<table>
<thead>
<tr>
<th>CONTENTS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>From the Scientific Council</td>
<td>5</td>
</tr>
<tr>
<td>Post-Crisis Economic Policy. Innovation Based Growth</td>
<td>7</td>
</tr>
<tr>
<td>Adam Glapiński</td>
<td></td>
</tr>
<tr>
<td>Sustainability, Innovation and Information Technology as Sources</td>
<td>16</td>
</tr>
<tr>
<td>of Value Generation</td>
<td></td>
</tr>
<tr>
<td>Stefan Hack</td>
<td></td>
</tr>
<tr>
<td>The Interest Rate Channel of Monetary Policy in Poland</td>
<td>36</td>
</tr>
<tr>
<td>Andrzej Kaźmierczak</td>
<td></td>
</tr>
<tr>
<td>Management on the Edge of Chaos: Challenges of the Petabyte Age</td>
<td>54</td>
</tr>
<tr>
<td>Piotr Ploszajski</td>
<td></td>
</tr>
<tr>
<td>New Challenges after the Crisis: A Monetary Policy Perspective</td>
<td>68</td>
</tr>
<tr>
<td>Zbigniew Polański</td>
<td></td>
</tr>
<tr>
<td>of Current Regulatory Developments</td>
<td></td>
</tr>
<tr>
<td>Sebastian A. Schuetz</td>
<td></td>
</tr>
<tr>
<td>Summary</td>
<td>119</td>
</tr>
</tbody>
</table>
Ladies and Gentlemen,

We present you the fifth edition of the ‘Journal of Management and Financial Sciences. It addresses the key issues of economic theory, which is faced with developing a new paradigm. This is due to both the crisis of 2007, which swept most of the world economies and globalisation favouring the spread of the crisis. The latter especially constitutes a major challenge for researchers. The main scope of macroeconomic analysis is progressively becoming global, and with it the question of the regulation of economic activity globally.

We hope that the presented articles will be a contribution to the task of shaping a new paradigm of economics. We hope you enjoy the results.

Janusz Ostaszewski,
Chairman of the Scientific Council and Dean of the Faculty

Ryszard Bartkowiak,
Vice-Chairman of the Scientific Council and Vice-Dean of the Faculty
Post-Crisis Economic Policy. Innovation Based Growth

1. End of the Crisis and Major Questions

The global economic and financial crisis which erupted in 2007 and it is perceived today as the most serious recession since the Great Depression of the 1930s. It appeared at the time of the rupture of the mega-bubble on the real estate market in the United States and in no time at all, engulfed the entire world.

What is the current state of the global economy? What were the main causes of the crisis? Has the crisis left behind something durable in the world economic order? Has economic development returned to its old rut? Will the capitalism of the next generations be different in terms of quality as a result of the crisis? These are currently the questions which attract the interest of not only economists but also world public opinion.

In any case, in the case of wealth accumulated by affluent people, according to calculations included in the report published by the Boston Consulting Group entitled BCG Regaining Lost Ground Global Wealth 2010 as well as 14 editions of the World Wealth Report published by Merrill Lynch Global Wealth Management and Capgemini, the level of world wealth measured by the value of assets under management in 2009 increased by 11.5 per cent reaching the level of $111.5 trillion to return almost to the highest level since before the crisis, with three quarters of the wealth accumulated by Europe and North America.

In 2009 the number of the richest people in the world (with more than 1 trillion dollars worth of net assets) returned to the state before the crisis and reached the level of 10 million, their wealth rose by 18.9 per cent to $39 trillion, with the ultra-rich group to have increased their wealth by 21.5 per cent. The pace of the wealth revival is led by the countries of Asia and the Pacific and especially BRIC countries; since 18 February BRICS – in connection with the formal inclusion of the Republic of South Africa in the group. The highest

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3 Korea and Turkey queued up.
number of millionaires: as many as 4.7 million families live in the United States, to be followed by Japan, China, Great Britain and Germany. Unusual is the level of the growing concentration of wealth. Less than 1 per cent of the world population were millionaires ($), but they possessed about 38% of the world wealth compared to 36 percent in 2008. Millionaires with a wealth exceeding $5m accounted only for 0.1 per cent of the population, however they possessed as much as 21% per cent of the global wealth (nearly $23 trillion), an increase of 19 per cent in 2008.

However, the return to the previous, highest level in the world history of wealth of the richest does not mean the ultimate ending of the crisis and the return to high prosperity and financial market stability. There is a considerable decline in investors’ risk appetite, the confidence placed by banks in their customers as well as the economic growth rate. As a result of the crisis there was a further abrupt concentration of wealth in the world. One can anticipate that this situation will go on until 2014 although the second quarter of 2009 marked the beginning of overcoming the crisis on the financial markets, so a reduction in risk aversion, a rise in share prices and the lower fluctuation or appreciation of currencies of the emerging economies against the dollar.

Poland compared to other countries of the region was, luckily, relatively mildly affected by the world economic crisis and it was the only country which reached a positive GDP growth of 1.7 per cent on an annual basis in 2009. This resulted from a peculiar backwardness rent: a lower openness of the economy than in other countries of the region and a lower share of means of transport, equipment and machinery in exports than, for instance, in the case of Sweden, the Czech Republic or Hungary. The fact that in 2009 there was a relatively slight decline in export dynamics in relation to import dynamics had a positive impact. As a result, the current account balance improved (the deficit declined by half towards the end of 2008). The major part of GDP growth resulted from net exports.

2. The Causes of the crisis

The analysts at the National Bank of Poland should be supported as they regard two groups of phenomena as the main causes of the last global financial and economic crisis.

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4 If the present trends continue, BRICS economies will outstrip G7 countries and there will be a new generation of millionaires to accompany this phenomenon.

Firstly, macroeconomic phenomena:
• growing global imbalances,
• long-term low real interest rates,
• baseless asset prices.

Secondly, the microeconomic weaknesses in the functioning of the financial system:
• defective structure of incentives (individual and institutional),
• weaknesses in the methods of measurement, assessment and risk management,
• inefficient corporate governance,
• loopholes in the regulatory system (micro- and macro-cautionary regulations).

The phenomenon of interaction and co-existence of the above unfavourable phenomena was an additional, very important element.

There are, however, some more fundamental and principal issues unresolved, difficult to verify empirically and crucial for the proper comprehension of the mechanism of crises, such as the last one:
• whether, as maintained by economists following the Keynesian tradition in one way or another, the last crisis, just like all others resulted from inevitable, immanent features of market economy as the market is not able to coordinate millions of spontaneous actions not necessarily rational for individual business entities?
• whether, as maintained by monetarists of all kinds, cyclical fluctuations and crises are caused by nominal shocks, and mainly by abrupt expansions of money and credit?
• whether, as maintained by neoclassical economists from the school of the real business cycle, the crises and cycle result from real shocks: external in relation to the economic system, such as for instance rapid technological changes?
• whether, as maintained by economists from the Austrian school, the systemic cause of the cyclical mechanism and crises is the structural inclination of banks to create loans inadequate to changes in the preference

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6 Exhaustive enumeration of sources of the global crisis and comprehensive review of literature on the causes and course of crisis are to be found in: M. Konopczak, R. Sieradzki and M. Wiercicki in: Kryzys na światowych rynkach finansowych – wpływ na rynek finansowy w Polsce oraz implikacje dla sektora realnego (Crisis on world financial markets – impact on the financial market in Poland and implications for the real sector), „Bank i Kredyt”, No. 41, 2010, pp. 45–70.

7 Cf. Z. Żółkiewski, Jezus Huerta de Soto, Pieniądz, kredyt bankowy i cykle koniunkturalne (Money, bank credit and business cycle), review, „Bank i Kredyt”, No. 41, 2010, pp. 139–140.
rate of the provisional market participants. From this perspective, crises are a consequence of banking based on the principle of fractional reserve, which creates an artificial economic expansion leading to a crisis and recession. The only systemic remedy is to introduce the requirement of a one hundred per cent reserve, fixed currency rates, money based on the gold standard and the liquidation of central banks.

• whether, as maintained by evolutionary economists (Schumpeter), crises and cycles are not only a natural but also an indispensable feature of the capitalist market system. It is in the phase of crisis when the selection of more effective technological, organisational and institutional solutions is made. The market economy develops dynamically not despite, but on the contrary, thanks to crises. From this point of view, the last crisis was the time of selection and victory of subsequent important economic innovation beams. In this phase of capitalist development in which we live today, they are largely in the sphere of innovations in the area of finance. New products, techniques and financial technologies create, together with the digital revolution, a new reality of the world economy and civilisation.

3. Capitalism in the time of the financial revolution

This new reality brings a promise and a guarantee of rapid development, but it also means a time of more uncertainty, inequality and abrupt, unpredictable changes, difficult to assimilate and accommodate within one generation.

It is worthwhile comparing statistical data. The share of the financial sector in the GDP of the United States accounted for 2.3 per cent in 1947 and in 2005 it rose to 7.7 per cent. In Great Britain the financial sector created 9.4% of the GDP. In 2006 the world domestic product amounted to $47 trillion. The value of capitalisation of all security exchanges amounted to about $51 trillion. The total value of national and international bonds amounted to $68 trillion. While the value of the derivative instruments reached as much as $473 trillion, so it was more than 10 times larger than the total world GDP! In 2007 the value of all the derivative instruments outside exchanges reached about $600 trillion. The

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8 “Central bank perceived as a central planning agency in the area of money and banking cannot be considered as a natural product of evolution of free market. On the contrary, it was imposed from outside in a dictatorship-like manner, as a result of attempts made by governments to obtain gains from extraordinarily lucrative opportunities created by banking based of fractional reserve” J. H. De Soto, Pieniędz, kredyt bankowy i cykle koniunkturalne (Money, bank credit and business cycle), Warsaw 2009, p. 611.

revolution in the financial sector, along with the digital revolution, determine new standards of competition for countries, regions and individual citizens.

The avalanches of new financial techniques and instruments and the supplanting of the old ones are bringing rapid and unpredictable consequences for countries and the whole world. It is an enormous challenge for governments and international organisations, which are aware of it, but unable to accomplish such an enormous and difficult task requiring coordinated actions on a world scale. At present it is absolutely unimaginable. That is why the further development of the world will occur in the process of spontaneous, uncontrollable and unhindered evolution. Intentionally, economists, financial analysts and analysts of business behaviour, not only from the schools of behavioural economics and finance or evolutionary economics, more and more frequently refer to biological analogies when analysing and describing the area of finance.

Joseph A. Schumpeter predicted already at the turn of the first decade of the 20th century that capitalism developed through processes of rapid changes and innovations appearing one by one in all fields, not only purely economic, with the financial sector having played a special and growing role since the very beginning. At present, the shift of the centre of gravity in the area of finance from financing innovation in production and services to its own production of financial innovations is of historic and revolutionary significance. The development of the world economy will rapidly accelerate, but there will be an increase in the sense of uncertainty and lack of security for both individual resources and jobs and public institutions such as social security and health insurance. Social awareness will not keep pace with these changes, and it is the democratic order which will suffer.

4. From security to uncertainty and risk

The 2007 crisis made everyone aware of a paradoxical situation in which the richest country in the world was indebted and financed by another country considered to be very poor. In 2007 the United States had to borrow about $800 billion dollars all over the world. At the same time China had a surplus of about

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11 Cf. J. A. Schumpeter, Kapitalizm, socjalizm, demokracja (Capitalism, socialism, democracy), Warsaw 2009; Teoria rozwoju gospodarczego (Economic growth theory), Warsaw 1960.
$262 billion and allocated a substantial part of it in American bonds. At this time the average annual earnings per one USA inhabitant was $34,000, while it was only $2,000 in China. Communist poor China to be the creditor of the United States: personifying the superpower and wealth of capitalism – this is a symbol of a new time in the economy (and not only) of the world. Suddenly, all of us, including economists have realised that we are living in an entirely new time, in which the whole experience and knowledge of world finance are not sufficient.

We are now experiencing the crisis of public confidence that results from the sudden awareness by some part of the public opinion of the growing problems connected with both repartition and capital insurance systems. A low level of financial knowledge is characteristic of all contemporary societies, including those which are economically the best developed. That is why the shock is more acute when public opinion becomes aware of the fact that the present times, though associated with the hope for increasing well-being, do not really mean the growing economic security and security of an old age pension endowment. For the first time notions like public finance deficit entered the colloquial language and everyday conversations are connected with the sense of the real risk of bankruptcy not only of an abstract state but also with a personal economic threat.

What is the potential black scenario for every European country whose rating is rapidly lowered by rating agencies that analyse the expected fiscal revenue and the debt to be paid off? The consequences will affect every citizen in the same way as happened in Greece or Ireland. The debt service is becoming more expensive now. On account of this, there will be a considerable rise in indebtedness. There will be a shortage of budget funds for the most elementary public services such as education, health, the judiciary, police, defence and pensions. There will be insufficient funds to maintain the energy and municipal infrastructure, higher education etc. International institutions will demand drastic savings, considerable tax rises and also the extension of the retirement age and indexation restriction. There will be a lower standard of living, recession and higher unemployment. Simultaneously, innovativeness and labour productivity growth rate will decline. All this will make the debt repayment difficult to fulfil. In such a situation there will be a consent to considerable inflation, which will, admittedly, reduce the burden of indebtedness but it will bring all the other negative consequences too. Emigration will grow and the political and party system will collapse.12 A number of European countries, including Poland, have

to accomplish numerous well planned actions and make hard efforts to prevent this scenario from becoming reality.

5. The economic challenges to governments

Many economists, financiers and business politicians claim that hardly anything can be done to durably improve the world financial system, restore and increase the dynamics of economic growth and avoid in the future such deep crises as the one in 2008. They argue that, firstly the nature of current economic and financial systems is too complex and dynamic to be effectively regulated, and in particular it concerns the character of the further evolution of these systems. Secondly, any effective regulation would require international coordination and the introduction of certain world standards. However, this solution is not feasible and utopian on account of politics and also due to the fact that not everyone is to lose or gain the same from these regulations.

On the other hand, nearly the same number of analysts and theoreticians become involved in some kind of mental experiments to create concepts of specific tools and whole systems of national and international regulation of the financial market. They have undertaken actions in this area believing that the extremely difficult financial and political situation of the richest western countries will make them enforce the new order of world finance.

It seems, however, that neither the first ones nor the others are right. Indeed, at present, governments and international institutions can hardly do anything in the area of new regulation of the world financial system due to the divergent interests (both inside the countries and among them) and the lack of one prevailing centre forcefully imposing its concept of global economic order (as for many years in the case of Bretton Woods or Washington Consensus). The history of the Tobin tax concept is an issue to consider. From this perspective, the most recent concepts of new financial regulations are purely theoretical or simply utopian. What is possible to do is to introduce moderate, limited changes in regulations.

However, it is not true that governments have nothing to do outside this area. It is necessary to get rid of neoclassical prejudices and focus on what is really decisive in the economic development dynamics, i.e. on the stimulation of the facilitation of innovation. Edmund S. Phelps\textsuperscript{13}, the Noble prize winner and his influential research centre at Columbia University, Center on Capitalism and

Society\textsuperscript{14} are right when encouraging the return to the Schumpeter perspective of restoring the business dynamics after the crisis.

The basic problem of highly developed economies is a general decline in development dynamics. It results from growing social stratification and unemployment leading to the exclusion of the majority of society from the access to creative and innovative professional activity. The process of this decline in development dynamics started already at the turn of the century. From this point of view, the last crisis shows really more similarities to the crisis of the 70s after \textit{oil shocks} than to the Great Depression of the 30s\textsuperscript{15}.

The task of the abrupt restoration of economic innovativeness requires reforms and restructuring based on the new economic paradigm. Instead of the economic policy based on the growing deficit of the public finance sector and low interest rates resulting in the fiscal crisis and inflation, the policy to be introduced should stimulate entrepreneurship and innovation through fiscal incentives\textsuperscript{16}. This policy does not have to include facilitation in establishment and liquidation of companies, liberalisation of the labour market, tax and credit stimulation of innovation, organisation and financing of high quality education and science, and at the same time care about employment and the use of the human factor.

The priority to innovation, human capital and science combined with the disciplined fiscal and monetary policy may be an escape forward, also for Poland.

Bibliography


\textsuperscript{14} Admittedly, Phelps is wrong when assuming that Schumpeter noticed only exogenous innovation from outside the company, e.g. from science and stimulated by the government.

\textsuperscript{15} The decline in dynamics may have resulted from the Nikolai Kondratieff long cycle.

\textsuperscript{16} The authors of NBP report speak in this context about “competitive and innovative economy taking full advantage of opportunities resulting from the membership in the Union” (op. cit., p. 50). They underline the need to raise the professional activity ratio, to improve the education system, to improve infrastructure, to improve bureaucratic procedures and develop innovativeness and modernity of production (op. cit. pp. 60–61).
Sustainability, Innovation and Information Technology as Sources of Value Generation

1. Introduction

The financial crisis which was triggered in 2008, and its subsequent implications and aftermath are confronting businesses and economies world-wide with unprecedented challenges. It requires ongoing international and global efforts to stabilize the world economy. In addition, researchers, political and business leaders realise that new challenges are ahead regarding world climate, biodiversity, and the issues brought about by the growth of the earth’s population. Industry leaders like Dieter Zetsche, Chairman of the Board of Management of Daimler AG is quoted with the following statement: “The costs of climate change will outclass the financial crisis by magnitude in the long term” (Daimler 2010). As Joseph F. Keefe, President and CEO of Pax World Funds, an investment company focusing on Sustainable Investing, puts it: “In fact, the sustainability crisis and financial crisis are related in that they both result from an excessively short-term focus that is costing us dearly” (Keefe 2010).

Mankind is facing unprecedented challenges in protecting the planet and transforming the world economy into a sustainable one. It is therefore an urgent call for concepts and innovative solutions that address the current and future challenges making use of economic principles by which enterprises and individuals can contribute to both the increase of a more sustainable use of the planet’s resources while ensuring economic success. The relationship between corporate sustainability performance and economic success has been widely analysed (Wagner et al. 2001, Schaltegger & Synnestvedt 2002, Guenster et al. 2005, Innovest 2007, Goldman Sachs 2007). The links between environmental management and the value of a company are well described in Schaltegger & Figge (2000) as well as the concept of eco-efficiency as the combination of economic

\[ \text{Eco-efficiency} = \frac{\text{Value added}}{\text{Environmental impact added}} \]

For detailed description including examples see Schmidheiny (1992), Schaltegger et al. (1996), WBCSD (2000).
and environmental performance (Schmidheiny 1992, Schaltegger et al. 1996, Schaltegger & Synnestvedt 2002). Recent studies concluded that the more eco-efficient firms earn an “abnormal return”, i.e., above average of between 2.8% and 5% over the period from 1997 through 2004 (Guenster et al 2005); and companies with a commitment to sustainability outperformed their peers also during the financial crisis (A. T. Kearney 2009).

2. Environmental Shareholder Value and Value Driver Tree

The intention of this paper is to identify sustainability management supported by innovative information and communication technology (ICT) as a source of economic value. With the background of case examples and empirical data from more than 50 companies, it aims to categorise the areas where information technology is relevant to increase enterprise sustainability performance while increasing quantifiable economic benefit for these companies. To systematically analyse the economic impact of IT-enabled sustainability management the model of Rappaport on economic shareholder value (Rappaport 1986) and the related concept of value driver/creation trees (Copeland et al. 1993, Koller et al. 2010, p. 421) are used. According to Rappaport managerial measures can be assessed on the basis of value drivers and the related management decisions on operational management, investment and financing.

Regarding the practical consequences for company management Schaltegger & Figge (2000) conclude in the compatibility between the concept of shareholder value and economically efficient environmental management. With reference to the value drivers as defined by Rappaport the compatibility is seen in particular for enterprise-value-enhancing-measures which are exhibiting the following characteristics (Schaltegger & Figge 2000, p. 38):

<table>
<thead>
<tr>
<th>Value drivers (Rappaport 1986)</th>
<th>Corresponding measures of environmental management enhancing enterprise value (Schaltegger &amp; Figge 2000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed capital investments</td>
<td>Capital extensive, i.e., smarter, smaller, cheaper installations</td>
</tr>
<tr>
<td>Working capital investments</td>
<td>Low material consuming, i.e., reduced throughput (lower purchase cost, greater resource efficiencies)</td>
</tr>
<tr>
<td>Sales growth</td>
<td>Sales boosting, i.e., increasing the benefit and attraction to customers, more desirable and competitive products and services, more revenue sources</td>
</tr>
</tbody>
</table>
continued Table 1

<table>
<thead>
<tr>
<th>Value drivers (Rappaport 1986)</th>
<th>Corresponding measures of environmental management enhancing enterprise value (Schaltegger &amp; Figge 2000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating profit margin</td>
<td><em>Margin widening</em>, i.e., increasing the brand and pricing power (higher prices due to greater perceived benefit as well as lower costs due to increased operational efficiencies)</td>
</tr>
<tr>
<td>Cost of capital</td>
<td><em>Safeguarding</em> the business and the flow of finance, i.e., confidence of the capital market, lower risk, lower cost of capital</td>
</tr>
<tr>
<td>Value growth duration</td>
<td><em>Long-term value enhancing</em>, i.e., anticipation of future costs and earnings potential, sustainable business model</td>
</tr>
</tbody>
</table>

**Figure 1. Value driver tree – potential impact of sustainability efforts on company value**


The importance of value drivers and their relevance in management decisions regarding sustainability has been evaluated in a recent study conducted by the Centre for Sustainability Management (CSM), Leuphana University Lüneburg and PriceWaterhouseCoopers (PwC) (Schaltegger 2010). According to the survey...
conducted amongst 112 companies in Germany covering different industries and varying in size the most important drivers are (1) efficiency, (2) risk management, (3) employee motivation followed by (4) reputation. Less important seem to be the drivers (5) innovation, (6) cost and (7) revenues.

For the further analysis of the relationship between the value drivers and the corresponding value-enhancing measures of environmental management supported and enabled by information technology a simplified value driver tree as described in Koller et al. (2010, p. 421) and introduced in a recent study publicised by Berns et al. (2009, p. 21) is utilised. This concept allows well to illustrate the potential positive impact of sustainability efforts on all levers that enterprises use to create value. Figure 1 depicts the generic value creation tree including the value drivers mentioned as well as some more detailed value creation levers, like market share, pricing power, cost savings and others impacting company value. In addition, the potential impact of sustainability efforts is listed aligned with the respective value drivers.

3. The Impact and Relevance of Information Technology

In which ways can information technology support and enable sustainability efforts? What role can IT play in increasing the sustainability performance in enterprises and implementing value-enhancing measures? In the subsequent section of this paper these questions shall be addressed. The underlying hypothesis is that information technology can play an important role in enabling value-enhancing measures also increasing the eco-efficiency of companies. In addition, information and communication technology (ICT) can be used to enable the transformation of companies and economies to a more sustainable way of doing business.

The report “SMART 2020: Enabling the low carbon economy in the information age” sees ICT in a leadership role and identifies where ICT can enable significant reductions of emissions in other sectors of the economy (The Climate Group 2008). The study is using a systematic approach to analyse the impact of ICT, called the SMART transformation. SMART in this case represents an acronym composed of the five elements standardisation (S), monitoring (M), accountability (A), rethinkiing (R), and transformation (T). Figure 2 below describes in more detail the proposed five steps of this transformational process enabled by ICT.
The framework of shareholder value (Rappaport 1986) and the corresponding measures of environmental management (Schaltegger & Figge 2000) provide the basis for the further analysis. This framework is used to categorise the IT-enabled measures which are enhancing value and sustainability (eco-efficiency) of enterprises; resulting in the alignment of value drivers, the corresponding measures of sustainability management and their enablement with the help of information technology (IT-relevance).

Information technology supports value-enhancing measures both directly and indirectly: indirectly, with improved decision-making through data transparency building on standardised processes and measurements; directly, when optimising and automating processes that would be otherwise resource and capital intensive. In addition, ICT offers opportunities for substitution and also dematerialisation. Teleconferencing is said to eliminate up to 30% of business travel (substitution) and mp3-downloads are estimated to have a 40% to 80% smaller environmental footprint than CDs (dematerialisation) (O’Marah 2010). For other technology examples see Erdmann et al. (2004) and Erdmann & Behrendt (2003):

- **Fixed Capital Investment (capital expenditure)** – Corresponding sustainability measures are targeting at smarter, smaller, and also cheaper installations.
This can be supported by information technology in monitoring respective fixed assets (buildings, plants, equipment) and establish accountability regarding their eco-efficiency. The most prominent proxies for the eco-efficiency of the company’s fixed asset are **Energy Management** and the management of **(Carbon) Emissions**. Fixed assets also include data centres where fixed capital investments as well as energy consumption and the resulting carbon emissions and can be reduced, for example by the use of virtualisation technology (**GreenIT**).

- **Working capital investments** – Corresponding sustainability management activities are targeting lower material consumption. Following the SMART concept the initial stage is measuring and monitoring resource use and **Resource Productivity** with the help of IT. The subsequent stage relates to optimising resource productivity with the use of IT. Whereas the third stage calls for transformation, like the dematerialisation by electronic means, e.g., replacing CDs with mp3-files.

- **Sales growth** – Measures and IT solutions for product safety & stewardship including tracking and monitoring ensure compliance with legal regulations (REACH, RoHS, GHS and others) ensure access to (new) markets and support the sales-promoting reputation of products and brands. Further aspects include the differentiation of products and services through life-cycle analysis (LCA) and the management of their product carbon footprint. These can be subsumed under the term **Sustainable Consumption** (WBCSD 2008).

- **Operating profit margin** – Measures around product safety already provide a basis for increasing pricing power and widening margin. More directly affecting a company’s profit margins are environmental measures with the support of IT that are aiming at increased **Operational Efficiencies**. Examples following the SMART concept are the standardisation and automation of processes with the help of IT. In the subsequent stages additional gains are possible via IT-enabled process optimisation, whereas IT-enabled substitution (eg. of telework vs. travel) support the transformation with positive effects on sustainability as well as increased operational efficiencies.

- **Cost of capital** – Businesses are seeking financing at low interest rates and manage their business risks. Compliance with legal regulations decreases operational as well as financial risks and increases confidence in the market regarding the continued economic success of the enterprise. This ensures the flow of capital and access to sources of financing at low cost of capital. IT solutions supporting **Compliance and (Operational)**
Risk Management are widely-used and have proven their value in the described context.

- Value growth duration – Measures geared toward the long-term success of the company’s business model are following a holistic approach and are aiming to manage economic, social as well as ecological aspects. Seeking a sustainable business model includes the anticipation of future costs and earnings potential, employee motivation as well as shifts in customer preferences, secure sources of supply and others. Modern enterprise resource planning (ERP) software solutions offer functionality for holistic Sustainability Performance Management in alignment with the company’s long-term Strategy.

Table 2 summarises the described aspects in a more condensed format. The columns describing the IT relevance are structured along the SMART concept according to three stages, thereby also indicating a maturity level as used in other studies (Senxian & Jutras 2009).

Table 2. Alignment of value drivers, corresponding measures of environmental management and their enablement with the help of information technology

<table>
<thead>
<tr>
<th>Value drivers (Rappaport 1986)</th>
<th>Corresponding measures of environmental management (Schaltegger &amp; Figge 2000)</th>
<th>IT relevance in the context of sustainability and meeting both objectives enhancing economic value and environmental performance (eco-efficiency) along SMART</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed capital investments</td>
<td>Capital extensive</td>
<td>Energy Management and (Carbon) Emissions</td>
</tr>
<tr>
<td>Working capital investments</td>
<td>Low material consuming</td>
<td>Resource Productivity</td>
</tr>
<tr>
<td>Sales growth</td>
<td>Sales boosting</td>
<td>Sustainable Consumption</td>
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<tr>
<th>Standardise, Monitor, Account</th>
<th>Rethink</th>
<th>Transform</th>
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<tr>
<td>Monitoring of assets</td>
<td>Substitute with smart technologies and buildings</td>
<td>Virtualisation of data servers, cloud computing</td>
</tr>
<tr>
<td>Measure resource productivity</td>
<td>Optimise resource productivity</td>
<td>Dematerialise (eg. CD→mp3)</td>
</tr>
<tr>
<td>Ensure Product Safety &amp; Stewardship</td>
<td>Reduce product carbon footprint</td>
<td>IT-enabled sustainable design of products, services</td>
</tr>
</tbody>
</table>
4. IT-enabled Increase of Shareholder Value and Eco-Efficiency

The following section aims to provide company case examples, which illustrate how value-enhancing measures from environmental management can be supported by information technology. The short case studies identify the leverage points how information technology can concretely increase economic value as well as environmental benefit.

4.1. Extensive capital investments – smarter, smaller, cheaper installations

Enterprise software, so-called enterprise manufacturing intelligence (EMI) software provides improved visibility into the use of resources in manufacturing settings, such as raw materials and energy, thereby increasing resource efficiency.
and yielding bottom-line results (Automation World 2009). EMI solutions extract and aggregate real-time manufacturing data from many disparate sources on the factory floor. The visibility into relevant data can help users at all levels – from plant floor operators through plant management to top-level executives – to make smarter decisions that contribute to a company’s bottom-line. Thereby this type of software solution also offers a very concrete example for closing the gap between strategy and plant floor execution as well as generating ecological and economic benefit.

The case of Valero Energy Corp., San Antonio, Texas illustrates this. The company selected an EMI solution called Manufacturing Integration and Intelligence (MII). Using MII Valero built dashboards for energy management to provide better real-time visibility into its 15 refineries are using energy resources like steam, electricity, and fuel gas. The company expects to significantly improve energy management across all 15 sites and annual savings of $4 million to $12 million per plant. The resulting improvements in energy management across the company’s 15-site fleet of refineries are projected between $60 million to $180 million annually (Automation World 2009).

IT infrastructure like data centres, servers, networks, and other hardware and software are considered part of a company’s fixed assets. IT and communication infrastructure account for approximately two percent of the planet’s carbon emissions (The Climate Group 2008). BSH, leading producer of white-goods household appliances provides a case example for reducing energy consumption and carbon emissions in its data centers. The company has centralised and consolidated its data centres and subsequently used virtualisation technology to significantly reduce the number of servers as well as energy consumption between 59% and 87%. In the case of the company’s Enterprise Resource Planning (ERP) systems the energy consumption was reduced by 1.3 million kWh, which translates into a reduction of 793 tons of carbon emissions per year (CIO 2008).

4.2. **IT-enabled reduction in working capital by consuming less materials**

Software solutions can provide improved visibility into the use of resources in manufacturing settings, such as raw materials. An example for the use of information technology to reduce the consumption of materials and working capital is Life Cycle Assessment (LCA). LCA is a technique to assess the environmental aspects and potential impacts associated with a product, process or service (BCorporation 2008). A broad portfolio of software solutions is supporting this technique (Jönbrink et al. 2000). The functionality of such software includes compiling an inventory of relevant and material inputs and material releases,
evaluating the potential environmental impacts, interpreting the results to help make more informed decisions about the environmental impacts of products, processes, and activities (EPA 2011).

Another example is offered by sports apparel and footwear company Nike, who – to further their sustainability efforts – recently released its software-based Environmental Apparel Design Tool. The tool aims to improve collaboration between Nike’s supply chain partners, foster fast-track sustainable innovation, and decrease the use of natural resources. Recognising the decline of natural resources and their increase in price, the tool helps designers to decrease the environmental impacts of products, reduce waste, and increase the use of environmentally preferred materials while allowing the designers to make real-time adjustments. In addition, Nike plans to release its Footwear Design Tool, Material Assessment Tool, and Water Assessment Tool in 2011 (Business Wire 2010).

Consumer electronics company Panasonic Corporation sells more than 15,000 different products and uses a lot of packaging. With the help of an enterprise software solution its subsidiary Panasonic Europe Ltd. manages these materials (plastic, corrugated cardboard, foil, paper along with the batteries) in a sustainable fashion meeting the European regulatory requirements for package recycling and battery disposal. They have installed the software solution to centralise recycling administration and provide detailed, accurate information to 45 recycling partners and 17 countries in Europe. Amongst the economic benefits reaped are an increase in data accuracy, lowered recycling expenditure, significant cost savings via centralisation, and a simplified audit preparation and compliance process (SAP 2010a).

The concept of dematerialisation is an obvious example where information technology has a positive impact on the consumption of less materials (with potential impact to also widen the company’s operating margin). For example, Apple’s iTunes digital downloads are estimated to have a 40% to 80% smaller than CDs as a means to deliver music (O’Marah 2010).

4.3. Sales growth – boosting sales via sustainable innovation products

Procter & Gamble (P&G) as part of its sustainability strategy has set a goal to generate $50 billion in cumulative sales from “sustainable innovation products”, i.e. products that have an improved environmental profile, in a five-year period ending in 2012. Cumulative sales of these products since July 2007 are at $13.1 billion USD. Since July 2002 P&G has cut energy use by 48%, CO₂ emissions by 52%, waste disposal by 53% and water use by 52% (P&G 2011a). Now the company extends its strategy and reach into its supply chain network. The goal
is to help suppliers either to move forward with their efforts or to get started working towards sustainability.

In the spring of 2010 P&G initiated and rolled out an IT-enabled sustainability scorecard programme for its suppliers. The so-called “Supplier Environmental Sustainability Scorecard” (P&G 2010b) is transparent and easy to implement and requests information on energy, carbon emissions, waste and water. The scores that suppliers receive will influence the overall supplier rating that P&G gives them. The effort initially involves a group of 400 suppliers in 33 countries and throughout P&G’s entire supply chain. The scorecard uses worldwide-accepted measurement standards from the World Resources Institute, the World Business Council for Sustainable Development and the Carbon Disclosure Project (GreenBiz 2010).

Retailer Walmart has put strong focus on the sustainability performance of its supply chain with its packaging and sustainability scorecards (Walmart 2010). Similar to the so-called “Walmart Supplier Sustainability Assessment” Procter & Gamble uses information technology in interaction and data collection from suppliers. Procter & Gamble’s exchange with suppliers takes place via the web. There suppliers find electronic spreadsheets to fill in their data along with electronic training materials including a brief video introduction by P&G’s Chief Purchasing Officer. Although these programs are foremost intended to be simple and are built on the exchange of electronic spreadsheets, the use of information technology for collection, tracking and monitoring can be automated in future.

4.4. IT-enabled eco-efficiencies increasing operating profit margin

Logistics provider United Parcel Service (UPS) provides an example for increasing operational and eco-efficiencies with positive impact on the companies operating cost. The company has implemented a software- and hardware-based routing technology called Package Flow Technology (PFT) for the optimisation of delivery routes. PFT is shortening delivery routes, minimising engine idle times and combining multiple deliveries into a single stop. It also helps to minimise time-consuming “left turns”. This software-enabled efficiency improvement resulted in 45 million kilometres reduction in mileage (2007) as well as 31,000 tons carbon emissions reduction (Gillies 2008). According to UPS’s CFO, Kurt Kuehn, PFT has saved 1,000,000 miles from UPS’ delivery routes since 2003. It has also reduced fuel use by 10,000,000 gallons and carbon emissions by more than 100,000 metric tons (Kuehn 2010).

German company Kaeser, is a leading provider of systems for compressed air. The service business with consulting, maintenance and repair services for equipment and facilities is key for the company’s strategy to boost margins
by selling compressed air as a utility service, not just products that generate compressed air (SAP 2010b). To support dynamic growth while keeping operating and administrative cost low, the communication with customers and service technicians was centralised and standardised. With the use of paper-less processes via online request forms and the exchange of electronic documents for the communication with the service technicians serving customers locally the company has realised significant savings and increased eco-efficiency. An estimated 20 million pages of paper, the equivalent of 600 trees are saved. The IT-based solution further results in decreased operating expenses while increasing process speed, reliability, and data quality (SAP 2010b). As illustrated with this example, IT-enabled eco-efficiencies can in terms of competitive advantage support both a cost-leadership strategy as well as a differentiation strategy (Porter 1985, Rappaport 1987).

Additional examples for the use of ICT resulting in increasing operational efficiency as well eco-efficiencies and improving margins via automation, optimisation, substitution and dematerialisation are found in Erdmann et al (2004) and Erdmann & Behrendt (2003). To provide another succinct example regarding the impact of ICT: it is estimated that modern teleconferencing capabilities like Cisco’s TelePresence eliminates the need for up to 30% of business travel (O’Marah 2010). This not only generates positive effects for the significant decrease in operating expenses but also frees up productive time for employees and can also positively affect their quality of life and work-life balance.

4.5. Safeguarding the business and the flow of finance – compliance and risk management and their positive implications for cost of capital

Environmental regulations regarding the safety of products as well as operations continue to increase at local, national and global levels and rapidly propagate across air, water, waste etc. For companies this means a serious and sometimes painful exercise to comply with environmental and safety regulations (REACH, RoHS, GHS etc.) to avoid costly penalties. Yet, there is no alternative as compliance to these regulations is a prerequisite of doing business. For example, unless companies comply with REACH regulations they are not allowed to do business with the European Union.

Meeting regulatory requirements and even exceeding them mitigate company risks. Besides the regulatory risks there are financial risks. With frequent recalls (45,000,000 children’s products were recalled in 231 recalls in the US in 2007 alone, Kids In Danger 2008) and other dramatic events everybody is aware that companies not complying with product safety standards and regulations have
experienced serious issues regarding public opinion, customer loyalty, claims from consumers as well as authorities with serious impact on the financial performance of these company and their valuation.

Another area of risk involves shareholder preferences. Sustainable and socially responsible investing is growing faster than overall investments: 18 percent between 2005 and 2007, compared to 3 percent for all investments according to Ceres, a network of investors and environmental organisations working with companies and investors to address sustainability challenges (www.ceres.org). This implies a correlation of environmental and sustainability management with the cost of capital. Further evidence is provided via the study “Global 500 Report” by the Carbon Disclosure Project (CDP 2010) which was commissioned by 534 institutional investors like pension funds, banks, asset management and insurance companies with 64 trillion US dollars assets under management (FAZ 2010).

In this context IT contributes in many aspects: For one, via the standardisation of regulatory processes and their operation in the daily operations of companies. In addition, companies will benefit not only from compliance itself but also from the benefits offered via the automation of otherwise cumbersome manual processes to ensure regulatory compliance. The investment required for the implementation of the IT-based solution is generating a positive return-on-investment. E.g., Canadian chemical company Nova Chemicals is cited to have achieved payback of its Environment, Health and Safety (EHS) application to manage greenhouse-gas emissions credits in less than two years (SAP 2010c). In other cases, like at Sharp Corporation with its vision of an “Eco-Positive Company”, meeting the regulatory requirements and the implementation of respective software solutions is part of its corporate strategy (SAP 2010d). Overall, the importance and relevance of software-based risk management tools to analyse companies’ risk potential as well as anticipate and mitigate future business risks are to be emphasised.

4.6. Long-term value-enhancing sustainability strategy enabled by IT

A 2008 study (WRI 2008) examining the effects of environmental change on business indicates that failure to adjust to changing conditions could cost companies up to 47% in earnings until 2018. As described in the example of Procter & Gamble an increasing number of consumer products and retail companies have embraced sustainability. In implementing their sustainability strategies they heavily rely on the capabilities of information technology. In the first step, this concerns the ability to provide data transparency on their sustainability performance. In subsequent steps – thereby following the SMART concept – the ability of information technology to actively support a long-term value-enhancing
sustainability strategy is not limited to performance measuring and monitoring. The examples shared and structured along the economic value drivers show that information technology can play a very important role in transforming a company into an enterprise with a long-term sustainable business model that continues to increase its economic value as well as eco-efficiency. Ingredients to such a strategy are IT-enabled automation (process innovation), optimisation of business processes within the company’s value chain and increasing resource productivity, as well as product and process innovation with the help of information and communication technology, e.g., via substitution and dematerialisation.

The examples provided by Nike, Procter&Gamble, as well as Walmart indicate that the implementation of such sustainable business strategies have to include the companies’ business network and their entire supply chain (WRI 2008, Business Wire 2010, GreenBiz 2010). These examples also underline the relevance of information technology in creating “next-practice” platforms (Nidumolu et al. 2009). Commonly these studies stress the importance of working with supply chain networks and building collaborative capacity.

SAP, leading provider of business systems and applications, is following a dual strategy as an exemplar as well as an enabler. With its software-based sustainability solutions the company aims to support companies worldwide to become more sustainable enterprises. In its own operations SAP uses IT solutions for corporate sustainability performance management including monitoring tools, so-called dashboards, for carbon emissions, energy consumption, printing as well as employee commuting. For 2009 the company reported a 15% reduction of carbon emissions, 7% reduction in electricity consumption, 30% reduction of business flights, and a reduction of paper use in the order of 25%. This resulted in cost savings of approximately € 90 million. Following the dual strategy, SAP as the leading business process software provider has embarked on building the market of sustainability software solutions. According to SAP’s Chief Sustainability Officer, Peter Graf, sustainability is seen as a key element of the company’s strategy and a cornerstone to sustain its business model. “Sustainability has the power to fundamentally change the way business processes work. And we must, as the leader in business process software, be a leader in sustainability if we don’t want to lose our leadership position” (MIT Sloan Management Review 2010).

5. Conclusion and Outlook

Sustainability is one of the most important challenges mankind is facing today and in the future as key resources are nearing depletion and the global climate is nearing tipping point. Its implications outclass the financial crisis in the long-
term. Given their dominance in the global economy, business organisations play a key role in creating value and enduring prosperity. Likewise they can play an important role in promoting sustainability by focusing on long-term business success and assessing the impact of their business operations on economic and environmental performance (eco-efficiency).

Building on the traditional model of shareholder value (Rappaport 1986) the subsequent work on environmental shareholder value (Schaltegger & Figge 2000) has identified measures of environmental management enhancing shareholder value while increasing environmental sustainability. Multiple research reports underline the potential of information technology to promote environmental sustainability (amongst others The Climate Group 2008, EIU 2004, Erdmann et al. 2004). The question addressed in this paper is concerning the role of IT to support value-enhancing measures while increasing the eco-efficiency of companies. The working hypothesis followed in this paper is that information technology is an important but inadequately understood tool that can be used to support the transformation of companies and economies to a more sustainable way of doing business (Melville 2010).

Following the structure of Rappaport’s shareholder value model and leveraging the SMART concept (The Climate Group 2008) it was shown with multiple company case examples that information technology is relevant in many aspects of value-enhancing sustainability management. IT-enabled sustainability management promotes increased company value in the areas of energy management, increased resource productivity, sustainable consumption, which positively affects sales growth and revenues. Likewise, it can create economic value by enabling greater operational efficiencies along the company’s supply chain, improved compliance and risk management (resulting in lower cost of capital), and creating competitive advantage for an enterprise with a comprehensive (IT-enabled) sustainability strategy.

Subsequent research shall address the company-internal and operational level, pointing to the business-IT alignment (Henderson & Venkatraman 1992) and how barriers and obstacles (like informational transparency, measurability, operation of sustainability targets etc.) in transforming the organisation to increased sustainability performance can be overcome with the application of information technology. Finally, and thereby following a set of research questions proposed by Melville (2010), research shall focus on the company’s external business network of business partners (Österle et al. 2002). As described with the cases of consumer product companies and retailers like Walmart, Nike, Procter & Gamble, or the Materials Pooling Project (Lichtenstein et al. 2008) research shall be directed to collaborative networks that promote sustainability and are
enabled by IT, addressing the research question how firms can optimally invest in sustainability IT platforms intended to increase sustainability performance of the entire business network.

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The Interest Rate Channel of Monetary Policy in Poland

1. The idea of the interest rate channel of monetary policy

The main channel implementing money impulses of the central bank and its impact on real economy is the mechanism of transmission generated through interest rate changes. Central bank interest rate shapes the monetary base and interbank market interest rates. The state of liquidity of banking sector reflected in the level of current accounts of commercial banks in the central bank has a decisive impact on deposit and credit rates in interbank transactions. The higher the level of surplus liquidity, the lower the price on the money market and vice versa. The basic price that reflects the changes in relations between demand and supply on the interbank market is overnight rate known in Poland as POLONIA rate. The changes in the interbank rate should be translated into interest rates offered to commercial bank clients in credit transactions. Thus, the rise in the banking sector surplus should result in the lower interest of corporate and household credits and the decline in the surplus liquidity should in turn contribute to exactly opposite effects. The decline in commercial bank interest rates should result in the rise in credits in the whole economy. The after-effect of credit activity is the growth in global demand, revival in the real economy and GDP growth. If the central bank intends to limit the global demand due to inflationary pressure it triggers a series of occurrences in the exactly opposite direction. The causative factor of restrictive monetary policy is the decline in the surplus liquidity of the banking sector. It is reflected in the monetary base (Mo) decline. A classic textbook mechanism of monetary impulse transmission through changes in the interest rate may be written down as follows:

\[
\text{Mo} \uparrow \rightarrow \text{M3} \uparrow \rightarrow i \downarrow \rightarrow I \uparrow \rightarrow Y \uparrow \rightarrow C \uparrow \rightarrow Y \uparrow
\]

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The traditional mechanism of monetary impulses transmission through changes in the interest rate assumes in advance the existence of four close cause-and-effect relations in the area of the money market and real economy:

1) the relation between changes in monetary base and money supply;
2) the relation between changes in money supply and market interest rate;
3) the relation between changes in interest rate and credit demand;
4) the relation between the volume of credit activity and GDP growth.

External funding of the enterprise sector has an essential impact on the economic growth. Increased credit funds for enterprises stimulate their investments and let them use their production capacities more effectively. In the conditions of Poland’s transforming economy, economic entities are short of their own investment capital. It is especially true about small and medium size companies. This sector creates as much as 60% of GDP in Poland. Thus, companies must, to a large extent, rely on external sources of financing, mainly bank loans. Sources of capital outside banks are limited in Poland. It is a result of an underdeveloped capital market, especially the corporate bond market.

The examination of the banking sector indicates that the effectiveness of the second link of the interest rate transmission mechanism is disputable. The rise in money supply M3 does not have to result in the fall in demand for money. The economy will absorb only the amount of the mass of money that is necessary to meet its needs. The surplus of money supply over demand may be frozen in bank financial investment in the country and abroad. Banks do not have to use surplus liquidity for development of credit actions. They may alternatively allocate it in the purchase of securities. In an open economy, and the Polish economy is regarded to be one, the surplus supply of money may flow out abroad. As a result,
the decline in interest rates will not take effect as the central bank might expect. The research of the second link of monetary policy, requires an assumption of the interdependence between the central bank base rate (i.e. reference rate in Poland) and interbank rates offered to customers by commercial banks, not the interdependence between money supply and interest rate.

2. Central bank base rate and bank credit interest

Assuming that the credit rates follow the changes in the central bank reference rate, it may be stated that the changes of the NBP money price will be reflected the degree of restrictiveness of the monetary policy and the restrictiveness degree on the credit market.

In practice, the money market interbank rates follow changes in the central bank base rate. It affects interbank credit interest rates for the period of 3 months, i.e. WIBOR 3M. It should be underlined, however, that WIBOR 3M rate only partially reflects the actual cost of credit interest for customers. It is the cost of capital acquisition by banking institutions only on one of the markets, namely the interbank market. WIBOR 3 M rate is then only one of a few elements that have an impact on retail credit interest. Wholesale and retail rates do not have to change in the same direction. Therefore, there is a need for research of changes in the base rate, 3M rate and retail rates for companies and households in commercial banks in Poland’s conditions.

**Figure 1. WIBOR 3M, reference rate and bank interest rates on PLN-denominated new loans to non-financial corporations**

Source: NBP data.
Figure 2. WIBOR 3M, reference rate and bank interest rates on PLN-denominated new loans to households for house purchase

The direction of changes in reference rate and credit interest rate in commercial banks seemed to coincide nearly in the whole examined period. The fall in reference rate was accompanied from the beginning of 2005 by the fall in commercial rates. In turn, when the reference rate grew in 2007 and the first half of 2008, bank rates followed them. Similarly, when in the second half of 2008 and the first quarter of 2009 there were declines in the NBP base rate, commercial banks reduced the money price for companies and households too. The situation changed more visibly in 2010. Although the reference rate was stable, commercial banks eased credit condition for firms in the first three quarters of that year. In the case of PLN housing credits for households no correlation between changes in reference rate and changes in retail rate was even more conspicuous. The PLN housing credit interest rate significantly declined despite the stability of the reference rate. Generally, however, in the dominating part of the examined period the money price followed the interest rate of the central bank. This link of interest rate channel was in principle effective.

Similar results were reached by the NBP Economic Institute\(^1\). According to the research done by the Institute, there was a complete lack of correlation between base rates and retail rates during the crisis of 2009 concerning housing credits and credits for small companies. In the case of other credits, the correlation between rates was retained, however, the time of adjustment was prolonged.

\(^1\) Distortions in the mechanism of monetary transmission resulting from the financial crisis. Has anything changed? What are we aiming at?, IE NBP, July 2010, p. 3.
“...in relation to households consumption credits, the adjustment time went up to 6–7 months (4 months before the crisis). Corporate credit interest follows the monetary market rates, though at a slower pace than before the crisis”.

3. Interest rates in the banking sector and credit dynamics

According to the notion of interest rate channel, the key relation is connected to changes in credit supply and interest rates assigned by financial institutions. Market interest rate level should create debtors’ demand and as a result, loan supply.

Figure 3. Bank interest rates and volume of PLN-denominated new loans up to 4 bln PLN to non-financial corporations

The analysis should deliberately distinguish two basic groups of debtors, namely businesses and households. Either of them could react differently to changes in interest rates. Also, within the corporate group some different reactions to changes in loan fund’s price can be expected. The credit demand may change in different way on the part of small and medium size enterprises (SME) and large ones. There is, however, a methodological obstacle of how to precisely distinguish loans that can be attributed to the SME sector and those within the sector of
The analysis assumes that credit worth up to 4 million PLN was taken out by small and medium sized companies, while loans above 4 million PLN went to large companies. Another methodological difficulty was the problem of how to isolate interest rates for either of the two groups. In this case the methodological difficulties were impossible to overcome. Polish statistical data do not show differences of the interest rates level offered to small firms and to big companies. It is not known whether in macro scale the interest rate for SME credits was on the average higher or lower. The only solution was to assume a uniform, average credit rate for all companies: large, medium and small.

Interest rate channel operation in the SME sector is confirmed by statistical data for 2005–2006 and data pertaining to the period from January 2009 to September 2010. The declines in bank interest rates were accompanied then by a clear rise in the value of loans granted to this sector. On the other hand, the mechanism of monetary impulses transmission discussed above is not confirmed by statistical data for 2007–2008. The rise of the interest rate was not accompanied by the rise in credit value to SMEs. The price of money was not a barrier to slow down the commercial banks’ credit actions. The economic boom and good profitability prospects of business ventures encouraged customers to take out loans despite their rising costs in the period of 2007–2008. The interest rate channel did not work thoroughly.

**Figure 4. Bank interest rates and volume of PLN-denominated new loans over 4 bln PLN to non-financial corporations**

![Graph showing bank interest rates and volume of PLN-denominated new loans over 4 bln PLN to non-financial corporations](source: NBP data.)
The operation of the interest rate channel is not confirmed by statistical data and does not show changes in demand for credit among large companies. In 2006–2009, i.e. the dominating part of the examined period, the rise in the interest rate was accompanied by the rise in the value of credits taken out by them. The level of the interest rate did not deter companies from the banking source of financing business. The mechanism of price monetary impulses practically did not work.

The analysis of the above two charts leads to the conclusion, that SMEs were more sensitive to changes in market interest rate than large companies.

In terms of value, household credits, especially housing credits hold a special significance for the Polish economy.

**Figure 5. Bank interest rates and volume of PLN-denominated new loans to households for house purchase**

![Figure 5. Bank interest rates and volume of PLN-denominated new loans to households for house purchase](image)

Source: NBP data.

The analysis of the direction of changes in PLN housing credits and their interest rates seems to demonstrate well the operation of the interest rate channel in this segment of the banking sector. The direction of change dynamics in both factors involved is evidently opposite. Price reductions in housing credits encouraged people to run into debt with banks for housing purposes. It was the exact opposite when housing credits became cheaper.

All in all, the analysis of the nominal values in question allows us to state that the interest rate channel operated in Poland to a limited extent. The key
issue is the possibility of the credit impact on businesses. Generally, the central bank in Poland had a limited impact on credit demand and possibilities of affecting the real sphere of the economy.

4. Fiscal deficit and bank investment policy

An important cause of the lack of effectiveness of the interest rate channel was an enormous supply of debt securities on the Polish financial market caused by the structural deficit of the public finance sector. The deficit of the public sector increased from 3.7% of GDP in 2008 to 7.9% of GDP in 2010. Public debt is calculated according to the methodology used by Eurostat.

Table 1. Increase in the public sector fiscal deficit, 2008–2010

<table>
<thead>
<tr>
<th>Year</th>
<th>Public sector balance (in % GDP and billion PLN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>–3.7 (–46,889)</td>
</tr>
<tr>
<td>2009</td>
<td>–7.1 (–95,730)</td>
</tr>
<tr>
<td>2010</td>
<td>–7.9 (–110,182)</td>
</tr>
</tbody>
</table>

Source: Finance Ministry data.

In the last three years, the public sector fiscal deficit increased more than twice. The annual growth in supply of debt securities has risen from nearly 47 billion PLN to over 110 billion PLN. In Poland, there has been a structural lack of public finance balance. It must be stressed that in 2007, the deficit of the discussed sector amounted to only 1.7% of GDP.

Table 2. Public sector indebtedness 2008–2010

<table>
<thead>
<tr>
<th>Year</th>
<th>Public sector indebtedness (% GDP and billion PLN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>47.2 (600.8)</td>
</tr>
<tr>
<td>2009</td>
<td>50.9 (684,1)</td>
</tr>
<tr>
<td>2010</td>
<td>53.5 (755,4)</td>
</tr>
</tbody>
</table>

Source: Ministry of Finance data.

The level of indebtedness of the whole sector rose from a little over 600 billion PLN in 2008 to over 755 billion PLN in 2010. The debt rise in the examined period achieved a dangerous level. In 2010, the relation of public debt to GDP amounted to nearly 54% and approached the dangerous border of 55%, i.e. the second threshold of caution depicted in the law on public finance in August 2009. Only due to some shifts in expenditure outside the budget
and including them with the spending of other entities, the indebtedness was artificially reduced. It pertains to spending from the National Road Fund, reduced by the Social Insurance Fund transfers to private Open Pension Funds or using part of the Demographic Reserve Fund by the Social Insurance Fund. If these expenditures were included in the public sector spending as it is done by the European Commission according to international accounting standards ESA 95, the above mentioned factor would exceed 55% of GDP, i.e. the second caution threshold. The relation would probably approach the constitutionally forbidden limit of 60% of GDP. Such a situation would require immediate restoring of a budgetary balance, which is practically unfeasible.

Commercial banks with structural surplus liquidity are important investors in the domestic market of treasury securities.

Figure 6. Bank claims on central government – monthly changes

![Figure 6. Bank claims on central government – monthly changes](image)

Source: NBP data.

Throughout the whole of 2008 and the first quarter of 2009 (except January), there was a growth in bank assets allocated in treasury securities. In December 2008, the purchases of treasury securities achieved an astronomical value of 15 billion PLN. In the following months bank investment policy in this segment of the financial market was changeable. However, in January and September and October 2010 there was a similar purchase wave of about 3.3–6.3 billion PLN.

In Poland, there was a classical phenomenon of the crowding out of the private sector by the expenditure of the public sector. For banks, the purchase of profitable treasury securities was more a competitive alternative of investment of
accumulated funds than credit granting. The interest rate of treasury securities was comparable with the profitability of loans granted to customers with credit risk aversion. In the condition of increased credit risk aversion, investment in state debt securities was the best possible form of investment. The phenomenon of crowding out intensified, especially in the second half of 2008, along with the development of the financial crisis. The portfolio of the bank’s bad loans was growing and encouraging commercial banks to tighten their lending policies in relation to both companies and households. However, the most important reason why credits were replaced by state securities was the extensive supply of treasury bonds with a profitability of about 6% (10 year treasury bonds).

The high profitability of treasury securities favoured the inflow of portfolio capital to Poland. Polish treasury bonds were more profitable than the German 10 year treasury bonds by 3 percentage points. Foreign investment funds, banks, insurance companies and pension societies allocated, on a large scale, the surplus cash on the Polish debt securities market. At the end of 2010 the value of treasury bonds owned by foreign companies amounted to over 120 billion PLN. Additionally, Poland experienced a huge inflow of European Union funds. The inflow of foreign capital resulted in surplus liquidity of the domestic bank sector, which threatened inflationary pressure.

The necessity of rising treasury securities the interest rate additionally caused the appreciation of the PLN exchange rate. The mechanism of the interest rate parity between domestic and foreign monetary markets was exposed. The inflow of the portfolio capital and EU funds to Poland created pressure to strengthen the external value of the Polish currency. The appreciation of the PLN rate of exchange lowered the price competitiveness of Polish exports on foreign commodity markets.

In order to freeze the bank sector transactional liquid funds, excessive in relation to needs, the NBP was forced to increase sales of the central bank bills. During the period 2008–2010 there was an enormous growth in 7-day debt offered at weekly auctions and securities purchased by commercial banks.

The Central bank money bills issue, evidently increased. Their share in bank assets rose from 2% at the beginning of 2009 to more than 9% in the first quarter of 2010\(^2\). In January 2010, the change in the central bank money bills stock accumulated to more than 15 billion PLN over January 2008. This process intensified later in the course of 2010. Let us note only, that the value of a single issue of central bank money bills with seven day maturity reached as much as

80 billion PLN in June 2010 compared to 6 billion PLN in January 2008. In 2011, the supply of NBP bills at every weekly tender is to rise to the average level of 120 billion PLN. Admittedly, their profitability rate are equal to the reference rate lower than the profitability rate of treasury bonds. However, the central bank money bills were an attractive form of investment for commercial banks. It was characterised by a lack of default risk, which in the condition of crisis was an essential feature.

**Figure 7. Commercioal banks holdings of NBP money market bills – monthly changes**

![Figure 7](image)

Source: NBP data.

The issue of the central bank money bills enhanced the phenomenon of the crowding out of private sector expenditures by the public sector. It is puzzling why the National Bank of Poland had to extend the supply bills in the situation of the credit crunch.

It may seem that a smaller issue would make banks ease corporate and household credits. From this perspective, it would be justified to stop issuing NBP bills. In the case of financial surplus liquidity, banks would have to allocate their funds in profitable credit assets due to the cost of their acquisition from customers. However, they did not have to do it in view of the abundant NBP bills supply. Thus, the central bank contributed to the slowdown of credit action in the Polish economy.

However, the NBP monetary policy is not aimed at setting the value of credits in the economy. Its aim is to keep the CPI at the level of 2.5%. The central
bank policy and open market operations are the key tools to achieve it. The task of open market operation is to manage the liquidity of the banking sector in such way as to bring the overnight rate POLONIA maximally close to the central bank reference rate. If the POLONIA rate differs much from the latter, there are advantageous conditions for arbitrage transactions. In such situations, banks take out one-day loans on the interbank market according to a very low POLONIA rate in order to purchase NBP bills for funds acquired in this way, at a much higher interest rate at the level of reference rate. Thus, in order to curb this kind of arbitrage, the central bank has to increase the issue of bills. Freezing the liquidity surplus the from banks’ current accounts in this way, the central bank reduces funds on the interbank market. In consequence, the lower liquidity on this market stimulates the rise in the POLONIA rate. The central bank has to increase the issue of money bills to bridge the gap between the POLONIA and reference rates. As a result, the money bills supply rose from a dozen or so billion PLN in 2009 to more than 80 billion PLN in the middle of 2010.

In order to slow down the above mentioned arbitrage transactions, the reference rate and all other base rates would have to be reduced. However, the central bank interest rate policy has to be subordinated to the inflation goal. Meanwhile, the growing inflation in Poland prevented the central bank from reducing its base rate. This, in turn, forced the central monetary institution to absorb the surplus liquidity through NBP bills issue. The growth in the supply of NBP bills resulted in the growth in supply and interest of treasury bonds.

The enormous supply of NBP bills and treasury bills allowed the banking sector to allocate financial assets at such favourable terms that extending credit actions for the non-financial sector hardly became profitable. The profitability of credit dues did not reach the height as to compensate for the credit risk. The crucial condition to avert this unfavourable phenomenon is to reduce the supply of treasury bonds. And this will become possible when the public finance sector deficit has been reduced, but it does not depend on the monetary policy.

The attempts applied at the end of 2008 and the beginning of 2009 by the National Bank of Poland to stimulate the banking sector credit action proved to be of little avail. There was a credit crunch in Poland. The NBP introduced a “Confidence Package” in order to maintain stability on the money market. Its role was, first of all, to maintain deposit and credit interbank transactions mainly through the additional funding of banks. And this goal was achieved. The extreme situation never occurred on the Polish market, i.e. the activities of the surplus money allocation and granting credits did not cease. This situation took effect on the western markets. However, the stable situation on the Polish market did not result in higher credit activity of banks.
5. Foreign currency credits and risk aversion

The interest rate channel distortions in Poland also resulted from the development of the banks’ credit activity for companies and households i.e. foreign currencies. Foreign markets were an alternative source of funding for domestic companies. Financing on the European foreign markets was especially attractive when the level of the Polish interest rate was relatively high in relation to the price of money on the foreign markets. Polish companies began the process of indebtedness in foreign banks or their suppliers and they took out credit from foreign investors. They also acquired capital issuing commercial bonds on foreign markets. The domestic interest rate could create the demand of business entities for credit taken out only in PLN. Market integration and the liberalisation of financial transactions launched the mechanism for using alternative sources of financing. On the domestic market, the relation between price and demand for loan funds slackened, which was particularly conspicuous in small countries with an open economy, and Poland is included among them.

Figure 8. Non-financial corporations indebtedness on loans and securities issued

The scale of domestic companies foreign financing systematically grew during the period between 2005–2010. While in 2005 foreign corporate credit indebtedness amounted to 113 billion PLN, in 2010 it was nearly 2.5 times
larger and amounted to 276 billion PLN. The growth in indebtedness in the Polish currency within the domestic banking system, in terms of value, was explicitly lower. However, what should be stressed here, is a considerably lower level of domestic indebtedness in relation to foreign ones. In 2010 it decreased by 120 billion. Interestingly, Polish companies have borrowed foreign currency credits in domestic banks also. In recent years its level has been stable, oscillating at approximately 50 billion PLN.

Domestic businesses were not considerably dependent financially on domestic banks, which were concerned especially by large companies. The situation looks different in the SME sector, where the entities were still dependent on PLN credit on the domestic credit market.

The practice of granting credit to households in foreign currencies was developed in Poland, mostly for housing purposes. The interest of this kind of credit was not determined by the level of the domestic interest rate but the price of money in the country of the currency in which the credit was granted. The demand for mortgage credit in foreign currencies depended on foreign interest rates. It gave rise to a paradoxical impact of foreign central banks’ policies on the size of credit creation within the domestic banking sector.

**Figure 9. Share of foreign currency denominated loans in total housing loans to individuals against CHF/PLN exchange rate, NBP rate and SNB rate**

Source: NBP data.
During the years 2004–2010 the share of mortgage credit taken out by households in foreign currencies grew systematically. This share rose in the examined period by nearly 6% and reached the level of 62% of all mortgage credit at the end of 2010. There was a clear connection between changes in the domestic interest rate and changes in the share of the credit structure. The relation was definitely negative. When the domestic interest rates were growing, there was a rise in the demand for individual housing credit taken in foreign currencies. Figure 9 shows another significant interdependence. The share of housing credit borrowed in Swiss franc continued to rise when its rate against the zloty depreciated. This happened during the period of 2004–2008. Then next, during the 2009 – 2010, the share of foreign currency mortgage credit declined as the Swiss franc rate appreciated against the zloty. It should be stressed that among foreign currency credit the Swiss franc housing credit held a dominant position.

The financial crisis and the crisis in the real economy reduced the capacities of companies and households to repay their credit liabilities.

**Figure 10. Bank impaired claims on sectors other than banks and central government – monthly changes (balance sheet gross value)**

![Bar Chart](image)

Source: NBP data.

Figure 10 indicates that 2009–2010 saw systematic growth in lost credit claims in the domestic banking sector. This extreme situation took place in December 2009, when the monthly growth in bad debts reached an astronomical value of nearly 5 billion PLN. Admittedly, in the months to come, the scale was mitigated, but the growth of lost credit assets was distinct and stable. At the
end of March 2010, the value of claims with the confirmed loss of value from
the non-financial sector amounted to 52.1 billion PLN, which meant 6.8% growth
towards the end of 2009 (thus, within only 3 months). As a result, the share of
dues with the confirmed loss of value in all claims raised from 6.5% at the end
2009 to 8.3% at the end of June 2010\(^3\). In the case of household consumption
credits, this share in the discussed period rose from 9.8% to 15.65%. In the case
of corporate credits, the share increased from 9.8% to 11.8%\(^4\). Risk aversion was,
besides crowding out, an important reason for credit slowdown in the Polish
economy and a cause of the ineffectiveness of the interest rate channel.

It appears, that the credit stagnation phenomenon could have been mitigated
by letting the central bank purchase commercial corporate bonds. Transactions of
this sort would be, in fact, a form of direct credit via the central bank. Under the
circumstances of the credit slowdown, this new solution to stimulate the economy
would not create inflation pressure and would not collide with the inflation goal of
the monetary policy. Its effectiveness in Poland would initially be limited because
of the underdevelopment of the commercial bond market. But this transaction
made by the central bank would inject money into the real economy. However,
it is not a new solution. Purchasing debt securities from companies is a normal
practice applied in highly developed countries during a recession.

6. Conclusions

The Interest rate channel includes two crucial links of the monetary policy
transmission mechanism. The first link is the impact of changes in the central bank
base interest rate on interest rates of the banking sector in credit transactions with
companies and households. The second link is the relation between commercial
bank rates and the size of the credit action. The direction analysis of the changes
in the above factors have not confirmed these relations in the Polish economy
during the period 2004–2009. The lack of demand elasticity for credit involved
mainly business entities. It is important, that SMEs should be more sensitive to
changes in the market interest rate than large companies.

The lack of the effectiveness of the discussed mechanism of transmission of
monetary impulses was caused by the surplus of debt securities on the domestic
financial market. It was an alternative form of the bank asset allocation compared
to granting credits. An enormous supply of treasury bonds came from the
structural deficit of the public finance sector. In Poland, there was the classical

\(^4\) Ibid. p. 13.
phenomenon of a crowding out of expenditures of the private sector by those of the public sector.

The growing deficit of the public finance sector enforced higher interest rates of treasury securities. This, in turn, caused a harmful appreciation of the zloty. The mechanism of the interest rate parity between domestic and foreign money markets became conspicuous. The inflow of portfolio capital to Poland exerted pressure on strengthening the Polish currency. As a result, the appreciation of the zloty lowered the price competitiveness of our exports on foreign commodity markets.

A large supply of NBP bills came from the need to keep the level of the POLONIA interest rate as close to reference interest rates as possible in order to prevent arbitrage transactions on the interbank market.

The size of the credit action only depends on the price of credit. The demand for credit is influenced by other factors. It is important what businesses think about the future economic situation and how their funds appear. At present, companies are not very optimistic about the growth of the future global demand, sales and income. That is why they are withholding new investment projects. The companies which are involved in new investment ventures prefer to finance them from their own funds. In 2009 and in the first half of 2010, deposits of business entities in the banking sector grew significantly. The price of credit was in this case of secondary importance. Simultaneously, banks reduced the supply of credits for companies due to the continued risk aversion. The share of bad debts rapidly grew in the banks portfolios. The reluctance to grant credits was not reflected in the increased interest but in toughening other conditions while granting them.

The prerequisite for the higher effectiveness of credit transmission channel is the reduction in the issue of treasury bonds as well as central bank money bills. The central bank has no impact on the budget deficit, fiscal policy and the supply of treasury bonds. Theoretically, the reduction in the issue of bills would result in a stable decline of interbank interest rates and create a risk of exceeding the level of inflation goal. The higher effectiveness of the domestic interest rate transmission channel could prevent banks from granting foreign currency housing credits. This would eliminate the impact of foreign central banks on the size of the credit action in Poland.

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Management on the Edge of Chaos: Challenges of the Petabyte Age

Today, the ‘data nature’ of the business world is significantly changing. Soon, every object (people included) will not only be wirelessly connected to the Net but it will constantly, in real time, actualise data on both its position in space and its status. As a result, our ability to capture, store, and understand huge amounts of data will change business as well as technology, science and culture in general. Because, as Ch. Anderson put it: In the era of big data, more isn’t just more. More is different. For everybody and every company¹. In the next decades, the era of big data, metaphorically denoted in this article as ‘The Petabyte Age’², may bring fundamental innovations and challenges to economy, business, research methodology and organisation of societies providing we develop methods for continuous analysis of massive data sets in real time.

The Petabyte Age, as it is understood in this paper, is not only about data alone although the intense information flow gives it its dominant character. Massive real time data on the behaviour and status of both human and nonhuman objects will affect the Age’s other characteristics such as the short-term nonlinearity and the heterarchic nature of the globally connected system. Heterarchy is a network of elements where each element shares the same “horizontal” (equal) position of power and authority. It is, then, the web of multi connections between individuals, products and organisations challenging all hierarchies, with random access and information symmetry, operating in real time.

The optimistic principle of heterarchy that we tend to disregard in organisational life goes: the more freedom is self-organisation the more order. Its critical paradox is that the freedom and order, the usual management opponents, become partners producing well-ordered, self-regulating, autonomous systems. In heterarchy, there is no need for organisation to get organised. Yesterday’s management was based on an assumption of order being based only on top-down control (regulation). If organisations are Newtonian-type machines, control makes

² A petabyte (PB) is a unit of information equal to one quadrillion (1015) bytes.
sense. If they are process-oriented, then attempting to impose control through rigid permanent structure is suicidal in the long run.

The whole of yesterday’s paradigm of strategic management will have to be redesigned to fit the new business environmental complexity (as defined by complexity and chaos theories) dominated by global connectivity, transparency, peer-to-peer, information symmetry and immediacy.

What is the meaning of those developments for companies? What challenges for their business models will they produce? How is all this forcing today’s companies to re-think their strategies and structures, and more fundamentally – their working paradigms? Those are the questions to be examined here to demonstrate just how the new globally interconnected business world is becoming a wiki platform for a cooperation to build an Enterprise 2.0.

1. The importance of the edges

“I never think of the future, Albert Einstein once observed, it comes soon enough”. Company managements do not have this kind of comfort, though. History is littered with examples of companies that overlooked important trends. At the same time, it is full of examples of companies that were masters in tracking the forces changing the business landscape and using them for their benefits. Today, the biggest business challenge is responding to a world that is not only hypercompetitive but in which the very rules of competition are constantly changing.

While dealing with complex economic, social and organisational systems that operate at the edge of chaos, managers need the ability to pick up subtle changes, even without knowing quite where to look for them, by looking everywhere at once. This is brilliantly described in the “splatter vision concept” used in the FBI for training agents protecting the U.S. presidents at large gatherings. This involves scanning a crowd for would-be assassins by looking into the distance and not focusing on anyone in particular. Splatter vision is a deliberately undirected concentration that allows the prepared mind to detect tiny irregularities like a hand in a crowd moving toward a gun3. In chaotic systems, the future manifests itself at the edges. The hardest thing to do in scenario planning and business strategy design today is to get periphery into the centre of the picture.

McKinsey experts looked at some of the trends emerging at the edges. Here it is what they have found4:

3 For more on splatter vision concept see: http://hbswk.hbs.edu/archive/5329.html
1) The Great Rebalancing
The coming decade will be the first in 200 years when emerging-market countries contribute more growth than the developed ones. This growth will not only create a wave of new middle-class consumers but also drive profound innovations in product design, market infrastructure, and value chains.

2) The productivity imperative in the West
Developed-world economies will need to generate pronounced gains in productivity to power continued economic growth. The most dramatic innovations in the Western world are likely to be those that accelerate economic productivity. If the West is going to grow, we’re not going to have more labour hours to put to work. All of our growth will have to come from productivity improvements. And that is a pretty large step change. In the 1970s, in the US, some 80 percent of its growth came from adding labour, 20 percent from productivity. In the next decade it was 70 percent from productivity, 30 percent from labour. Today, Europe needs to achieve 100 percent from productivity and Japan needs to achieve 160 percent to boost growth and productivity.
We need to identify the levers that it would take to achieve that. If we are not able to do it, say McKinsey experts, we will have to agree to lower growth.

3) The global grid
The global economy is growing ever more connected. Complex flows of capital, goods, information, and people are creating an interlinked network that spans geographies, social groups, and economies in ways that permit large-scale interactions at any moment. This expanding grid is seeding new business models and accelerating the pace of innovation. It also makes destabilising cycles of volatility more likely.

4) Pricing the planet
A collision is shaping up among the rising demand for resources, constrained supplies, and changing social attitudes toward environmental protection. The next decade will see an increased focus on resource productivity, the emergence of substantial clean-tech industries, and regulatory initiatives.

5) The Market State
States need to respond to many stresses induced by globalisation and technology. And this is a difficult challenge. It requires collaboration between government and business to address it.

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5 Ibid.
2. Instability and turbulence

In 2007, Allan Greenspan professed “the end to the age of stable development” and warned, quite rightly as it soon turned out: *The American economy may face recession*. For sure, this new era will not evolve smoothly. Future economic crises including major ones are inevitable. Management theory for the 21st century will have to be invented in real time, as thousands of truly global companies make it up on the run.

There are reasons to believe that short-term instability is becoming a systemic feature of the future global business environment for at least four reasons, each sufficient enough to produce this effect:

1) the ‘network effect’ that is always present in complex systems with a rich network of global feedback loops between multiple elements and agents;

2) the “over-optimisation” of business processes operating in just-in-time mode, with lack of buffers and without waste and slack resources. Paradoxically, over-optimisation in the turbulent environment increases the chance of the system going into crisis;

3) people will always make mistakes, and the mistakes of people in global companies will turn into global mistakes with consequences far beyond the boundaries of the company itself;

4) the increased homogeneity of the economy and business (models, structures, mechanisms, tools, methods, ways of thinking, etc.). Homogeneity harms development of any system, including biological, for diversity allows for creating even more diversity and the further development of the system. E.g., some analysts point to the world wide use by financial institutions of the ‘monopolistic’ Value at Risk mathematical model for risk assessment as the crucial cause behind the financial crisis in 2008 as it gave all firms a false feeling of security.

3. Global transformation: the end of history?

Everybody is asking today: *when will this crisis end?* As it seems, Nassim Taleb (incidentally, a long time critic of the VaR model) was right by noticing that the effects of wars, stock market crises and radical technologies are multiplied just because they disturb our expectations toward the world as an ordered place where the end of crisis means a return to ‘normality’.

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The present crisis, however, seems to be different from the others in the last decades. It is not just a next economic cycle but it looks rather like a major restructuring of economic order. It may have started with turblences in the financial sector but its roots reach much deeper down in the global economic tissue, as the latest developments at different levels of the global economy and politics have demonstrated. Thomas Friedman, in his famous book “The World is Flat” announced the death of distance and the resulting fundamental change in the global management model. In 30 years, he said, we will have gone from ”sold in China” to “made in China” (now) to “designed in China” to “dreamed up in China”. The combined message coming from multiple developments at different levels of the global economy and business inevitably lead to a conclusion that we are witnessing a profound process of systemic transformation of management models, labour markets and economic structures. Could this be a new stage of the industrial revolution?

A century ago, 40% of Americans worked in the agricultural industry; today it is 3%. Some 50 years ago, most of Americans worked in manufacturing; it is approximately 14% now. Today, the majority of them work in services and IT. What will happen next?

In human history, there have been different ‘Centres of the World”: Egypt, Greece, The Roman Empire, France, England, USA/EU. Why would history have to stop now? What would be the new ‘Center’ and the ‘new normality’ in the foreseeable future?

Understandably, the speed of the process may be disorienting to many. After all, it took the Roman Empire almost two centuries to fall; four generations of getting used to it. Some 30 years ago, Ervin Toffler introduced the brilliant notion of the ‘future shock’ that he says is a blinding disorientation caused by the premature arrival of the future. Surprise is, then, the key to management today. The New Economy is the world of surprises and instability. Today, companies must devote even greater attention to more kinds of stakeholders (including the distributed Internet-based audiences), more regulations, and more risks – and watch closely what their customers are tweeting about them.

Even the best market analysts will have, at best, an incomplete knowledge of what comes next. Chaotic systems are plagued by the feature called the predictive hopelessness. The most common statement in business will most likely be: I do not know. And the major managerial question, instead of “when will this the crisis

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end?" should ‘be what will be the next one?’ Stocks will fall as Baby boomers cash out? The brand bubble? The EU’s Euro system falling apart?

3. Only the paranoids survive

Andy Grove, Intel’s long time President, wrote a little smart book called “Only the paranoids survive”. It was his discussion with the popular American attitude: think positive. Today, he says, you should be scared to death, constantly looking for new competitors, new technologies, new consumer values and new global trends. If you are not frightened, you are soon dead. Searching becomes a way of life. In the new economy, in most cases, your biggest competitor will probably come from outside of your sector. How do dominant companies lose their position? They probably pick the wrong competitor to worry about. Accordingly, in the New Economy, sources of innovations are mostly outside of their own sector. The major technology that will change our business will most probably come from outside. The main danger to any company is an inability to see the connection between today’s fiction and tomorrow’s reality.

4. The Global System Goes Chaotic

In October 2006, Fortune magazine devoted its entire issue to the dramatically changing business environment. In conclusion the magazine said: The forecast for most companies is continued chaos with a chance of disaster. The challenge is getting comfortable with it. Complexity becomes the least understood feature of today’s business world. Complexity is a feature of a system in which many elements, independently, affect each other in many different ways. It has several powerful features, such as: spontaneous organisation, adaptive abilities, and it is always balancing on the edge of chaos between stagnation and anarchy.

In the world of predictive helplessness, the skills of selecting and analysing information are becoming more critical than ever. The number and complexity of information is growing exponentially and the time stays the same. Our brain may soon become the major bottle neck in the system of information processing.

Thus, the growing importance of designing efficient interfaces between the world of information and a human being. The problem is not information overload but insufficient filters. New communication senses will be needed in the future to enable people to absorb the enormous mass of information with which they are

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10 A. Grove, Only the Paranoids Survive, Doubleday Business, 1996.
confronted. The user interfaces we use today to transmit information to our brains threaten to create a real bottleneck for new broadband services. The bottleneck is thus our embodied brain, not our capacity to boost cable or wireless connectivity. The design challenge in implementing digital connectivity in an analogue environment lies in creating a working concept of corporal literacy that will inform a design for all the senses, says Martin Rantzer of Ericsson Foresight\textsuperscript{11}.

5. The end of intuition?

This is what Dan Ariely once said on irrationality in this kind of workplace: “One way to think about it is the following: imagine you stand on a field and you have a soccer ball and you kick it. You close your eyes and you kick it and then you open your eyes and you try to predict where the ball fell? Imagine you do this a thousand times; after a while you know exactly the relationship between your kick and where the ball is. Those are the conditions in which intuitions are correct – when we have plenty of experience and we have unambiguous feedback.

That’s learning, right? And we’re very good at it. But imagine something else happened. Imagine you close your eyes, you kick the ball, and then somebody picked it up and moved it 50 feet to the right or to the left or any kind of other random component. Then ask yourself, how good will you be in predicting where it would land? And the answer is: terrible.

The moment I add a random component, performance goes away very quickly. And the world in which executives live in is a world with lots of random elements. Now I don’t mean random that somebody really moves the ball, but you have a random component here, which you don’t control – it’s controlled by your competitors, the weather; there’s lots of things that are outside of your consideration”\textsuperscript{12}.

6. Management in chaos, chaos in management

In 1998, Shona L. Brown and Kathleen M. Eisenhard published their ground breaking book “Competing on the Edge: Strategy as Structured Chaos”\textsuperscript{13}. Competing on the edge of chaos, as they say, is an unpredictable, frequently uncontrollable, even ineffective strategy, that is however the best method of change management today. What it means, however, is that we are doomed to

\textsuperscript{12} https://www.mckinseyquarterly.com/PDFDownload.aspx?ar=2742
\textsuperscript{13} Harvard Business Press, 1998.
unpredictable, uncontrollable and ineffective strategies because today nothing better is possible. It is the very attempt to create ‘perfect’ strategies’ that are predictable, fully controllable and always effective that lead to pathology of both strategies and organisations themselves. As a result, they have become not ambitious enough, with no long-range vision, overregulated and bureaucratic, geared to success at any cost (in most cases by being satisfied with the small but certain) and freaking out easily when failing. The key challenges today are, then: react (destroy) quickly, anticipate, if possible and lead the change when it makes sense.

“Wealth in this new regime flows directly from innovation, not optimization. That is, wealth is not gained by perfecting the known, but by imperfectly seizing the unknown”, says Kevin Kelly in his manifesto book “New Rules for the New Economy” 14. “Imperfectly seizing the unknown” – wouldn’t that be the best definition of entrepreneurship in the new era? Revolution does not happen when a new technology arrives. It happens when business adopts new behaviours.

7. Disruptive technologies, open source and the digital socialism

Each era has its own disruptive (radical) technology considered the major solution to all problems. The previous radical technologies, the ‘waves’, of the computer era were: mainframe computers (1960+), minicomputers (1970+), PCs (1980+), nets and the Internet, distributed data processing (1990+). Each wave brought leaps in productivity and an increase in costs. Each wave elevated the companies that understood the opportunities it was bringing (e.g.: IBM, Microsoft, Yahoo, Google) and destroyed the once that did not (e.g.: Wang Lab., DEC). The next wave is approaching. This time it is not fuelled by a single technology. It is composed of 4 major ‘powers’: the wireless omnipresent broad-band Internet, the cheap, common computer chips (PCs, mobile phones, chips in every product), the cheap and plenty of wireless frequency bands, and the open source mechanism.

Of particular importance is the open source philosophy based on the 3 major principles: common goal, common efforts and common sharing the results. This may well become a new management model for the future. Linux, Wikipedia and the thousands of other open source products are not about market success. The revolution is in the method, and not in the effect. Open Source may well be for mass innovation what assembly line was for mass production. Would this be a beginning of a new era where the collaboration replaces the corporation? 15

In 2008, Kevin Kelly interestingly announced: the New Socialism is coming\(^{16}\). “When masses of people who own the means of production work toward a common goal and share their products in common, when they contribute labour without wages and enjoy the fruits free of charge, it’s not unreasonable to call that socialism. (...)” The new socialism runs over a borderless Internet, through a tightly integrated global economy. It is designed to heighten individual autonomy and fight centralization”, says Kelly. Then, he continues rightly: “In the past, constructing an organization that exploited hierarchy yet maximized collectivism was nearly impossible. Now digital networking provides the necessary infrastructure. The Net empowers product-focused organizations to function collectively while keeping the hierarchy from fully taking over. Wikipedia is not a bastion of equality, but it is vastly more collectivist than the Encyclopaedia Britannica. The largely unarticulated but intuitively understood goal of communitarian technology is this: to maximize both individual autonomy and the power of people working together”\(^{17}\).

“The wiring of humanity lets us treat free time as a shared global resource, and lets us design new kinds of participation and sharing that take advantage of that resource, says Clay Shirky in his latest book”\(^{18}\). He calls the free time a cognitive surplus. The potential impact of cognitive surplus is enormous. Wikipedia was built out of roughly 1 percent of the man-hours that Americans spend watching TV every year.

Ever since the beginning of civilization, people had only 3 organisational tools for any large-scale efforts based at division of labour (specialisation): the markets, with the mechanism of material rewards, the hierarchy, with its threat of punishment for not complying, and the charisma. Now, as it seems, there is the possibility of a 4th model of potentially effective social organisation that is embedded in the very core of open source methodology and philosophy. The future belongs to those companies that can smartly combine yesterday’s hierarchy with today’s open innovation. Distributed co-creation becomes best practice. In the past few years, the ability to organise Web communities to develop, market, and support products and services has moved from the margins of business practice to the mainstream. Wikipedia and Linux were the pioneers. Today, 70 percent of the executives recently surveyed by the McKinsey Institute said that their companies regularly created value through Web communities. Similarly, more

\(^{16}\) K. Kelly, Global Collectivist Society Is Coming Online, WIRED, May 2009.
\(^{17}\) Ibid.
than 68 million bloggers post reviews and recommendations about products and services\textsuperscript{19}.

\section*{8. The Internet of Things}

The Internet of Things is the next logical step in the technological revolution. The first step was about connecting people. Now, it is about connecting also inanimate objects: anytime, anywhere, by anyone and anything. Every object and person wirelessly connected to the Net and constantly, in real time, actualising data on both its position in space and its status. The Petabyte Age is different because more is different, says the above mentioned Ch. Anderson\textsuperscript{20}. The biggest challenge of the Petabyte Age will not be storing all that data. It will be figuring out how to make sense of it. Those will win who sooner than the others recognise this new opportunity, as it is only starting to emerge today.

There is a justified expectation that in the wireless, self-configuring Internet of Things extremely large databases of information will change how we learn things. The traditional way of doing science is to achieve a hypothesis and then collecting data to confirm it. It may turn out that tremendously large volumes of data will allow us to skip the theory part in order to make a predicted observation\textsuperscript{21}.

Google was one of the first to notice this. When you misspell a word when googling, Google suggests the proper spelling. How does it know this? It is not because it has a theory of good spelling. It does not. Instead, Google operates a very large dataset of observations which show that for any given spelling of a word, x number of people say “yes” when asked if they meant to spell word “y.” Google uses the same philosophy of learning via massive data for their translation programmes. They can translate from English to French, or German to Chinese by matching up huge datasets of humanly translated material. E.g., Google trained their French/English translation engine by feeding it Canadian documents which are often in both English and French versions. Not one person who worked on the Chinese translator spoke Chinese. There was no theory of Chinese, no understanding. Just data\textsuperscript{22}.

\textsuperscript{21} Ibid
\textsuperscript{22} Ibid.
In the Internet of Things, the smart enterprises will become full-fledged data laboratories. The goal will be to analyse every transaction and capture insights from every customer interaction, without waiting for months to get data from the field. Companies will have to become experts in big data processing and experimenting to test new products, business models, and innovations in customer experience and to make decisions in real time\textsuperscript{23}.

What does the Internet of Things mean for business? Will it bring a chance/threat for companies and their business models? The Petabyte Age is still only the fuzzy edge of the horizon. But it will move to the centre sooner than we expect. Eric Schmidt, Google, in May 2010, responding to the acquisitions that Google was spying on individuals while developing Street View, said: "As a society, we still haven’t come to the point of knowing what we want to do with all that new technology and what is right”.

9. Preserving/creating the ‘garage mind’

In the contemporary marketplace, most big, new businesses started as a result of years of market research, planning and strategic investments. Venture capitalists and big-money consultants get together with ideas that are based on years of experience and expertise, and they work in order to maximise profits. There are, however, still millions of individual entrepreneurs that start successful companies on their own, single-handedly, out of impulse and based on a single bright idea. They are typically small to medium-sized at best, and they reach their maximum capacity within several years. Then they stop growing or drop dead or unexpectedly turn big, frequently with no apparent reason. Why and how it happens is a powerful question.

In the U.S., the country of innovations and cars, many new technologies, products, business models and great companies were started by passionate ‘nuts’ in their parents’ garages; HP, Apple, Microsoft, Google, Starbucks, eBay, Facebook, Threadless, YouTube, LinkedIn, Nike, Motorola, Harley Davidson, just to name a few. It’s highly educative to study what happened to them (innovations, innovators, companies) later, after they left the garage. What are the challenges, the rivers to cross, on the way from garage to success or even greatness? It is important to study this phenomena as even the “grown up” firms (maybe even them, especially) need the “garage mind” today, in the hypercompetitive chaotic environment. Today, the challenge for every big company, is re-inventing itself

into a fertile platform for setting up, finding and/or supporting ‘inner garages’ in order to become a garage-minded company.

Several great companies are famous for their ability of implanting the garage elements in a ‘grown up’ formal structure, e.g.: Google, with its 20% paid time for new individual projects, excessive number of new products (in Beta) and free company restaurants as new idea incubators, IBM with internally initiated open source projects, 3M Corp. with its innovation culture, Cisco with the elaborate system of “growing” start-ups, and P&G with its ‘Connect and Develop” open innovation strategy.

Great companies are not born overnight, they are grown. Great small companies need to grow into great big companies. They need permission to make mistakes. They need to be able to go unnoticed for a while. They are just like people. This frequent contradiction: creative passion (a garage) or ‘hard, classic management’ (a grown-up company) is superficial. The main problem of garage entrepreneurs and grown up companies is how to maintain the flow of fresh ideas and high level of adrenaline after the company becomes big and enjoys success? Management is almost never about 0–1: good-or-bad, yes-or-no, wise-or-stupid, short time-or-long time, people-or-profit, tradition-or-novelty, etc. Management today is, more than ever, about the necessity of finding the fine line and the right balance between: the hierarchy and spontaneity, the necessary control and space for experimentation, the benefits of standardisation and leaving a space for ‘deviations’, the ‘closed’ and ‘open’ innovation, the useful employees’ integration and protecting the creative “unadjusted”. Most companies clearly have a problem with it.

Formerly, companies based their identity on their history. Today, many of them have to reinvent it and base it on their future. In the Petabyte Age, only the hybrid companies will survive, by being able to combine the two seemingly contradictory organisational formulas: the corporate rigour and the ‘garage’ vigour. One of the things that make a great company today is realising that somewhere on the planet Earth, in some obscure garage, there is a kid desperate to do it better. And he/she will probably do it, as the edge of chaos, apart from being a challenging place to run business, is at the same time a great platform for innovation and growth.

Why some companies made it big, sometimes from the scratch? Why did the thousands of other start-ups not succeed but stayed small or just vanished? Because they spotted the chance on the horizon, that others did not notice, and in the process of development they were able to find the right balance between corporate rigour and entrepreneurial vigour. This is exactly the kind of primary skills that enterprises and people will need to survive on the edge of chaos and information overload.
10. Macroeconomics and management theory re-united?

Managing a company in the global ‘tightly coupled’ business environment dominated by real time big data flow requires much wider competences and more sophisticated skills than yesterday. As this paper intended to demonstrate, the first time in history the macroeconomics and business practice are so close each other. Global trends and crises affect local companies faster than ever. The mistakes and turbulences in a single company may influence the global economies instantly. As a spectacular example, see the cucumber poisoning case in Germany/Europe in June 2011. Management theory alone is no longer sufficient to grasp management. Economics cannot analyse global systems without comprehending how companies are managed. It is time for more inter-disciplinary interactions, more joint research and sharing research methodologies. In today’s ‘chaotic’ organizational systems, specialisation kills understanding.

Bibliography

Internet sources:
1. Introduction

Leaving aside the period of World War II, the recent global crisis is generally considered to be a unique peacetime economic and financial event since the 1930s, i.e. since the days of the Great Depression. As such, it should be then expected to have, as it predecessor had, a long lasting impact on the different facets of social and economic development, public policies included.

The aim of this essay is to analyse this influence and the related challenges on only one dimension of public activities, namely on central banking and monetary policy. In particular, we ask about the shape of the monetary policy when the crisis approaches and reaches its end. Thus, we do not only ask about monetary policy “exit strategies” from the crisis. More importantly, we are concerned about the long-lasting impact that the challenges faced during the crisis might have on the conduct of future monetary policy.

This paper, therefore, covers a very timely and broad topic. As a result some simplifications in the treatment of the subject may be detected by a careful reader. When making generalisations and providing illustrations such simplifications were regrettably unavoidable given the size of the essay and the ongoing nature of the processes under consideration.

For the clarity of the exposition we often use the conventional to a certain extent distinction between the “strategic” and the “operational” dimension (or framework) of monetary policy conduct. The former term refers to the goal (or goals) and methods (e.g. setting intermediate targets, forecasting exercises or communication techniques) applied by the central banks in their monetary
management. The latter term refers to the tools used by central banks in order to achieve their target(s), the crucial one in “normal” times being the interest rate. Its changes are a manifestation of the stance of implemented policy and, thus, are often discussed under both headings (“strategic” and “operational”). We are fully aware of this dichotomy; nevertheless, in the paper we treat interest rate issues mostly as belonging to central banks’ operational activities.

The paper is structured as follows. In the next section we outline the main features of the monetary policy consensus which emerged in the two decades before the eruption of the crisis in the summer of 2007. Against this background in section 3 the developments in the monetary policy area, which have taken place since the crisis started, are very shortly overviewed. Section 4 deals with three issues. First, with the challenges posed to the monetary policy consensus by the crisis. Second, with the problems of exit strategies from the crisis policies. Third, with the challenges faced by central banks when considering issues of their monetary policy strategies to be implemented after the crisis and the related exit strategies are over. Section 5 concludes.

2. Monetary policy consensus before the crisis

However strange it may sound from today’s perspective, in the years preceding the crisis there was a growing conviction among the economics profession that monetary policy, at least in developed countries, was increasingly “a science” based on certain generally accepted principles as opposed to “an art”, i.e. a policy where decisions were mostly based on judgment (Mishkin 2007)¹. This monetary policy consensus was founded on some theoretical concepts, among them the most important being the long-run monetary neutrality, the impact of expectations on policy, the short-run inflation-output trade-off (the Phillips curve)², and – in the field of financial economics – the concept of efficient market hypothesis³.

These theoretical assumptions laid behind the monetary policy consensus. Before going further one has to stress, however, that in practice not all central banks operating in the developed world fully subscribed to its tenants. For example, the European Central Bank’s strategy has been quite distinct from the standard inflation targeting approaches, the most popular monetary strategy

¹ The distinction between “science” and “art” in a monetary policy context is, however, due to Blinder (1998).
² See for example Bean (2007, p. 171) and Bain and Howells (2009, pp. 122 and 222). An elaborate analysis on the theoretical synthesis in macroeconomics of the first decade of the present century can be found in Woodford (2009).
³ For more see Cooper (2009, chaps. 2 and 3) and Roubini and Mihm (2010, pp. 43-46).
concept for nearly two decades before the crisis\(^4\). On the other hand, though, the ECB strategy was usually encompassed by the wider term of “one target, one tool” approach (or “implicit” inflation targeting).

According to the consensus, on the strategic side it was understood that monetary policy\(^5\):

- was the primary tool of demand management, i.e. central banks’ actions were assumed to be more effective in shaping the size of aggregate demand than fiscal actions. Certainly, fiscal policy burdened with social, political and legal commitments is less flexible, and its lags, especially the ones resulting from the decision-making process (so-called inside lags), are much longer than it is the case with monetary policy. Furthermore, the primacy of monetary policy in demand management has increased over time as a result of the rising popularity of floating exchange rate regimes (after the 1990s emerging markets’ financial crises);
- should focus on inflation stabilisation, meaning that when controlling the aggregate demand priority ought to be given to inflation reduction and when (or if) this was achieved – to price (or monetary) stability (usually meaning an inflation rate of approximately 2%). Inflation, especially of higher rates, was considered to be undesirable as it involved well-known costs, i.e. it reduced social welfare (Bofinger 2001, chap. 5). Despite formally targeting only inflation, however, lower volatility of output fluctuations was also considered to be beneficial as evidenced by the concept of flexible inflation targeting and the fact that central banks usually implemented such flexible versions of the strategy under discussion;
- despite the widely shared view (following Friedman (1963, p. 17)) that inflation is ultimately always and everywhere a monetary phenomenon and concentration on price stability, monetary and credit indices were – paradoxically – marginalized in central banks’ policy. Their monetary policy models typically featured very rudimentary financial systems\(^6\) or simply did not include money and credit or other variables describing the situation in financial markets\(^7\);

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\(^4\) According to the IMF during the 1990-2007 period 29 countries (both emerging markets and developing ones) formally implemented inflation targeting (Roger 2009).

\(^5\) This list of principles guiding the strategic dimension of monetary policy before the crisis is based on Bean (1997, pp. 171-176), Bain and Howells (2009, pp. 122 and 222), Mishkin (2007) and Stark (2010). On the origins of the monetary policy consensus, both in theory and practice, see Goodfriend (2007).

\(^6\) See for example Goodhart et al. (2009), White (2009), IMF (2010a, p. 21-22) and ECB (2010b, pp. 138-145).

\(^7\) This was due to the fact that such models were to a large extent based on so-called New Neoclassical Synthesis (its most important assumptions are being discussed in this section), which basic model did not take into account money, and financial markets and intermediaries (Bludnik 2010).
• the emphasis on price (monetary) stability meant that in practice less prominence was given to financial stability issues. After the emerging markets’ financial crises of the second half of the 1990s these issues were widely regarded as crucial, or at least important, for central banks. This was, among others, visible in the incremental publication of financial stability reports. However, in practical day-to-day policymaking, financial stability requirements were given secondary importance in the sense that it was implicitly assumed that monetary stability should also result in the maintenance of financial stability (IMF 2010a, pp. 5–6; Bini Smaghi 2011). This disregard to financial stability was also clearly visible in the US Federal Reserve’s “cleaning-up strategy” (sometimes described in financial jargon as “Greenspan’s put”), which assumed that the asset price bubbles should not be pre-emptively pricked through interest rate increases, but allowed to burst freely; only afterwards central banks should intervene (by lowering interest rates) in order to help financial markets to recover (White 2009);

• the role of expectations’ management by a central bank in achieving monetary stability was strongly emphasised. Indeed, it was even stated that “not only do expectations about policy matter, but (...) very little else matters” (Woodford 2005). Consequently, in order to effectively manage inflation expectations central banks had to be credible, which in turn called for their independence (i.e. decision making autonomy), and transparency in monetary policy conduct.

On the operational side, the above principles were supplemented by the following ones, sometimes labelled as “the new view” (Bindseil 2004, pp. 248–252):

• the short-term interbank rate should act as the operational target. Independently of the details of monetary strategy in place central banks have used such rates, usually the shortest ones, i.e. overnight rates, to shape the stance of their policies. Thus, in some contexts, the targeted rate has been characterized as “the” monetary policy instrument;

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8 One of the important reasons for this was the lack of commonly accepted definition of “financial stability”. See for example Schinasi (2004). Simplifying, it can be said that there are two basic approaches to this concept. The first one equalizes the absence of a financial crisis with financial stability. The second, points out that under financial stability the financial system performs fluently its functions, even if it is hit by different types of shocks. Thus, in light of these approaches, financial instability means simply a financial crisis or such a malfunctioning of the financial system that it is unable to perform properly its functions, especially the intermediary one.

9 Consequently, the above mentioned financial stability reports did not identify properly the threats emerging on financial markets and did not highlight the forthcoming stresses (for more on this see Davies and Green 2010, pp. 61–67).
• to influence the rates central banks have used actively open market operations, in the form of repurchase agreements on securities (repos) and reverse repurchase agreements (reverse repos), and standing facilities (or at least a borrowing facility). Reserve requirements, if in place, have been used passively, i.e. reserve ratios were held constant; their role being to create demand for reserve money and (under the averaging system) stabilise it. All in all, under “the new view”, in the context of central banks’ operational activities, liquidity management became underappreciated vis-à-vis the short-term interbank rates setting (Kroszner 2010).

The seven listed principles of monetary policy conducted formed a common approach followed by the most developed world central banks before the crisis struck. A few observations can be made at this stage.

First, the above characteristic describes to a large extent the practice of inflation targeting or – more broadly – of an approach to monetary policy conduct often called “one target, one tool” strategy, the target being inflation, while the tool being the interest rate. Let us remember again that this practice is varied across countries. We have already mentioned the ECB’s strategy as not fully compatible with the standard description of inflation targeting strategy. Now we can add the example of the US Fed, which by law is required to target both inflation and unemployment (the so-called “dual mandate”). Nonetheless, the outlined principles describe the general consensus shared by monetary policymakers as well as monetary theoreticians and analysts in the years leading to the crisis.

Second, the existence of this consensus does not imply that before the crisis opinions were not voiced signalling the weaknesses of this approach. Leaving aside the non-mainstream economics (as, for example, the post-keynesian stream of thought), it is worthwhile stressing that even economists from the international public sector pointed out that pursuing monetary stability might be at the cost of financial stability deterioration. Further research confirmed this conjecture (Frappa and Mesonnier 2010).

Third, despite the declared medium-term focus of the “one target, one tool” approach, in particular by the standard inflation targeting strategy, in practice central banks had a tendency for fine-tuning short-term objectives when implementing it (Bini Smaghi 2011). This was a direct result of relying to a large extent on real-time variables subject to deep revisions, e.g. output gaps and related measures (for example reflecting conditions on the labour market). Consequently,

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10 See papers penned by economists from the Bank for International Settlements in Basel (for example Borio and Lowe 2004; White and Borio 2004).
monetary policy decisions based on such variables tended to destabilise the situation, particularly when monetary policy was too accommodative, which in turn called for the further fine-tuning of central banks’ actions\textsuperscript{11}.

Fourth, the implementation of the monetary policy consensus proved apparently successful and the two decades to the crisis were even labelled as “the golden years of central banking” (Gerlach et al. 2009). They coincided with the situation known as the “Great Moderation” – during the 1990s and until 2007 in major developed countries (mainly, but not only, in the US) relatively strong growth was accompanied by declining inflation and price stability coupled with lower than in earlier decades variability in output and inflation. Of course, this very unusual period in economic history did not result from monetary policy actions alone. Although its causes have not been satisfactory researched yet, it is probably safe to say that it was at least stimulated by the regulatory and structural reforms of the last two decades of the XXth century and the first years of the following one, of which the emergence of the above described monetary policy consensus was an important component (see also Ingves et al. 2010).

3. Monetary policy and the crisis: A bird’s eye view

Despite successful inflation control in developed countries, excessive credit and monetary expansion, which originated in the late 1990s, was the main underling reason behind the growing financial imbalances (White 2009; Borio 2011). They resulted in financial instability that became the essential component of the crisis that broke out in August 2007. Clearly, achieving monetary stability was not sufficient to maintain financial stability.

The crisis led to economic policy responses virtually all over the globe. This also refers to central banks. As it is usually the case during greater episodes of financial and economic turmoil, the challenges faced by monetary authorities created a situation in which their policies became again much more an art than a science.

In this section we very shortly sketch the central banks’ responses to the crisis. Initially, we deal with their operational level decisions, since in the first instance they reacted to the emerging threats by using the available tools and – equally, if not more importantly – by creating new ones. Afterwards we switch to the strategic issues where first developments appeared only more recently; as a matter of fact central banks’ strategic choices resulting from the crisis still have to fully materialise.

\textsuperscript{11} On the US experience see Orphanides (2003a, 2003b).
3.1. Operational issues

The emergence of the financial turmoil led to additional liquidity provided to central banks’ operations and to reductions of their interest rates. Although there were important exceptions (e.g. the ECB started reducing rates only in October of 2008), the process had already begun in the late summer of 2007 when the Fed commenced cutting its rates. At the turn of 2008/09 and in the first half of the latter, depending on the country, this sequence of interest rate reductions finished as they approached the zero level. See Figure 1.

Figure 1. Major central banks’ policy interest rates, 2007 – mid-February 2011

![Figure 1](image-url)

Note: The Figure shows headline policy rates, which might have been misleading during the crisis. For example, changes in the ECB’s open market operations (the switch from variable rate tenders to fixed ones with full allotment) led overnight market rates to be much closer to the deposit rate, i.e. making the latter a de facto policy rate. In May 2009, when the main refinancing rate was set at 1%, the deposit rate of the ECB was already at 0.25%. It must be also remembered that the Fed (in December 2008) redefined its headline policy rate as between 0% and 0.25%, while the Bank of Japan (in October 2010) set it in the range of 0% and 0.1%.

Source: Websites of the central banks referred to.

This policy rates evolution has been accompanied by liquidity management actions which have been generally labelled as “balance sheet policies” (Borio and Disyatat 2009) or, in central bank parlance, as “quantitative” or “credit easing” policies. They encompassed a series of decisions, differing in details among central
banks, whose common feature has been the expansion of their balance sheets above what was necessary to implement interest rates of almost zero percent in the interbank money market (White 2009). Consequently, liquidity management stopped being subordinated to the interest rate policy.

These decisions involved many different actions, non-standard measures or unconventional instruments, the most important being the maturity extension of open market operations, changes in standing facilities, broadening of the eligibility criteria for collateral and widening of the range of counterparties as well as outright purchases of securities, securities lending programmes and swap lines\textsuperscript{12}. Central banks have not only provided liquidity to money markets but also to capital markets, thus, expanding their traditional function of lender of last resort to what can be labelled as “investor of last resort” (Roubini and Mihm 2010, pp. 153–154). However, despite this wide range of new instruments it was observed that central banks’ actions showed rather convergence than divergence (Pikkarainen 2010). Obviously, the common result was a strong expansion of central banks’ balance sheets as evidenced by Table 1\textsuperscript{13}.

\begin{table}[h]
\centering
\begin{tabular}{|l|c|c|c|c|c|}
\hline
\hline
Euro area (1) & 10.7 & 31.1 & 37.6 & -8.3 & 65.5 \\
Japan (2) & -22.2 & 0.6 & 9.2 & -1.7 & 8.1 \\
Switzerland & 2.6 & 13.5 & 68.9 & -3.3 & 85.4 \\
United Kingdom (3) & 26.2 & 26.9 & 71.1 & 47.4 & 217.2 \\
United States & 3.1 & 4.7 & 145.5 & -0.5 & 155.9 \\
\hline
\end{tabular}
\caption{Major central banks’ balance sheet size changes, 2006–2009 (in percent)}
\end{table}

Notes: (1) In the period under consideration the Eurosystem’s balance sheet was also increased in size as a result of the expansion of the euro area: in 2007 Slovenia joined it, in 2008 – Cyprus and Malta, and in 2009 – Slovakia; (2) Data refers to fiscal years ending on 31 March the following year (e.g. data for 2009 refers de facto to 31 March 2010); (3) Data refers to consolidated balance sheet as of 28 February the following year (e.g. data for 2009 refers de facto to 28 February 2010).

Source: Annual reports of the central banks are referred to (as posted on their respective websites).

\textsuperscript{12} More on this see in Gerlach et al. (2009, pp. 90–92) and Pikkarainen (2010). It should be added here that in some countries, but not among the developed ones, reserve requirement ratios were also changed. For example, China, India, Russia, Brazil and Poland reduced these ratios and subsequently increased them. It must be stressed, however, that the first three of these countries do not operate under the inflation targeting framework.

\textsuperscript{13} It is worthwhile stressing the two extreme cases in Table 1: Japan and the United Kingdom. The size of the Bank of Japan balance did not change much since the Bank increased it considerably in earlier years because of its attempts to combat deflation and stagnation. In the case of the Bank of England the expansion of its balance sheet was very strong, due to the rise of the balance sheet of its Banking Department (Issue Department’s balance sheet is much smaller and more stable). Since the former reflects more directly the Bank’s effort to stabilise the financial system, we can mention that its size increased by 466.8\% (!) in the time span of 2006–2009.
3.2. Strategic issues

As it was already suggested, so far the crisis had above all an impact on the operational dimension of monetary policy. No major official changes in monetary strategies or central banks’ legal frameworks had taken place, although there have been important hints suggesting that such changes are about to come. We are still only at the beginning of the process of reshaping the strategic aspects of monetary policy.

Some facts related to the latter monetary policy’s dimension are worthwhile mentioning, nonetheless. First, let us refer to the case of the Bank of Iceland which in 2008 suspended the implementation of inflation targeting (Gudmundsson 2010), leading to the reflection that the orthodox execution of such strategy is not suitable under the circumstances of deep financial turmoil.

There are, however, other indications, confirming that serious discussions of a more constructive nature on central banking strategy are taking place. This has been clearly evident recently. In June 2010 the UK’s Chancellor of the Exchequer announced the government’s intention to introduce new arrangements in financial regulation which should expand the Bank of England’s powers in both macroprudential policy and microprudential supervision, putting the bodies responsible for them in Bank’s structure14 (Sants 2010; Bailey 2011); although they will be separated from the Monetary Policy Committee, their work is expected to have an impact on monetary decisions. In September of the same year the Reserve Bank of Australia was officially required to incorporate financial stability issues into its policy mandate (RBA 2010)15. The ECB is discussing its strategy too, although it is assuming the existing legal and conceptual framework (Stark 2010; Bini Smaghi 2011); on the other hand, however, one cannot observe that the new EU financial stability architecture which started at the beginning of 2011 assumes greater ECB involvement in financial stability matters. Without any attempt to exhaust the catalogue of changes and proposals let us finish this list by mentioning that the National Bank of Poland in its yearly monetary policy guidelines has been increasingly stressing the role of financial stability factors in achieving price stability16.

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14 It should be remembered that until 1997 banking supervision had an important place in Bank’s organisational structure and policies.

15 It is worthwhile stressing here that at the end of September 2009 already 17 out of G-20 central banks enjoyed laws explicitly stating that financial stability was their objective or task (IMF 2010a, p. 40).

16 In the NBP Monetary Policy Guidelines for 2011 we can read that “The global financial crisis has shown that in order to ensure long-term price stability factors related to financial system stability should play a more pronounced role in monetary policy than to date. Inflation targeting enables the pursuit of such a policy while providing support for the regulatory and supervisory policies addressed to the financial sector.” (NBP 2010, p. 4)
This quick, and definitely superficial overview, clearly shows that both operational and strategic issues remain an important, open challenge for central banks. The next section discusses them, together with other challenges facing central banks and their policies in the years ahead.

4. After the crisis: Challenges for monetary policy

As a rule, major financial and economic crises resulted in an acceleration of central banking development and monetary policy innovations. Let us only recall that the US Fed was created as a result of bank panics culminating in the events of 1907, continental European hyperinflations after World War I led to policies based on new premises and to central bank reforms, while the Great Depression and subsequent events brought another deep redefinition of monetary policy (central banks were frequently nationalised and their policies became subordinated to governments’, deposit insurance was created, and on the operational side reserve requirements became a new tool while the role of open market operations gradually increased).

By the same token one should expect that the recent crisis will have an impact on central banking, monetary policies and ideas underlying them. In fact, some authors argue that a new era in monetary management is about to come (Goodhart 2010; Lamfalussy 2011; Borio 2011). Accordingly, in this context of the impact of the crisis, we deal below with challenges that monetary authorities are facing. They are collected in three groups linked to: (i) the modifications in economic thinking and in the monetary consensus, (ii) the exit strategies, and (iii) the longer-term, and thus of a more durable nature, the impact of the crisis on monetary policy.

4.1. Challenges posed to the monetary policy consensus

Although still not fully perceptible the crisis is having an impact on economics and finance, or more precisely, on the standard mainstream thinking underlying the pre-crisis monetary policy consensus. This should have been expected, since – as noted some time ago – “Monetary theories arise out of monetary disturbances” (Hicks 1967, p. 157).

In section 2 we have mentioned four theoretical concepts underpinning the pre-crisis consensus: the long-term neutrality of money, the role of expectations in policymaking, the short-run trade-off between inflation and output (or unemployment), and the efficient market hypothesis. Without going into details and pretending to exhaust the topic, let us mention that some of these ideas were lately questioned again.
The concepts of long-run monetary neutrality and short-term Phillips curve as a matter of fact refer to the same issue. In the past, clearly before the monetary policy consensus emerged, these ideas were also subject to heated debates which recently reappeared again as illustrated for example by the work of Akerloff and Schiller (2008). More importantly, the efficient market hypothesis was strongly criticised on theoretical grounds (for example as implied by Minsky’s financial instability hypothesis (Minsky 1986/2008); see also Woolley 2010), by financial markets’ practitioners (Cooper 2009), and by many economic policy analysts (for example White 2009; IMF 2010a, p. 7; Roubini and Mihm 2010, pp. 40–43). Behavioural finance and related concepts have gained increasing attention instead. In short, the efficient markets hypothesis was challenged by concepts stressing financial imperfections and frictions, and the observations that “a financially advanced economy is structurally unstable” (De Antoni 2007, p. 174) and “liberalized financial systems seem to be inherently procyclical” (White 2009).

All these criticisms (and the positive proposals) mean that in the wake of the crisis central banks and their policies have been facing challenges resulting from changes in their underpinning theoretical beliefs. As could be expected, however, due to the need for a quick policy response, the crisis in the first instance and above all dented the monetary policy consensus. In particular, the following points should be stressed:

• under the new circumstances the idea of monetary policy as the primary tool of demand management has been questioned. Its effectiveness clearly declined as evidenced by the facts that policy interest rates approached zero levels and – indirectly – by the development of governmental programmes aiming at institutional and microeconomic fundamentals of financial systems and the ensuing large fiscal expansion. Once again, the asymmetric effectiveness of monetary policy is nothing new; during the Great Depression debate it was implied by the Keynesian concept of the liquidity trap and the observation that during downturns relying on monetary policy actions to counteract them was like “pushing on a string”;

• there have been attempts to redefine and supplement the “one target, one tool” strategy (explicit and implicit inflation targeting). To redefine – in the sense that it has been definitely confirmed that in

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17 Of course, this expansion also resulted from other factors, mainly from the mechanics of automatic stabilisers embedded in the fiscal sector and additional attempts to stimulate aggregate demand. In 2009 the overall world fiscal imbalance (as a percent of GDP) reached 6.8% (in 2007 it was merely of 0.4%), the main deficit countries being the US (12.9%), the United Kingdom (10.3%), and Japan (10.2%). The euro area fiscal deficit apparently reached its peak in 2010 at 6.7%. All data quoted from the IMF (2010b, p. 3).
New Challenges after the Crisis: A Monetary Policy Perspective

practice achieving monetary stability also means avoiding price declines (deflation)\textsuperscript{18}. While discussing monetary strategy issues an important suggestion was that price stability might be understood as inflation rate above the usual 2\%\textsuperscript{19}. To supplement – in the sense that monetary policy must pay attention to financial stability as the latter is ultimately an important prerequisite for achieving monetary stability. As shall be discussed later on, a new monetary policy consensus encompassing the idea of “pre-emptively leaning against the wind of financial markets procyclicality” has emerged;

- **the overnight rates stopped to be the only factor shaping the stance of monetary policy.** The expansion of central banks’ balance sheets, signalled in the previous section, resulted to a large extent from the introduction of (or better to say the return to) outright purchases of securities, i.e. transactions without specified maturities. These in fact outright open market operations have had an impact on longer-term interest rates. Moreover, they were accompanied by the expansion of refinancing facilities and in some countries (however, as mentioned not the developed ones) by changes in reserve requirement obligations. Thus, **during the crisis the stance of monetary policy has been shaped not only by the very short interest rates but also by longer rates, and by changes in other central bank instruments.**

The adoption of unconventional instruments implies that when the circumstances markedly improve they might be abandoned and the operational framework may return to the pre-crisis consensus form. It could also be argued that the changes made in the strategic framework might be reversed as well. These issues lead us now to discuss first the short-term challenges, mostly linked to the so-called exit strategies, while afterwards we switch to more longer-term oriented questions.

### 4.2. Exit strategies

At first glance it may seem quite obvious that the economic recovery and the return of stability to financial markets should lead to the withdrawal by central banks (and also other public institutions) from policies conducted during the crisis. Therefore, the problem of how to exit from the crisis policies emerges.

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\textsuperscript{18} As, for example, it was implied by the concept of price level targeting, particularly, when a central bank was expected to aim at a constant price level.

\textsuperscript{19} Blanchard et al. (2010) even talked of about a 4\% inflation target. This proposal was, however, bluntly rejected by the central bank community (Stark 2010; Weber and Hildebrand 2010; Bini Smaghi 2011).
No doubt, in the short- and most probably medium-term this is the crucial challenge for central banks, especially those which implemented large unconventional monetary policy programmes (as did the US Fed, the ECB or the Bank of England). By no means is this not an easy task – in 2010 both the Fed and the ECB made unsuccessful attempts to exit from crisis policies\textsuperscript{20}.

Thus, exit strategies are an issue for the major central banks of the developed world. Why is this so? The easiest answer is simply to observe that in 2010 the crisis was not over yet, especially its financial component, and – consequently – it was too early to start an exit from crisis policies\textsuperscript{21}. Undoubtedly, this is to a large extent a correct interpretation, which at the same time, with the benefit of hindsight, validates the opinion that despite on average positive world economic growth the financial crisis at that time had not been finished.

Having said that, however, it has to be stressed that the concept of exit strategy in itself creates important problems and challenges. Above all, if you exit from something you should know where you are heading. At the time of writing this essay (February 2011) this is not that obvious. Many issues referring both to the strategic and operational dimensions of central bank activities are still being debated. We discuss them in more detail in the next sub-section; however, it can already now be hinted that the return to all principles of the pre-crisis consensus is rather doubtful.

Leaving this subject (temporarily) aside two other important challenges must be signalled. First, the timing of the start of the exit. Second, its speed.

The first challenge has already been a major problem as confirmed by the above mentioned unsuccessful attempts to exit from crisis policies. Although we attributed them to the fact that at that time the crisis was not yet over, there are other issues at stake here. The ideal timing to start an exit strategy, i.e. to start closing the crisis programmes by selling the different types of assets purchased and – consequently – change the market interest rates, should take into account two dangers: (i) for financial markets stability that might result from the assets’ sell off and (ii) for inflationary expectations development (White 2009). On the one hand, the exit could be premature leading to further problems. On the other hand, it is also important to take into account that very low interest rates should not be maintained for a time longer than needed, especially given

\textsuperscript{20} On their announcements see Bernanke (2009) and ECB (2010a).

\textsuperscript{21} It should be stressed, however, that in 2010 some crisis programmes ended (for example, the Eurosystem’s covered bond purchase programme). It is also worth noting that already in the course of 2009 the size of some major central banks’ balance sheets slightly declined (see Table 1).
the fact that rates have been already low for an extended period of time and such rates involve some non-inflationary costs as well\textsuperscript{22}.

The second challenge, i.e. the speed of exit, involves the same problems as the earlier one; but, there is one more factor to be considered. Namely, as convincingly stressed by White (2009), the question is \textbf{whether central banks have the technical skills to reverse the expansion of their balance sheets as rapidly as they would like to}. In other words, will they be able to set the prices of assets in such a way as to achieve a pace of exit that will not result in the dangers mentioned when the timing of the exit was discussed?

Data published in the first two months of 2011 has shown that in many countries inflation has been on the rise. To a large extent this was due to food and oil price increases, i.e. to factors usually not related to domestic central bank policies\textsuperscript{23}. Nonetheless, in order to avoid the rise of inflation expectations and the appearance of so-called second round effects, central banks may be additionally motivated to increase interest rates and accelerate the closure of other crisis programmes while the state of the economies and their financial markets continues to be fragile. Thus, monetary policy-makers face at present the following dilemma: \textbf{should they speed up the withdrawal from crisis policies to control inflation, risking the growth prospects and opening the possibility of a new wave of destabilisation in financial markets?}

These are very serious problems which pose great challenges to central banks. There are, however, also other exit strategy questions as, say, \textbf{what to leave from the non-standard measures and which of them may gain a permanent status} (Pikkarainen 2010). For example, the IMF (2010a, pp. 26–27) notes in particular that expanded collateral, a wider range of counterparties, and liquidity absorbing tools (central bank bills, remunerated central bank deposits) should be maintained after the crisis.

In the longer run, however, the crucial issue is that of the future monetary policy framework, mostly its strategic dimension. Below we turn to this subject.

\textbf{4.3. Longer-term impact on monetary policy}

Clearly, the main challenge for economic policy in general, and monetary policy in particular, is the creation of a new policy framework that, on the one hand, will allow for strong and stable economic growth coupled with monetary stability,

\textsuperscript{22} As, for example, making it more difficult to assess properly financial risks, inducing a search for yield or delaying balance sheet adjustments. See BIS (2010, chap. 3).

\textsuperscript{23} But they might be due to the global lax monetary stance which originated during the crisis (Borio 2011).
while, on the other, will allow the prevention, or at least mitigation, of the probability of future economic and financial crises. Taking into account these requirements the implication is that **the new policy framework should only to a certain extent rely on the pre-crisis monetary consensus.**

It is our understanding that **the very basic principles of inflation targeting have to be maintained.** Central banks should continue providing the nominal anchor, in the form of price stability, to the economic system. On the strategic side of monetary management, central banks’ mandates ought to continue emphasising inflation control. Since modern monetary systems are credit-based, on the operational side interest rate control should in principle be of key importance. Together with inflation expectations’ control it should allow for anchoring inflation.

This said, it must be emphasized nonetheless that the crisis has shown that traditionally understood inflation targeting strategies (“one target, one tool” approaches) have been too narrow. It means that their practical implementation resulted in the omission of factor(s) that ultimately also had an impact on price stability. Under the credit-based monetary system, financial stability is such a factor. Thus, **successfully incorporating financial system’s considerations in the traditional inflation targeting approach is the main challenge in the creation of a new, more robust monetary policy framework.** Some call the resulting strategy as “IT+” (Wolf 2009). Others – more correctly – prefer the broader term of “new macrofinancial framework” (White 2009), in which monetary policy is but one, albeit crucial, component providing stability, both monetary and financial.

Before we go further into proposals concerning different aspects of the new monetary policy framework, let us point out to another important challenge ahead of central banks, which may actually impact any type of policies implemented. As we recall from section 2 the management of expectations and the resulting need for central bank independence have been among the cornerstones of the pre-crisis consensus. Policies implemented during the crisis, nonetheless, resulted in factors that threaten central bank independence and, consequently, monetary policy credibility.

This is for several reasons. Above all, the volume of treasury securities issued in order to finance fiscal stimuli makes governments more interested (than in the case of a lower public debt) in interest rate setting. Other factors challenging central bank independence can be mentioned too. They result from different legacies of the crisis (such as bank resolution problems, the issue of the proposed bank tax, etc.) as well as from the introduction of the new policy framework – discussed below – that will call for more interactions with the
government (Goodhart 2010; Lamfalussy 2011; Borio 2011). Before moving forward into the latter issue let us stress that one of the positive experiences of the pre-crisis period was that central bank independence and expectations’ control were important factors that increased the quality of policymaking. Thus, the new policy framework must be characterised by the preservation of central bank independence to the extent that was the case before the crisis.

As already suggested, the discussions on the new central banks’ policies have led to the conclusion that the role of financial markets’ developments must be taken to a larger extent than it used to be the case during the pre-crisis period. Several major challenges emerge in this context, nonetheless. They deal with:

• the conduct of interest rate policy,
• the problem of identifying potentially dangerous bubbles and the costs involved when leaving the bubbles to develop freely versus the costs of pricking them in advance,
• the available tools, and
• the coordination of monetary and macroprudential policies with regulatory and supervisory (i.e. microprudential) policies.

As relates to the conduct of interest rate policy the crucial issue is about its response to the inherent instability of modern financial systems, which – as sometimes suggested – may probably further increase over time. Given such possible developments and, above all, the pre-crisis experience, a new consensus seems emerging, stressing that monetary policy should be tightened pre-emptively during credit market upturn and not only eased during its downturn. Thus, a policy of pre-emptively leaning against the wind of credit pro-cyclicality should be implemented, preventing unsustainable credit expansion and its consequences (the development of different sorts of asset price and/or debt bubbles). In practice, it means that interest rates during the credit expansion should be higher than they would have resulted only from forecasted inflation dynamics or Taylor-type rules (White 2009; Stark 2010; Ingves et al. 2010; Bini Smaghi 2011).

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24 See also for example Gerlach et al. (2009) and IMF (2010a).

25 White (2009) mentions three groups of factors contributing to this development: structural changes in the financial system (securitization, globalization, consolidation), fair-value accounting, and the pro-cyclicality of Basel II arrangements.

26 As mentioned earlier, in particular the US Fed since late 1980s followed policies allowing for credit expansion (the boom) that were succeeded by pre-emptive easing during the downturn (the bust). To some extent the same can be said about the ECB, which ignored the reference value (of 4.5%) that it set for yearly monetary expansion.
The question of identifying potentially dangerous bubbles is clearly a major cognitive subject. Among others this is because not all the bubbles are equal and some of them burst without damaging the economy whilst their development may bring gains in terms of economic growth (Posen 2010). Clearly only pricking in advance bubbles that might lead to economic or/and financial collapse makes sense. Hence, making an ex ante distinction between “dangerous” bubbles and “safe” ones will be a major challenge for central banks when implementing the above mentioned pre-emptive policies.

This leads us directly to the question of costs involved when leaving the potentially dangerous bubbles to develop freely and the costs involved when pricking them in advance (e.g. by rising the interest rate to such an extent that it damages economic development). Given that there are different varieties of bubbles with different characteristics concerning the timing and their negative impact on the stability of financial markets, central banks will find it difficult to estimate the net cost (or benefit) of their pre-emptive actions. Therefore, central banks’ attempts to determine such net cost/benefit will become another major challenge, contributing – with the already discussed challenges – to decisions based to a large extent on judgment and discretion.

The issue of available tools involves two sets of problems. The first one deals with the question of measures or indicators to be used to gauge the extent of financial imbalances. The second one stems from the fact that preventing such imbalances requires not only above mentioned policy of leaning against the wind, but also macroprudential policies that must be supplemented by regulatory and supervisory decisions, i.e. microeconomic actions.

The size of financial imbalances can be evaluated using measures referring to values that are considered “usual” in “normal” times, for example by averaging their values over time and obtaining “reference values”. This could be the traditional deviations of credit and monetary aggregates from a trend that exceed a given threshold, and price-earning or price dividend or loan-to-value ratios (Stark 2010; Papademos and Stark 2010, pp. 315-320) as well as so-called early warning indicators often used in international contexts (see for example Goldstein et al. 2000, chap. 8).

More challenging is the issue of regulatory and supervisory policies supplementing traditional monetary actions. Monetary policy instruments alone cannot be the only tools used to control the boom-bust cycle as demonstrated by the pre-crisis and crisis experience27. Hence, traditional central

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27 One important argument used against increasing interest rates to stop developing bubbles in the US was that to achieve this, rates ought to be increased to levels that would have damaged the real economy.
bank policies and instruments must be complemented with macroprudential policies, i.e. policies focusing on systemic risks and based on instruments that take into account the “health” of financial markets and institutions as a sector (IMF 2010a, p. 13). To achieve this, microprudential tools (such as liquidity or capital requirements) have been expanded to the whole or parts of the financial system and linked with cyclical developments turning them into macroprudential instruments (as for example did Spain with its dynamic provisioning initiative). Although some work of this kind has already been done, this area is open for further research. The recent paper by the Committee on the Global Financial System clearly suggests that authorities should look for new macroprudential tools (CGFS 2010).

However, to be effective macroprudential instruments must be supplemented by regulatory and supervisory (i.e. microeconomic) actions, since only then macroprudential policies can be successfully implemented. This and earlier problems bring another major practical challenge, i.e. the one of monetary, macroprudential, regulatory and supervisory actions coordination. This is an extremely important and politically sensitive issue in view of the fact that it is related to the preservation of central bank independence in designing and implementing monetary policy. The increasing importance of supervisory regulations as well as macroprudential and microprudential instruments (together with earlier mentioned factors) will, as already signalled, most probably result in the rising role of judgment and discretion in policymaking. This may easily lead to pressures on central banks that can diminish their independence from the government. Hence, the issue of coordination between central banks and other bodies responsible for financial stability is a major organisational and political economy challenge.

As was mentioned in subsection 3.2 these problems are already heavily discussed (see also BIS 2011). From the purely conceptual point of view it is stressed that what really matters is that the flow of information between microprudential and macroprudential authorities be timely, fluent and of proper quality (Lamfalussy 2011). It is also recalled that too much emphasis on micro issues may distort the focus of monetary policy and, in consequence, reduce its effectiveness in achieving macroeconomic targets.

In practice, several basic organisational models to solve these coordination problems between monetary and macroprudential activities of a central bank

28 Galati and Moessner (2011) conducted an exhaustive survey of macroprudential policies and instruments discussed until recently.

29 We implicitly assume that a central bank should be also in charge of macroprudential policies since its macroeconomic focus predestines it to such activities. For more on this see CGFS (2010).
and microprudential policies (i.e. regulatory and supervisory actions) have been designed. They can be boiled down to a committee-based (or cooperative) model and a control (or integrated) model. The example of the latter one is the Bank of England’s new organisational framework already mentioned in subsection 3.2. The committee-based model can be illustrated by the US Financial Stability Oversight Council (FSOC) or the EU European Systemic Risk Board (ESRB).

At present these are the two basic models of coordination between monetary, macroprudential and microprudential policies. Given, however, the dynamics of financial markets’ developments in recent years it can be expected that the question of coordination between monetary and financial stability authorities will remain an issue for the time being and one can expect that over time other forms of coordination may emerge\(^{30}\).

5. Concluding remarks

As it was stated, central banks are now on the verge of a new period in monetary management. The challenges resulting from the crisis, posted to monetary policy, and in fact to economic policy as a whole, led to discussions on all crucial aspects of central banking actions, and more widely – economic policies, though these latter issues were not even touched in the paper. Concerning monetary policy these discussions will continue until at least a new consensus is reached. However, before it is eventually established, an interim period will follow – indeed, it is already taking place. In this interim period, as was suggested in the paper, many challenges that emerged during the crisis and were discussed may threaten policy’s effectiveness. At the same time it was hinted that the new monetary policy framework will most probably be based, at least in part, on the pre-crisis consensus.

Similarly as in the course of the crisis, in the years ahead monetary policy will go on being to a large extent based on judgment and discretion, and to a lesser extent on plain principles or rules. Therefore, it will continue to be to a large degree an art, not a science. This is because of the many dilemmas remaining that can be dealt with only by practical policymaking. “Science” for the time being will play a useful, albeit only an advisory role in this process.

\(^{30}\) For example Carney (2011) stresses that the committee-based model has two basic variants. The first one is less centralised and can be illustrated by the ESRB. The second one is more centralised and, according to this author, was suggested in the de Larosière (2009) report.
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1. Introduction

Since mid 2007 the world has faced one of the biggest financial crises ever. The subprime crisis was the third important financial crisis in the last 12 years. Due to the very complex and intransparent structure of structured finance products and their incalculable systemic relevance, large write downs and ongoing mistrust is inherent in nearly all financial markets until today. This mistrust led to a drying-out of important treasury markets like the interbank money market or the secondary market. Even with massive bail-outs (€1.873 billion by mid-October 2008) and enhanced money market tender programmes (like US-TALF or EU-Repo) a spillover to the real economy could not be avoided but lead to a partial stabilization of international financial markets and a temporary decrease of secondary market spreads. But as is noted in the CEPS Task Force Report (Lannoo (2008)) there was no European response to the crisis and from a national point of view this is comprehensible since the impact on European countries has been heterogeneous. Even if this crisis was not a European crisis, one of the hallmarks of the E.U.’s Financial Services Action Plan (FSAP) is questioned: disintermediation and therewith securitisation which is a very important factor for the development of a mature capital market beside the financial intermediaries. The integration process of EU financial markets and financial intermediaries proceeds much faster than EU regulation and supervision. And as it was noted in Lannoo (2008) the EU realized this shortcoming ten years ago and reacted, beside of the start of the monetary union and the launch of the FSAP, with the
implementation of Lamfalussy Committee proposals. But even if this reform brought some remarkable results, it was crafted during good market conditions and seems not to be capable of stormy times. More and more experts got the result that we have probably reached the limits of what is possible under the current system and that we need a major step in EU wide financial regulation and supervision reform. Also the politicians are under pressure to adopt a stronger banking regulation and foresee crises with early warning systems. We want to analyse the previous literature about early warning systems and especially have a look at the developments for major structured finance markets in the last two crises. By documentation of the major shortcomings in the present regulatory framework which especially stand out through the last two years of financial distress we evaluate actual regulatory approaches and show the consequences for the world economy. In chapter two we define financial market stability and give a short literature review about early warning systems for financial crises. In chapter three we show in detail the rating behaviour of US and European structured finance instruments and detect stylised rating facts. Afterwards we explore the US structured finance issuance and outstanding to detect possible moral hazard intentions that could be prevented through new regulatory approaches. In chapter four we take the findings of chapter two and three and try to find the motivation for the behaviour of market participants to originate and invest in structured finance instruments. We do this with the Bearingpoint securitization survey (2009) and with theoretic economic approaches. In chapter five we summarise the findings of the three former chapters and evaluate the actual EU regulation on credit rating agencies, Basel II enhancements and the Basel III consultation paper to differentiate between necessary regulations and possible overregulation.

**2. Financial market stability and early warning systems for financial crises**

Before we start discussing the possibility of an early warning system to prevent financial crises it is useful to define financial market stability. The ECB (2010) defines financial stability as “a condition in which the financial system – which comprises financial intermediaries, markets and market infrastructures – is capable of withstanding shocks and the unravelling of financial imbalances. This mitigates the likelihood of disruptions in the financial intermediation process that are severe enough to significantly impair the allocation of savings to profitable investment opportunities”. Additionally DeBandt and Hartmann (2002) define
a financial market instability as inherent “if major losses are realized during a short time period and if central money markets, like the interbank market, shut down and if systemic important banks struggle”.

In the last 15 years the world mentioned three major financial crises. Mishkin (1992) describe a financial crisis as “a disruption to financial markets in which adverse selection and moral hazard problems become much worse, so that financial markets are unable to efficiently channel funds to those who have the most productive investment opportunities. As a result, a financial crisis can drive the economy away from an equilibrium with high output in which financial markets perform well to one in which output declines sharply”. Thereby it is independent if the causing shock is an individual collapse or an asset price bubble. In 1998 the financial markets were shocked through the collapse of the hedge fund LTCM. Like often in financial crises the central bank, in this case the Federal Reserve, organized a $3.5 billion rescue package to prevent a more damaging spillover to systemic important banks and therewith at least also to the real economy. Only three years later, in 2001, the financial distress was due to the “dot-com bubble”.

After both crises the world economy slowly recovered and with initiatives like the rework of Basel I there were also initiatives to make the banking system less sensitive to financial crises. In 2007 the “subprime crises” appeared and is the most intense crisis since the Great Depression. Of course after every crisis there were impulsive actions to develop “early warning systems” consisting of lots of financial indicators to forecast future financial crises. These early warning systems started to gain in popularity since the Asian crisis 1997 (Kaminsky et al. (1998)). Nevertheless it is difficult to develop such a system since e.g. all three mentioned crises had different reactions of fundamental indicators of early warning systems. This should give us a first indication that every crisis is different and that it is very difficult to forecast financial crises. It is supported by Borio and Drehmann (2009) who noted that the construction of reliable quantitative tools to inform assessments of the buildup of risk in the financial system has proved elusive. Davis (1995, 1999, 2002) mentioned that some features are common to all crises. A good in sample performance of indicators has just limited advantages since the same indicators must perform as well out of sample to indicate systematic risk. Overall, the different early warning systems were just partially helpful to predict the subprime crisis. The challenge of this paper is to analyze the behaviour of structured finance rating movements, issuance and outstanding. We want to detect stylised facts and reasons for the subprime crisis to evaluate actual regulatory approaches and show possible early warning indicators.
3. Stylised facts from structured finance rating behaviour and issuance

As noted in Loeffler (2004) rating agencies are important for the stability of financial markets. Ratings are used to price risky debt, to compute economic and regulatory capital, or to calibrate internal ratings of banks. Ratings should give an orientation for default probabilities of the rated assets. They should be stable and assign the same default probability over all asset classes. But is this also true for financial innovations like structured finance instruments?

3.1 Structured finance ratings

It is important to understand that every structured finance product is just as good as the underlying assets. To understand the major losses due to structured finance products one step is to analyse if the ratings indeed correlate with the expected default probabilities for each rating category. Standard and Poor’s (2011) calculated the Gini coefficients for different structured finance products. The higher the Gini coefficient the greater is the correlation between the ratings and the structured finance instruments default behaviour. As can be seen in the next chart the Gini coefficients were in the 90% area for each product before 2006 which is a good indicator that the ratings matched the expected defaults.

Figure 1. Based on calculations of S&P (2011)
The three financial crises (LTCM collapse, “dot com” bubble, subprime crisis) marked in the chart led to lower Gini coefficients. But the decrease of the Gini coefficient due to the last crisis led to significant and ongoing downturns. Especially the decrease of the Gini coefficient for CDOs to 15% in 2008 questions the ratings methodology. This has direct application to the financial market stability because the whole financial system (especially Basel II, rating trigger) is related to ratings. If the ratings expected default probability differs from the realised defaults enormous consequences for the whole financial system and its stability have to be considered. Ratings are based on a statistical database that no market participant could have in this detail. If market participants do not trust in ratings or in rating agencies they will reduce their interaction with market participants (see also chapter 4). After this first indication we want to analyse the rating transition behaviour for structured finance instruments since the year 2000.

3.2. Structured finance ratings transition

Normally rating agencies use through-the-cycle ratings (Altman and Rijken (2005)) that are more resistant against business cycle fluctuations. Therewith we should expect nearly constant up- and downgrade probabilities for all rated financial instruments. But if you have a look at the downgrade frequency of Standard & Poor’s global structured finance ratings (S&P (2011)) we see in 2008, 2009 and 2010 outliers with 38%, 54% and 34% that raise again the question if the rating methodology for structured finance instruments is correct.

In general we can determine that the structured finance ratings reacted in average with a one or two year lag in downgrades to the recession. As a crises threshold value we define in dependence on Fitch (2010) a 10% downgrade rate. This threshold is based on the historical rating changes statistic for bonds of global financial institutions because the rating methodology is validated. A downgrade rate higher than 10% shows an extreme economic downturn. Therewith an extreme exceeding of the 10% threshold in combination with a high spread between structured finance and corporate downgrades provides evidence that the structured finance rating methodology is inappropriate, i.e. a corporate “AAA” is not equivalent to a structured finance “AAA”.

3.2.1. USA

The defined 10% threshold is violated in 2002/2003 with massive downgrades of US ABS and US Single-Name Synthetics. These downgrades are explainable through the “dot com” bubble, which was an economic crisis of the tertiary sector. The companies needed a lot of liquidity and the investors who provided liquidity
wanted protection through single-name synthetics. As the bubble imploded the quality of the underlying deteriorate and therewith the single-name synthetics. A spillover to other sectors of the real economy, the rise of unemployment involved from 3.9% (Q4/2000) to 6.1% (Q3/2003), the 9/11 shock and the amazing advance in prices for crude oil beginning afterwards explain the weak performance of ABS underlyings leading to a 20% downgrade rate in 2003. As a first result we can determine that the performance of structured finance instruments depends enormously on the performance of the underlying assets. Also the time lag in downgrades depends on the economic crisis, the strength and the range of the shock. Structured finance ratings reacted much stronger in the subprime crisis compared to the “dot com“ bubble. Equivalent rating categories (e.g. “AAA”) for complex structured finance products, e.g. CDO², and for standard products like corporate bonds lead to an underestimation of the risk inherent in the structured financial instrument. Structured finance ratings are more volatile and just limited comparable to ratings of other asset classes.

**Figure 2. Based on calculations of S&P (2011)**

![US Structured Finance Downgrades](image)

At the beginning of the subprime crisis the most structured finance ratings stayed constant. The US CDOs and the US RMBS were even in 2007 massively downgraded. The US RMBS downgrades are related to the underlying mortgages that have floating interest components. Especially the large increase of the US Federal Funds rate starting in January 2005 led to an increasing default rate.
of US residential mortgages. The increase in CDO downgrades is explainable with CDOs with MBS as underlying. With the deterioration of the US economy the situation for US mortgage owners got worse and the downgrades for US RMBS and US CDOs increased in an unprecedented manner. The deterioration of the US economy led also to a decline of commercial real estate demand and therewith automatically to higher default rates in commercial mortgages resulting in higher downgrade rates. The commercial mortgage market seems to be more robust, explaining the one year lag in downgrades compared to US RMBS. One reason could be that corporate have higher reserves and could withstand economic downturns for a longer period.

Let us have a look to the US structured finance ratings in more detail.

Figure 3. Based on calculations of S&P (2011)

In figure 3 we compare the US structured finance downgrade averages. The 2000–2003 average covers the “dot com” bubble. The 2004–2006 average shows an average for a period with good economic conditions and the 2007-2010 average describes the average for the subprime crisis. For the US ABS the 2007–2010 average is nearly on the same level as for the period of 2000-2003. This gives us an indication that the US ABS were not hit harder in the subprime crisis than in the economic downturn in 2001. In contrast the US RMBS have very low downgrade rates between 2000 and 2006. On average there is no statistical significant difference of the 2000–2003 and the 2004–2006 average. But the 2007–2010 downgrade average marks the all time high for downturns. We can conclude that structured finance ratings are not able to predict financial crises because
ratings react with a time lag. The downgrade average of US RMBS between 2000–2006 gives no indication for the crisis. Important systemic assumptions of structured finance rating methodologies are wrong (e.g. correlation) and long term structured finance ratings are highly volatile and have not the stability expected from a through-the-cycle rating. The volatility of the structured finance ratings must be due to biased rating methodologies and to incentives to issue structured finance instruments. These incentives could lead to moral hazard problems to generate enough underlyings.

3.2.2. Europe

In Europe we should expect lower downgrade rates because of a lower structured finance issuance. The assumption is based on a less developed market for securitization and therewith a higher screening of the securitised underlying. Keys et al. (2009) gives an indication that high issuance of structured finance instruments could lead to less monitoring effort and lax screening. In contrast to the USA the 10% threshold seems to be too high, nevertheless the 10% burden was exceeded in both crises. After the “dot com” bubble we see high downgrade rates for EU CDOs and EU single-name synthetics. The high downgrade rate for EU CDOs could be due to a high risk inherent in the underlying (maybe US structured finance instruments). There are no important downgrades for EU ABS which support the assumption that structured finance issuance is very restrictive and indicates a high underlying quality of the European assets.

Figure 4. Based on calculations of S&P (2011)
The downgrades after the subprime crisis show some differences to the US. We see the highest downgrade rate for EU CDOs with more than 40% downgrades. This rate is the third highest compared to the US downgrades. Interestingly the downgrade rate for EU CMBS is nearly on the same level as for the US. Also the downgrades for EU single-name synthetics are in the range of the US values. The rise of the EU RMBS downgrades is due to lax screening on the Spanish mortgage market. Summarising we can state that the higher developed the structured finance market the higher is the range of structured finance instruments and the risk of lax screening of the underlying.

**Figure 5. Based on calculations of S&P (2011)**

European ABS performed well in the period 2000–2010. The EU CDOs and EU single-name synthetics show high rating volatility in both economic downturns. Remarkable is the amazing increase in downgrade rates for EU MBS. In the period 2000–2006 as in the USA nearly all European structured finance ratings give no indication for a financial crisis. The relatively low downgrade rates compared to the US structured finance market are due to less investor confidence in structured finance products. One reason for the low European structured finance issuance is the high developed Pfandbrief market and the investor confidence in this instrument.

**3.2.4. Structured finance ratings summary**

The structured finance ratings gave no indication for the subprime crisis and reacted completely different compared to the “dot com“ bubble, which makes the
development of an early warning system for financial crisis more complicated. If we consider the enormous dependence of the banking system on ratings, financial stability is in danger if the banks’ dependence is high for structured finance instruments used for secondary market refinancing. Structured finance ratings react differently compared to ratings of other asset classes. The European structured finance market seems to be more conservative and therewith gives an important indication that there have to be exogenous motivations for structured finance issuance. It is not just the simple completion of financial markets. Motivations like the decrease of regulatory capital, regulatory arbitrage or more general economic factors like monetary policy could have amplified the US structured finance issuance leading to the subprime crisis.

3.3. Structured finance issuance and outstanding

As a next step we want to analyse the structured finance issuance and outstanding. This is necessary to draw conclusions why structured finance instruments were issued. Afterwards we complete the findings to show motivations for securitisation.

3.3.1. USA

The US structured finance market is the most developed in the world and the most complex structured finance instruments were issued in the USA. If we analyse the structured finance issuance in more detail we see clear differences.

Figure 6. Based on calculations of SIFMA

![Figure 6](image)
The **US ABS issuance** has a healthy growth rate between 1996 and 2003. The high increase between 2004 and mid 2007 is due to the economic recovery of the “dot com“ bubble and the investor acceptance of structured finance products. The growth in the ABS market did not lead to the international financial crisis. The reason is the diversified portfolio of ABS underlyings like leasing-, credit card- or student loan receivables.

**Figure 7. Based on calculations of SIFMA**

![US ABS Issuance (Collateral)](image)

The detailed **US ABS Issuance** figure shows normal growth rates for all securitized underlyings but home equity loans. The interaction of MBS, home equity loan ABS and resecuritisations amplified the granting of mortgages and home equity loans which became an important danger for financial market stability. The US ABS issuance has normal growth rates for nearly all instruments but home equity ABS. These structured finance instruments had no significant impact for the formation of the worldwide financial crisis. The investor trust in home equity loan ABS amplified the issuance of home equity loans and home equity loan ABS in an unprecedented manner. The issued volume increased from $74,4 billion in 2000 to $483,9 billion in 2006, i.e. a growth of more than 650% in 6 years! Due to the rising real estate prices the home owners with good credit history could get additionally to their mortgage a home equity loan. The rising US interest level led to increased defaults in home equity loans and therewith
also in mortgages in the Alt-A and A scoring worsening the situation on the MBS market.

Figure 8. Based on calculations of SIFMA

![U.S. Mortgage-Related Structured Finance Issuance](image)

If we have a look at the **US mortgage-related structured finance issuance** we see an important activity through US agencies. Even if the non-agency issuance nearly doubled between 2004 and 2005, which is clearly incompatible with an economic related growth rate, it must be primarily CMBS issuance, since the US agencies issued an enormous volume of RMBS. This thesis is supported because the downgrade rates of the CMBS are more resistant against economic fluctuations than RMBS. The dominant players in the agency sector were governmentsponsored enterprises (GSE) like Fannie Mae, Freddie Mac and the Federal Home Loan Bank. According to Holmes (1999) we believe that the main reason was the policy the GSE were restricted to through the US Department of Housing and Urban Development (HUD). Since the early 1990s the HUD relaxed the conditions for the allocation of mortgage loans until in 2006 the HUD directed the GSEs that 56% of their loans have to be provided to borrowers with income below the median in their area. Additionally the HUD restricted that 12% of the
GSEs mortgage financing have to be special affordable loans. These loans were provided to borrowers with an income less than 60% of their medians income. The yearly agency MBS issuance was in the range of $440 billion. The peak was reached in 2003 with an issued agency MBS volume of over $2.7 trillion.

Figure 9. Based on calculations of SIFMA

This led to an increasing outstanding volume of MBS with its peak in 2009 with nearly $9.2 trillion. As noted before the ABS (beside of home equity loans) issuance and also the ABS outstanding have normal growth rates, besides the fact that the difference increased over the years. The difference could be seen as an indicator for systemic risk and possibly be integrated into early warning systems. Less structured finance issuance means that economic conditions dampened or the investors trust in structured finance instruments worsen. If there is additionally a high structured finance outstanding, the default probability could increase with not predictable effects to collateral default correlation and systemic risk observed in the subprime crisis. For the sake of completeness we see the ratio of structured finance issuance and outstanding (ABS%, MBS%) as an indicator for repayment speed or revolving frequency. Even if the agency MBS issuance was worrisome
the immense MBS outstanding is even more. The magnitude of $9.2 trillion MBS outstanding indicates that enormous positions must be held by investors all around the globe. It was grossly negligent of investors risk management to disregard these indicators and careless from the worldwide regulation authorities. A main reason for the incredible growth rate in the MBS market was the policy driven MBS issuance by US GSEs with a maximum of $2.7 trillion. A higher spread (outstanding vs. issuance) indicates less investor confidence and market uncertainty. The issuance/outstanding ratio could be seen as indicator for the revolving speed of structured finance instruments. The systemic risk due to US agency MBS issuance was grossly neglected by the worldwide supervision authorities and in the regulation frameworks. And even more dangerous the picture become if we see the enormous and disproportional issuance of US CDOs backed by structured finance instruments: $307.8 billion.

**Figure 10. Based on calculations of SIFMA**
3.3.2. US structured finance issuance and outstanding summary

Figure 11. Mortgage related structured finance amplifiers for the subprime crisis

If we neglect for this chapter the question why financial institutions invested in structured finance instruments, we see clear differences in structured finance issuance. We can state that there is dependence between high issuance and high downgrades. This fact may be random for structured finance instruments but reveal the former noted rating methodology failures. According to that we could determine clear motivations for structured finance issuance, especially for mortgage related instruments. Due to the combination of low US interest rates, social policy, the economic recovery of the “dot com” bubble and the apparently unlimited demand for structured finance instruments, the mortgage supply also seems unlimited. Figure 11 describes the interaction that leads to the crisis. Home equity loan ABS and RMBS were the main underlyings for CDOs (figure 9). If they stagger the CDOs also will stagger. The RMBS with subprime underlyings staggered as the FED increased the main interest rates. But for most of the high quality RMBS this increase was not dramatic. It became dramatic because additionally many people also had home equity loans. Due to that home equity loan ABS, bad and good quality RMBS and CDO² struggle and the crisis was perfect. Together with important failures of the rating methodologies for structured
finance instruments and the drying-out of the important interbank markets the world faced one of the biggest financial crises ever.

As a consequence we could say that with a regulation of credit rating agencies, higher risk weights, better banking supervision on risk- and liquidity management and more intensive banking due diligence the crisis could have been prevented.

### 4. Was banking behaviour rational?

The Bearingpoint securitisation survey from December 2009 shows valuable insights into the motivation of securitisation. Before the subprime crisis one main motivation was the control of assets on the balance sheet to release regulatory capital. It was also possible to gain regulatory arbitrage due to the change to the securitisation framework. Other important reasons were better conditions compared to unsecured refinancing, risk transfer and the diversification of liquidity channels.

![Figure 12. From S&P (2011)](global_structured_finance_speculative-grade_annual_default_rate.png)

The first theoretical approach describes a cycle that explains the “originate-to-distribute” behaviour of banks and the nearly unlimited investor demand for structured finance instruments. If we have a look at the low default rates of speculative grade structured finance instruments before the subprime crisis in
figure 12 and the enormous issuance due to nearly unlimited investor demand, it was rational on a micro-level to originate structured finance instruments. Nevertheless the risk of a too capital market orientated refinancing strategy was neglected. The worldwide supervision authorities ignored that and underestimated the risks and complexity of structured finance instruments for banks and for the whole financial system.

The risk especially increased due to the high demand for securitisations because banks could not generate enough underlyings with their standard business procedures. The consequence was a reduction of bank lending standards. Kiff and Mills (2007) showed that securitisation could lead to lax screening and less monitoring effort. Franke (2005) mentioned that beside the moral hazard problem also the danger for adverse selection rises. Together with the high motivation of hedge funds to invest in structured finance instruments a dangerous cycle started. But why had hedge funds and other market participants such a high demand for structured finance instruments?

Figure 13. “Originate-to-distribute” securitization subprime cycle

Cole, Feldberg and Lynch (2007) showed that hedge funds managed over $1.426 trillion in 2006. Since 1995 this was an incredible growth rate of more than 700%. From an economic point of view the growth of the hedge fund industry led
to decreasing returns per fund. To reach the required returns hedge funds had to use higher leverage and invest in more risky financial instruments (Papademos (2007)). Therewith hedge funds bought non-performing loans directly from banks, invested in junior structured finance pieces or bought mezzanine structured finance tranches and originated resecuritisations (CDO²).

The cycle ends with the shareholder of hedge funds: the institutional investors. So, banks are shareholder of hedge funds and expected high returns. Due to the enormous growth of the hedge fund industry the accepted risks increased. The hedge fund demand for structured finance instruments increased and banks generated enormous underlyings with less and less due diligence to fulfill the demand (figure 13). Amplified was the cycle with the high ratings of credit rating agencies that suggest default protection and cheap money due to low US interest rates. The behavior was rational to invest in hedge funds, to originate structured finance instruments and to use more capital market orientated funding from a bank point of view.

From a macro perspective this had to lead to a financial crisis. As the crisis occurred in 2007 the demand for structured finance instruments dried up, the banks had to provide liquidity facilities, fulfill margin calls and guarantee for the hedge fund losses which ended in a liquidity crunch. These systemic risks were predictable and a main failure of worldwide supervision and regulation authorities. The reasons for the drying-out are shown in the liquidity crunch cycle in figure 14. Banks relied too heavy on cheaper secondary market funding. As the subprime crisis started the ABCPs of the banks own conduits were bought by the originating banks to avoid the draw of liquidity facilities. As this was not enough the liquidity facilities were drawn which led to rating triggers and downgrades for the structured finance instruments and for the originating bank. Both traditional funding and secondary market funding got more expensive or temporary impossible leading to a liquidity crunch. The banks dependence on secondary market funding via structured finance instruments depends on the incorporation of future gains and losses.

To prevent future crises it is necessary that banks see the origination of structured finance instruments not as a one-time game that lead to moral hazard behaviour. If they see the origination as an infinitely repeated game they also have to incorporate future gains and losses into their decision and will support financial stability with their more conservative behaviour. In the actual discussion about banking regulation the regulator has to reduce the bank dependence on secondary market funding in a way that the cycle shown in figure 15 will not be critical for the liquidity positions of banks. As explained before the discount factor of future gains and losses influence the decision of banking behaviour.
Many banks struggled in the subprime crisis with liquidity problems which could easily be explained with game theory.

**Figure 14. Liquidity crunch based on too strong reliance on secondary market funding**

Especially the uncertainty due to biased structured finance ratings led to a drying out of the interbank market. The behaviour of the banks could be easily explained with game theoretic approaches like the prisoners dilemma (Gibbons (1992)).

**Figure 15. Prisoners dilemma from Gibbons (1992)**

<table>
<thead>
<tr>
<th></th>
<th>Bank 1 (vertical axis)/Bank 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>lending</td>
<td>not lending</td>
</tr>
<tr>
<td>$\beta, \beta$</td>
<td>$\delta, \alpha$</td>
</tr>
<tr>
<td>$\alpha, \delta$</td>
<td>$\gamma, \gamma$</td>
</tr>
</tbody>
</table>

with $\alpha > \beta > \gamma > \delta$. 
If there is high uncertainty in the interbank market banking group one and two play maxim strategies to prevent losses and reach the equilibrium \((g, g)\). This “not lending” behaviour lead to higher spreads and in extreme to a situation where all banks do this tradeoff. The result is a complete drying-out of the interbank market (Brunnermeier (2009)). This has already enormous consequences for systemic risk and financial stability but will be amplified if this game is also played between banks and investors regarding commercial paper sales. If also the commercial paper market is close to a drying-out there is no other chance to prevent a collapse of the financial system with state guarantees and central bank initiatives. This phenomenon could be observed since the financial crisis 2007.

Analysing the banking behaviour we could determine that banking behaviour was rational on a micro-level and in short to mid-term. Three conclusions follow: it is important that banks’ dependence on secondary market liquidity and the regulatory disregarding of off-balance sheet positions are limited. Rating agencies should be regulated with an international framework to guarantee that the expected default probabilities are highly correlated with the realised defaults. All three aspects are very important to restore confidence in financial markets. Before we evaluate actual regulatory approaches regarding these aspects, we give a short introduction to banking regulation.

5. Banking regulation and structured finance enhancements

Financial market stability is very important for a growing real economy. But strong international competition, shadow banking and moral hazard behaviour make financial markets more complex and interdependent. For prevention banking regulation is very important.

Banking regulation restricts the financial markets and because of that every regulation initiative has to be well considered. Regulation is adequate if depositors and states are prevented from losses. It is important to understand that the goal of regulation is not to prevent losses in general, but to prevent moral hazard behaviour. Bhattacharya et al. (1998) provides a good overview of regulation literature. Some aspects to highlight are the possibility for passive money creation which has direct effects to the money supply of an economy and to price stability. Some authors are of the opinion that the banking system has a tendency for instability.

We have to question why the last three crises could not be prevented or at least led to lower defaults. One reason is the innovation speed. These new players and instruments are often not regulated or fall out of the existing regulatory
framework. The key question is whether the structured finance instruments complete financial markets and rise financial market efficiency of if they just circumvent regulation and are moral hazard intended. Another problem is that the international regulation reacts heterogeneous and with a high time lag to these innovations. Regulation could lead to lower returns and so the banking system tries to circumvent the regulation. This is a normal profit maximising behaviour and not critical if the regulation authorities respond fast.

In 2009 and 2010 there was and still is enormous international political pressure to implement as soon as possible new regulation frameworks like the “European regulation on credit rating agencies”, “Basel II enhancements” or the “Basel III consultation paper”. These enhancements and consultations are necessary but the danger is that proposals are discussed that were developed too fast. The whole Basel regulation was developed and implemented within 5–10 years. Of course there are failures that are obvious which could be corrected in a very simple way, but there are other interdependencies that are not seen today, leading to possible overregulation that did not prevent crises but have important consequences for economic growth. Especially the “Basel III consultation paper” has to be seen very critical.

5.1. EU-regulation on credit rating agencies

As noted before credit rating agencies (CRA) have a high systemic relevance. Therefore the European Parliament and the Council of the European Union passed the regulation (EC) No 1060 in September 2009 on CRA [EU 2009].

The regulation tries to prevent blind trust in credit ratings and to encourage the banks own due diligence procedures.

If a prospectus is published for a security the prospectus should contain detailed information that the CRA is registered under this regulation. To support this, the regulation suggests the CRAs to apply to the IOSCO Code.

Ratings issued outside of the EU could also be used for regulatory purposes, but only if they comply with the requirements of the regulation 1060/2009. The CRA has to monitor if the ratings of this third country CRA are as stringent as those provided for the EU regulation. The effective monitoring should be guaranteed by the full and unconditional responsibility for the credit ratings through the EU CRAs.

To prevent moral hazard behaviour of CRA, the CRA are not allowed to provide consultancy or advisory services.

This framework regulates that CRAs do their own due diligence. They should use rating methodologies that are rigorous, systematic, continuous and be subject to validation (back-testing).
If a rating could not fulfill the requirements due to a lack of reliable data or the complexity of the structure, the CRAs should not provide a credit rating or withdraw an existing credit rating. To rise transparency and disburden the investors due diligence CRAs should use own rating categories for structured finance instruments and mark them specially.

To prevent moral hazard behaviour the regulation prescribes intensive compliance policies. To avoid potential conflicts administrative board members should not get business dependent compensation. Analysts and other employees of CRAs should rotate to guarantee a gradual change in analytical teams and credit rating committees.

Also a report should be submitted to the European Parliament and to the Council to discuss alternative approaches to the ‘issuer pays’ model. One alternative is the creation of a public Community CRA.

Summarizing the regulation of CRAs is a step in the right direction and picked up the weaknesses showed in the third chapter. Maybe the subprime crisis could not have been avoided but at least attenuated. More supervision, transparency and disclosure covenants are necessary to regain investor confidence and strengthen financial stability. One aspect is very critical: the non-providing of ratings for new financial instruments. If the historical data is not adequate ratings should not be provided. This is overregulation and prevents innovation and growth in the financial industry. We propose a new rating category for financial innovations which could be linked with higher risk weights. Then institutional investors could decide whether they want to invest in these new financial instruments.

5.2. Basel II enhancements

As a first reaction to the financial crisis the Basel Committee presented “Enhancements to the Basel II framework” (Basel 2009a) in July 2009.

Summarising the rest of the enhancements there were also changes to Pillar 2 and Pillar 3 guidance. As noted in Basel (2009a) Pillar 1 capital requirements are minimum requirements and should be supplemented with Pillar 2 capital support to strengthen banks against unanticipated shocks. Additionally there were also lots of changes to banks risk management procedures in the supervisory review process and disclosure requirements in the context of securitisation that are over the scope of this paper. Obvious failures occurred by the development of Basel II, shown through the subprime crisis, were corrected. The enhancements are necessary and not disputable. They will prevent possible cycles like shown in figure 12 but will not affect the standard structured finance issuance. The enormous policy pressure to develop more rigorous banking supervision frameworks is dangerous. In the
subprime crisis regulatory faults were used to create regulatory gains. This was still possible despite the long development time of Basel II. Therefore actual regulatory consultation papers have to be considered and evaluated carefully.

5.3. Basel III consultation paper

One main goal of Basel III is to make the financial system more shock resistant and to prevent systemic important crises. But also risk management procedures and supranational supervisory structures were discussed.

BIS (2009b) abstract the five important areas of change to the Basel II framework that are in consultation.

1) The quality, consistency, and transparency of the capital base will be raised.
2) The risk coverage of the capital framework will be strengthened. As showed before in BIS (2009a) for the risk coverage from trading book and securitisation exposures.
3) Introduction of a leverage-ratio.
4) Introduction of a series of measures to promote the build up of capital buffers in good times to reduce the existing Basel II pro-cyclical behaviour.
5) A 30-day liquidity coverage ratio and a longer-term structural liquidity ratio will be introduced to guarantee a global minimum liquidity standard.

To strengthen the quality of Tier 1/2 capital to absorb losses, certain securitisation exposures which are currently deducted 50% from Tier 1 and 50% from Tier 2 should receive a 1250% risk weight. This is adequate and should have been done with the implementation of Basel II.

To address counterparty credit risk in a better way BIS (2009b) promotes the approach to “create a separate supervisory haircut category for repo-style transactions using securitisation collateral and prohibit re-securitisations as eligible financial collateral for regulatory capital treatment purposes”. The creation of a separate supervisory haircut category for repo-style transactions using securitisation collateral is essential. Re-securitisations are even more unpredictable and so they should not serve as financial collateral.

In addition, the Committee is proposing also a separate supervisory haircut category for securitisation exposures. The new haircuts would double the corporate debt haircuts. At the beginning of the subchapter the BIS (2009b) noted that these proposals are grounded in observations from the crisis, empirical work and industry surveys. Nevertheless the simple doubling of haircuts is not traceable.

Another discussed approach is the introduction of a leverage ratio.
First of all the basic idea of Basel II is risk-dependent regulatory capital. With a “simple, non-risk-based” leverage ratio the Basel II principle is questioned. As a compromise the Basel Committee should think about partial ratios that measure for example the dependence on capital marked based refinancing or about higher risk weights if certain thresholds are exceeded. Other ratios like the balance sheet duration of possible securitisation assets or a ratio for off-balance sheet positions are also conceivable.

6. Summary

In 2007 the world faced one of the biggest financial crises ever. It was the third important financial crisis in the last 12 years. Spillovers to the real economy and moral hazard behaviour of carpetbaggers resulted in enormous pressure on worldwide political institutions to approve a more rigorous regulation on financial institutions and predict financial crises via early warning systems. As shown in chapter two the development of an early warning system is still elusive and most models did not incorporate structured finance indicators. We showed that every financial crisis is different and analysed the behaviour of structured finance ratings and structured finance issuance and outstanding in detail. Failures in rating methodologies are evidently and most of the structured finance instruments had normal growth rates. The combination and supply of home equity loan ABS, RMBS and CDO² based on structured finance instruments are one important catalyst of the subprime crisis and mainly driven by exogenous factors like low US interest rates, social policy and failures in Basel II. Afterwards we showed that banking behavior was rational on a micro-level but must lead to a systemic crisis on a macro-level tightening with the drying-out of the liquidity markets. We found evidence in the Bearingpoint securitisation survey (2009) and in two theoretical approaches shown in figures 14 and 15. As a conclusion we see three important areas for regulatory changes. The bank dependence on secondary market funding must be limited and measured. Off-balance sheet positions must be supervised and could not be Tier 1 capital any more. CRAs have to be regulated to restore confidence in financial markets and to raise the reliance on ratings used for regulatory purposes. With this background we evaluated three important regulatory approaches. The EU regulation of CRAs acts on our topics and is a step in the right direction if it is implemented with international coordination. Nevertheless we see the non-providing of ratings for financial instruments with a low historical database as critical and propose a separate rating category for new financial instruments together with higher Basel II risk weights. The Basel
II enhancements from July 2009 were a first reaction to the crisis and solved the main regulatory problems shown in the subprime crisis. With discomfort we evaluated some aspects of the Basel III consultation paper. Many aspects are disputable and are in the right direction. The success of a risk insensitive leverage ratio is debatable. Other options are we compromise are partial ratios that measure for example the dependence on capital marked based refinancing (like a liquidity ratio), the balance sheet duration of possible securitisation assets or a ratio for off-balance sheet positions.

Bibliography

Summary

Adam Glapiński

Post-Crisis Economic Policy. Innovation Based Growth

Crises are not only natural but also indispensable in the capitalist market system. It is during the crisis when there is a natural selection of the most effective organisational, institutional and technological solutions. The decline in the growth dynamics is a crucial problem in highly developed economies. The task of an abrupt business recovery of innovativeness requires the implementation of reforms and restructuring on the basis on a new economic paradigm. Business policy based on the public sector growing deficit and low interest rates leading to fiscal crisis and inflation should be replaced by the policy stimulating entrepreneurship and innovation through fiscal stimuli. This policy has to include the facilitations in the area of establishment and liquidation of companies, labour market liberalisation, tax and credit stimulation of innovation, organisation and financing of high standard education and science, and at the same time due care of employment and use of the human factor.

Stefan Hack

Sustainability, Innovation and Information Technology as Sources of Value Generation

There is growing consensus in management and economies world-wide that sustainability is a topic of growing importance and material impact to consider. An increasing number of companies are viewing sustainability not only as a challenge of complying with regulatory requirements but also as a business opportunity and a source of competitive advantage. The current financial crisis has helped policy-makers and management alike to focus again on the longevity of business models and the duration of value growth in enterprises and economies. Sustainability requires innovation – e.g., modern technology to move into higher resource efficiency levels – and is therefore considered a source of innovation. Likewise, technological innovation in future will be increasingly sustainability-oriented. However, recent research shows that most companies still struggle when it comes to exploiting the opportunities and mitigating the risks that sustainability presents (Berns et al. 2009). Companies cite a number of obstacles and barriers to embracing sustainability. Foremost, these are limited informational transparency, the absence of a clear business case for sustainability, as well as difficulties in measuring, tracking, and reporting sustainability efforts.

This paper suggests and provides evidence that these challenges can be addressed with the use of modern information technology (IT). It introduces IT as a key enabling technology for increasing sustainability while creating economic value. Derived from Rappaport’s shareholder value model (Rappaport 1986) and subsequent work on environmental shareholder value by Schaltegger & Figge (2000), also validated with recent examples from companies world-wide the paper identifies leverage points for
the use of information technology to improve sustainability performance as well as
to increase economic company value.

Andrzej Kaźmierczak

**The Interest Rate Channel of Monetary Policy in Poland**

Central bank interest rate as an instrument of monetary policy has had a very limited influence on credit activity of commercial banking sector in the last five years in Poland. The National Bank of Poland has not been able to shape credit volume and domestic activity applying the basic tool of monetary policy. This phenomenon was the result of classic crowding out effect stemming from huge deficit of fiscal sector and from oversupply of treasury securities in domestic financial market. Purchase of treasury debt paper was attractive, alternative form of assets allocation for banks limiting the supply of credits for non financial sector. Aversion to credit risk in financial crisis circumstances has weakened the importance of interest rate level in financial capital allocation.

On the other side, demand for credit has not depended on interest rate level only. For businesses, a very important factor shaping demand for external financing was perceived perspective of future economic situation and the level of own funds. The main prerequisite for strengthening the interest rate transmission channel of monetary policy is limiting fiscal sector deficit and limiting supply of treasury debt paper as an attractive asset for commercial banks for investment.

Piotr Płoszajski

**Management on the Edge of Chaos: Challenges of the Petabyte Age**

The paper examines the multiple consequences of the global economy and management systems becoming complex and chaotic at the time that the amount of information on the real behaviour of objects on the Internet of Things is growing exponentially. What is the meaning of those developments for companies? What challenges for their business models they will produce? How all this is forcing today’s companies to re-think their strategies and structures, and more fundamentally – their working paradigms? Those are the questions to be examined to demonstrate just how the new globally interconnected business world is becoming a wiki platform for cooperation to build an Enterprise 2.0.

Zbigniew Polański

**New Challenges after the Crisis: A Monetary Policy Perspective**

Major economic and financial crises usually had an impact on central banks and their policies. Is this the case with the recent crisis? To answer this question several issues concerning both the strategic and operational levels of monetary management are discussed. First, we outline the monetary policy consensus before the crisis and address its weaknesses. Second, we shortly describe monetary developments during the crisis. Third, we investigate the following problems: (i) recent changes in economic thinking on monetary policy and financial markets, (ii) the issue of exit strategies from
the crisis monetary management, and (iii) the question of a more durable impact of the crisis on monetary policy conduct. In relation to the last problem it is stressed that monetary authorities must fully recognise all the implications resulting from two facts: that their activities are related to credit-monetary systems, in which bank credit is the ultimate source of money, and that of inherent instability of financial markets. Consequently, central banks must pay more attention to financial stability issues. On the one hand, this implies the idea of “leaning against the wind” as concerns credit expansion and asset price increases, while on the other, at the operational level, it implies that proper macroprudential instruments must be developed and perfected.

Sebastian A. Schuetz


In 2007 the world faced one of the biggest financial crises ever. It was the third important financial crisis in the last 12 years. Spillovers to the real economy and moral hazard behaviour of carpetbaggers resulted in enormous pressure on worldwide political institutions to approve a more rigorous regulation on financial institutions and predict financial crises via early warning systems. We analysed the performance of structured finance ratings and structured finance issuance/outstanding to detect the main shortcomings of the subprime crisis. Afterwards we explain the behaviour of market participants with theoretical models and a survey of institutions involved in securitisation. With the conclusions of this analysis we evaluate the EU regulation on credit rating agencies and current Basel II enhancements. Finally, we can determine that most regulatory enhancements are in accordance with our analysed shortcomings. Some approaches like the introduction of a leverage ratio are counterproductive and a danger for worldwide economic growth.