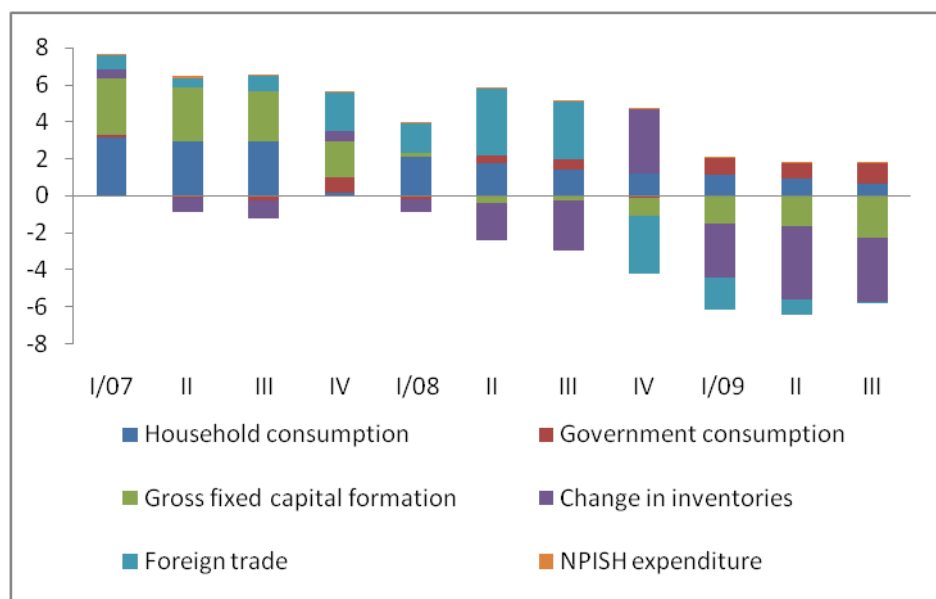


Figure 22: Structure of Czech GDP growth. Czech data. Source: CNB Inflation Report 2010 I

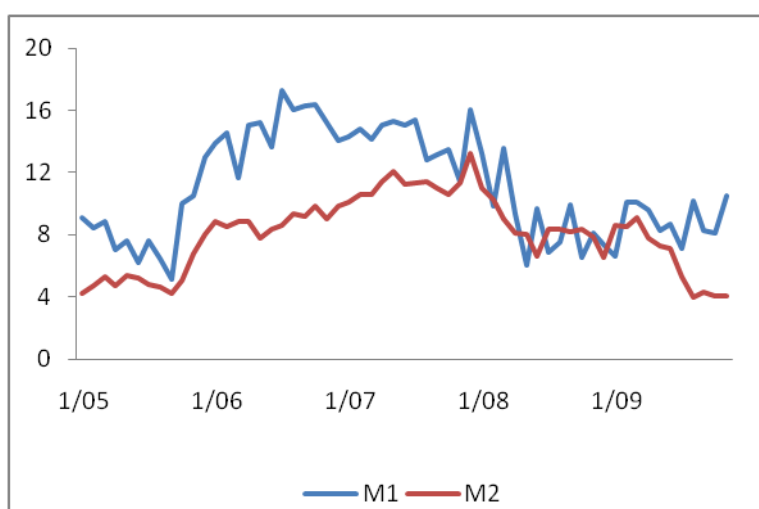


Figure 23: M1 and M2 (annual percentage changes). Czech data. Source: CNB Inflation Report 2010 I

From Figure 23 we can see that the transmission mechanism in the Czech Republic does not work well. Since the year 2008 the central bank has tried to support the liquidity on the market, while increasing the narrow money supply M1, the broader money supply M2 growth gradually decreased to very low levels (as measured by percentage changes).

4.8. Analysis of the financial crisis impact on major banks in the CEE

This part of the thesis will analyze the impact of the recent economic development on the performance of main banks present on the CEE banking market with respect to credit rationing, information asymmetry, and Stiglitz-Greenwald theory. The analysis focuses on most of Central and Eastern European countries, which allows for a deeper understanding of similarities and differences of various markets and their stage of development, their exposure to foreign-economic risk, or their microeconomic structure. The link with the theoretical part in part 1 of the thesis comes in the analysis of the development of credit and especially the Core-Tier ratio¹⁸³ of analysed commercial banks. The reason for this approach is that the monetary transmission mechanism (i.e. the interest rate pass through from the central bank to the real economy) did not work well during the crisis. Therefore, it was very difficult for the central banks to react. All central banks decreased their interest rates dramatically. However, commercial interest rates did not decrease, some have even increased (see Figure 9 for the Czech data). To see when and how the crisis affected the behaviour of commercial banks, I do a financial analysis of five biggest banking groups in the CEE. The region of Central and Eastern Europe was chosen on purpose as this region has faced extreme changes over the past two years.

183 A term used to describe the capital adequacy of a bank. Tier I capital is core capital, this includes equity capital and disclosed reserves. These requirements exist for the protection of investors who hold an interest in these types of businesses. Governing bodies place reserve requirements upon these institutions based on the premise that stakeholders will still receive limited payment should insolvency occur. The capital requirement is a bank regulation, which sets a framework on how banks and depository institutions must handle their capital. The categorization of assets and capital is highly standardized so that it can be risk weighted (see Risk-weighted asset). Internationally, the Basel Committee on Banking Supervision housed at the Bank for International Settlements influence each country's banking capital requirements. In 1988, the Committee decided to introduce a capital measurement system commonly referred to as the Basel Accord. This framework is now being replaced by a new and significantly more complex capital adequacy framework commonly known as Basel II. While Basel II significantly alters the calculation of the risk weights, it leaves alone the calculation of the capital. The capital ratio is the percentage of a bank's capital to its risk-weighted assets. Weights are defined by risk-sensitivity ratios whose calculation is dictated under the relevant Accord.

Starting from strong development still in 2007 going through difficult times in the after-Lehman crisis – when investors all around the world did not believe in CEE economies and were withdrawing money – to relatively stable period recently when markets finally started to distinguish between particular countries. All banking groups are convinced that the CEE region will prove to be the driving economic force in Europe again after the crisis. The countries of CEE suffered some setbacks in 2008 and 2009 and are likely to have troubles in 2010 as well. Some problems were significantly more severe in some cases than those in Western European countries. However, the convergence process that started more than two decades ago is still far from over. The continuing need to catch up after about five decades of communism will ensure that the region again undergoes stronger growth than Western Europe in the years ahead. While the recent global economic decline will likely lead to a new assessment as to the sustainable level of debt, and to a decline in lending activity in CEE at least in the short-term, we continue to believe that credit expansion accompanied by long-term economic growth will prove to be a secular growth trend, rather than a process that has already surpassed its peak.

Therefore, I present the analysis of commercial banks' balance sheets; I do comparisons with respect to years 2007-2009 with a focus on all CEE countries¹⁸⁴. I also analyse the behaviour of crucial ratios (ROE, Core-Tier I, and cost/income ratio) and net profit to show the dramatic changes in the performance leading to stricter loan provision and its development. This part the of analysis is partly an updated version of the project results worked out for AT Kearney in 2009¹⁸⁵. All errors are mine.

4.9. Questions and focus

As argued, this thesis analyses the key changes in the CEE banking industry resulting from the financial crisis and its development on loan provisions. 2009 was a year of recession

184 Only for Société Générale, this country analysis was not possible due to the lack of disaggregated data

185 Here, I would like to thank my CEMS colleagues Philipp Heck, Jan Vyhlička, Koen Willems, Michaela Ondová, with whom I worked on this Project. This project, however, did not include 2009 data when the impact of the financial crisis was the most visible. This was one of the reason why I wanted to analyse the behaviour of commercial banks in this thesis to see the full impact of the crisis and to link it with the Greenwald-Stiglitz monetary paradigm.

in Central and Eastern Europe¹⁸⁶ (Poland excepted), as it was in Western Europe. Relatively large differences were, however, apparent within the region. Financial crisis and the Stiglitz-Greenwald theory evoke many questions.

- What was the impact of the financial crisis on individual banking groups?
- What are the most significant changes that banking groups have adopted to survive?
- What are the consequences for particular banking groups and for the market in general?
- When did the crisis hit particular banking groups?
- How did various banking groups react to the crisis?
- Can we see support of credit rationing and screening?
- What is the role of credit mechanism in the economy?
-

The thesis focuses on prominent players in the CEE region. These are KBC, Raiffeisen International, Société Générale, KBC, Erste Group, UniCredit. For the analysis, annual reports, semi-annual and quarterly reports from years 2007-2009 were used, moreover several banking studies and newspaper reports were also analysed to get the full picture of the development of the commercial banks behaviour. I divide the analysis for every banking group into six sections: Ownership structure, key ratios (cost/income, ROE, core tier¹⁸⁷), stock evolution, net profit, country analysis, and credit analysis. Following this financial analysis, the comparison links the Stiglitz-Greenwald theory with the yielded results with the focus on credit rationing, information asymmetry and signalling. The central bank behaviour nor the macroeconomic development of particular countries is due to limited space not described in this thesis. However, generally, the behaviour was similar throughout the region, central banks were dramatically reducing their basic interest rate to support lending and investment in the region and states applied certain fiscal measures to support aggregate demand¹⁸⁸.

186 The new CEE notion includes also Austria. In this thesis, I will however, stick to the original CEE notion (i.e. only post-communist countries)

187 Core tier is considered as the key measure of solvency position

188 In the analysis I have tried to minimize the absolute values and rather to present results in percentages if possible

4.10. **Raiffeisen International**



Raiffeisen International (RI) is one of the leading banking groups in Central and Eastern Europe and operates one of that region's largest bank networks with more than 3.000 business outlets. Its leading role is furthermore reflected in the good positioning of its network banks in their respective markets. Raiffeisen entered CEE region more than 20 years ago by founding the first subsidiary bank in Hungary in 1986. While the company's expansion was initially characterized by the establishment of its own banks, acquisitions of existing banks began to predominate in 2000. To finance its further growth efficiently, Raiffeisen International went public in April 2005. It issued more shares in the framework of a capital increase in October 2007. Raiffeisen International concentrates its activities exclusively on CEE markets¹⁸⁹¹⁹⁰. Raiffeisen International network comprises 15 banks and other financial service enterprises. Raiffeisen was recognized as "Best Bank in Central and Eastern Europe". Interestingly, RI achieved the best year in history in 2008 followed by dramatic decline in profit in 2009.

4.10.1. **Ownership structure (as of March 2010)**

Ownership structure of particular subsidiaries varies across CEE countries, as somewhere the subsidiary is co-owned with some other institutional investors. The main shareholder (see Figure 24) of Raiffeisen International is Raiffeisen Zentralbank Österreich (RZB). RZB, established in 1927, is the central institution of the cooperative banking group. The owners of the Zentralbank are eight regional banks (named Raiffeisenlandesbank), which in turn are owned by some 550 local Raiffeisenbanks. It is one of the largest banking groups in Austria. There are interlinks between the Raiffeisen financial group and the Raiffeisen rural cooperatives (cooperatives of farmers for agricultural and related products). Raiffeisen members have considerable interests in the Austrian economy (construction, media, insurance etc.). There are no significant ownership interlinks to Raiffeisen organisations in countries such as Germany or Switzerland, only to those in the east (Raiffeisen International).

¹⁸⁹ The analysis, numbers, and comparison are due to the most recent information available in May 2010.

¹⁹⁰ Information based on Raiffeisen International

Raiffeisen International, mostly owned by RZB (whose share is 70%), is the company which operates banking subsidiaries in 15 countries of central and eastern Europe.

RZB has subsidiaries in many CEE countries, namely Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Hungary, Moldova, Poland, Romania, Russia, Serbia, Slovakia, Slovenia and Ukraine. The shares of these so-called network banks are held by RZB's subsidiary Raiffeisen International Bank-Holding AG that is listed on the Vienna Stock Exchange. Raiffeisen bank has been more successful in Balkan countries mostly, such as in Serbia Albania, etc., where Raiffeisen bank is one of the biggest banks operating. No other international bank in the region has a similarly extensive and closely-knit distribution network.

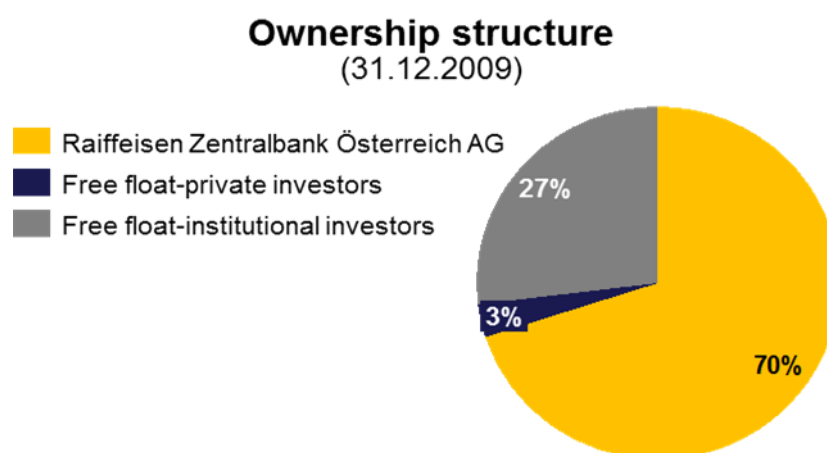


Figure 24: Raiffeisen International ownership structure

4.10.2. Key ratios

Consolidated own funds amounted to EUR 8.3 bn as of 31 December 2009 (plus 15% in comparison to 2008 mainly due to a capital increase of EUR 0.6 bn) in the form of participation rights and an issue of hybrid capital in the amount of EUR 650 m (entirely subscribed by RZB). On the other hand, exchange rate movements of currencies, including especially the Russian rouble, Serbian dinar, Ukrainian hryvnia, and Belarusian rouble, had a

negative impact on core capital. In 2008, net profit grew by 10%, ROE¹⁹¹ decreased by 4pp but still yielding extraordinary results. In 2009 there was a dramatic drop in ROE to record low 4.2%.

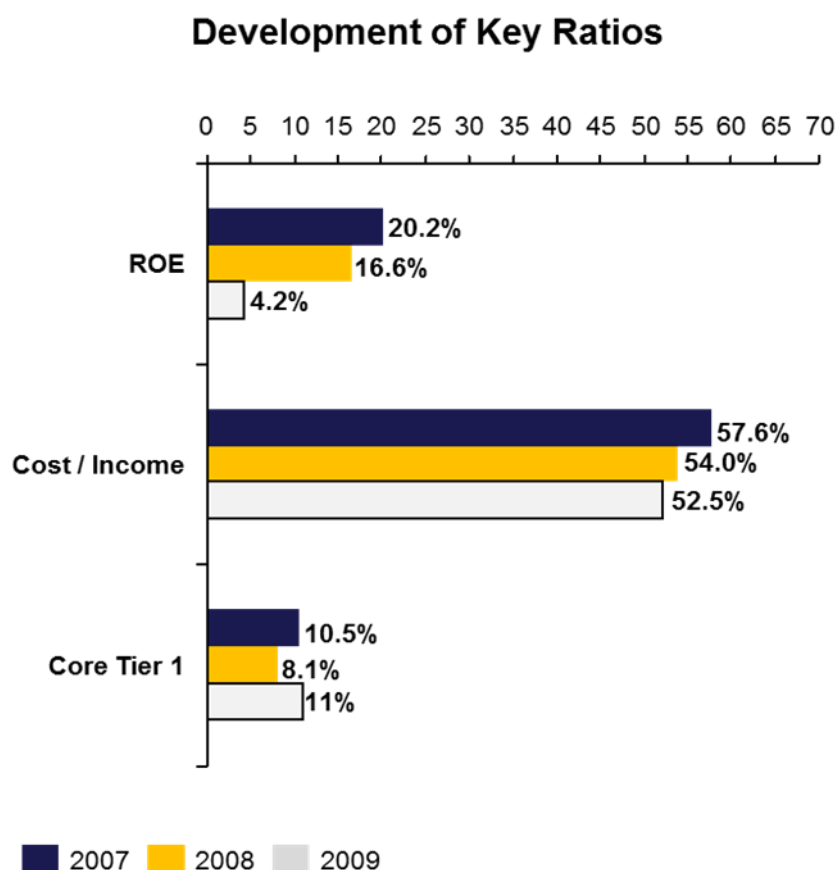


Figure 25: Development of Key Ratios, Raiffeisen International

From the Figure 25 we can see that while the bank was not harshly hit by the crisis in 2008 (they achieved the best year ever in 2008), year 2009 was difficult. Core Tier 1 ratio was improved to 11% after the drop in 2008, which is above average. There were several capital injections and the bank seems to be capittaly stable. Owner of RI Raiffeisen Zentralbank

191 ROE (return on equity) – Return on the total equity including minority interests, i.e. profit before tax respectively after tax in relation to weighted average balance sheet equity. Average equity is calculated on month-end figures and does not include current year profit.

received EUR 1.75 bn in state capital from Austria¹⁹² and RZB provided more than half of the funding for RI. Capital injection allowed it to boost its capital ratio to 11%. Since the beginning of 2008, the calculation of capital adequacy has been performed in accordance with Basel II.

Cost cutting has also been extremely important, leading to cost-income ratio last year by 1.5 percentage points to 52.5 per cent. Cost/income ratio has been steadily decreasing since 2007. In 2008, Cost/Income Ratio improved by 3.6% on the group level in comparison with the previous year. General administrative expenses increased by 21 per cent. Operating income increased by 29 per cent in 2008. Again, Hungary the only country showing negative result already in 2008. For 2009, this ratio supports the claim that the bank was correspondingly decreasing costs (which must have been very tough as the income decreased dramatically as shown). On the overall group level the banking group managed to decrease cost/income ratio (which is one of the positive sides of 2009). The decline of general administrative expenses by 14 per cent in the reporting period was greater than that of operating income by 11 per cent. That resulted in another improvement in the cost/income ratio¹⁹³, a key measure of bank efficiency representing the ratio of operating expenses to operating income, by 1.5 percentage points from 54.0 to 52.5 per cent.

192 Raiffeisen International was not itself eligible to tap the Austrian government's EUR 100bn banking stability package (no Austrian banking licence).

193 Cost/income ratio – Indicator of an enterprise's cost efficiency based on the ratio of expenses to earnings. It is calculated by comparing general administrative expenses (comprising staff expenses and other administrative expenses and depreciation/amortisation of tangible and intangible fixed assets) with operating income (net interest income, net commission income, trading profit/loss and other operating profit/loss).

Cost / Income Ratio (%)

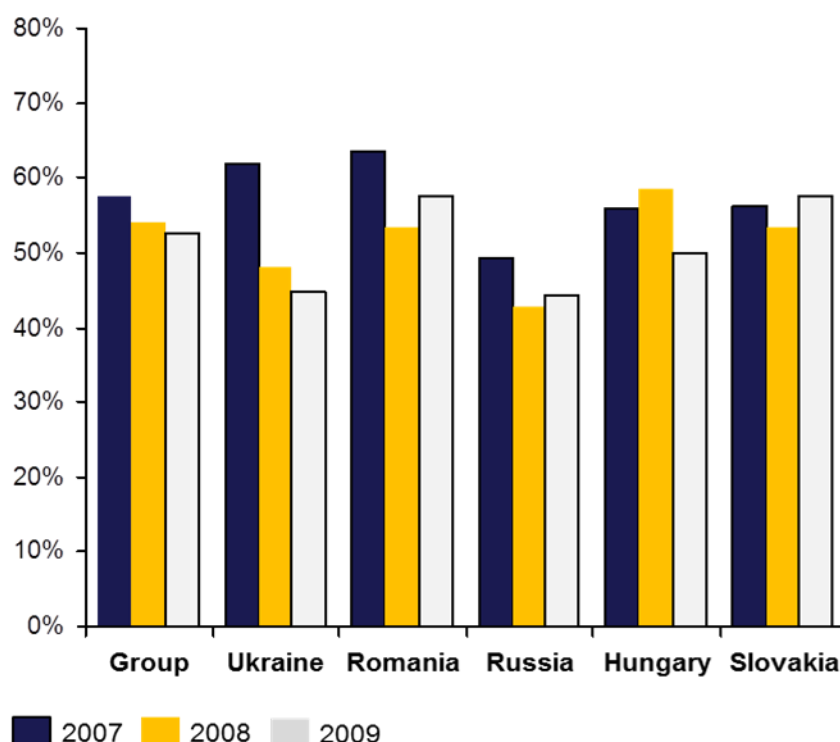


Figure 26: Raiffeisen International, Cost / Income Ratio for a country

The analysis of Cost/income ratio for particular countries also shows significant differences proving that putting all countries in the CEE into one basket is not appropriate. Ukraine managed to continue on the decreasing trend, while Slovakia returned to pre-2007 levels. There, the cost optimization is necessary. A lot of focus was on Hungary, where the country suffered the most across all Visegrad countries, the state of Hungary had to use IMF funds and several mostly fiscal problems had to be solved affecting most of Hungarian nations. The Hungary profit levels for all analyzed banking groups decreased, but some other key performance indicators were more positive. One of them is the cost/income ration for Raiffeisen International, which is below the group level. On the other hand, the banking group is very efficient in Russia, where the ratio is below 50%, which is considered as a successful result.

In order to save costs, but also due to very high uncertainty, there was a Group-wide halt to further branch expansion in RI. In addition, halt to the hiring of new employees was implemented. Significant macroeconomic downturn provided the grounds for the bank's first

reduction in staff numbers after many years of continual staff expansion. Staff reductions necessary in Ukraine, in Hungary, and Slovakia¹⁹⁴ at the start of 2009.

4.10.3. Stock evolution

Along with the general recovery of international stock markets, the Raiffeisen International shares suffered from significant drop following the fall of Lehman Brothers in September 2008, reaching the absolute minimum in January 2009. There was a dramatic drop of the Raiffeisen's stock price during autumn 2008; Stocks lost 81% of its value in 2008. As the stock market usually are one of the most predictive hard data measures, we can see the stock market recovery since January 2009. The stock price is however still on the one-third of the April 2008 level (the peak level).



Figure 27: Stock Price Chart (EUR), Raiffeisen International

From Figure 28 we see the strong trading activity after the fall of Lehman Brothers. Red columns depict decreasing price. Otherwise, the post-Lehman period (mostly after the rebound in January 2009) was mostly in line with the pre-Lehman daily trading volume.

¹⁹⁴ Though, in Slovakia the staff reduction had been planned due to operational efficiency and it would have been implemented even if the crisis had not come

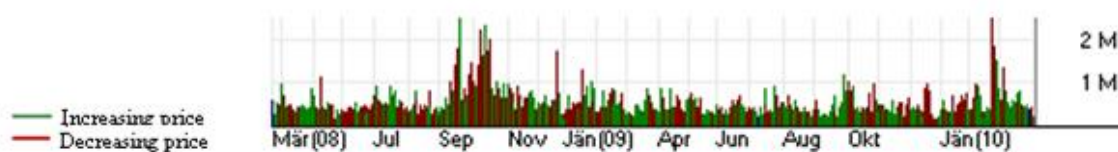


Figure 28: Trading volumes of Raiffeisen International Share

4.10.4. Net profit

Net profit evolution (see Figure 29) depicts a steady increase since 2004. Net profit dramatically decreased to EUR 287 m (see Figure 25 and Figure 29). The banking group was successfully growing and every year it was able to generate additional EUR 100-200 m on net profit. Here, it is important to repeat that 2008 (despite the very crisis) the banking group achieved the best result ever. However, in 2009 we see a significant drop in net profit. Overall RI was able to sustain the crisis better in 2008 (better in comparison to other analyzed banking groups). However, the 78% decrease in net profit in 2009 pushes the banking group back on the 2004 levels. The group's core capital increased by 17%.

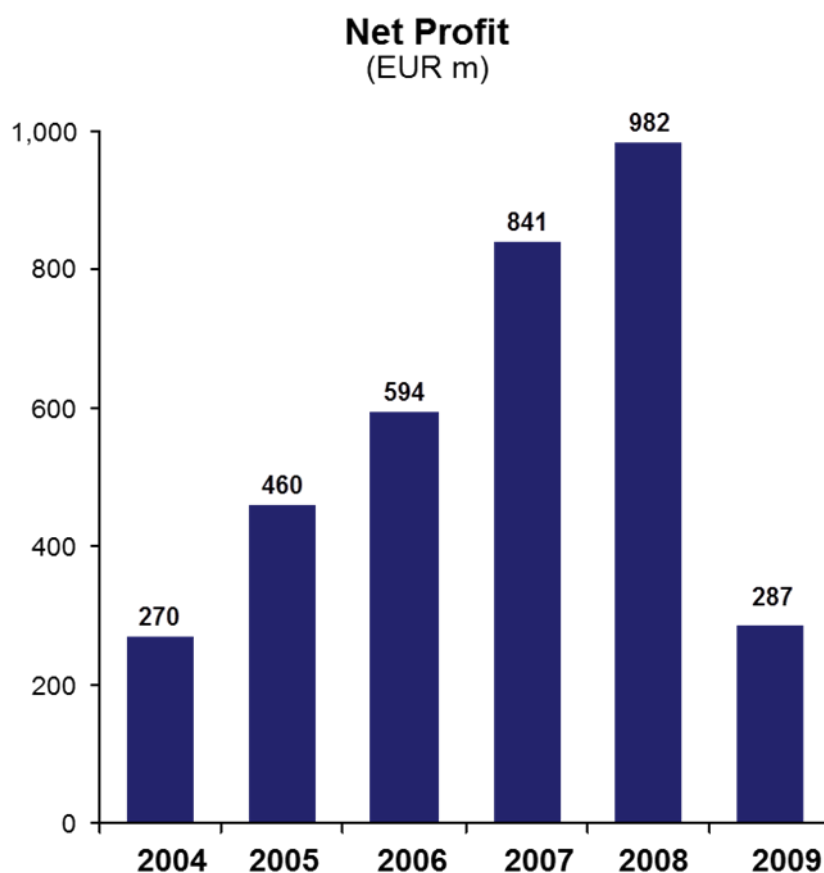


Figure 29: Raiffeisen International Net Profit Evolution.

4.10.5. Country analysis

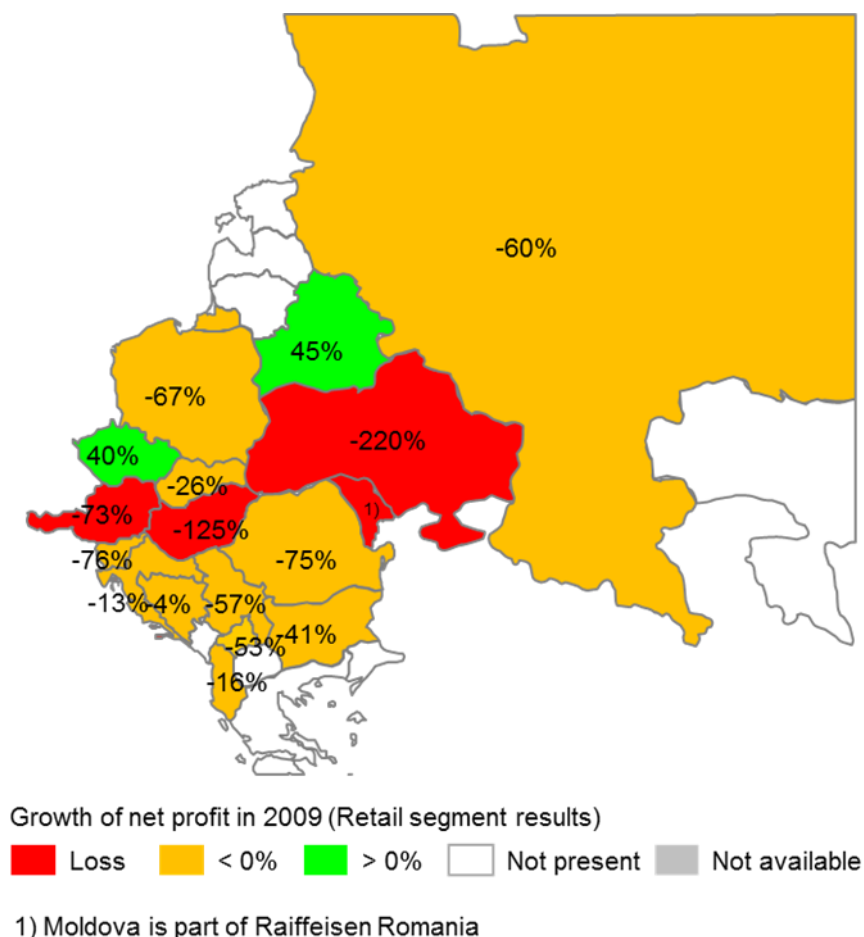


Figure 30: Growth of RI's net profit in 2008 (Retail segment results), Source: Annual reports, author's calculation

Raiffeisen International is very much oriented on the CEE. In 2000 the acquisition of existing banks began: In Kosovo, Belarus, Albania and Ukraine in 2002 through 2005. The most recent acquisition was that of Impexbank in Russia in 2006, whose merger with the Russian Raiffeisenbank has now been completed. New outlets were opened mainly in Southeastern Europe, and particularly in Romania and Bulgaria. In 2008 the financial crisis was not yet clearly visible from Raiffeisen's figures. In 2008, Raiffeisen had a net increase of 216 outlets compared with the preceding year.

In 2008, Hungary and the Balkans suffered from decreasing profits; otherwise all countries grew. Overall, RI's net profit grew in 2008 by 10%. In 2008, net profit grew by more than 10%. Raiffeisen International achieved record earnings; Profit rose by 16%.

However because significantly higher impairment losses (+119%), increase of net profit lower than the operating profit. In 2008, only Hungary and the Balcans suffered from decreasing profits; otherwise all countries grew. Hungary did not perform well in 2008.

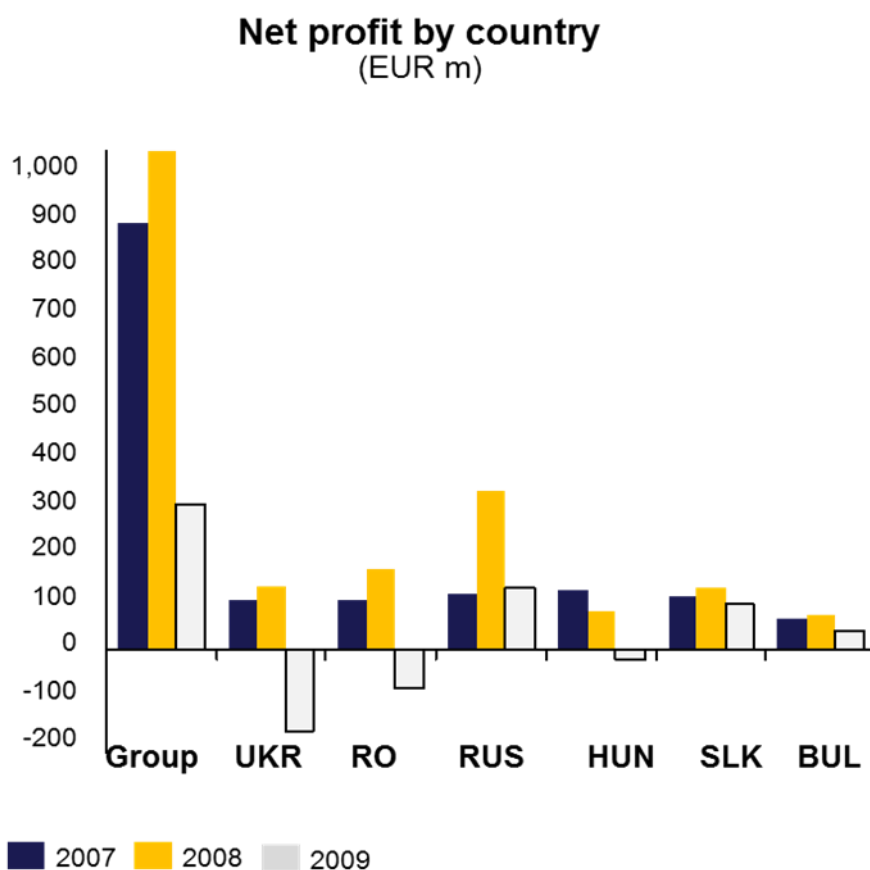


Figure 31: Growth of Raiffeisen International's net profit in 2009 in comparison to 2008

In 2009, despite the decrease the Polish market and favorable loan/deposit ratios in the Czech Republic and Slovakia had a positive impact on the group's results. Lending volume in Hungary declined in 2009. Slovenia and Slovakia already benefited from their status as members of the euro zone, which grants them direct access to ECB funding lines. In Ukraine, the net loss from 2008 deepened (See Figure 51). The Country net profit analyses shows significant differences across countries. While some countries managed to sustain positive net profit (some were not even affected much such as Belarus or the Czech Republic), others (such as Ukraine, Hungary) suffered significant decrease in profit levels. In Ukraine even, the loss from 2009 wiped out almost all 2008 and 2007 profits. Ukraine proves to be the country, which has been the most hit by the crisis in the CEE.

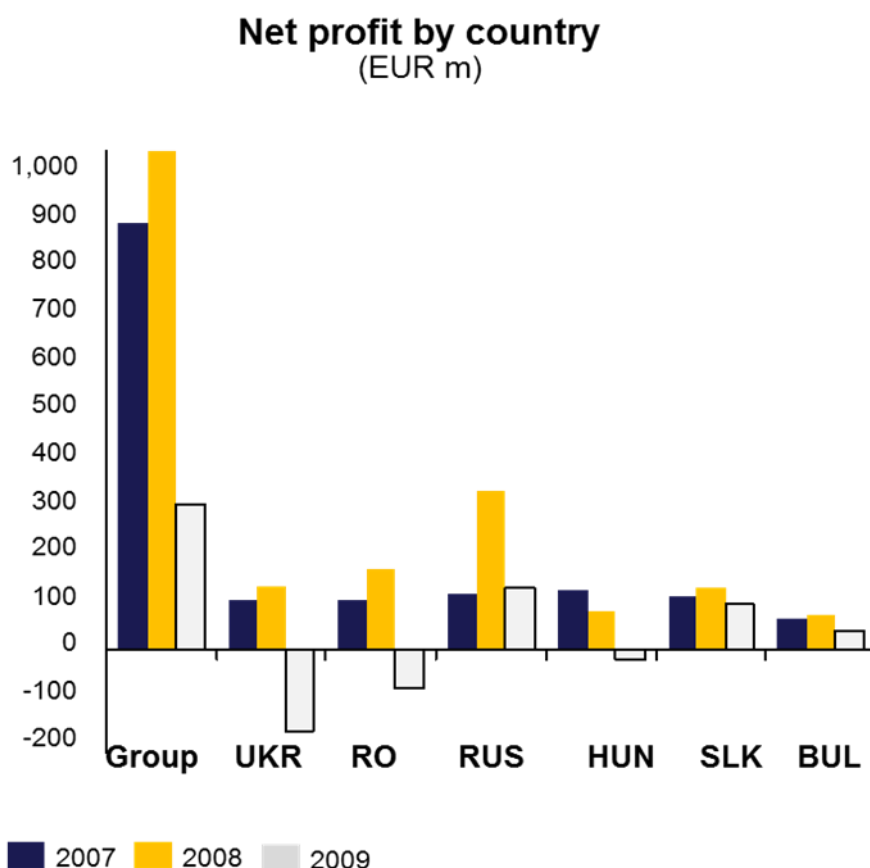


Figure 32: Raiffeisen International's net profit per country, 2007-2009¹⁹⁵

In Poland deposits increased by 0.2 per cent year-on-year. The loan/deposit ratio also improved because of the company's focus on acquiring and retaining customer deposits. The expense of acquiring customer deposits rose significantly due to intensified competition on the money market since the beginning of the year. However, only part of the increase was passed on to customers. Consequently, net interest income in 2009 remained below the value of the previous year. Net trading income, on the other hand, turned out better than in the preceding year due to successful currency-related transactions. However, a decline of payment transfers and lower customer margins in foreign exchange business had an adverse effect on net fee and commission income.

In the Czech Republic net profit grew by 40.1 per cent, total deposits increased by 17.9 per cent, while the loan portfolio grew by 4.7 per cent (still having 110% loan/deposit ratio in 2009). Raiffeisen International does not confirm that the Czech Republic is the net

¹⁹⁵ Due to space limitations only counties with interesting development depicted

lender. Most subsidiaries are net debtors. Provisioning for impairment losses increased in 2009, following the market trend. Raiffeisen International in Bulgaria improved its cost-income ratio in the reporting period from the previous level of 47.4 per cent to 43.7 per cent. The difficult situation of the Romanian real economy led in 2009 to an increase of provisioning for impairment losses, and particularly for loans to private individuals. Lower margins on customer deposits and on deposits from banks led to a decline of net interest income in the past year. Extensive cost-cutting measures led to a significant personnel reduction by over 660 employees compared with the preceding year (minus 9.6 per cent). Also in reaction to the crisis, business processes were further centralized, and risk management strengthened. The Russia segment was also unable to escape the effects of the economic crisis. Net profit fell by 65 per cent. The average devaluation of the Russian rouble year-on-year also weighed heavily on earnings in this segment.

Because of the difficult economic situation in Ukraine, Raiffeisen Bank Aval took extensive crisis management measures in the period under review. Provisioning for impairment losses was increased greatly, which primarily affected business with private individuals. Furthermore, restructuring programs were implemented in all customer groups: corporate customers, small and medium-sized enterprises, and private individuals. Parallel to that, activities in customer relationship management were pushed forward to tap existing customer potential further. Moreover, an optimization program for the branch network was started. At the same time, the number of employees was reduced

4.10.6. Credit analysis

In order to cope with risk, Raiffeisen International implemented more stringent risk criteria. From the financial point of view, foreign currency lending was sharply curtailed, which was the case for all banks in the region. Dramatic decline in lending was common for all banks, which however resulted in decrease in investment activity in all countries and therefore it undermined the economic growth. Generally, funding facilities have been severely limited and more costly than before. Banks implemented stricter underlying standards on new loans (credit limits, maturities and collateralisation).

Decreasing creditworthiness of borrowers and resulting lower ratings were the reason for significantly higher provision in 2008. Higher risk provisioning due to partly ineffective capital hedge. Individual provisions rose by 78%, portfolio related provisions went up 266%

in 2009. While growth and earnings were previously in the foreground, the bank focused in 2009 on strengthening capital, managing liquidity and risk, raising efficiency, and lowering costs. The banking group strengthened liquidity primarily by intensifying acquisition efforts on the deposit side, expanding cooperation with supranational institutions, and financing through RZB. Unsurprisingly, 2009 was also shaped by the sharp rise of non-performing loans and the related increase of provisioning for impairment losses. The liquidity was being strengthened mostly due to intensifying acquisition efforts on the deposit side more selective lending, extensive restrictions on granting foreign currency loans to private individuals. The considerable worsening of many borrowers' creditworthiness and financial strength necessitated a significant increase of net allocations to provisioning for impairment losses. Credit growth has slowed noticeably, the bank had expected an increase in loan defaults from companies and private households for 2009 and 2010. Further measures aimed at raising efficiency and expanding capabilities.

While net allocation to individual provisions climbed by 212 per cent due to the increase of non-performing loans, portfolio-related provisions decreased by 33 per cent due to volume effects. Consequently, the risk/earnings ratio rose significantly, from 24.1 per cent to 59.2 per cent. Interest income declined by 10 per cent. More than 80 per cent of that derived from the most important item on the statement of financial position, loans and advances to customers, from which income decreased by 8 per cent for the reasons described above. Significant declines were registered by interest income from loans and advances to banks (minus 60 per cent) due to the general reduction of the interest rate level and from credit balances with central banks (minus 47 per cent) due to volume effects. Although the total amount of customer deposits decreased by 4 per cent, interest expenses increased by just under 1 per cent. The reason for that was stiff competition for customer deposits in many markets and associated higher expenses. Lower interest expenses by 25 per cent were shown for deposits from banks, which is in line with the volume reduction.

A look at the development over the year reveals a slight flattening of momentum in net allocations after the second quarter of 2009, when the largest net allocations were made. The net provisioning ratio¹⁹⁶, which is the, increased by 1.88 percentage points to 3.19 per

¹⁹⁶ ratio of net allocations to average risk-weighted assets (credit risk)

cent. The loss rate, which is the ratio of written-off loans to total endings, rose from 0.11 per cent to 0.30 per cent. The unfavourable economic environment was also discernible in the risk/earnings ratio, which is the ratio of provisioning for impairment losses to net interest income. This ratio rose from 24.1 per cent to 59.2 per cent. The largest net allocations to individual provisions were made in the CIS. Half of individual provisions in the region were due to private individuals, and half to corporate customers.

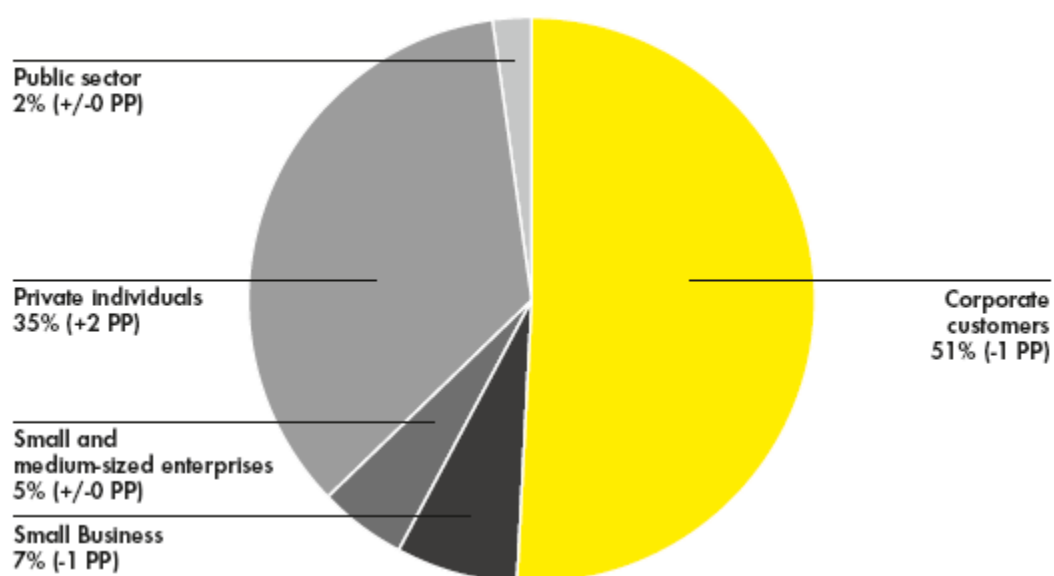


Figure 33: Structure of loans and advances to customers, 2009, Raiffeisen International

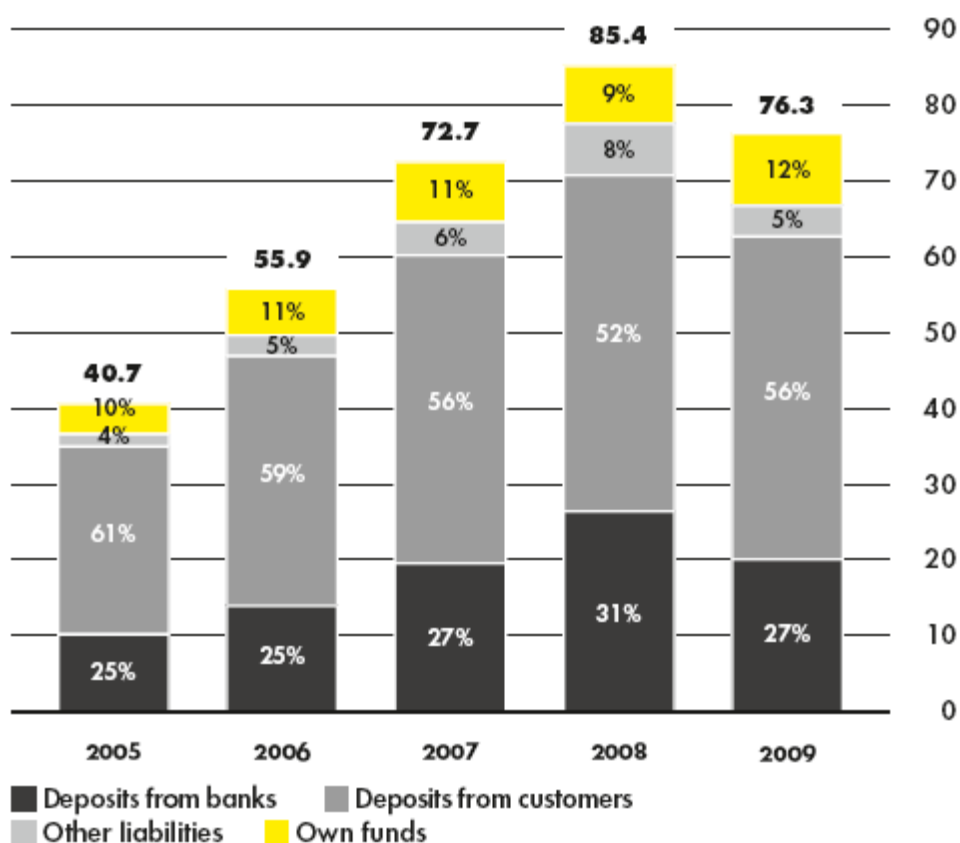


Figure 34: Structure of liabilities on the statement of financial position (in EUR bn), 2009, Raiffeisen International

Ratios	2009	2008
Net provisioning ratio (average risk-weighted assets, credit risk)	3.19%	1.32%
Net provisioning ratio (total loans outstanding)	1.95%	0.80%
Loss rate	0.30%	0.11%
Portfolio rate	3.53%	1.75%
Risk/earnings ratio	59.18%	24.14%

Figure 35: Risk ratios, 2009, Raiffeisen International

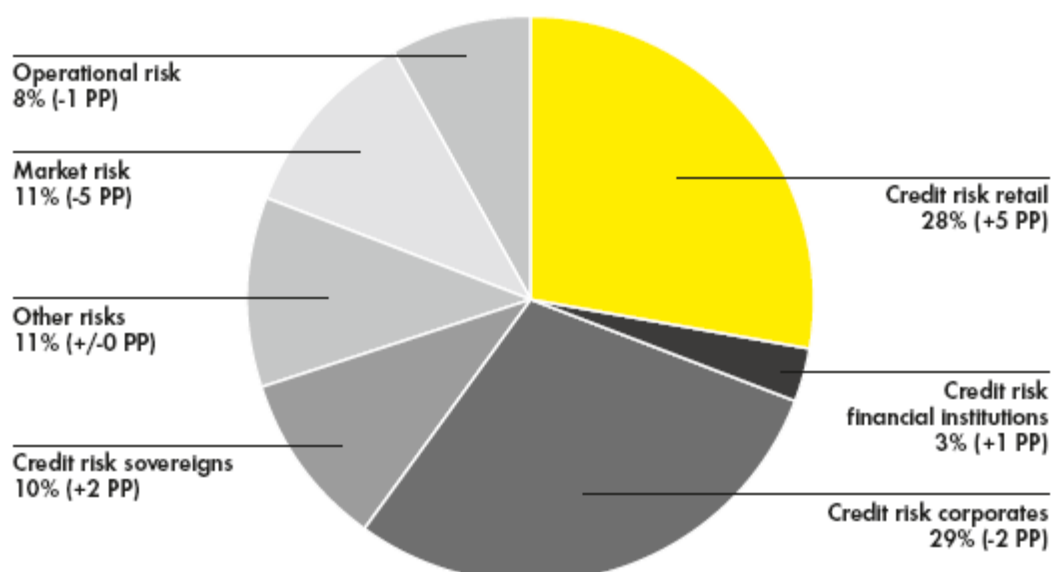


Figure 36: Risk contribution of individual risk types to economic capital, 2009, Raiffeisen International¹⁹⁷

Economic capital shows – as in the last year – that credit risk of the corporate customer division remains the dominant risk category. Its share in total risk (29 per cent), however, is decreasing steadily in annual comparison. Credit risks in total account for 69 per cent of economic capital. Market and operational risks account for 11 and 8 per cent respectively and in addition a general risk buffer is allocated for other risks as well.

4.11. Société Générale



Société Générale is a multi-brand player. It is by far the biggest banking Group out of those analyzed. With 163,000 employees working in 82 countries and more than 30 million customers, the banking group is – contrary to the other banking groups analysed in this thesis – a truly global player.

¹⁹⁷ Risks in the target rating perspective are measured as economic capital presenting a comparable measure across all types of risks. It is calculated as the sum of unexpected losses stemming from different Group members and different risk categories (credit incl. country risk, market, and operational risk). In addition, a separate buffer for other risks not explicitly quantified is held on overall Group level.

4.11.1. Ownership structure

The ownership structure has been relatively stable over time. Most of the shares are floating freely in the stock market.

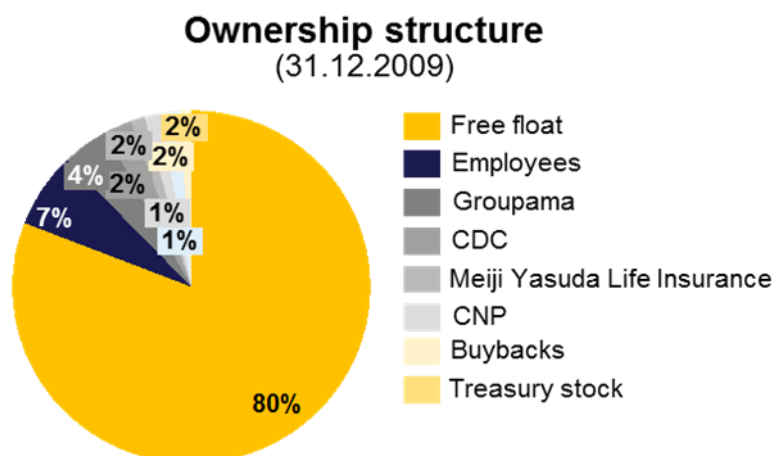


Figure 37: Société Générale ownership structure, Source: Annual reports and author's calculations

4.11.2. Key Ratios

Société Générale's retail banking business line saved the group from heavy impacts of the economic and financial crisis. In 2008, changes in balance sheet were not so significant besides the drop in shareholder's equity. Amount of total assets remained almost unchanged during 2008. Group managed to increase ROE both in 2008 and in 2009 (significantly: see Figure 38). However comparing it to previous periods, results are not satisfactory enough. Group has changed its strategy and moves to repositioning to increase client focus, operational efficiency and reduce risk. But risk criteria are implicitly strengthened as there has been an explicit reduction of exposures to risk. Société Générale received government aid of EUR 1.7bn in 2008¹⁹⁸. Société Générale also has the option to raise the new funds by issuing Tier subordinated debt securities with the same characteristics of the notes issued in 2008, non-dilutive preference shares with no voting rights but eligible for Core Tier I capital

198 The State injected capital in the form of subordinated debt or preferred shares – The hybrid debt securities will carry no voting rights and will be non-dilutive to existing shareholders. The securities can be bought back at the option of the issuer, but the repurchase price gradually increases. The issued date will be remunerated at a fixed rate for the first 5-yrs (coupon approx. 8.0%) and at a variable rate thereafter

computation. Preference shares cannot be converted into ordinary shares at any time, however they can be repurchased by the issuing bank. Interests paid on preference shares are not tax deductible.

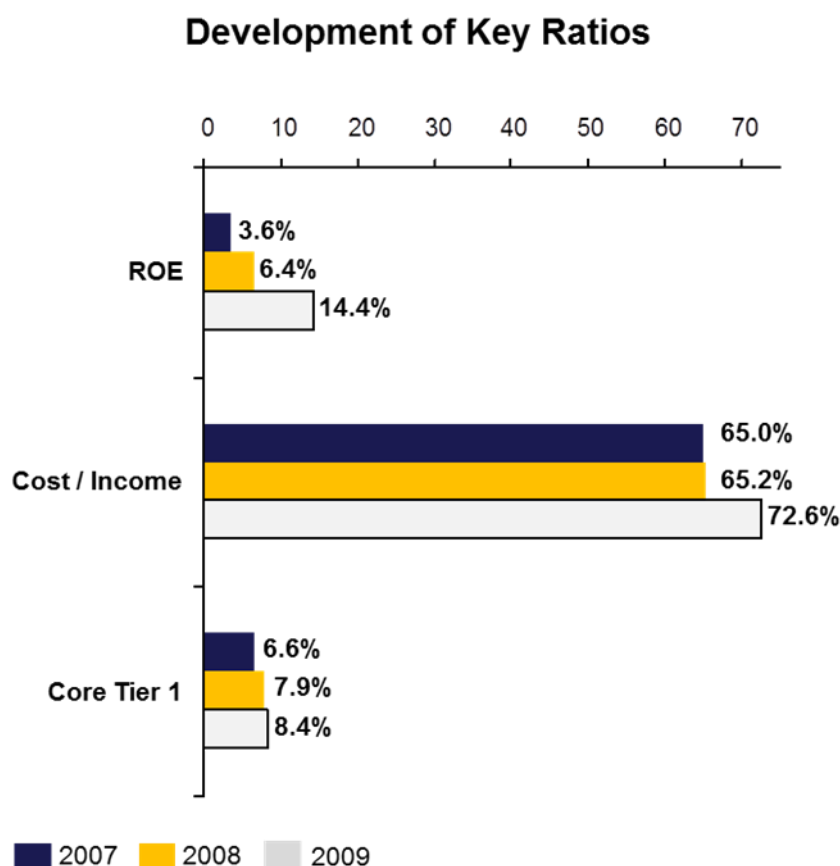


Figure 38: Development of Key Ratios, Société Générale, Source: Annual reports and author's calculations

Core Tier 1 ratio increased to 8.4% in 2009, which is still below some other competitors. There has been a fall in risk-weighted assets of -6.2% in 2009, mostly because of success of capital increase (EUR 4.8bn) and the reimbursement of notes subscribed by the French State. Soc Gen managed to raise □EUR 37bn of funding in 2009 due to a diversified programme of issues on the capital markets supplemented by French state contribution. Cost/income ratio increased to 72.6% (up by 7.4 pp, which is not a positive result and far above competitors) after stable 65% in 2007 and 2008. ROE reached strong 14.4% in 2009: a significant improvement from 3.6% in 2007.

4.11.3. Stock evolution

From Figure 39 we see that the Lehman Brother's fall is not that visible¹⁹⁹. The stock price was on the decline since mid-2007. Recent price around 60 EUR is still not even ½ what has been at the peak levels in 2007.



Figure 39: Stock Price Chart (EUR), Société Générale

However, while the Lehman Brother's effect is not clearly visible from the price chart it is easily recognisable from the trading volumes chart (see Figure 40)

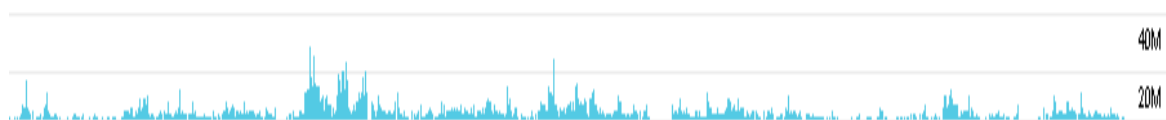


Figure 40: Trading volumes of Société Générale Share, Source: Annual reports and author's calculations

4.11.4. Net profit

Société Générale achieved in 2008 net profit of EUR 2 bn in 2008. The problems in 2007 were caused by financial mismanagement, strong rebound in 2008 was stopped by the financial crisis. Even though the bank suffered it remained in black numbers. Net Income in 2009 was EUR 678m, which is a decrease of 70% in comparison with the previous year. We see (Figure 41) that last three years were very difficult for the banking group.

¹⁹⁹ Grey shadows distinguishes years.

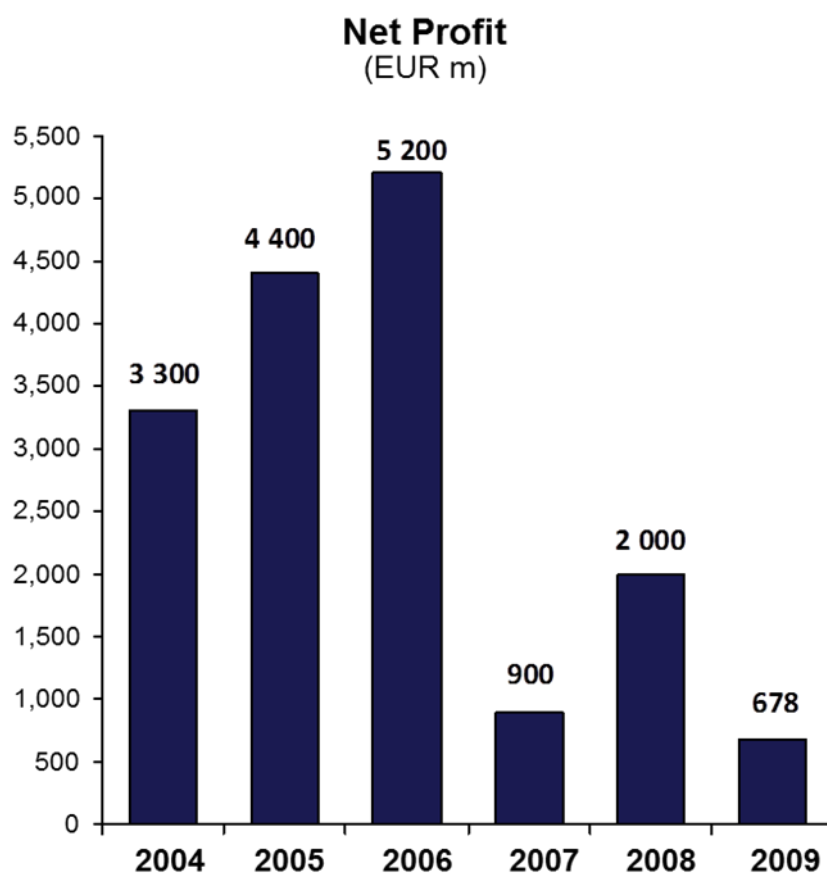


Figure 41: Société Générale Net Profit Evolution, Source: Annual reports and author's calculations

4.11.5. Country analysis

Société Générale managed to report positive net profit in all its core markets in Europe but crisis affected other areas. In the Czech Republic there has been stronger competition with the normalization of market conditions and □ Société Générale maintained leadership mostly thanks to regular product innovation. To react to the thought conditions, Komerční banka stopped issuing 100% mortgages of the value of the property used as collateral. In Romania, there has been an improvement of the loan to deposit ratio and the bank yielded good net profit both in 2008 and 2009 (see Figure 44).

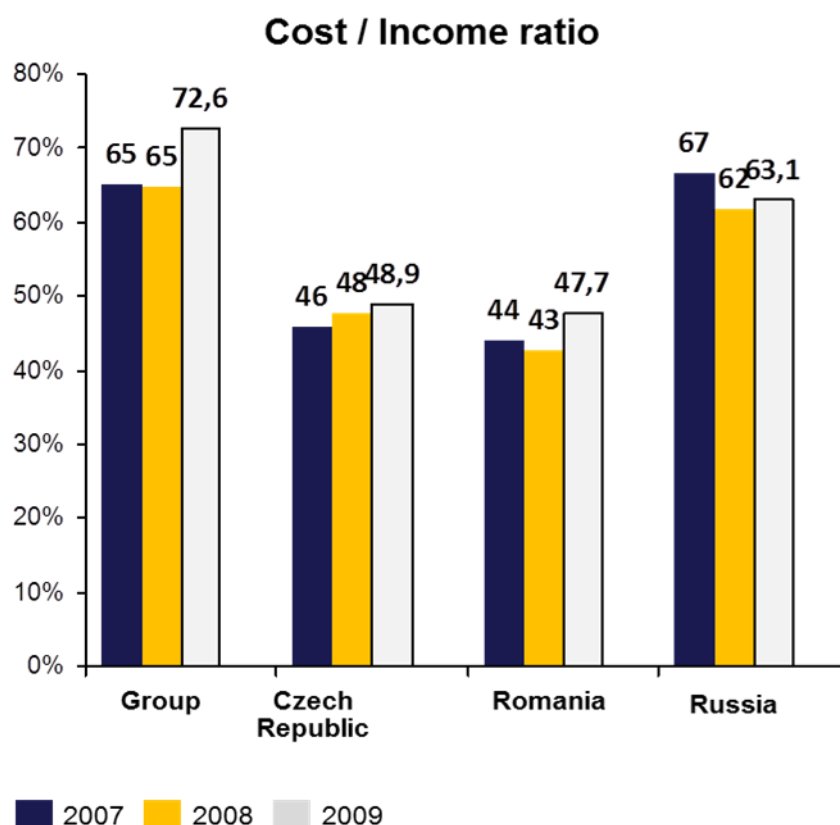


Figure 42: Societe Generale's presence in the CEE (as of 2010)²⁰⁰

Efficiency by country varies as seen from Figure 43. In most countries, the priorities of the bank during the crisis were reduction of costs and strict monitoring of expenses, very prudent approach to the risk, and established provisions and impairments. The bank has stopped new hiring indefinitely and it has halted the expansion of its network in most countries.

²⁰⁰ The standard 2007/2008/2009 comparison was not possible due to the aggregation of data

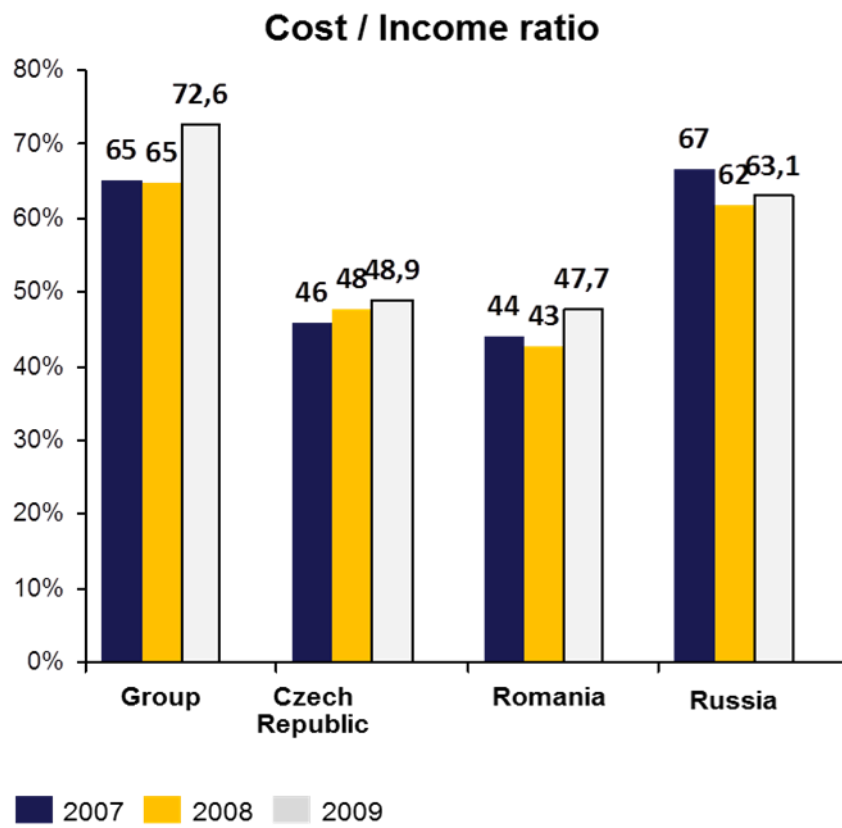


Figure 43: Société Générale, Cost / Income Ratio for a country, Source: Annual reports and author's calculations

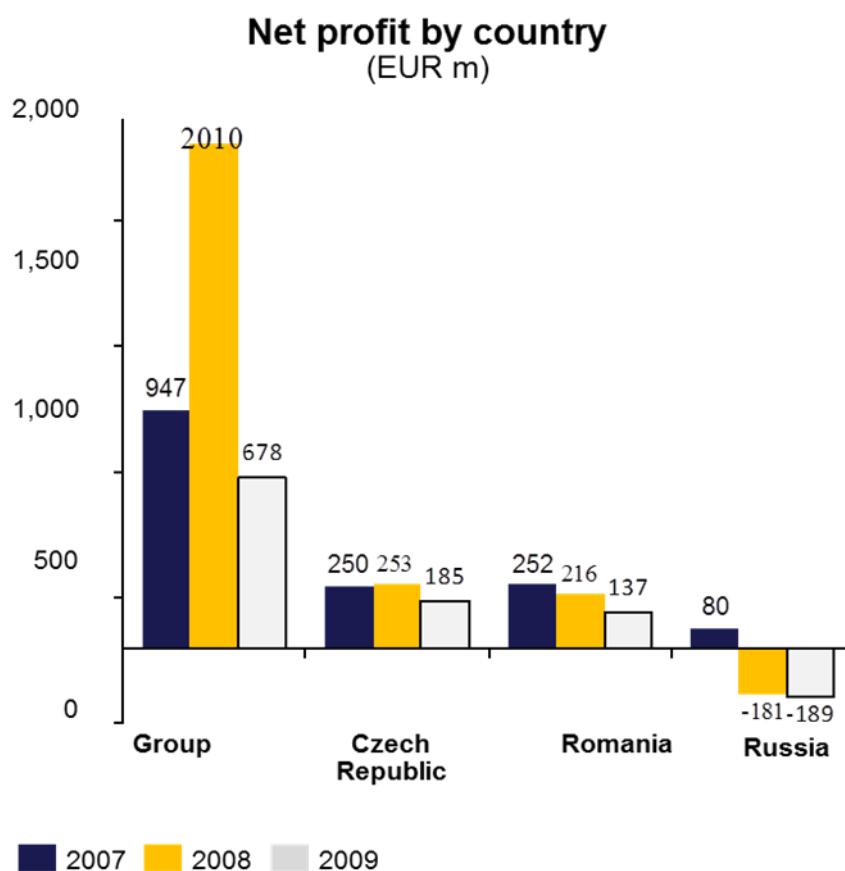


Figure 44: Société Générale's Net profit per country, 2007-2009, Source: Annual reports and author's calculations

The bank expects rebound in profitability in 2010 due to, reduction of losses on the residual value of vehicles, upturn in origination of margins, reduction in the cost of risk and continued growth of business (though slower than originally expected). The bank continues with the operations' realignment and of the measures to reduce operating expenses initiated in 2008. There has also been a significant reduction of the balance sheet since the start of the financial crisis

4.11.6. Credit analysis

Households' reluctance to get into debt at the beginning of the year 2009 gradually gave way to a demand for loans. This was boosted both by the decline in house prices and interest rate levels (see for example Figure 5 as a proxy for the whole market. The behaviour of all central bank was similar in this respect). New housing loan business enjoyed a strong revival in the second half of 2009 up 4.2%. Consumer credit provided further evidence of its resilience in 2009, increase of 2.6% vs. 2008 in a shrinking market. Overall, outstanding loans

to individuals rose 3.6% in 2009. The effects of the crisis on the business climate can also be measured through the deterioration in risk. Overall, deposits increased by 5.4% and loans decreased by 2.6% vs. 2008, which resulted in the improvement of loan to deposit ratio: 94% in 2009 vs. 102% in 2008. Overall, the performance affected by the economic environment. There has been much higher cost of risk in 2009. Surprisingly, in CEE there has been a significant increase in consumer credit (Société Générale, 2010).

Despite unpleasant economic environment, Société Générale is still increasing the number of deposits and loans in Retail Banking outside France. However, the main market for Retail Banking for Société Générale is France and, therefore, the portion of loans in CEE to Group is very small. In terms of loans to customers and customers' loans, Russia is the second core market in Europe right after Czech Republic. On the group level, there is significant increase in development of Retail loans and in Retail deposits. In the Czech Republic, slower growth in lending activity in 2008 reflecting market uncertainties and lower levels of clients activities (slower demand for credit). In conclusion, we can see that Société Générale is due to its global exposure (both country-wise and product-wise) a unique player on the CEE market (even KBC does not have such a big exposure) and therefore the impact on the banking group was relatively different.

4.12. **UniCredit**

UniCredit operates in 22 European countries, with more than 166,000 employees and 10,000 branches. UniCredit benefits from a strong European identity, extensive international presence and broad customer base. It is a market leader in Central and Eastern Europe. Operating in 19 CEE countries, the bank benefits from relative geographical diversity.

4.12.1. **Ownership structure**

The ownership structure is diluted with the highest share having Mediobanca S.p.A. (See Figure 45).

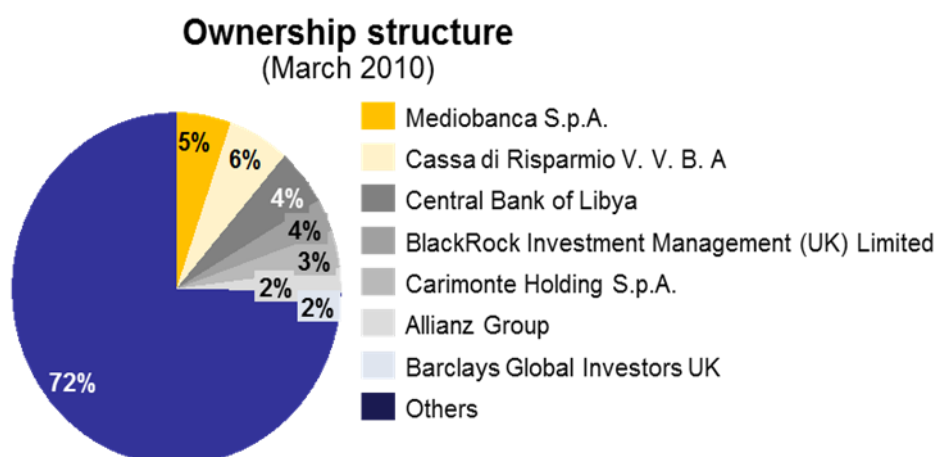


Figure 45: UniCredit Group ownership structure, Source: Annual reports and author's calculations

4.12.2. Key ratios

The key ratio analysis reveals interesting development. Both ROE and Cost/income Ratio worsened for UniCredit Group, only Core Tier 1 was improved in 2008. The cost income returned to 2007 levels: to improve cost/income ratio, the staff was reduced in 2008 by 7.7%. In 4Q 2008, capital increase by EUR 3bn through issuance of shares. ROE decreased due to drop in profits (the development is absolutely converse to Société Générale's: see Figure 38). Core Tier 1 ratio was improved to 8.45% in 2009. The development of this ratio is mainly through capital strengthening - without, it would have remained on similar level as 2007 (5.83%). Total Capital²⁰¹ ratio increased to 12.88%²⁰².

²⁰¹ Total Capital to total assets ratio: tier 1 capital plus Tier 2 Capital (preferred stock, subordinated debt, and loan loss reserves) divided by total average assets.

²⁰² UniCredit Group received EUR 2.7bn from the Austrian government.

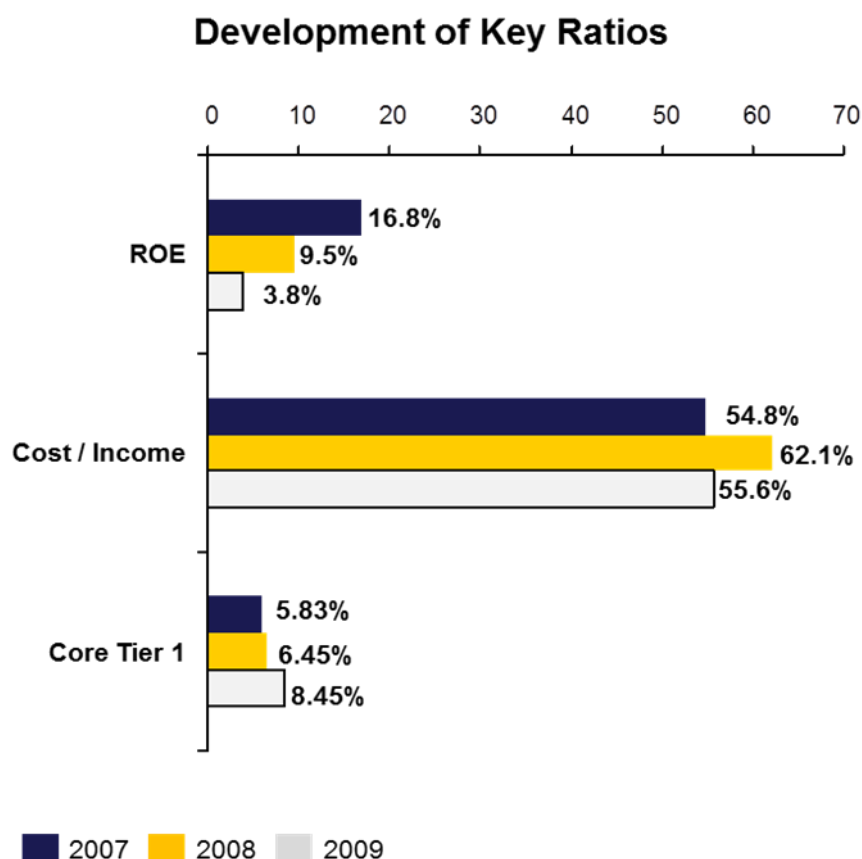


Figure 46: Development of Key Ratios, UniCredit Group, Source: Annual reports and author's calculations

A closer look into the balance sheet reveals dramatic changes, compared to 2007. UniCredit Group both slows down expansion and increases efficiency measures in CEE. The bank had to reduce exposure to portfolios of asset-backed securities and the bank stopped securities trading on its own account. Branch expansion planned for 2009 was put on hold and staff reductions of approximately 2,000 FTEs in 2009. Overall, the measures taken have led to significant decrease in cost/income ratio in all analysed countries (Figure 47).

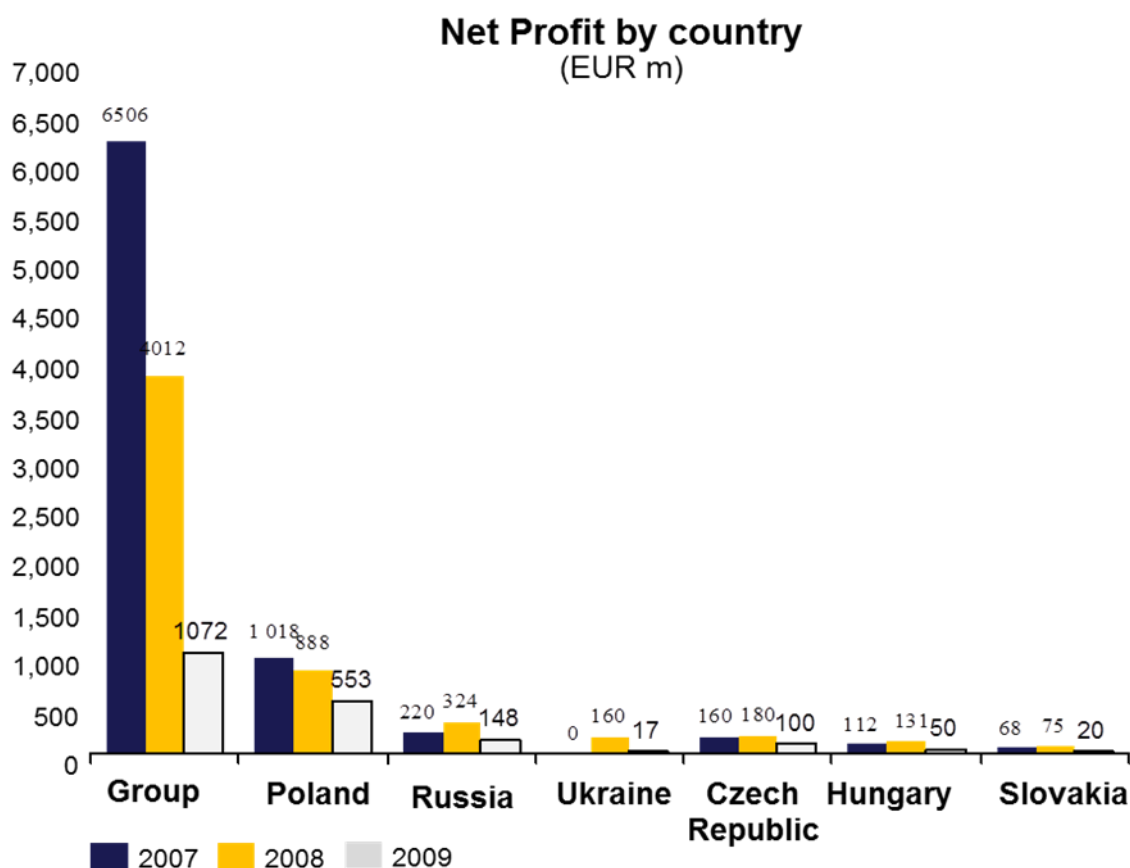


Figure 47: UniCredit Group Cost / Income Ratio for a country, Source: Annual reports and author's calculations

4.12.3. Stock evolution



Figure 48: Price Chart, UniCredit Group –Share, Source: yahoo.finance.com

The stock evolution (Figure 48) describes a steady decline of the share price, which was only accelerated by the fall of Lehman brothers. However, the September 2008 crisis was not the beginning of the stock price decrease. The stock price rebound can be spotted in

March/April 2009, after which the price has stabilised around EUR 2 per share (still only one third of January 2007 value).

4.12.4. Net profit

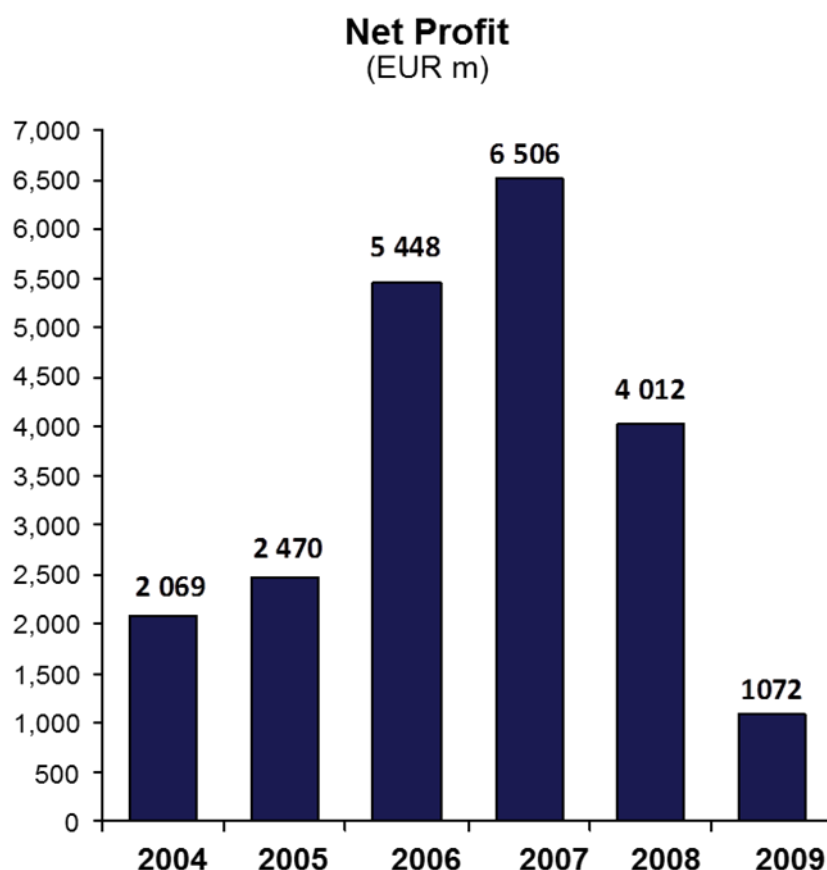


Figure 49: UniCredit Group Net Profit Evolution, Source: Annual reports and author's calculations

Unicredit Group in 2008 achieved Net Profit of EUR 4 bn, which is a decrease by 38.3% in comparison to 2007. The drop was largely due to 3Q and 4Q 08 results. Though higher growth was expected, profit before tax in the CEE region grew by 14.6. In 2008, Unicredit Group's Net Profit dropped by 38%, but remains on a high level. In 2009 the situation was much more dramatic, the net profit dropped to EUR 1.7 bn. In 2009, net profit reached EUR 1.7 bn. Balance sheet strengthened: total assets, trading and net interbank exposure reduced, leverage ratio improved. The Group's portion of net profit in 2009 is EUR 1.7 bn compared to EUR 4.0 bn in the prior year (Figure 49). From this figure we can also see how extraordinary were years 2006 and 2007.

4.12.5. Country analysis

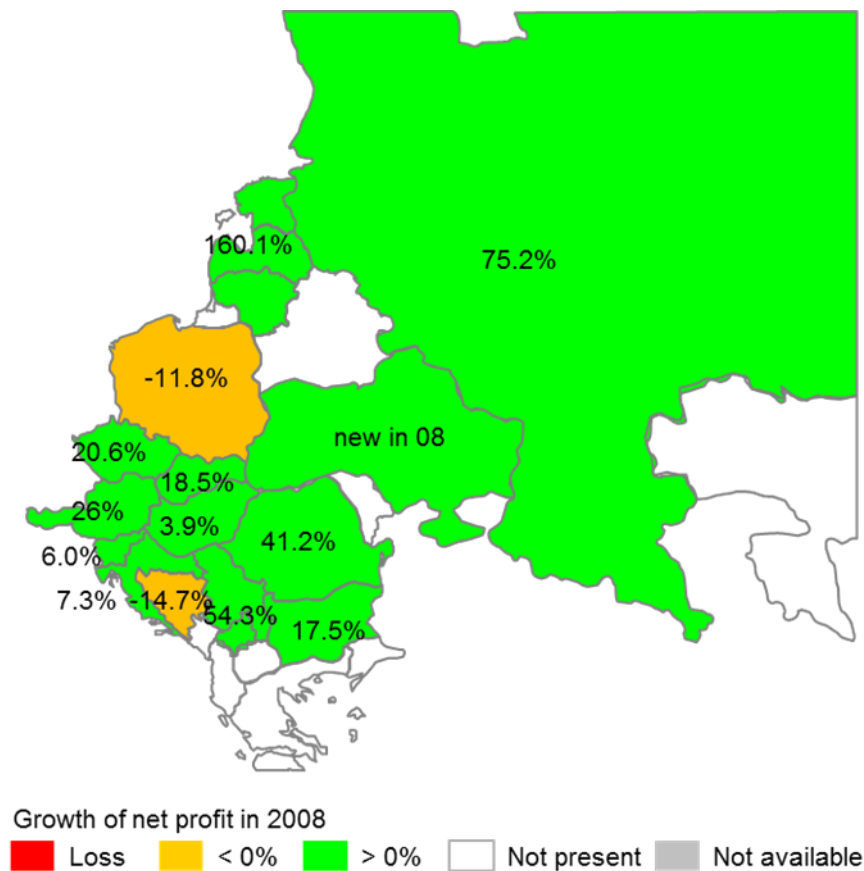


Figure 50: Growth of UniCredit Group's net profit in 2008 (Retail segment results), , Source: Annual reports and author's calculations

In CEE, Unicredit Group realized double-digit growth rates in net profit in almost all countries in 2008. Without Poland, increase would even be by 28.8%. Poland's net profit dropped due a decrease in revenues caused by lower fees. At the same time (2008), revenues increased by 11.0% and costs by 10.3% in CEE. We see (Figure 50) that still in 2008, most of UniCredit Group's subsidiaries were growing, while in 2009 only the Baltic states surprisingly managed to grow (Figure 51). However, no subsidiary went to red numbers in 2009, which is a unique achievement.

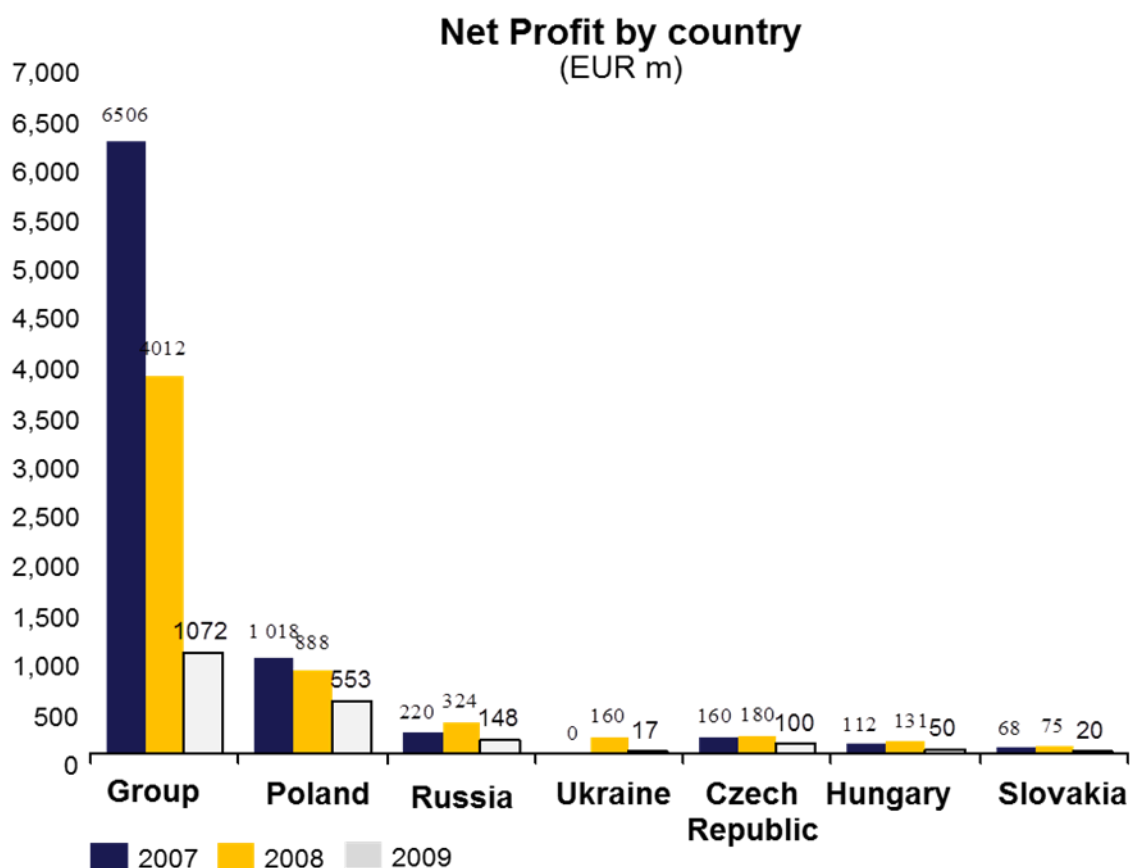


Figure 51: Growth of UniCredit Group's net profit in 2009 in comparison to 2008, Source: Annual reports and author's calculations

Figure 52: UniCredit Group's Net profit per country, 2007-2009, Source: Annual reports and author's calculations

UniCredit's approach and performance differs among the CEE countries. From Figure 52, we see that Polish subsidiary contributed more than 50% to the group's net profit (while in 2007 it was less than 16%). UniCredit Bank Hungary achieved its best result in 2008 but fell in 2009. The bank considers itself especially strong with treasury and mortgage loans (which went into troubles in 2009). UniCredit Bank Czech Republic was established in 2007 with a strategic focus on affluent and small business clients. In Poland Pekao Bank has a market share of 20% in loans and deposits and has the strongest position in all CEE countries. In Ukraine, UniCredit bought 94% of the shares of Ukrotsbank in 2008 only 536 branches in 2008. In Romania, the bank is one of UniCredit's "aggressive growth" countries. It is the country's leading bank in terms of capital and total assets. Market share in loans to corporate customers reach nearly 25% in 2009.

4.12.6. Credit analysis

(mln Euro)	Var. y/y %	(mln Euro)	Var. y/y %
Cash and cash balances	56.7%	Deposits from banks	-39.9%
Financial assets held for trading	-34.7%	Deposits from customers and debt securities in issue	0.9%
Loans and receivables with banks	-3.2%	Financial liabilities held for trading	-31.0%
Loans and receivables with customers	-7.8%	Financial liabilities designated at fair value	-2.8%
Financial investments	-1.5%	Hedging instruments	36.0%
Hedging instruments	58.3%	Provisions for risks and charges	-0.8%
Property, plant and equipment	1.3%	Tax liabilities	-21.6%
Goodwill	-1.9%	Liabilities included in disposal groups held for sale	-41.9%
Other intangible assets	-4.7%	Other liabilities	-22.5%
Tax assets	1.5%	Minorities	-1.2%
Non-current assets and disposal groups held for sale	-39.6%	Shareholders' equity	+ 8.5%
Other assets	-25.3%	- Capital and reserves	+ 11.6%
Total assets	-11.2%	- Available-for-sale assets fair value reserve and cash-flow hedging reserve	- 146.6%
		- Net profit	- 57.6%
		Total liabilities and shareholders' equity	-11.2%

Figure 53: UniCredit Group balance sheet 2009/2008, Source: Annual reports

The analysis of credit suggests that there are big differences in the development of balance sheet items (see Figure 53). While cash and hedging instruments increased by around 57%, financial assets held for trading and non-current assets decreased by around 35%. On the liability side, deposits from banks decreased by 40%. This analysis confirms that banks decreased the willingness to buy foreign hedging instruments, while increased the issuance of their own hedging vehicles.

	LOANS y/y	DEPOSITS y/y
Retail	-6.8%	9.3%
CEE	-6.5%	0.9%
Poland's Markets	-2.6%	7.8%
TOTAL GROUP	-7.8%	0.9%

Figure 54: UniCredit Group loans and deposits brakedown 2009/2008, Source: Annual reports

Figure 54 describes the development of loans and deposits in 2009. While overall the deposits have not changed (+0.9% only), in Poland it looks like no crisis was present: deposits increased by almost 8% and the decline of loans was only 2.6%. However, the direct impact

of the crisis on the bank was so severe that government support was needed and issuance of capital realized (Capital increased by EUR 3bn). This was decided already in 4Q 2008 and executed in 1Q 2009. Ordinary shares were issued to current shareholders. Generally, total net write-downs of loans and provisions increased by 42%. Overall, for the group, the credit risk is highest in the CEE (UniCredit, 2010).

4.13. Erste Group



Erste Group has an extensive presence in CEE, where Erste serves around 17 million customers. Erste Group is present in nine countries (Austria, Czech and Slovak Republics, Ukraine, Moldova, Romania, Serbia, Croatia, and Hungary) with additional indirect presence in three other countries. Key markets remain for the group remain Czech Republic, Romania and Austria. However, due to the crisis, Erste Group stopped the expansion in Ukraine and 15% of employees have been dismissed since 2008.

4.13.1. Ownership structure ²⁰³(as of March 2010)

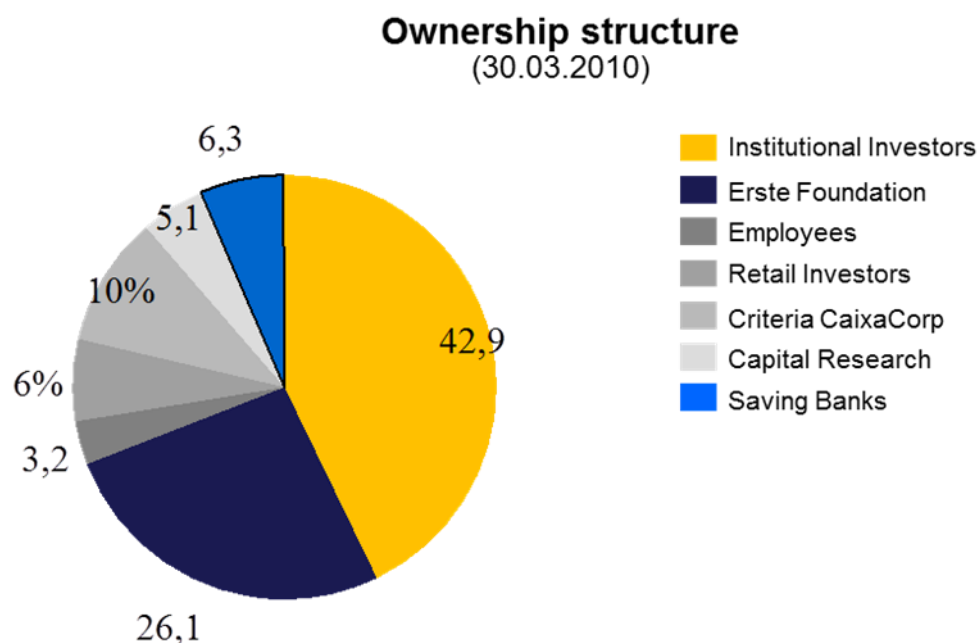


Figure 55: Erste Group ownership structure, Source: Annual reports and author's calculations

²⁰³ http://www.erstegroup.com/Investor_Relations/Share/Shareholder_Structure/

4.13.2. Key ratios

The key ratio analysis must be focused on core tier ratio. The capital raising was pursued: In spring 2009, when the bank issued EUR 1.8 bn of participation capital to the Republic of Austria and private investors at the same terms, while in autumn the Bank raised straight equity of EUR 1.7 billion through a secondary offering. Therefore, Erste Group's total capital jumped by EUR 5.0 billion to EUR 16.1 billion (interestingly there has not been a significant increase in core tier ratio). This increase in capital rose to the increase in capital led to a proportionate rise in the core tier ratio to 8.3% (see Figure 56). However, the aim to have core tier ratio above 9% was not achieved. Core tier ratio increased slightly because bank is trying to improve its capital position and ratio has improved in 2009 after issuance of new capital. As risk-weighted asset growth remained muted, the increase in capital led to a proportionate rise in the core tier 1 ratio to 8.3%²⁰⁴.

²⁰⁴ These levels are unprecedented in the history of Erste Group.

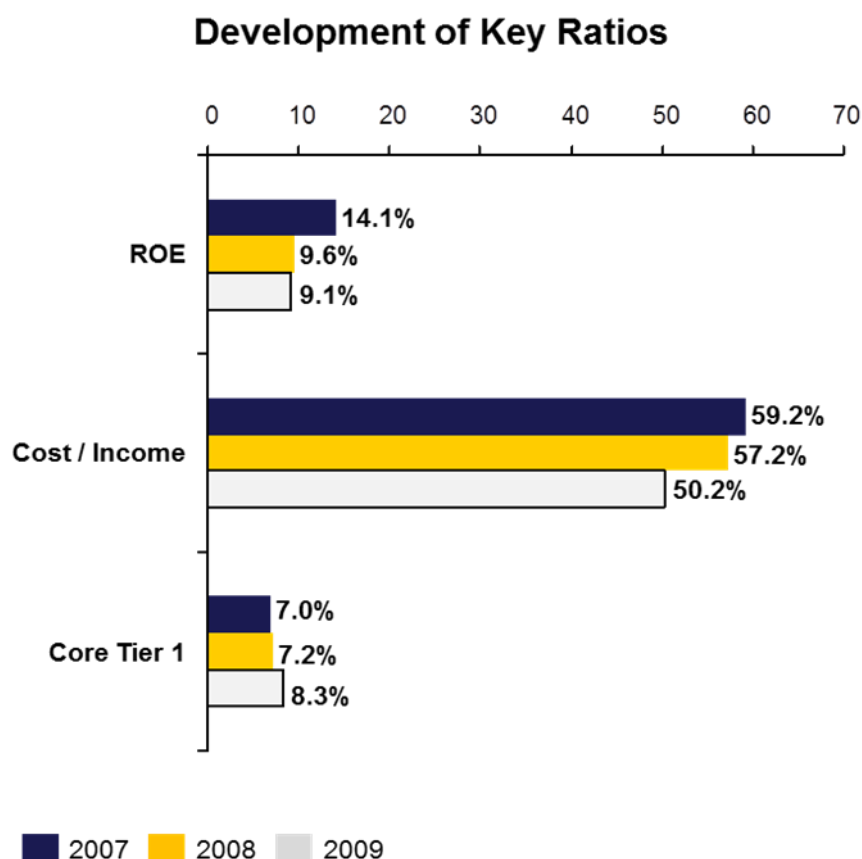


Figure 56: Development of Key Ratios, Erste Group, Source: Annual reports and author's calculations²⁰⁵

Key insights based on ratios suggests a drop in ROE was caused mainly by exceptional losses. Cost efficiency increased because in terms of operational results, bank had the best year in 2009. A drop in ROE was caused mainly by exceptional losses but it stays at reasonable 9%. We see that in 2009 the ROE was almost the same as in 2008. Cost efficiency increased because in terms of operational results, bank had the best year. In 2009, cost/income decreased dramatically. Overall, operating income grew by 8.3%. This increase was attributable primarily to the increase in net interest income (+6.3%) and the trading result (+410.1%). Net fee and commission income declined by 10.1%. General administrative

²⁰⁵ Erste Group received support from the Republic of Austria. Erste issued participation and hybrid capital up to EUR 2.7bn (Coupon is 8 % p.a. after tax), Coupon will increase in 5 years, Republic of Austria purchased EUR 1bn Agreement of potential issuance of bonds– Up to EUR 6bn of state-guaranteed bonds. Already issued were EUR 1.5bn - 3 years maturity (3% p.a.) and EUR 1bn - 5 years maturity (3,375% p.a.) (Erste Group, 2010)

expenses decreased by 4.9%. Consequently, the cost/income ratio improved to 50.2% (see Figure 46).

In reaction to the crisis, Erste Group tightened lending standards and stopped expansion to risky countries. The bank started to limit foreign currency lending (no Swiss Franc loans) and restricted conditions on Euro loans. Erste also raised provisions and reduced Loan-to-Value ratios. The reaction of Erste was also limiting exposure to high-risk countries Ukraine and Serbia. Erste restricted large investments to countries with prospects of EU membership and focus on deposit-funded lending business to reduce reliance on parent company lending.

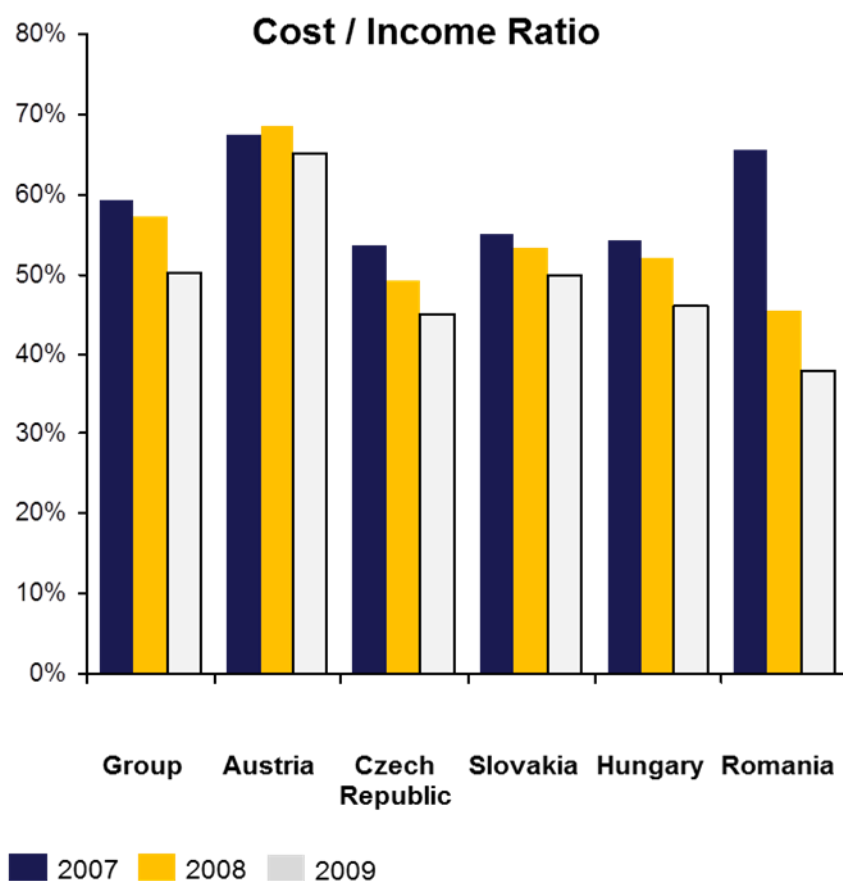


Figure 57: Erste Group, Cost / Income Ratio for a country, Source: Annual reports and author's calculations

In 2008, most countries improved their cost efficiency. Romania improved by more than 20 percentage points. Overall, there has been relatively successful restructuring and transformation. Erste Group Cost/Income ratio based on general administrative expenses and all incomes including trading results. Market shares of Erste subsidiaries are relatively stable. There was a drop in Czech Republic, Romania and Slovakia and an increase in Hungary,

Ukraine in 2008. Strategy was adjusted particularly in Hungary and Romania. The bank's aim is to focus on simple and transparent products (Erste Group, 2010). In the Czech Republic, there has been a strong retail funding and relatively high share of consumer loans. In Hungary, no more Swiss Franc and Japanese Yen loans pursued. Generally, there has been restrictions on conditions on Euro loans and loan-to-value ratios. In Romania, higher provisioning for FX loans have been applied. In Slovakia, Basel II implemented in 2008. Overall, there has been an increase in delinquencies in leasing and SMEs. In Ukraine, lending was scaled back, headcount reduced by 15%, and branch network expansion was stopped. Comparison of booked loans and deposits in 4Q 2008 suggests that Romanian and Hungarian units are highly dependent on parent company funding (which goes against the strategy of Erste to reduce dependence on parental funding). Situation bad especially in Hungary. Smaller markets are dependent on external funding as well. On the other hand, Czech unit is funding other divisions²⁰⁶.

4.13.3. Stock evolution

Along with the general recovery of international stock markets, the shares of Erste Group gained 60.9% in 2009 after having suffered a dramatic decline during the financial crisis of 2008. From Figure 58, we can see a rebound in June 2008 and a drastic fall in September of the same year.

²⁰⁶ This is valid also generally. Czech Republic is usually considered to be a net saver.



Figure 58: Price Chart, Erste Group Bank AG-Share, Source: Erste



Figure 59: Trading volumes of Erste Group Share, Source: Erste

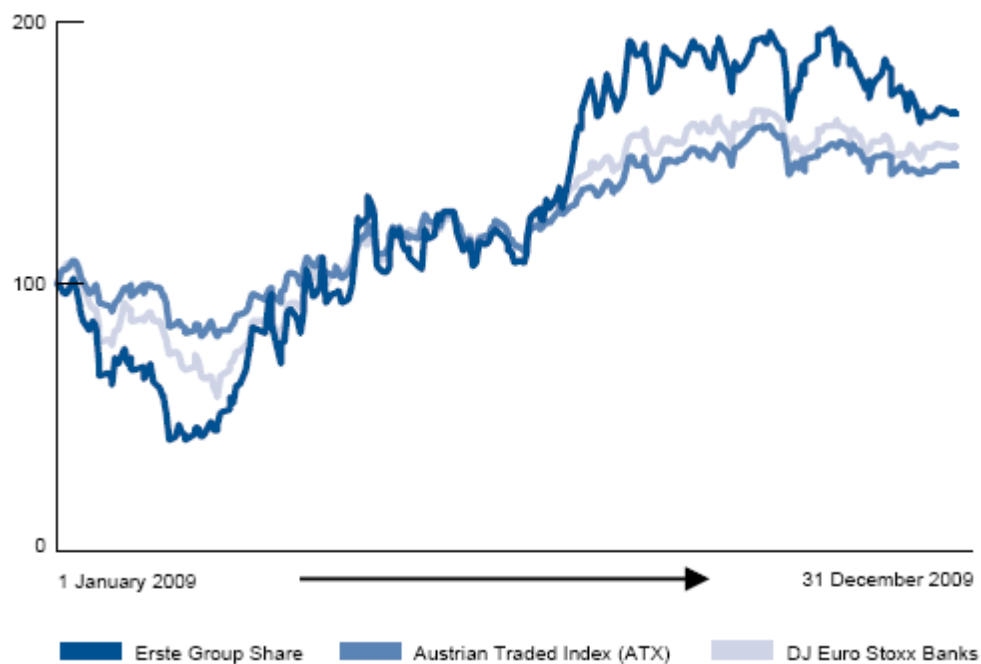


Figure 60: Erste Group Stock Price, ATX, and DJ Euro Stoxx Banks Evolution (EUR) since January 2009, Source: Erste Group

However, as seen from Figure 60, Erste Group shares outperformed the market and almost doubled in 2009. On the other hand, the ratio is again 1/3 if we compare recent (April 2010) with beginning of 2008 data (Figure 58).

4.13.4. Net profit

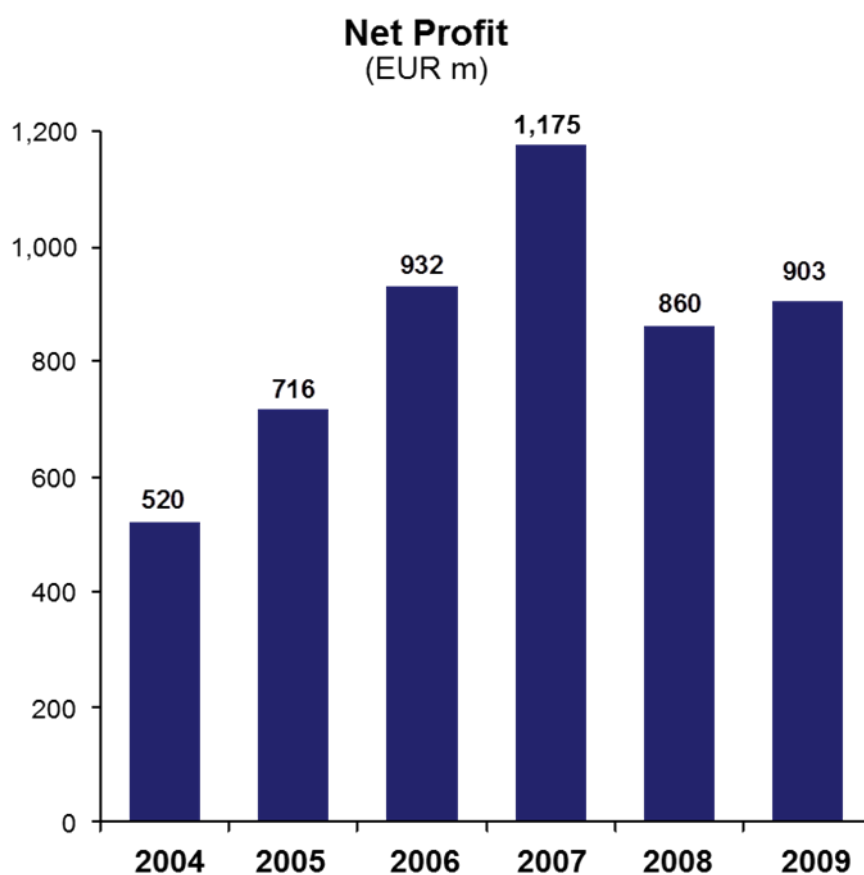


Figure 61: Erste Group Net Profit Evolution, Source: Annual reports and author's calculations

Despite high losses, Erste Group remained profitable in all years (which is not the case for KBC for example, see Figure 69). Adverse effects of crisis were partially mitigated by the sale of non-core insurance business²⁰⁷ in 2008. 2008 loss was assigned to Corporate Centre. Sources of loss in 2008 were obviously Iceland default and Lehman Brothers default but also Write-offs of Goodwill in Romania, Serbia and Ukraine, and the revaluation of portfolio. In 2008, Operational efficiency improved but profitability was affected by losses.

In 2008, sources of income increased but they were offset by impacts of crisis. Quarterly evolution of consolidated profit, interest income and provisions reveals interesting development. Interest income was rising for the whole year 2008. Profits of the last quarter of

²⁰⁷ to Vienna Insurance Group

2008 dropped dramatically due to exceptional events. Provisions have been rising due to an expected increase of non-performing loans. Profits in 3Q 2008 were affected by sale of insurance business. In 2008, balance sheet slightly contracted mostly due to drop of value in financial assets. In 2008, Shareholders equity shrunk considerably during the last quarter. Quarterly Evolution of Assets and Shareholder's Equity shows that Total assets started dropping in the middle of 2008. Decrease in assets in 2008 was mainly caused by financial and trading assets, intangibles and loans to credit institutions. Retail loans were rising and retail deposits dropped minimally in 2008. In 2009, the situation was much more severe but net profit was interestingly higher than in 2008 (Figure 61).

4.13.5. Country analysis

In 2008, Erste Group had the best operating results ever but suffered exceptional losses. The financial result was not yet fully visible as Erste Group achieved the Record operating profit despite the financial crisis. Capital ratios were still at comfortable levels. The changes in net profit were largely driven by extraordinary effects. In order to cope with the crisis, Erste Group decided to stop expansion in Ukraine and Serbia, as well as to optimize across all CEE countries.

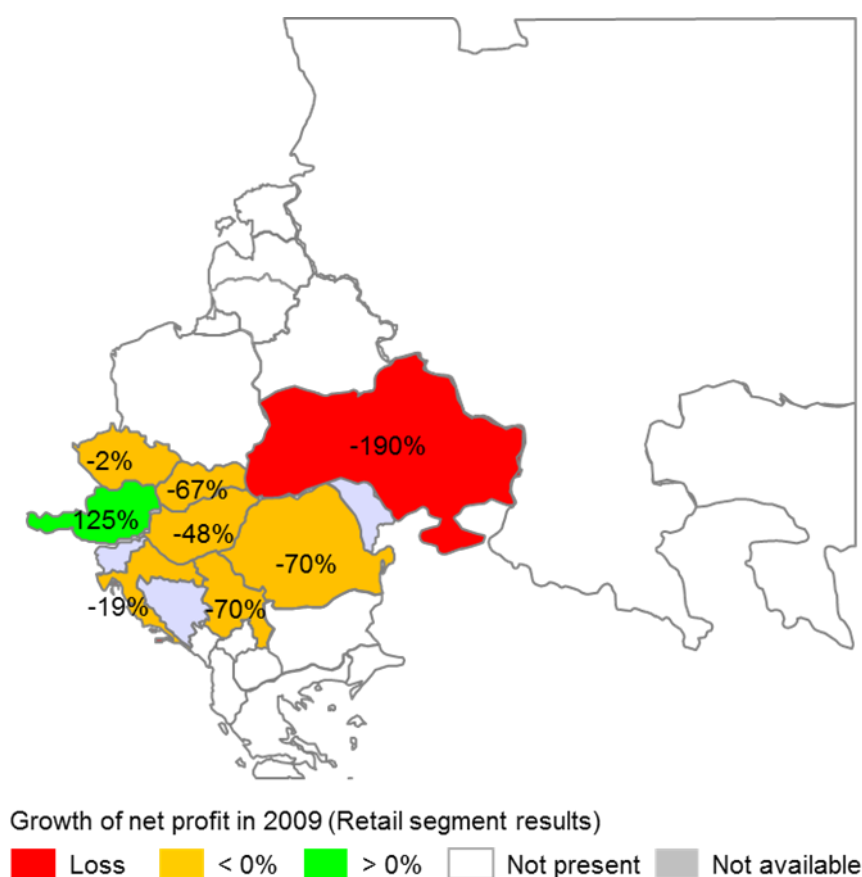


Figure 62: Growth of net profit in 2008 (Retail segment results), Source: Annual reports, author's calculation

From Figure 62, we see that in 2008 it was only the Ukraine, where the group suffered from losses. In Czech and Slovak Republics, as well as in Austria, the Group experienced decline in growth, and in many CEE countries the Erste Group managed to increase growth of net profit in 2008. Therefore, we can conclude that the crisis was not yet fully visible from the annual data. Group net profit for the year attributable to the owners of the company rose by 5.1% in 2009 despite an almost 100% increase in risk costs. However, due to extraordinarily difficult last quarter of 2008, Erste group had to raise capital. The raised capital and funds were EUR 2.7bn of hybrid and participation capital²⁰⁸ and EUR 2.5bn of state-guaranteed bonds.

Despite the crisis, operating profit rose in 2009, mostly due to net interest income and a turnaround in net trading results. On the other hand, operating costs decreased, which was

²⁰⁸ Austria subscribed for EUR 1bn

caused mostly by a fall in non-staff costs (see cost/income ratios). Net interest margin grew to all-time-high 3%. As the key markets are in Austria, and Czech Republic (both countries with relatively low risk) and as these countries make up of 2/3 of Groups loan book, the Group did not have to face significant risk linked with the loan portfolio. The bank started to screen customers much more closely than previously. In Ukraine, the net loss from 2008 deepened. See Figure 63).

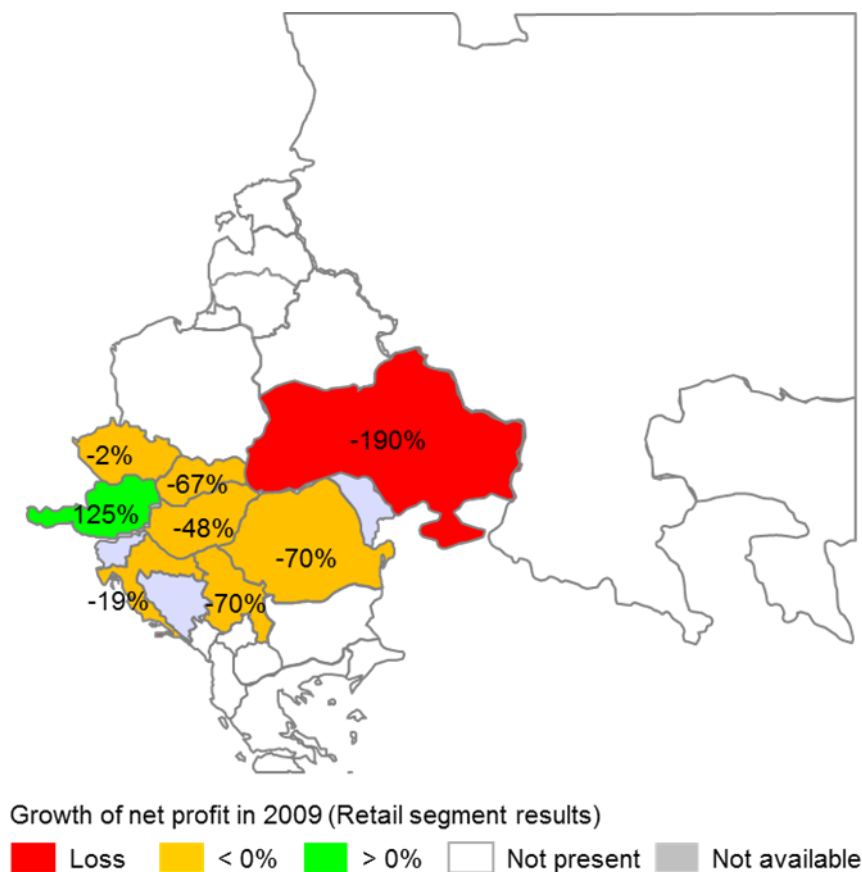


Figure 63: Growth of Erste Groups's net profit in 2009 (Retail segment results), Source: Annual reports and author's calculations

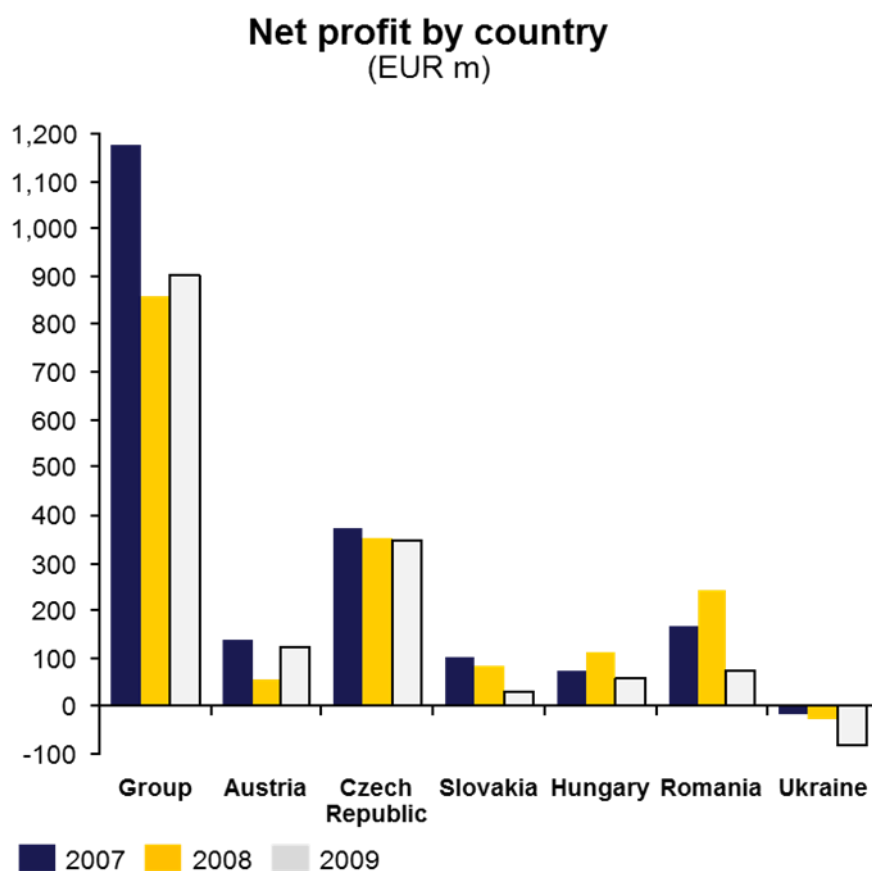


Figure 64: Erste Group's Net profit per country, 2007-2009, Source: Annual reports and author's calculations

Romania, Serbia and Ukraine, Revaluated their portfolio. Loss was assigned to Corporate Centre. If we split the group's net profit into country results, we see that they are very different. While some countries (f.e. Czech Republic, Austria) remained solid (Austria managed to recover from the crisis very soon and Czech Republic was not very affected due to good capital position – some of it caused by the country's banking crisis in 1997-1998 and the following low-risk attitude). On the other hand, countries such as Slovakia, Hungary and Romania were very affected but still managed to generate net profit in 2009. The most problematic remains Ukraine, where the crisis had the most visible effect (but on the other hand, Ukraine's subsidiary was not even profitable in 2007 either).

4.13.6. Credit analysis

The credit crunch was present overall the economy, and banks had to improve their balance sheet indicators (and this stricter lending led to further slowdown of the real sector). In addition to coping well with higher risk costs thanks to strong pre-provision profit

generation, Erste group has vastly enhanced their capital position during the past year. Customer deposits continued to increase their share of the funding pie, while the dependence on short-term interbank funding decreased markedly and was fully covered by ECB eligible collateral. Risk provisions²⁰⁹, increased by 92.0%. The deteriorating macroeconomic conditions, the related increase in credit defaults and the worsening of borrowers' creditworthiness were the reasons for the allocation of additional risk provisions. As a percentage of average customer loans, risk costs amounted to 161 bps in 2009 (2008: 88 basis points).

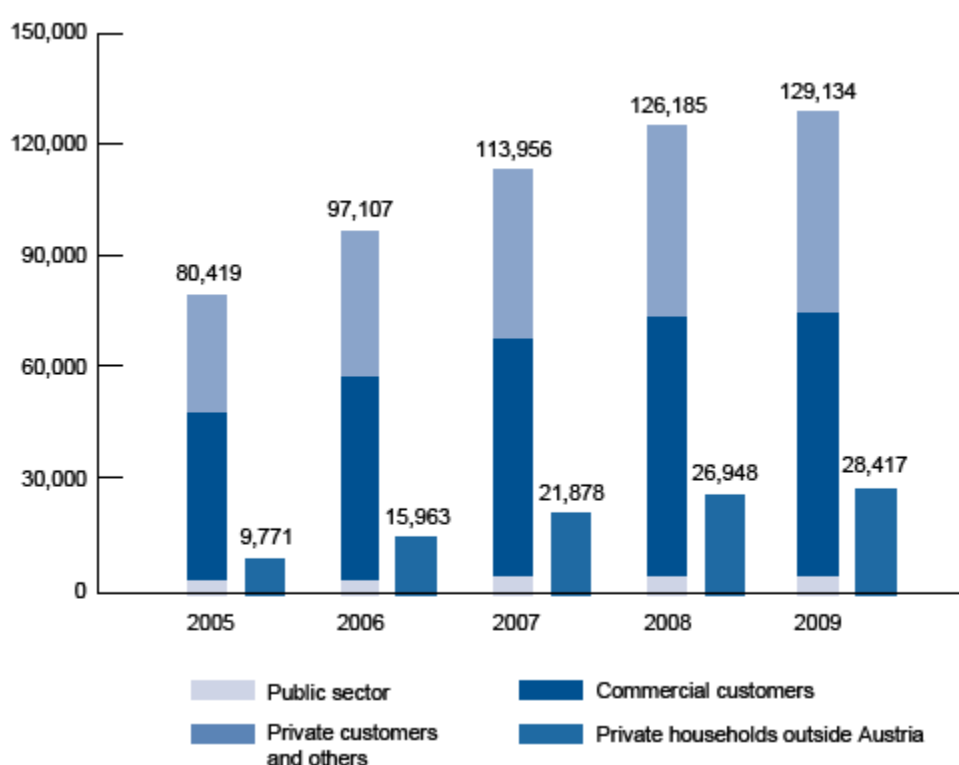


Figure 65: Loans and advances to customers, structure and trend, in EUR m, Source: Erste Group annual report

Risk provisions for loans and advances increased to new allocations as a result of the difficult economic conditions. The ratio of non-performing loans to loans and advances to customers grew from 4.7% to 6.6% in 2009, while the ratio of non-performing loans to total exposure increased from 2.9% to 4.1% over the same period. The rate of deterioration of both

²⁰⁹ the balance of the allocation/release of provisions for the lending business and the costs of direct loan write-offs and income from recovery of loans already written off

key figures continued to slow down significantly in the fourth quarter of 2009. Deposits grew faster than loans in 2009, however this was most likely caused by stricter lending rather than higher depositing.

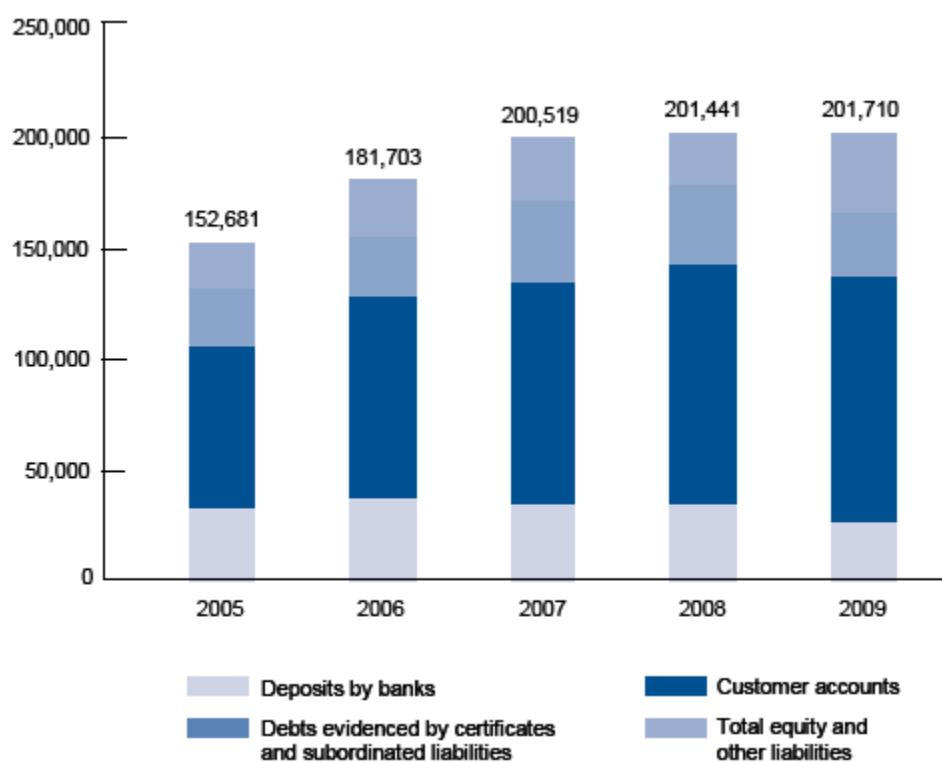


Figure 66: Balance sheet structure/liabilities and total equity in EUR m, Source: Erste Group annual report

Customer deposits rose by 2.5% and therefore more than customer loans. Increases were recorded at all subsidiaries. The loan-to-deposit ratio was unchanged at 115.3% (Erste Group, 2010). Despite the crisis, there was no substantial drop in book value of deposits in 2008 only a slight drop in deposits at the end of a year in Czech Republic and Romania.

4.14. **KBC**

KBC is an integrated group, catering mainly for retail, SME and mid-cap customers. It occupies leading positions on its home markets of Belgium, the Czech Republic, Slovakia, Hungary, Poland and Bulgaria. Elsewhere around the globe, the group has established a presence in selected countries and regions. At the end of 2009, the group unveiled a renewed strategic plan for the years ahead to further transform the group into a more focused, regional

European player. The aim is to decrease the risk profile, while retaining the engine of growth provided by the presence in CEE²¹⁰. The bank expects a number of activities to run down, curtailed or sold in the coming years in order to further reduce the group's risk profile and to enable it to pay back within a reasonable period of time the aid received from government. The group's ambition is to be a strong European regional financial player, with a clear geographic focus. The group will concentrate its activities in Belgium and five countries in CEE, namely the Czech Republic, Slovakia, Hungary, Poland and Bulgaria.

4.14.1. Ownership structure

Despite the financial problems KBC went through, the ownership structure has not changed in 2009.

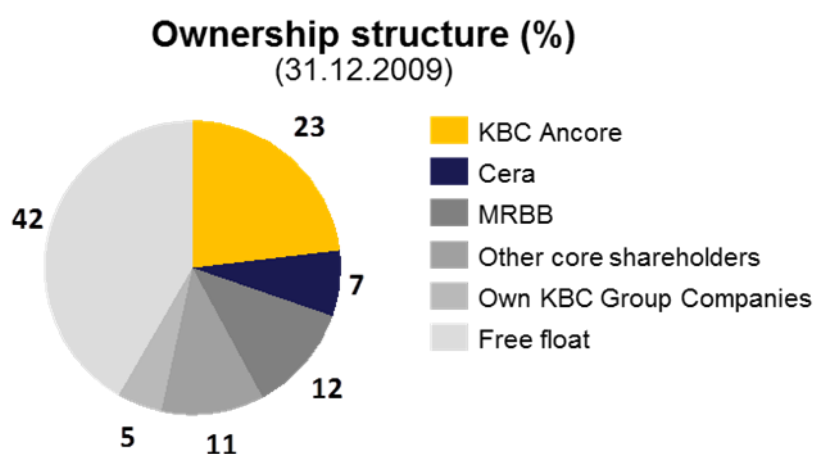


Figure 67: KBC ownership structure, Source: Annual reports and author's calculations

4.14.2. Key ratios

The bank's performance kept up reasonably well until the summer of 2008, but then the market conditions deteriorated dramatically in third and fourth quarter of 2008. CEE profits for 2008 declined strongly, but the CEE business unit remained profitable taking the whole year (see Figure 68). The bank suffered from negative ROE and increased cost/income

²¹⁰ The strategic plan formed the basis on which the European Commission decided whether KBC would be able to redeem the government-held securities within a reasonable timeframe.

ratio, but KBC also strengthened its core capital. Applied cost-control principles have resulted in a longer run cost/income ratio of between 50% and 55%. Negative ROE caused by net loss via the EUR 4.7bn write-downs on toxic assets, the operating income deteriorated as well due to difficult market conditions. Core Tier ratio was boosted by two capital injections by the Belgian and Flemish government. Interest income remained fairly stable in. Losses on loans started to rise since third and fourth quarter of 2008.

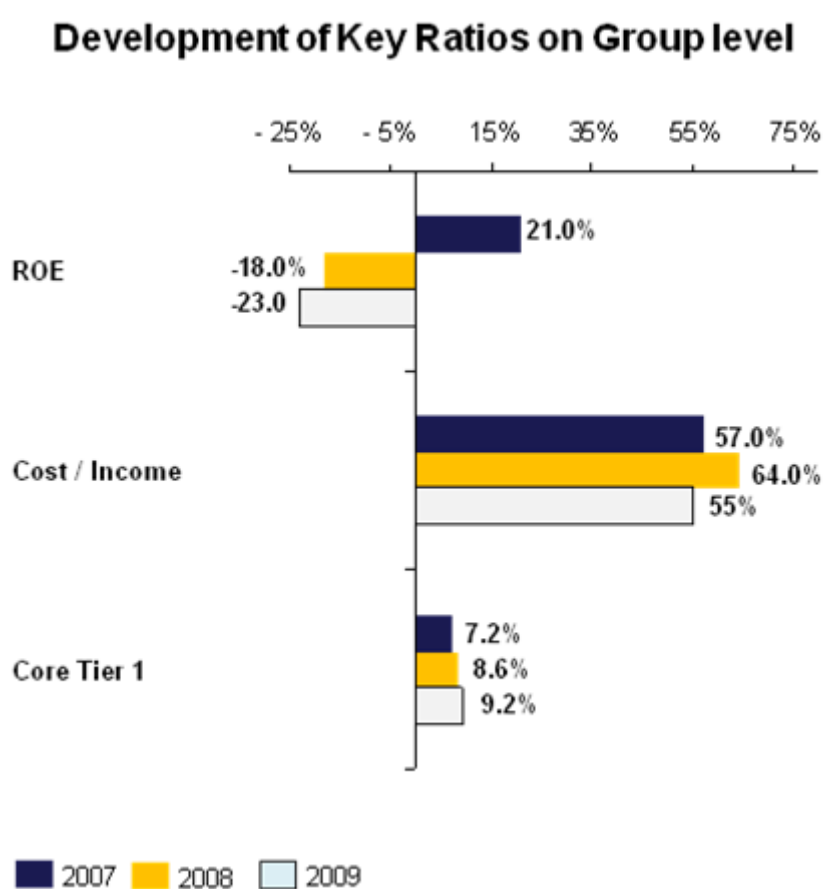


Figure 68: Development of Key Ratios, KBC²¹¹, Source: Annual reports and author's calculations

²¹¹ After capital increase on 22 January 2009 by Flemish Government

4.14.3. Net profit

The drop in net profit is dramatic, confirming tough times for KBC (Figure 69). Profit in 2008 strongly affected by EUR 4.7 bn write downs on Toxic Assets but did not improve in 2009 either. Generally, KBC's Net Profit since 2008 has been significantly affected by the crisis: deposit margin pressure, depressed fee and commission income, and poor trading performance. Despite significant government support, shareholder equity dropped due to reported losses. Net profit dropped dramatically in third and fourth quarter 2008 while loan impairments are rising. Performance kept up well until summer 2008, but operating environment changed markedly from September.

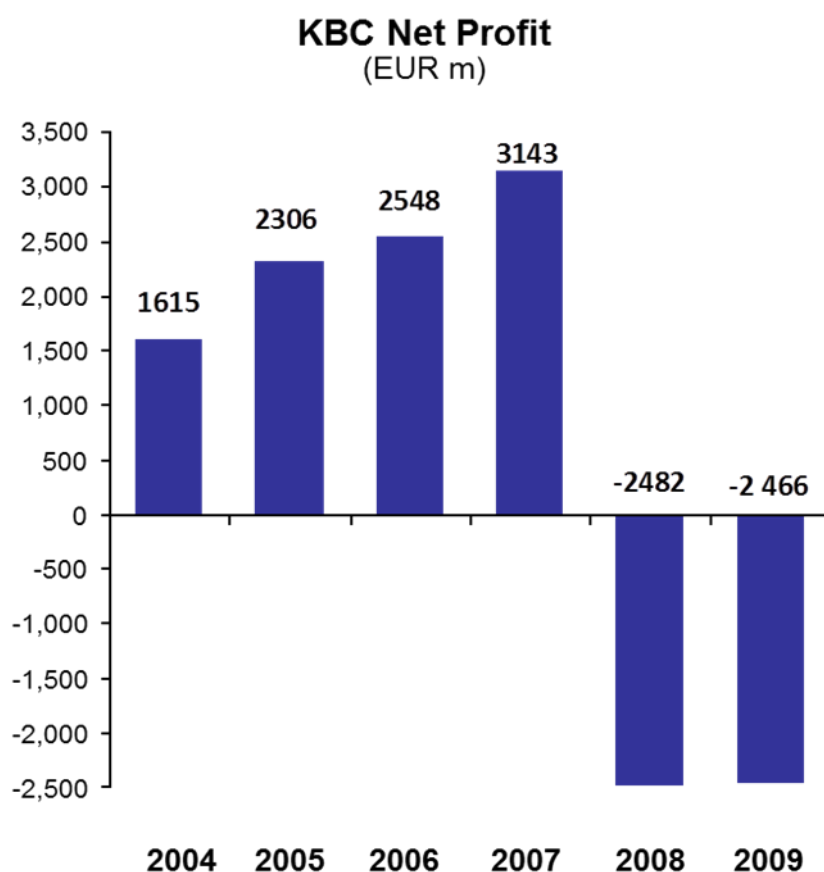


Figure 69: KBC Net Profit Evolution. , Source: Annual reports and author's calculations

KBC expanded its branch network in 2008 but implemented a branch expansion stop for 2009. The profit development is starking, when last two years almost wiped out all 2006 and 2007 profits.

4.14.4. Stock evolution

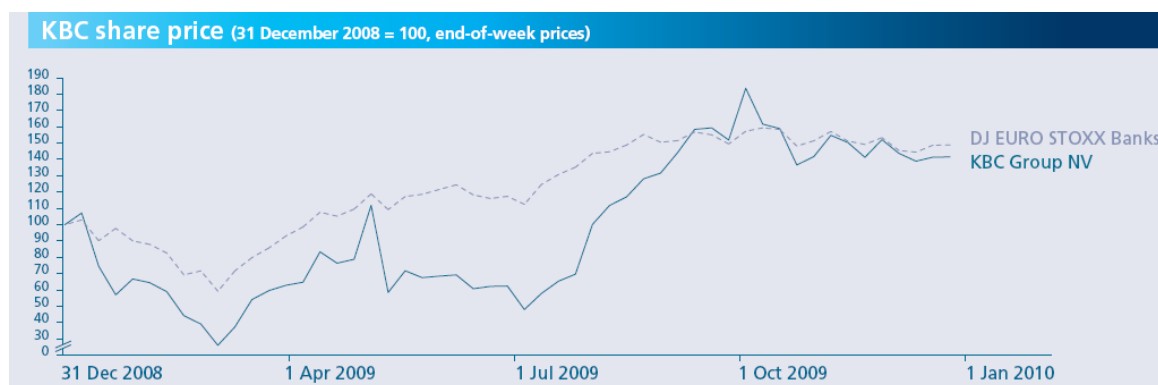


Figure 70: Stock Price Chart (EUR), KBC

From Figure 70 we see the strong trading activity after the fall of Lehman Brothers. Red columns depict decreasing price. Otherwise, the post-Lehman period (mostly after the rebound in January 2009) was mostly in line with the pre-Lehman daily trading volume.

4.14.5. Country analysis

For the group, there are four key countries with important market position: Czech Republic, Hungary, Poland, Slovakia. The bank focuses on organic growth and does not expect any further acquisitions. Net profits dropped for every country (except Slovakia) due to rising operating costs (Figure 71). In 2008, growth in Slovakia happened partly due to acquisition of Istrobanka in the beginning of the year. Profit figures affected by exposure to Icelandic banks and CDO losses. In 2008 there was still a solid growth in Loans (+25%) and deposits (+8%) for CEE region. Despite the financial crisis, KBC managed to improve its efficiency in CEE Cost/Income as a measure of efficiency as only operational costs taken into account for cost/income ratio calculation

KBC's market share in CEE remained relatively stable in 2008. Market share insights No growth in market share in the newly entered markets Bulgaria and Russia focus lies on the four key markets where KBC maintained the status-quo in terms of market share. Increase in Slovakian market share due to acquisition of Istrobanka. Strategic goal to have a minimum of 10% market share in every market.

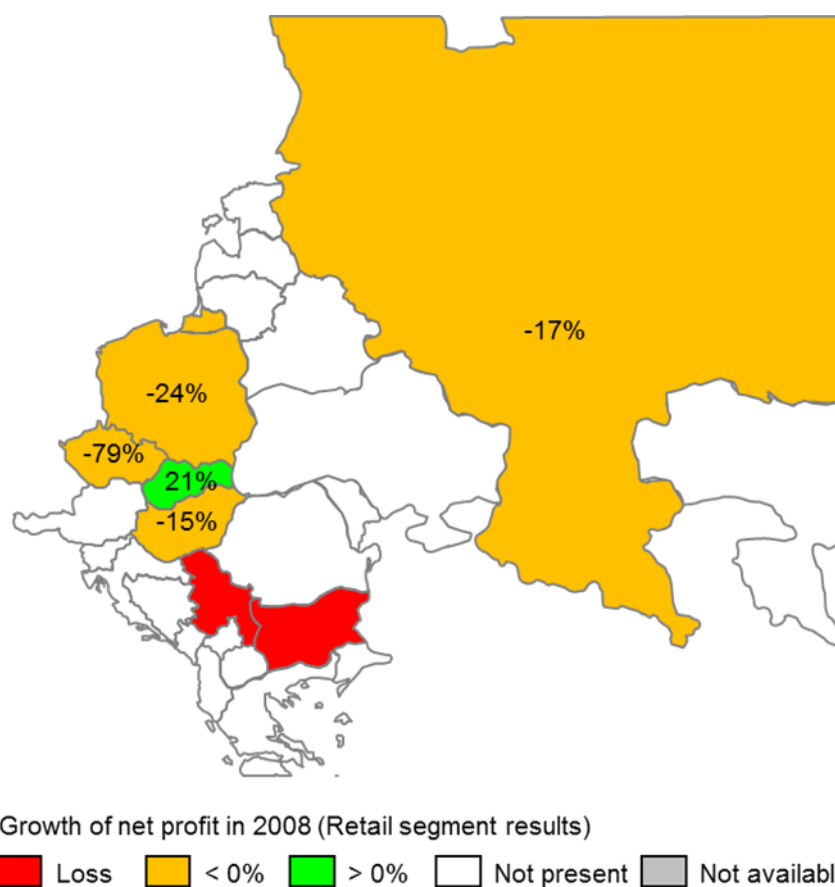


Figure 71: Growth of KBCs net profit in 2008 (Retail segment results), Source: Annual reports, author's calculation

In Hungary, there has been a stop growth for corporate lending, consumer finance, car leasing and mortgage lending. The bank even started deposit gathering campaigns to consolidate good. Further tightening of underwriting criteria for loans. Losses on loans have been reduced in 2008 due to proactive measures. Overall, a ban on branch expansion was implemented. In Poland, there has been a focus on deposit products. Retail segment focuses on less risky segments of clients and higher margin products. Corporate segment focuses on comprehensive service, increase of the non interest income share (commissions). Cost optimization program has been launched focusing on the decrease of fixed costs.

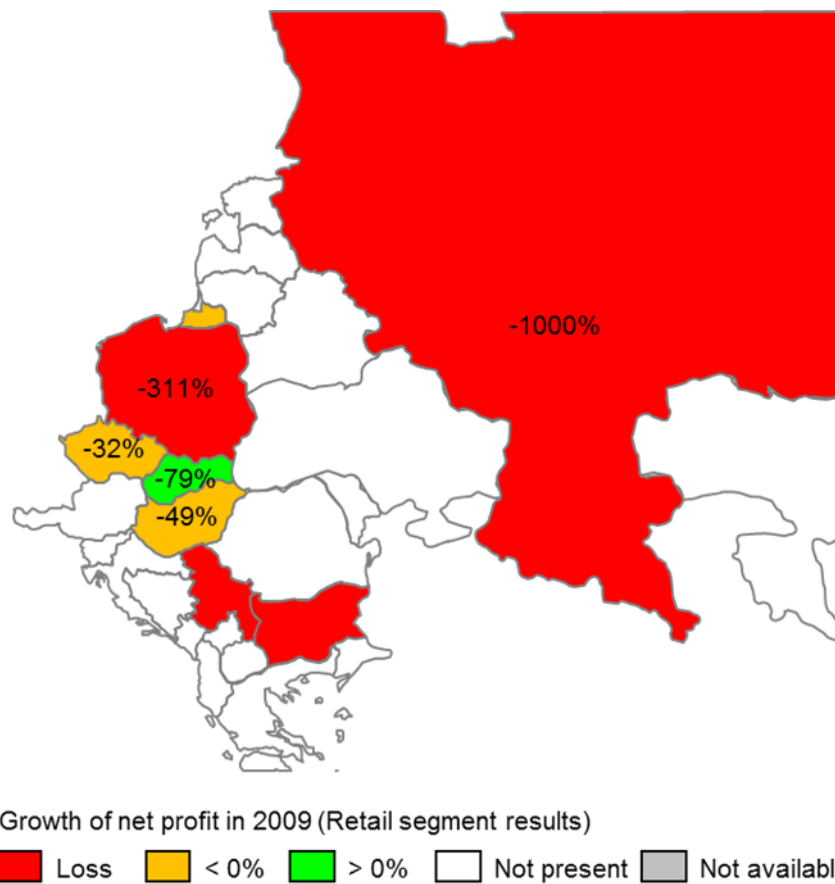


Figure 72: Growth of KBCs net profit in 2009 (Retail segment results), Source: Annual reports, author's calculation

The reduction in the group's non-core activities will release substantial amounts of capital, which will be used to finance organic growth in the home markets and to pay back the government support received. From Figure 72, we can see that the 2009 year was very difficult for the bank.

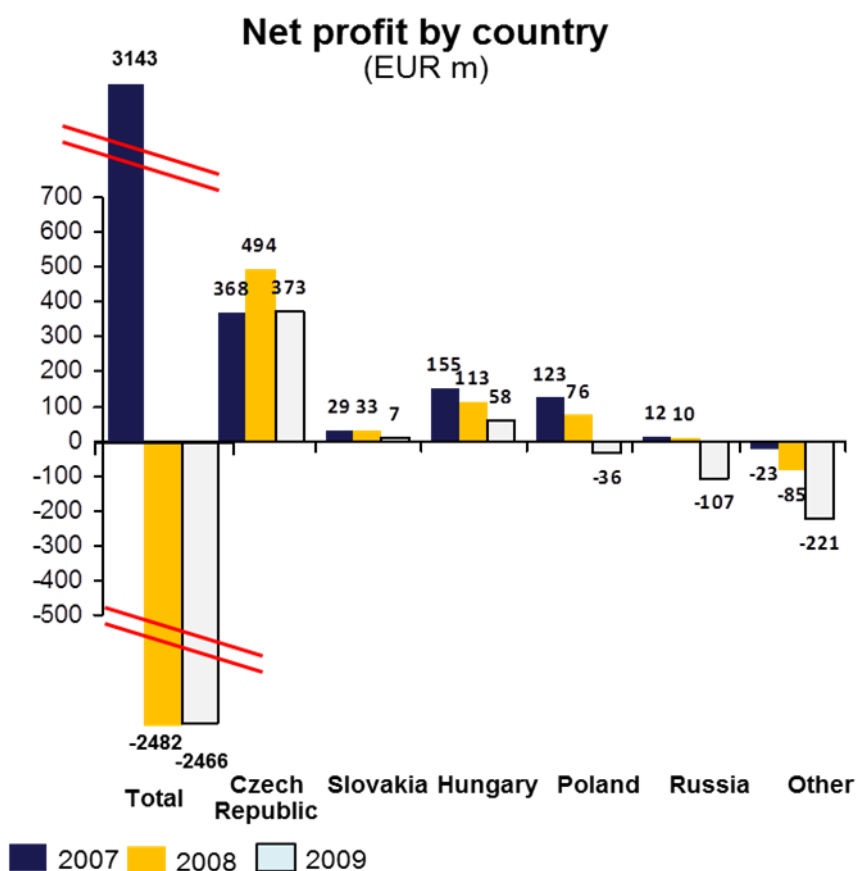


Figure 73: KBC's net profit per country, 2007-2009, Source: Annual reports and author's calculations

This is expected to result in an overall reduction of approximately 25% in the group's risk-weighted assets. In addition to scaling down on-core activities, KBC will make a public offering of a minority stake in the group's Czech banking subsidiary CSOB. KBC does not intend to do any major acquisitions.

The aim of KBC is to achieve a tier-1 capital ratio for the group as a whole of at least 10% (under current Basel II rules). Targets is set for each line of business, adjusted to the development. The group will focus on retail, SME and mid-cap customers in these home markets, offering them a comprehensive range of banking, asset management, and life and non-life insurance products and services. If we disregard these loan losses, the underlying result (before tax and loan loss provisioning) declined by less than 10%. Furthermore, KBC expects that Central and Eastern Europe will continue to function in the future as a growth engine for the group, as the region's economies progressively converge towards the Western European level. That takes catch-up process likely in terms of not only gross domestic

product per capita, but so the penetration of financial products. In view of these factors, combined with the

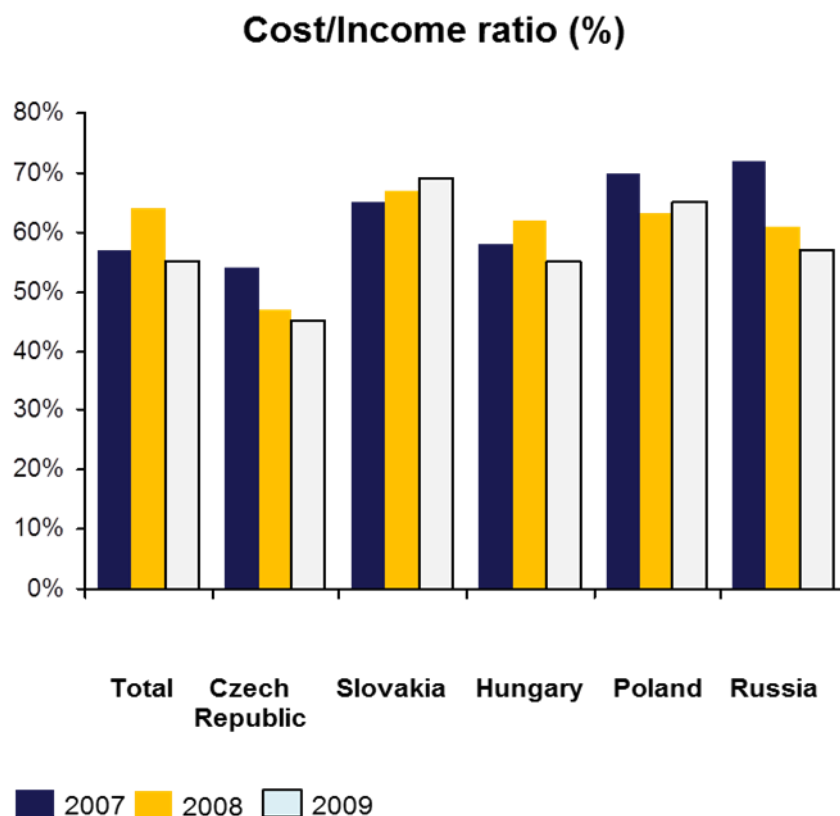


Figure 74: KBC, Cost / Income Ratio for a country, Source: Annual reports and author's calculations

In Slovakia the cost/income increased, which is a unique phenomenon also bank-wise. The recent difficult period had little impact on the market share of KBC's companies in the region. Overall, KBC's share of the loans and deposits market remained unchanged. What's more, for the second year running, the group was the largest fund manager in the region comprising the Czech Republic, Slovakia, Hungary and Poland. As in Belgium, the share of the market in investment funds is greater than that of the market in traditional deposit products. At year-end 2009, the share of the market in investment funds was estimated at more than 34% in the Czech Republic, at 13% in Slovakia, at 20% in Hungary, and at 5% in Poland.

4.14.6. Credit analysis

The bank faces tough times. Impairment on loans (loan losses) increased more than ten times since 2007 (see Figure 75). The proportion of non-performing loans in the total loan

portfolio rose from 1.8% in 2008 to 3.4% in 2009 (Figure 76). Moreover, non-performing loans could still rise further in the early stages of economic recovery due to the lag effect. The bank (as other banking groups) has implemented Restriction of corporate and retail lending: risk weighted assets expected to further drop in 2009. Conservative loan provision methodology applied: 2.4% loan loss charge in 2008.

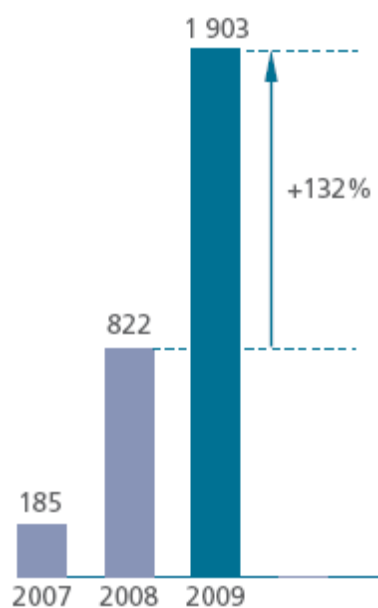


Figure 75: Impairment on loans and receivables (IFRS, m EUR), for KBC, Source: (KBC, 2010)

	2004	2005	2006	2007	2008	2009
Credit cost ratio, banking	0.20%	0.01%	0.13%	0.13%	0.70%	1.11%
Tier-1 ratio, group (Basel I to end of 2006, Basel II since 2007)	11%	10%	10%	9%	9%	11%

Figure 76: Credit cost ratio and Tier-I ratio for KBC group, Source: (KBC, 2010)

If we look specifically at the countries in which KBC is present, real gross domestic product contracted by about 3.6% (weighted by the share of the respective countries in the group's risk-weighted assets), which is comparable with the EU average. Moreover, the KBC subsidiaries in the CEE region were even more hit, when the credit/cost ratio²¹² increased to 2.12% in 2009 in comparison to 0.83% in 2007 (KBC, 2010). But once again there were sharp differences from one country to another (ranging from 1.12% for the Czech Republic to 6.15% for Russia, Figure 77). However, generally credit losses in CEE region are significantly higher than in Belgium.

²¹² $[net\ changes\ in\ individual\ and\ portfolio\ based\ impairment\ for\ credit\ risks] / [average\ outstanding\ loan\ portfolio]$.

Loan and investment portfolio, banking	31-12-2008	31-12-2009
Credit cost ratio		
Belgium Business Unit	0.09%	0.17%
CEER Business Unit	0.83%	2.12%
Czech Republic	0.57%	1.12%
Slovakia	0.82%	1.56%
Hungary	0.41%	2.01%
Poland	0.95%	2.59%
Russia	2.40%	6.15%

Figure 77: Loan and investment portfolio, (KBC, 2010)

The bank itself understands that: *As far as the banking activities are concerned, the main source of credit risk is the loan and investment portfolio. This portfolio is the result of what can be considered as pure, traditional lending activities.* (KBC, 2010)

Economic capital distribution, KBC group*	2008	2009
Credit risk	45%	64%
Non-trading market risk	27%	14%
Trading market risk	4%	3%
Business risk	11%	8%
Operational risk	8%	6%
Insurance risk	5%	3%
Funding cost risk	–	2%
Total	100%	100%

* All percentages relate to figures at the end of September.

Figure 78: Economic capital distribution, (KBC, 2010)²¹³

²¹³ Economic capital as the amount of capital required to cover unexpected losses in fair value that the group might incur over a one year period. Economic capital is calculated per risk category using a common denominator (the same time horizon of one year and the same confidence interval) and then aggregated. Since it is extremely unlikely that all risks will materialise at the same time, an allowance is made for diversification benefits when aggregating the individual risks.

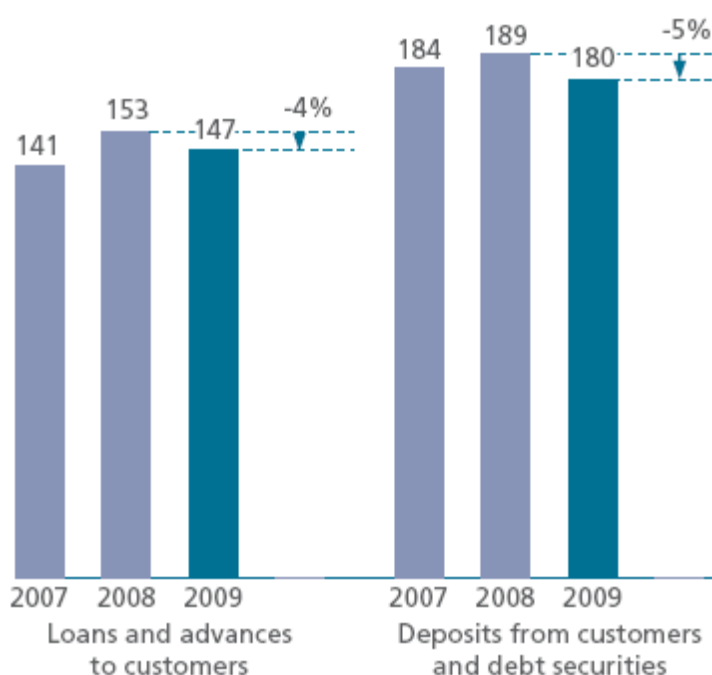


Figure 79: Loans and customer deposits (bn EUR), (KBC, 2010)

As we can see from Figure 79, in 2009 KBC decreased loans by 4% in comparison to 2008, while deposits decreased by 5%. The bank could have afforded it as deposits and debt securities still by a large percentage overcome loans to customers. KBC focuses on its core CEE markets and traditional banking operations. In the Czech Republic, the strategy is on offering full range of banking products with formal commitment to keep lending. However, stricter loan requirement criteria are applied to achieve much more conservative loan-to-value ratio

KBC manages to have Loan-to-Deposit ratio of 104% versus sector average of 130% (Figure 79). KBC also started to focus on traditional products: Deposits, Consumer & Corporate Loans. What is crucial for the link with the theoretical part, which comes in the 4.15th Chapter, there has been an increased interest spread between deposits and loans (mortgages) to increase margin levels. Lending slowed down towards end of 2008, especially outside of home markets due to intentional policies aimed at reducing risk – lending in core CEE markets continued to grow however CEE strategic outlook. In 2009, there has been a certain rebound in lending, however, still the loans to customers decreased by 4% in 2009.

4.15. Comparison

Crucially, during the crisis the supply of money (broad aggregates M3, M2) has decreased, despite the large increases in the narrow money aggregate (M1) via central banks interventions. This suggests the limitation of the traditional money supply channel. Instead, banks were trying to screen candidates better; they required more collateral, better proving of financial health of credit candidates (both companies and individuals). As described in the theoretical part, Weiss and Stiglitz (1981) point to the unwillingness of banks to lend even though they have sufficient funds and the demand for loans is higher than equal the supply of loans. The explanation is that further increase of lending would decrease banks' profitability. This is exactly what has happened during the crisis. Commercial banks did not want to provide candidates with credits even though they had sufficient funds (increased by the M1 aggregate). Stiglitz and Greenwald focus their attention on demand deposits. The critical point their hypothesis is that some loans on the loanable fund market will not be repaid. Therefore, in the times of financial turmoil this share dramatically decreases, while the banks decrease the supply of credit, which in turn further undermines the economic activity. This credit-squeeze spiral can hardly be stopped. Therefore, several steps were taken by the non-private authorities (central banks, states, state-run banks) to support the credit channel (dramatic decrease of interest rates, fiscal stimuli, support of credit financing, co-financing of credits). This all was done primarily to overcome the large uncertainty on the market.

4.15.1. Credit

The key to understanding the supply of loanable funds (credit availability) is to understand the behaviour of banks (which is what I have tried to do in the previous chapters). In the Stiglitz-Greenwald model, banks are considered to be risk averse. This risk aversion is crucially increasing in times of economic distress. Unsurprisingly, 2009 was shaped by the sharp rise of non-performing loans and the related increase of provisioning for impairment losses (see for example Figure 75). However, the upward momentum of non-performing loans slowed significantly in the second half of 2009, and overall economic conditions improved. Furthermore, credit growth will probably turn out to be extremely moderate, and public budgets are likely to remain very heavily strained for the years to come (Raiffeisen International, 2010).

Consumer credit experienced a slowdown during 2009 and the demand for credit and bank services declined significantly due to the sharp decline in growth triggered by the financial crisis. That was also partly due to a change in risk policy that mainly concerned foreign currency loans. Many banks saw the sharpest decline was registered by net fee and commission income. The exchange rate movements of currencies, including especially the Russian rouble, Serbian dinar, Ukrainian hryvnia, and Belarusian rouble, had a negative impact on core capital. Net Profit dropped sharply after the collapse of Lehman Brothers.

When finishing this thesis (May 2010), the market situation is once again characterized by relatively good liquidity. However, more elective lending, extensive restrictions on granting foreign currency loans to private individuals, and targeted strengthening of the loan work out and collection activities are going to prevail in the foreseeable future. The analysis of cost/income ratio for particular countries also shows significant differences proving that putting all countries in the CEE into one basket is not appropriate. In some countries, large public debt resulted in bank funding strains and put foreign currency borrowers at risk. Interest rate defence of currency adversely affects potential economic recovery and the unwillingness of banks to lend even though they have sufficient funds and the demand for loans is higher than equal the supply of loans supports the observation of Stiglitz & Greenwald (2003) and Stiglitz & Weiss (1981). We can therefore conclude that the interest rate is not like a conventional price, it is rather a promise to pay an amount in the future. Therefore, this thesis confirms that there is no simple relationship between the central bank interest rate and the performance of the economy.

4.15.2. Measures taken

Many banks managed to cope with risk; they have implemented more stringent risk criteria. From the financial point of view, foreign currency lending was sharply curtailed, which was the case for all banks in the CEE region. Dramatic decline in lending was common for all banks, which however resulted in decrease in investment activity in all countries and therefore it undermined the economic growth. Generally, funding facilities have been severely limited and more costly than before. Banks implemented stricter underlying standards on new loans (credit limits, maturities and collateralisation); most banks stopped issuing 100% mortgages of the value of the property used as collateral.

As expected, the economic crisis led to increased losses on loans. All analysed banks were – immediately after the Lehman Brothers fall – more restrictive on corporate and retail lending. Most banks have started or plan to scale down their non-core activities, some are implementing other financial optimization measures, such as realizing capital gains through real-estate sale-and-lease-back operations and selling treasury shares currently held on the balance sheet. Most other activities outside the core markets will therefore be sold or run down. Other preventive measures are: conservative foreign currency lending, further tightening of credit underwriting criteria, even stop growth for corporate lending, consumer finance and CHF mortgage loans. Some banks (f.e. KBC) even did deposit gathering campaigns in order to consolidate favourable funding position. Some banks introduced new risk committees. For example, Raiffeisen International introduced, Credit Portfolio Committees to define credit portfolio strategies for different customer segments. In these committees, representatives from business and risk management units discuss the risks and opportunities of different customer segments (e.g. industries, countries, retail divisions) and develop limits for the Group's future credit portfolio orientation.

4.16. Conclusion and limitation

For the analysis of financial crisis the standard neoclassical presumption about the banking system simply are not satisfactory. The reason is that standard neoclassical economics says that when there is an excess of demand for credit then the unsatisfied applicant for the credit will ask for a higher interest rate, and the equilibrium on the loan-market will be achieved. As we experienced during past two years this was not the case. Most new-comers were rejected, many companies did not receive additional funding and their financial health was extremely vulnerable to these tough conditions. Many companies went bankrupt not because they did not have reasonable prospects ahead of them but because they did not receive operational credit to overcome the toughest times of the crisis.

According to the presented Greenwald-Stiglitz theory, a bank that maximises the expected return might refuse to provide such an applicant with a loan as the applicant is signalling that – as he is willing to accept a higher interest rate – he is more vulnerable to default. The central determinant of the economic activity is the ability and willingness to bear the risk linked with the provision of loans. As I have shown empirically, the development of commercial banks is vulnerable to behaviour not described in the traditional money-supply-

channel theories. The attention is on credits, core-tier (tier I) ratio or the quality of applicants rather than simple pass-through mechanism.

From the microeconomic perspective it is of a good interest that all banks implemented new versions of screening, and credit rationing as described well by Greenwald, Stiglitz (2003), Weiss and Stiglitz (1981), Bester (1985) or Berger and Udell (1992). The pre-condition for the theory of credit rationing is the imperfection of capital markets. Information asymmetries therefore imply that a bank might behave in a different way than the standard neoclassical economics would predict.

4.16.1.Limitations of the thesis

The main problem of this analysis is the data lag. Generally, aggregate and macroeconomic data face the trouble of delay. Therefore, the use of these data is rather limited; especially in times of turbulent economic changes, these data cannot be of a big use for a detailed economic forecast. On the other hand, this was not the purpose of this thesis. Also after the discussion, the macroeconomic (country) analysis was also omitted from the thesis. Various analyses of fiscal stimuli, economic policy reaction and political process are of a large interest; however, due to the limitations of this thesis, I have decided not to include them in the thesis. However, to get the full picture the analysis of central banks, firms, real economy, and state authorities would be necessary. We saw that using this microeconomic approach, we can get different results for different banking structures have different reactions to the financial turmoil.

4.16.2.Conclusion

Recent financial and economic turmoil is a real time laboratory for theoretical economics. The crisis allows for testing various hypotheses under the condition of recession and economic downturn. The Stiglitz-Greenwald theory, we have used, is a result of more than 25 years of work (both independent and collaborative) and has much to offer. The theory can help to understand the link between interest rate and bankruptcy; it implements new concepts such as information asymmetry, signalling, and screening into monetary economics. I have tried to link the paradigm developed by Stiglitz and Greenwald on recent commercial bank data. From analysing these data, we can conclude that banks increase their screening and credit rationing in the times of economic decline. Generally, I may argue that the

development of interest rates, the behaviour banks, and the credit market fulfils the assumptions of the theory. We can clearly observe credit rationing. Therefore, we might conclude that uncertainty is very crucial during recession. However, the crisis is not over yet and I may hardly predict the behaviour of the economy after the crisis. For the full understanding of the whole transmission mechanism in the current recession, we still have to wait several years.

The years 2007-2009 took us on a roller coaster ride. First came the unexpected financial crisis, followed by the economic slump, but then also the end of the recession. All banking groups shifted their strategy from growth and earnings to strengthening capital, managing liquidity and risk, raising efficiency, and lowering costs. Overall, the market has now (May 2010) much more liquidity than anytime after the Lehman Brothers fall. The upward momentum of non-performing loans slowed significantly in the second half of the year, and overall economic conditions improved. After credit growth in CEE already slowed greatly in the second half of 2008, it came to a nearly complete standstill in the first half of 2009. A massive rise in the cost and decline in the supply of external financing, tightened conditions for bank loans, and lower demand for credit were responsible for that. In addition to the economic recession, the devaluation of some CEE currencies due to the global economic crisis accelerated the increase of nonperforming loans. The situation in the banking sector stabilized in the second half of 2009, but remained generally tense. The reasons for that were a further rise of unemployment rates due to the recession on the one hand, and uncertainty about the extent, speed, and sustainability of the general economic recovery on the other.

Credit is individual and the information relevant for providing the credit is highly specific²¹⁴. The economic crisis started in October 2008 with the turmoil on the financial markets it is now (May 2010) still unclear when the economy will return to the normal condition. The financial crisis threatens credit availability to both big and small businesses due to higher uncertainty on the market, incomplete transmission mechanism and information asymmetry (credit rationing). During the crisis, confidence decreases, screening of credit applicants by banks increases, long-term interest rates rise.

²¹⁴ For example, a lender who has dealt with a particular borrower for a long time possesses tacit information about the borrower. Such a borrower might then face a lower interest rate.

Recent financial crisis has had large effects on the real economy. On the other hand, it offered a unique chance to study economic theories and their validity in times of economic recession. It is natural to ask whether aggregate fluctuations can be understood using a Walrasian model (a competitive model without any externalities, asymmetric information, missing markets, or other imperfections). Stiglitz-Greenwald offer approach that is more realistic. Moreover, this crisis will lead to changes in the financial system. Any change (let regulatory or institutional) should be based on the better understanding of the banking system. The neoclassical perspective is inappropriate. Instead, institutional framework should be used: as such the Greenwald-Stiglitz paradigm.

In conclusion, this thesis tried to show how credit rationing matters, it analysed balance sheets of commercial banks and their consequences to credit provision. From the analysis, we can clearly see that the role of credit is vital for the banking system. We can conclude that money – at least in the short run – matter for the economy. The institutional structure of the whole banking system should be researched more thoroughly with the focus on the role of credit and information asymmetry.

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4.18. Abbreviations

- | | |
|----------|---|
| • CEE | • Central and Eastern Europe |
| • CEER | • Central and Eastern Europe and Russia |
| • RI | • Raiffeisen International |
| • RBZ | • Raiffeisen ZentralBank |
| • CE | • Central Europe |
| • SE | • Southeastern Europe |
| • CIS | • Commonwealth of Independence States |
| • SocGen | • Société Générale |
| • WTO | • World Trade Organization |
| • GDP | • Gross Domestic Product |
| • IMF | • International Monetary Fund |
| • WB | • World Bank |
| • EC | • European Committee |
| • ROE | • Return on Equity |
| • KB | • Komerční banka |
| • EU | • European Union |
| • SKK | • Slovak currency, Slovenská koruna |
| • VAT | • Value Added Tax |

5. Appendix: Posudky diplomové práce

Report on Bachelor/Master Thesis

Institute of Economic Studies, Faculty of Social Sciences, Charles University in Prague

Student: Bc. et Bc. Martin Pospíšil

Advisor: Doc. Ing. Pavel Mertlík, CSc.

Title of the thesis: Three essays on Joseph Stiglitz and information asymmetry

OVERALL ASSESSMENT (provided in English, Czech, or Slovak):

Předložená diplomová práce Martina Pospíšila seznamuje čtenáře s dílem velikána soudobé ekonomie Josepha E. Stiglitze, zejména s jeho analýzou trhů s asymetrickou informací. Široko aplikovatelné výsledky výzkumu v této oblasti posunuly podle autora naše porozumění jevům, s nimiž se setkáváme na reálných trzích a jež tradiční neoklasická ekonomie v očích mnoha kritiků neuměla dosti dobře vysvětlit.

Práce je souborem tří esejů. První, s názvem „Život a dílo Josepha E. Stiglitze“, sleduje bohatý teoretický záběr ekonoma, zasahující do mikroekonomie, makroekonomie, veřejných financí, ekonomie rozvoje a problematiky ekonomické transformace východoevropských zemí, a zdůrazňuje jeho významné postavení v rámci dvou škol ekonomického myšlení – nové Keynesovské a nové institucionální ekonomie. Všímá si však také jeho praktického působení v čele Výboru ekonomických poradců prezidenta Clintona či jako hlavního ekonoma Světové banky.

Druhý esej, s názvem „Informační asymetrie“, se především zabývá důsledkem tohoto fenoménu v oblasti ekonomického rozvoje a zkoumá, zda globalizace vede ke konvergenci či divergenci technologické a informační úrovně různých zemí.

Třetí esej, s názvem „K novému paradigmatu v peněžní politice – případová studie České republiky“, je aplikací nového přístupu k peněžní ekonomii, vycházejícího z práce Josepha E. Stiglitze a Bruce C. Greenwalda v oblasti ekonomické teorie informací a zdůrazňujícího dosud podceňovaný význam úvěru v hospodářském životě. Vysvětluje faktory, které určují ochotu a schopnost bank úvěry poskytovat a jež vystupují do popředí právě v době ekonomické recese.

Téma předložené práce patří k významným námětům ekonomického myšlení. Každou práci, která se jím zabývá, činí jeho důležitost užitečnou; tuto volbu tématu lze tedy jedinečně přivítat. Ze způsobu zpracování lze tušit zaujetí autora celou problematikou, objektivitu jeho přístupu i schopnost kombinace teoretických poznatků s vlastními zkušenostmi z hospodářské praxe.

Klady zpracování zřejmě převažují nad dílčími, rušivě působícími a celkový příznivý dojem zbytečně oslabujícími nedostatky, ty však zde právě proto uvedme v co nejúplnějším výčtu.

Nesrovnalosti mezi odkazy v textu a bibliografickými soupisy. Tento dost nápadný, protože masivní jev je podle příčiny čtverého druhu:

A) práce chybí v bibliografii vůbec (např. odkaz Woods (2005) na straně 57 nelze vztáhnout k žádné práci, protože žádný autor jménem Woods v bibliografickém soupisu není).

B) práce chybí v bibliografii příslušného eseje, zatímco v odděleném bibliografickém soupisu jiného eseje zařazena je (např. odkaz Cullis and Jones (1998) v textu druhého eseje na straně 33 se vztahuje k práci zařazené jen v bibliografickém soupisu prvního eseje).

C) nedostatečně specifikovaný odkaz lze vztáhnout na více prací v bibliografii (např. odkaz Keller (2001) na straně 52, 54 (dvakrát), 56, 58, 59 (dvakrát), 60, 61 (třikrát), 62 lze stejně tak dobře vztáhnout jak na práci “Geographic Localization of International Technology Diffusion”, tak i na práci “International Technology Diffusion” téhož autora).

D) práce je v bibliografickém soupisu chybně zapsána (např. vinou chybného zápisu je jedna práce v bibliografickém soupisu vedena jako dvě zdánlivě různé práce a obě jsou opatřeny tímž odkazem Hodgson (2000) na straně 17, 18).

Výčet a třídění nesrovnalostí mezi odkazy a bibliografickými soupisy

esej	odkaz	na str.	druh nesrovnalosti
1.	Stiglitz (2003)	11, 12, 14, 21, 24 (třikrát), 27	C
1.	Greenwald a Stiglitz (1986)	13	B
1.	Stiglitz (1996)	13	A
1.	Kahneman and Tversky (1980)	15	A
1.	Snehota (1990)	15	B
1.	Roland (2001a)	16	A
1.	Mlcoch (2005)	17	A
1.	Hodgson (2000)	17, 18	D
1.	Schmoller (1996)	18	A
1.	Peukert (2001)	19	A
1.	Stiglitz (2002)	20 (třikrát)	C
1.	Mankiw (2007)	20, 21	A
1.	Rogoff (2002)	22, 23 (dvakrát)	A
1.	Pollin (2004)	25	A
1.	Mallaby (2006)	25	A
1.	Jezek (2004)	26	A
2.	Cullis and Jones (1998)	33	B
2.	Rothbard (1979)	33	A
2.	Fukuyama (2004)	33	B
2.	Alchian (1965)	34	B
2.	North (1994)	34	B

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- 2. North (1977) 35 B
 - 2. Coase (1988) 36 A
 - 2. Stiglitz (2001) 38 B+C
 - 2. Stiglitz (2001b) 38 B
 - 2. Smith (1776) 39 B
 - 2. Korinek and Stiglitz (2006) 43 B
 - 2. Schmukler (2004) 43 A
 - 2. Solow (2008) 44 A
 - 2. Soros (1994) 45 B
 - 2. Hatzichronoglou (1999) 48 A
 - 2. World Bank (2007) 48 A
 - 2. Stubbs and Underhill (2000) 48 A
 - 2. Stiglitz (2003) 49, 53 (dvakrát), 54 (třikrát), 59, 62 C
 - 2. Grossman and Helpman (1991) 52, 68 D
 - 2. Keller (2001) 52, 54 (dvakrát), 56, 58,
59 (dvakrát), 60, 61 (třikrát), 62 C
 - 2. Romer (1996) 53, 55 (čtyřikrát), 56, 69 A
 - 2. Woods (2005) 57 A
 - 2. Krugman and Obstfeld (2003) 57 A
 - 3. Lizal and Svejnar (2001) 72 D
 - 3. Mishkin (2003) 77 A

Nedostatky ve zpracování poznámek pod čarou

Poznámky pod čarou jsou mnohdy torzovité, jakoby opuštěné podobě spěšného záznamu prvního nápadu, přičemž ani jejich přibližný smysl nelze vždy odhadnout:

č. 17: nejspíše naznačený, ale neprovedený záměr vysvětlit termín “welfare state”.

č. 26: „Hage (2000)“ jen opakuje odkaz v textu na citaci. č. 53: nejasné uvedení pouhého jména Stiglitz bez čehokoli dalšího.

č. 76 je téměř doslovným opakováním poznámky č. 67.

č. 77 je téměř doslovným opakováním poznámky č. 54.

č. 107: nejspíše naznačený, ale neprovedený záměr vysvětlit termín “spot markets”.

č. 108: nejspíše naznačený, ale neprovedený záměr vysvětlit termín “public signal function”.

č. 167: poznámka nejasného účelu “For example Stiglitz”.

č. 185: nejasné uvedení pouhých jmen “Stiglitz and Greenwald” bez čehokoli dalšího.

Nedostatky ve zpracování bibliografie

Soupis bibliografických citací je u všech esejů uspořádán podle abecedy; tento princip je však dodržován nedůsledně: u prvního eseje je mezi Gibbonse a Goldmanna vklíněno 8 citací autorů od C- (Clinton) po F- (Fukuyama); v ostatních případech je často porušováno abecední pořadí v rámci téže iniciály: tak Hayek stojí před Hamiltonem, Korinek před Khalilem, Kuczynski před Krugmanem, Lewandowski před Langloisem, North před New York Times; u druhého eseje Romer, PM. před Romer, D., 2000b před 2000a; u třetího eseje Berger před Benitem. Identifikaci citovaných autorů někdy ztěžuje zkomolení jména: u prvního eseje Khaneman místo Kahneman, Tuerski místo Tversky; u druhého eseje Langois místo Langlois; u třetího eseje Merlik místo Mertlik.

Záměny matematických symbolů

Při popisu parametrů B , β , γ , θ učebnicového R&D modelu je parametr γ (gamma) na straně 69 bezdůvodně přejmenován na parametr λ (lambda), jinak v modelu nefigurující, a hned na téže straně v poznámce pod čarou číslo 175 je parametr θ (théta) naopak přejmenován na parametr γ (gamma). Výsledkem těchto záměn je zmatek na úkor srozumitelnosti výkladu.

Odhlédneme-li od výše popsaných nedostatků, splňuje předložený text svými kvalitami kritéria IES FSV UK pro diplomovou práci, a proto jej doporučuji k obhajobě se známkou „velmi dobře“.

SUMMARY OF POINTS AWARDED (for details, see below):

CATEGORY POINTS

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TOTAL POINTS	(max. 100 points)	75
GRADE	(1 – 2 – 3 – 4)	2

NAME OF THE REFEREE: Jan Čech

DATE OF EVALUATION: 31. 8. 2009

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Report on Master Thesis

Institute of Economic Studies, Faculty of Social Sciences, Charles University in Prague

Student:	Martin Pospíšil
Advisor:	Pavel Mertlík
Title of the thesis:	Three Essays on Joseph Stiglitz and Information Assymetry

Diplomová práce Martina Pospíšila se zabývá ekonomii Josepha Stiglitze, a to jednak v hospodářskopolitickém kontextu (kritika tzv. washingtonského konsensu), jednak – a zejména – jeho teorií informační asymetrie. V třetí eseji se pokouší o aplikaci stiglitzovské ekonomie na vysvětlení současné globální finanční krize a jejího dopadu v ČR.

Práce prokazuje autorovou dobrou znalost díla Josepha Stiglitze i jeho místa v rámci soudobé ekonomie. Pokus o vysvětlení mechanismů vzniku soudobé krize s pomocí teorie informační asymetrie a na ní založených nedokonalostech tržního mechanismu je zajímavý a otevírá prostor k dalšímu rozpracování v budoucnosti.

Práce představuje ve srovnání s jinými závěrečnými pracemi obhájenými na IES FSV UK v posledních letech vysoký standard. Navrhuji ji proto k obhajobě s hodnocením stupněm výborně.

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