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Content

EDITORIAL

WHAT THIS FINANCIAL CRISIS TELLS US[*]

Daniel DĂIANU

The significance of the current financial crisis is huge, and its policy implications are manifold – and one of those is that we need to learn from previous crises. I recently heard one leading central banker saying that the depth and magnitude of this crisis could hardly have been predicted a year ago. His is not an isolated voice. But their remarks should be a surprise, for it is the job of a central banker to focus on the health of the financial system, and not just the stability of prices.

There have been various crises over the past decade and there are people who learned from them. Some financiers and economists – such as Warren Buffett[1]*, Edward Gramlich, Paul Krugman*[2]*, Alexander Lamfalussy*[3]*, Nouriel Roubini, Paul Volcker – warned another crisis was in the making, underlining the menace posed to financial stability by new types of financial innovation. Studies of the Bank of International Settlements and the Bank of England had examined roots of the current crisis before it erupted. I would add here reports of the European Parliament (one in 2002, in particular) that pointed the finger at issues that are being widely debated these days.*

1. THE CALCULATION DEBATE REVISITED

The failings of rating agencies and financial institutions in evaluating synthetic financial products and the rising opacity of financial markets have reminded me a famous debate in economic thought.

The calculation debate took place among several leading economists during the interwar period, in the last century. One camp fielded, among others, Ludwig

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[*] This text is based on three articles which were published by European Voice: The Calculation Debate revisited (13 June 2008), What this crisis teaches us (9 May 2008), and "Purging the toxins" (27 September 2008)

[1] In a BBC interview, in March 2003, Warren Buffett named derivatives "financial weapons of mass destruction".

[2] In "The Return of Depression Economics"(New York, Norton, 1999) Paul Krugman writes: "…modern financial markets, by creating many insitutions that perform bank-like functions but do not benefit from bank-type safety nets, have in effect reinvented the possibility of traditional financial panics"(p. 162).

[3] Alexander Lamfalussy: "…even if we were to reach a state of generalized competition on a worldwide scale financial markets ought not be left to their own devices. Those who attribute the virtues of global sstability to a fully competitive and liberalized financial system may be right. But how can we know? …I believe that we should not try to find out in practice how smoothly and swiftly self-corecting our system would be in the absence of the active care of the public authorities" ("Financial Crises in Emerging Economies", New Haven, Yale University Press, pp. 88-89).

von Mises[4] and Friedrich von Hayek[5], who stressed that free markets and clearly defined property rights (private property) are essential for proper calculation of costs and benefits and economic development; these were very dear tenets of the Austrian school of economic thought. Hayek highlighted also the ubiquity of information/knowledge in society and, in this context, the role of entrepreneurship (like Joseph Schumpeter did) in promoting technical change. The other debating camp used the intellectual guns of Oskar Lange[6]. The latter, while being against private capital, acknowledged the importance of markets in economic development and tried to build on them a mechanism of "market socialism" (which relied on social property). But Lange's model had its own major flaws. One originates in the inadequate pricing of capital, which undermines its accumulation as a source of economic growth over the long run. Moreover, entrepreneurship could not blossom in conditions of market socialism, where capital and risk-taking are not properly rewarded.

What came closest, in modern history, to an implementation of market socialism was the texture of socially owned firms in the former Yugoslavia, which has brought some prosperity to its citizens as against what occurred in the typical command economy in the former soviet system. Goulash communism in Hungary was also an attempt to introduce market reforms in a socialist economy. Much worse than "market socialism" was the command (communist) system. While having the power to mobilize resources for major projects it suffered from fundamental original sins: lack of proper valuation of factors of production and stifling of innovation (apart from the suppression of political liberties). The collapse of the command (communist system), as well as the market economic reforms in China and, later on, in Vietnam, have proven, in a spectacular way, which camp of economic thought won the debate.

To put more emphasis on this victory and make the hook-up with the current financial crisis I would recall something of great significance. There was a group of soviet economists –Leonid Kantorovich[7] and V.V. Novojilov among them-- who thought that quantitative models can replicate markets and offer scarcity valuations to capital, labor and land. They tried hard to work out general equilibrium (input-output) models and came up with so called "shadow prices" as substitutes for free market prices. Interestingly, Kantorovich got a Nobel prize for his work. But his models were far away from being able to help the command system --for nothing

[4] Ludwig von Mises, "Economic calculation in the socialist commonwealth", originally published in german in 1920 and reprinted in Fr.von Hayek (ed.) "Collectivist Economic Planning", pp. 89-130, London, Routledge and Kegan Paul, 1935.

[5] Friedrich von Hayek, 'The Use of Knowledge in Society" reprinted in "Individualism and Ecobomic order, Chicago, Henry Regnery Co., 1972.

[6] Oskar Lange, "On the economic theory of socialism" (1938) reprinted in Alec Nove and Mrio Nuti (ed.), "Socialist Economics", London, Penguin, 1972, pp. 92-110.

can substitute real markets and clearly defined property rights as foundations for an efficient economy. In addition, entrepreneurship cannot be simulated, or stimulated by decree; it has to happen in reality, as a result of incentives and economic freedom. That there is need for a public sector (that supplies public goods) in a modern economy and that markets have their own failings which need to be addressed is another serious matter for discussion and public policy response.

Above I have linked the calculation debate to the current financial crisis. A financial system which has been increasingly based on capital markets (securitization) –as it has evolved in the last couple of decades – has brought the key issues of transparency and proper valuation to the fore. Ironically, these are exactly some of the main negative traits which have brought the command system down. As a matter of fact, models which were used by leading investments banks (brokers) and rating agencies in assessing risks, and the ratings that were assigned to new (synthetic) financial products, have proven to be highly erroneous. Likewise, a certain type of securitization, which has distanced lenders from the consequences of their actions more than dangerously, has obfuscated risks (the counterparty risks) and enhanced the opacity of markets. The non-existence of effective markets for derivatives (OTC) has compounded the diminishing transparency of markets and added to inadequate valuation. The credit crunch could not be avoided due to an overwhelming lack of transparency and trust. The bottom line is that missing genuine markets (for various derivatives) and highly questionable valuation of securities pushed toward a freezing of credit markets.

The causes of the current financial crisis should prod many to remember the lessons of the famous calculation debate: we need genuine markets, transparency and proper valuation of factors of production and products (services). Simulation and models cannot be but a very imperfect and insufficient substitute of actual markets. And the transparency and smooth functioning of markets need to be propped up by adequate regulations and supervision. For, markets, by themselves, cannot protect themselves against their inherent weaknesses and the public good needs, sometimes, the work of a visible hand.

2. IS ONLY GREED TO BE BLAMED?

As the markets come to terms with what is happening and as thoughts focus on how to save and re-build the financial system, there is one statement among Paulson's remarks on 19 September that deserves particularly close attention: "We must now take further, decisive action to fundamentally and comprehensively address the root cause of our financial system's stresses." Do we understand the root causes that have transmitted the diseases that now ail every branch of the financial

[7] Kantorovich, L.V. (1965), *The Best Use of Economic Resources*, London, Pergamon.

system inside and outside the US? What is the transmission mechanism that has been at work so intensely?

The media is now full of condemnations of greed; for many this is the quintessential source of this financial crisis. But is it only greed that should be blamed for this mess? What about the flaws of the originate-and-distribute model, which decouples loans from assets, has spread risk and facilitated the emergence of systemic risk. What about skewed pay schemes in the financial industry that have stimulated reckless risk-taking at the expense of prudence (not to mention the ethical dimension these schemes carry)? What about the nonchalance with which rating agencies have assigned investment-grade values to derivatives of more than questionable value (such as 'collateralised debt obligations' and 'credit default swaps')? What about the conflicts of interest that plague the financial system? What about banks engaging in casino-type transactions on a massive scale? And, not least, what about the lightness of or the absence of any regulation of the 'shadow' banking sector, made up hedge funds, private equity funds and the like that are extremely leveraged and engage in speculative operations?

These questions highlight a thesis: the root cause of this crisis is an inadequately and under-regulated financial system. These are in part the effects of the Phil Gramm-Leach-Bliley Act passed in the US Congress in 1999, which was, basically, a repeal of the Glass-Steagall Act of 1934[8]. That act triggered a further wave of deregulation in the financial industry that, inter alia, brought to the market a plethora of fancy products whose risks were poorly understood. Mortgages are not toxic per se; badly constructed securities based on them are toxic. The packaging and repackaging of financial products are toxic, making their valuations increasingly unclear and reducing their tradability. Reward schemes that shape the decisions of managers and agents in markets and that make their behaviour irresponsible, when judged from a systemic perspective – that is toxic. Misleading quantitative models are toxic. Not to address these and other problems would be totally wrong. The tripwire for this financial crisis may have been in the housing industry, but housing is not the structural cause of the crisis.

What this crisis should make plain to everyone is that not all financial innovation is benign. It is therefore baffling to hear the argument that fresh regulation is bad because it would stifle financial innovation. Fresh regulation is necessary because there has been a lack of proper regulation and supervision. The enormous mistakes that have been made by allowing finance to develop its own, highly risky "raisons d'être" must be undone.

[8] Which put Chinese walls between commercial and investment banking.

But are we capable of learning that lesson? Why is it that we fail to learn from previous crises? At a recent Eurofi conference in Nice, Nout Weelink, the governor of the Dutch central bank, cited greed as a key factor driving people's propensity to forget and repeat behavioural patterns conducive to euphoria, excesses, over-indebtedness and finally, panic and crisis. A famous book on financial crises by the Massachusetts Institute of Technology professor Charles Kindleberger traces the same sequence of mindsets and behavioural patterns.

I accept this explanation, but not without qualification. A market economy involves cyclical movements and ups and downs. The entrepreneurial spirit lifts the economy, but, together with the herd instinct, it can also bring it down, by overshooting. This is indisputable, and a reflection on how free markets function. But just as modern economies need public policies, so they need regulations. As traffic needs rules and lights in order to protect people's lives, so market economies need regulations to limit collateral damage and enhance the production of public goods and restrict negative externalities. A lax monetary policy can lead to higher inflation and, ultimately, to a recession, but cannot, by itself, cause the meltdown of a financial system. This is the crux of the matter: the features of the financial system that have brought the threat of collapse are structural features of the 'new' financial system, including a breakdown of due diligence.

Regulators and supervisors are supposed to think about the good of economy and of society, rather than to pursue specific interests. And they are supposed to learn. They may espouse ideological beliefs, for none of us is devoid of intellectual kinship. But, even so, they are supposed to learn and think in terms of what is good for society. They are supposed to have a good grasp of systemic risks.

Vested interests can have a long arm and try to influence regulations and supervision (the mortgage industry pressed Congress hard to roll back state rules aimed at stemming the rise of predatory tactics used to lure homeowners into high-cost mortgages). But vested interests must be strongly resisted, and with all means. Regulators and supervisors should know that financial markets are volatile and prone to instability, and that the efficient-markets hypothesis – that prices reflect all known information – is a fantasy.

In the real world, we need regulators and supervisors who have a good understanding of how financial markets function in practice and who do not succumb to market fundamentalism. They should never underestimate systemic risks; they should always be alert to financial stability. Strains and crises cannot be entirely avoided – but we can limit the damage they cause. For that to happen, we need to learn from mistakes and establish better, more effective and comprehensive regulatory and supervisory setups.

3. WHAT THIS CRISIS TEACHES US

Some use the complexity of financial markets as a leitmotiv when explaining this crisis. But this is pretty much a self-serving argument, hard to accept without qualification. Not all financial innovation is sound. Not all products and services are accepted by markets; and regulations are needed to protect consumers and investors. Some financial products are better than others; some are flawed by design, among them those that underpinned the international quasi-Ponzi scheme that has enabled companies to report abnormally high profits that do not reflect revenues generated by their businesses. It therefore makes sense to judge the nature of various financial products, and to regulate the financial industry as a whole.

One of the questions posed by this crisis is about policies. As a rule, the pro-cyclical use of monetary and budget policies should be avoided. One can argue that price stability should play second fiddle when financial stability is at stake, but one has to keep in mind the effects of injecting liquidity into the system when inflation is on the rise. This crisis reminds us again about the risks of financial liberalisation when institutions are not congruent or when markets are not functioning smoothly.

Market structures should be re-examined. We have undoubtedly seen a massive failure of regulatory and supervisory frameworks. Risk management, at both micro and macro levels, has failed miserably in countries that claim to epitomise good practices in banking and finance. Those who keep saying that things are better in Europe than in the US have to think twice about the national fragmentation of regulatory and supervisory structures in the EU, a fragmentation that clashes glaringly with the logic of single markets. The Lamfalussy process, which has been developing regulation of the financial service industry in the EU since 2001, needs much improvement if it is to cope with mounting challenges. Some argue that since the crisis started in the regulated sector of the financial system, its non-regulated area should be left alone. But this argument is ridiculous: banks have made use of loopholes and poor regulations to develop the non-regulated sector, creating a shadow banking sector.

The current crisis is a stern indictment of the incentive structures in the financial industry, which have stimulated reckless risk-taking at the expense of necessary prudence. Some banking turned into a “casino”-type activity, through the creation and selling of new types of securities. This asymmetric compensation scheme has to be corrected and the culture of investment banking has to change for the benefit of the economy as a whole. But inappropriate compensation schemes operate in other industries, too. There are numerous CEOs who receive incredibly high salaries and bonuses despite the shaky performance of their companies. There is a huge ethical issue here, one that needs to be addressed by politicians and policy-makers: How can we ask citizens to bear the brunt of painful adjustments when

some of those who have been deeply involved in creating this mess are shunning responsibility, or are not accountable?

The structuring of fiscal policies also has to change. It is, for example, quite odd to see Americans saving so little and their deficits being financed by emerging economies. Moving further along this line of reasoning one reaches the issue of policy coordination against the backdrop of financial globalisation: Is coordination appropriate? Do we have proper structures of global governance? Unless we manage globalisation adequately, rising nationalism (principally in the form of protectionism) and populism in policy-making could reverse the evolution toward more open markets. The quest for energy security and affordable food could easily make things worse.

This financial crisis, in conjunction with the "food crisis", brings to prominence another issue: Is there an optimal degree of openness for an economy? The debates about international financial institutions, prematurely asking emerging economies to open their capital account, about energy dependency and about food dependency make glaring the question of the optimal openness of a market. In addition, open markets should not to be confused with deregulated markets; deregulated markets could easily backfire and cripple the functioning of a free society, one in which social cohesion and social justice are meaningful. Open markets, in order to operate as such, have to be accompanied by wise public intervention, which should consider both market and government failures. The bottom line is: Full openness is not necessarily advantageous economically and socially.

Arguably, the view that the market should be seen as the solution for all decision-making, a view that has much influenced policy-making in the last couple of decades, has been fatally wounded by this crisis. It is high time to be pragmatic, open-minded and commonsensical. Open trade, markets and competition are good. But we need effective regulations and sensible public policies if the majority of our citizens are to benefit from free markets.

ESSAY

THE INSTITUTIONAL DIMENSION OF HAYEK'S WORK

Ion POHOAȚĂ*

***Abstract**: Hayek is not an institutionalist in the usual sense. As he did not belong to any school, the relationship with institutionalism was not an exception. However Hayek alone is a school, a world of ideas. One having powerful contact points or interference areas that are both the object and subject of a complex research called NIE (New Institutional Economics) for more than three decades. Influence is not our concern here. However, we believe that if neoinstitutionalists considered him as one of „their own", as Adam Smith should proceed, they would have a lot to gain. Being close to their names would bring them more glory. They have enough reasons to do it. Topics such as spontaneous and manufactured order, the type of order in a free society, the rules – source of the state, the source of good rules of conduct, etc., the fertile dialogue with spirit aristocrats such as Hayek or Smith could bring only gains.*

***Keywords**: institutions, spontaneous and created order, Hayek, rule of law,*

***JEL Classification**: B25, D02.*

1. INTRODUCTION

There is not a special work written by Hayek and especially dedicated to institutionalism. However, in the intimate texture of his impressive theoretical construct, institutionalism is omnipresent; present for explaining in an innovative manner the origin and evolution of the free world (including the economic one), of its fundamental institutions, especially the market and the state.

We cannot proceed to an exhaustive approach of what is believed to be the institutionalist dimension of the Hayekian work in this study. We will only deal with some „strong" subjects, most of them approached by the great Economics philosopher in his trilogy, *Law, Legislation and Liberty.*

From this magnificent work Hayek's institutionalism is an induced, collateral, reachable, non ostentatious and a generous one in its economic, political, psychological and even legal theory on **rules** and **order**. These are the key words that put Hayek in line with his great forerunners – A. Smith with his "invisible hand" and C. Merger with his organic and pragmatic institutions. Hayek remains "an individualist (methodologically and ontologically speaking)" (Leroux&Livet, 2005, p. 193). Moreover, in order to underline once more the register in which the great

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economist exposes his theory asserting that the 1st volume of his trilogy, *La*w, *Legislation* and Liberty, called *Rules and Order* opens with a motto, taken from Montesquieu*, De l'esprit des loi*, I p. I and which emblematically reads: "Intelligent beings may have laws of their own making; but they also have some which they never made".

2. SPONTANEOUS ORDER AND MANUFACTURED ORDER

Stopping at these pages of the first volume of his well known trilogy, we find out that for Hayek *"order describes a state of affairs in which a multiplicity of elements of various kinds are so related to each other that we may learn from our acquaintance with some spatial or temporal part of the whole to form correct expectations concerning the rest, or at least some expectations which have a good chance of proving correct"* (Hayek, 1978, p. 36).

If we have in view the fact that in a society, individuals cooperate to satisfy their needs, *"this matching of the intentions and expectations that determine the actions of different individuals"* (Hayek, 1978, p. 36), i.e. particularly what he understood as order in social life occurs as an **objective need**; society, regardless of its shape and development level cannot subsist outside of an order.

The order referred to by Hayek is not a monolithic one. Two "*reasons*", that is two sources lead to two major types of social order. The former is **organized** (taxis) and the latter is **spontaneous** (*kosmos*).

The former is **exogenous**, pertaining to an **arrangement** operated by a specific person, an authority; anyway, it is doubtful, from this point of view for the supporters of freedom, yet according to the spirit of the partisans of authoritarianism; based on an **imposed hierarchy** and on **obedience relations** to the superiors' will. It is a **particular, artificial** order that promotes a **prior established purpose**, by one's deliberate act of will. It is a relatively **simple** order in which existential evolution may be intuitively pursued.

The latter, the spontaneous one is **endogenous**; it comes from the inside and is not related to any **social engineering**. It is a normal, self-imposed order (*kosmos*), not one's deliberate work. **No clearly and precisely determined purposes** and finalities which convince the individual to "promote an end which was no part of his intention. Nor it is always the worse for the society that it was no part of it" (Smith, 1836, p.112). The quoted lines belong to Smith and are used by Hayek, in his turn, to reveal the similitude between his spontaneous order and Smith's natural order that arises under the "*guidance of the invisible hand*". Then, there is a complex order "*based on purely **abstract** relation*s" (Hayek, 1978, p. 38), impossible to grasp by means of the intellect of a single individual; and even less likely to be manipulated in this way. It is precisely the abstract character that ensures **permanence** to spontaneous order; it persists even if the elements that ensure its organic texture

change; "a certain structure of relationships is maintained" (Hayek, 1978, p. 39), even if a number of components change their role and place. Based on the elements that ensure permanence, Hayek asserts "the constitution of intentionality", of some "behavioural regularities" that come to maintain order.

3. FREE SOCIETY AND THE COEXISTENCE OF THE TWO TYPES OF ORDER

Hayek's works, i.e. not only the aforementioned trilogy, but also in his entire work highlight without doubt his preference for **spontaneous order**. Methodological individualism and liberal philosophy are employed to prove that the open, great society is especially one of manufactured, non deliberate order when it comes to norms. It would be preferable for it to occupy the entire social space. Unfortunately, Hayek and others must admit that *"the spontaneous order is made up of individuals and organizations"* (Hayek, 1978, p. 46) and, in other words, the Great Society is based on the existence of two inner types of order, the imposed and the spontaneous one. To be more precise, *"the family, the farm, the plant, the firm, the corporation and the various associations, and all the public institutions, including government, are organizations which in turn are integrated into a more comprehensive spontaneous order"* (Hayek, 1978, p. 46). The borders between the society components are not clearly delimited. The degree to which they combine so as to form the social mixture called **Open Society** is not "*a product of our imagination*". However, *"there will often be a nucleus or several nuclei, of more closely related individuals, occupying a central position"* (Hayek, 1978, p. 47). Hayek is convinced that this dominance is produced in the sense of spontaneity, "*the forces creating spontaneous order*" being always stronger than the ones leading to imposed order. Anyway, the principal thesis upon which Hayek builds his approach is that we will always deal with a combination between spontaneous order and organizations. Yet, an organization never came to occupy the entire field. If she succeeded, this has not occurred in a complex society, but in a "*rudimentary*" one that entrusted a single mind the science and will to see, know, and understand everything. Beyond such experiments, in a normal society, "*the detail to decide*" remains the work of the individual. Doing otherwise equals to the replacement of spontaneous order by an organization, an unbalanced fact for the social organism. This happens because *"the spontaneous order arises from each element balancing all the various factors operating on it… a balance which will be destroyed if some of the actions are determined by another agency on the basis of different knowledge and in the service of different ends"* (Hayek, 1978, p. 51).

Hayek's **conclusion** seems to be found not in the aforementioned trilogy, but in another work, written later, in 1988 in which, in a more conciliatory tone, he admits that within the *macro-order*, "*deliberated organization*" has its means and importance (Hayek, 1988, p. 71). Only the configuration and the dimension of

components change. The shape of the whole is not affected. Even if organizations become stronger and their aims are shown in a braver and uncompromising manner, their fulfilment takes place within the same game, i.e. spontaneous order, a greater one, yet sharing the same functional mechanics.

4. RULES – SOURCE OF ORDER. THE STATE

Regardless of the shape, either spontaneous or manufactured, order has its source: its components obey certain **rules**, in their movement and functioning. Not the same rules, this in understandable. Some induce spontaneous order and are completely different from the praxis-type organized structure. Yet, regardless of our perspective of seeing things, what is important is that their respect equals the framing of multiple and various individual components in a trend, i.e. the acquisition of a **regularity**. As a matter of fact, if we were to look at the etymology of the word, Hayek prefers the term **regularity** to **rule** especially in the case of rules that lead to spontaneous order.

Hayek's belonging to institutionalism is related to his concern to define, explicitate, categorize and underline **the origin of rules**. As in the case of the two types of order and strongly related to these "end products" obtained by obeying the rules, Hayek divides rules in two major groups: **thesis** or rules of deliberated organization and **nomos** or rules of spontaneous order. **The former** are **deliberately created**, fulfilling the aim of edicts, instructions, **directives**, with very precise and concretely formulated purposes of the organizations. Their **prescriptive** nature is obvious. The ones in **the latter** category do not result from the will and deliberated action of any particular person. They do not have definite aims, they are **abstract**, independent of their circumstantial factuality of time and space. Their formation is related to spontaneous, not intentional. Therefore, they do not have a normative, but a prohibitive dimension. They simply occur as "***rules of conduct***" and are worth following on the way to the open society.

It is understandable that due to the logic of things, once fascinated by spontaneous order, Hayek remains an admirer of rules and their respect leads to such an order. He believes that a **first**, essential **attribute** is that *"they are observed in action without being known to the acting person in articulated («verbalized» or explicit) form"* (Hayek, 1978, p. 19). In other words, Hayek's actors are aware that their action takes place with the respect of certain rules; they believe that what they do is part of a trend that most of them accessed, that their action is a normal and positive one. Yet, as *"children who, by learning of language, are able to produce correctly most complicated expressions they have never heard before"* (Hayek, 1978, p. 19), social actors are not able to "verbalize", give sense to their action, even if this time they understand the purpose and logical substance of their approach. This occurs due to the **abstract** character of spontaneous rules. Abstract, yet indirectly

unidentifiable. This would be the **second attribute** of spontaneous rules: *"such rules come to be observed because in fact they give the group in which they are practiced superior strengths and not because this effect is known to those who are guided by them"* (Hayek, 1978, p. 19). The relationship between the visible and invisible part of rules is masterly grasped by Hayek when he presents the spontaneous order of free market to us, a conclusive and undoubting instance of the way in which spontaneous order always brings profit to the ones that win, once they are initiated to this game, "*a confrontation which follows the rules*" and show their superiority with respect to "*ability, force and chance*". Here, in this laboratory which is a representative sample of spontaneous order and is called market, each individual is driven by a visible gain, serving invisible needs (Hayek, 1976).

Aiming for spontaneous order to completely cover the economic and social organism, Hayek similarly seeks the ideal state on this set of rules defined by the exclusive right to existence for spontaneous rules. He hates constraint and is forced to admit it only when a common good is involved. Here, in this point, Hayek is tempted to put the identity mark between common utility and justice (see Elleboode&Houliez, 2006, p. 49), underlining that *"it was well understood through most of history that the prime public concern must be directed not towards particular known needs but towards the conditions for the preservation of a spontaneous order which enables the individuals to provide for their needs in manners not known to authority"* (Hayek, 1976, p. 2). In other words, justice is a common good that all individuals should benefit from, people's actions being the only ones considered as just or unjust. Not order, either spontaneous or not is the one to receive the feature of just. According to Hayek, only the individuals' actions carried out according to the rules that lead to spontaneous order are just. Within such a democracy, Hayek comes to talk about "*the mirage of social justice*", a major theme of the second volume of his trilogy.

Dreaming at the ideal state, Hayek is forced to admit that, even in the case of rules, the spontaneous feature is not the only one, regardless of its importance. Consequently, he is forced to admit that for society to exist and social life to be possible, a certain order is needed. In other words, there are rules beyond our understanding that make social life possible. But this is not all. It is not only a question of the power of understanding, but also of the will of certain members of the citadel. Hayek is convinced that the good functioning of society depends on the individuals' acceptance and respect of rules stipulating conventions, norms, and not to the way in which they take the shape on "*their spirit*". In order to exemplify this, Hayek does not hesitate when asserting that *"some such rules all individuals of a society will obey because of the similar manner in which their environment represents itself to their minds. Other they will follow spontaneously because they will be part of they common cultural tradition. But there will be still others which*

they may have to be made to obey, since, although it would be in the interest of each to disregard them, the overall order on which the success of their actions depends will arise only if these rules are generally followed" (Hayek, 1978, p. 45).

Rules that individuals "are forced to obey" are especially those concerning them all, and not each of them in part, rules related to norms, without any direct link to the individuals' particular wishes. According to Hayek, these are the "***rules of law***" with a "*deliberate origin*", necessary to carry out "*the balance work*" with respect to the life of the citadel; asked only where, by their abstract character, the individual does not see the factors that the achievement of his particular interest depends on and the way in which fulfilling this goal may have effects on others.

"*Ungrateful*" in their nature, the rules of law must be **imposed**. The government is entrusted this mission. It has *"the task of enforcing the rules on which the order rests"* (Hayek, 1978, p. 48). This is **one** of the functions of government, the **coercive**, unwanted but requisite one. This is a function that, once assumed, ensures the government the character of **warrant of the laws**, their formality, sanction, perfection and appliance. However, the government has one more function, i.e. a **service** one, which, in Hayek's opinion resembles that of a "*factory service*", the "*factory*" being the society, in this case. The government has the possibility to be a service provider because, in its turn, it is an "*organized order*" based on rules, instruments and operational structures. This is one of those organizations which may turn against society, precisely due to its degree of perfection or its perception as distinct unit beyond people who actually bring it to life, as Mises also underlines. Moreover, this may be due to its possessive, suffocating force that can be identified with the socialist "*barrack society*", instruments of monstrosity. In order to concisely reveal the monstrosity of any totalitarian ideology promoted by such an organization of the acquisitive State-government, Hayek quotes the founder of the first totalitarian state in a motto. We call him V.I. Lenin who, as ruler of the first state that successfully proclaimed its freedom, strongly claimed:

"*The whole society will have become a single office and a single factory with equality of work and equality of pay****"*** (quoted by Hayek, 2001, p. 123).

Hayek based his argument on the fact that such tendencies will be prevented by the prior set-up of the state, government, its perception as an organization, among others and its **inclusion** in the general spontaneous order; its submission to common laws, with its internal and organizational regulations and work instruments. Only this is the true state. The other, opposed path is servitude. As the process of government "*autonomizing*" within spontaneous order such as the identification of the government with the state, or even society in order to show that the first one is an organization and the second means spontaneous order (Hayek, 1978, p. 48).

There are current issues, even tempting ones for some and Hayek needs to explicitate, once more and speak about the two functions as belonging to the same

organization – the government, only within the globalizing framework that spontaneous order gives.

5. THE SOURCE OF GOOD RULES OF CONDUCT

Hayek may be claimed by institutionalists not only for his efficient concerns on the classification of rules and the two types of social order determined by these rules. He was particularly interested in the origin of rules. In the context in which he considered the origin of deliberated rules as a common place that is easy to understand, he believed it was interesting to make the sources of abstract rules leading to spontaneous order known.

Hayek was not in favour of "deliberately adopted" rules. He rather stops on the first and second floor (especially on the second one) to approach the birth and affirmation process of the institutions (rules) from an **evolutionist** perspective in his works suggestively called *Process of Cultural Evolution, Evolution of Self Maintaining Complex Systems* and *The Stratification of Rules of Conduct* (Hayek, 1981). Notions such as **cultural evolution, practice filtering, selection, imitation or individual innovations** are key words which synthetically define Hayekian discourse. It is a discourse in which the author is not ashamed of proclaiming his line of thought as compatible to Darwin's one. On the contrary, he even believes that Darwinism was inspired from social theory and not vice versa.

In their primary origin, good rules of conduct are "*individual innovations*"; they start from individuals and spread only when important groups which are significant as a quota sample put them into practice, thus imposing a distinct "*cultural tradition*". After their appliance and pursuit, when that particular group gains ascendance and prosperity, other groups **imitate** it and rules of conduct spread. It is precisely success, the final result which usually gives to *"the cultural heritage…a complex of practices or rules of conduct"* the character of worthy generalizing **institution.** *"These rules of conduct have, thus, not developed as the recognized conditions for the achievement of a known purpose, but have evolved because the groups who practiced them were more successful and displaced others"* (Hayek, 1978, p. 18). Hayek's almost excessive care to clear out the sense of the process, its "rise" must be observed and remembered here; the fact that it naturally and commonly "flows", departing from individual innovations and continuing with their institutionalizing only in the context of success. There is no **establishment process** and such a process could not be omitted; all is the result of an evolution process in which evolution and selection operates on and from the results obtained by certain social groups by using particular initially specific, individual rules. Following the Darwinist line and approaching Menger to justify his assertions, Hayek clearly fixes the origin, sense and final result of the process in which

individual, even genetically accountable rules become general good rules of conduct.

Hence **selection, adaptation** and **imitation** are not omitted from the explanatory Hayekian framework. Selection acts at the level of "detail circumstances". Individual responses to these individual circumstances acquire the status of a rule when the latter is likely to produce an order. How can individual responses start resembling and how can they acquire an abstract dimension? By means of the other groups' imitation of the rules that brought success to the initial group. Imitation and generalization, by extension, is the way to in which an intuitively discovered rule or transmitted through "*cultural evolution*" may acquire universal features, generating a new spontaneous and evolution of the society. And all this in a process which is spontaneous in itself, starting in an individual innovation, filtered by the gain differences which prove to be the most efficient for the social organism.

6. SHORT ASSESSMENTS AND CRITIQUES

Hayekian intuition in the discovery of spontaneous order and rule origin, on the path of social causality, on which such an order rests proved to be prolific and inspiring. All evolutionist neoinstitutionalists followed him, without hesitating to invoke both him and Darwin when they needed a sustaining argument. Those who employ game theory to explain the origin and behaviour of institutions, similarly refer to Hayekian "*biology*" to render their discourse more trustworthy. Then all that try to explain the internal dynamics of free world, the rise of open society, starting from Karl Popper must also use Hayek.

This does not mean that there are no detractors. Usually, the assumed incompatibility between methodological Hayekian individualism, on one hand and the appeal of the most anti group, anti whole and anti collective discourse, on the other hand is made at the level of "*social groups*". Who will read his entire work will easily notice that the aforementioned incompatibility is only apparent.

There are also attempts to question the evolutionist theory and the pretended Hayekian rationalism in the cultural evolution of societies. For instance, Hans Hermann Hoppe claims that *"Hayek's anti-rationalism is expressed in his «theory of social evolution» where purposeful action and self-interest, trial, error and learning, force and freedom as well as state and market (society) have been systematically eliminated as explanatory factors of social change and replaced with an obscure «spontaneity» and a collectivistic-holistic-organizistic principle of «cultural group selection»"* (Hoppe, 1994, p. 73-74).

The "*force*" of Hopper's critique which I considered as representative for this type of critiques brought to Hayek (also see Salerno, 1990) is based on a well known principle that is, decontextualization. If he were to refer to the whole, he would see

that his words do not stand a chance in diminishing the grandeur and logics of the construction. Hayek is difficult to read and understand. He may seem obscure but this in only due to his unequalled power of abstractization and not due to the fact that he lacked correct understanding of things. Yet, even if he does not admit these critiques, Hayek is forgiven for the presumptive methodological and explanatory gaps pertaining to the force of things and the evolution of facts. And this evolution "*flows*" from the inside, through the selection that "*cultural groups*" operate according to the principle of result efficiency, without exogenous interferences.

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THE NEOLIBERAL CHALLENGE: BETWEEN THE SCIENTIFIC SOPHISM AND THE COMMUNICATIVE FASCINATION

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Summary: *Narrations - even those about current phenomena and trends- require a minimum expositive structure, so that they acquire a sufficient degree of intelligibility. That is a difficult attribute when it is dealt with politico-economic processes with the added pretense of remembering past facts and also learning the lessons of History. However, the conventional "introduction–exposition-denouement" sequence recommended by Aristotle in the Poetic as the ideal order of a tale does not allow to delimit the nature and implications of the neoliberal offensive narratively in the peripheral capitalism.*

In this way, the proposal of F. Kermode for a textual analysis through the road "beginning-end-potentiality" makes operative the analysis of the challenges posed by the current return of neoliberalism and it overcomes the descriptive limitations of the Aristotelian method when it is dealt with the characterization and implications both of a politico-economic program of capitalist depth and the economic philosophy that underlies in such a project. Especially, this is true of the current of thought of the most genuine liberal tradition whose practice defers - in the developing economies that make up the successive peripheral rings of the contemporary capitalism- those socio-economic ingredients that could respond to objectives of social emancipation.

Keywords*: sciencie social, neoliberalism, history, ideology*

JEL Classification*: B40, B52, E13*

1. THE NARRATIVE LIMIT OF THE NEOLIBERAL RETURN

The exam of the return of orthodoxy is even more complex when we observe the multiple doctrinal sources where a mutation of the original liberal referent is witnessed: from the new classic macroeconomics to the anarco-capitalism. Although it is certain that we are in front of a version of the fable about "vintage wine in new wineskins" it is also right to say that it cannot be hidden that the consolidation of the current trends presents multiple social, political, cultural and economic aspects, the combination of which in specific coordinates of historical time and space make even more inscrutable a multipurpose referent, question already glossed by Ortega (1980, p. 135):

"... from 1780 in Europe all that inflamed and exited was called "freedom", as the Greeks called "kalon" the most disparate things as long as they coincided in their

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alcoholic effect. The artisan from Paris died behind the barricade screaming: Freedom!, while in the cathedral of the Seine, a few meters away from the castle where Goethe worked, Fichte screamed "freedom" from the bottom of his splendid, incandescent, frantic soul... **And the truth is that both: -the artisan and the meditator– referred with the same cry to things not very related among themselves."**

Indeed, the term liberalism contains a complex semantics that allows a selfish use of the word and its derivatives, cultivating a selfish obscurantism from, in some cases, economizing trivialities and, in others, from sophisticated mathematical developments but, in general, with an inclined practice to the vulgar empiricism and the selfish use of scientific sophisms and persuasive communicative techniques (cf. some previous reflections in Garcia Menendez, 1986). As a consequence, along the present paper we remit ourselves to the conceptual delimitation of the term "neoliberalism" understood as the global program designed and/or applied in the present historical phase to negotiate the cycle of accumulation in the peripheral capitalism (in connection with the neoconservative trend of the central capitalist countries).

On the other hand, the neoliberal calendar widens its platform insofar as it metabolizes the positive and normative analysis of certain anomalies that acquire structural range (as the dialectics engendered by the simultaneous development of the globalization process of the world market and the trends of fragmentation in economic blocks) although the accumulated experience teaches us that it is not just a mere return of the orthodoxy at all.

In fact, the current neoliberal politico-economic program is supported by a scientific paradigm that has not faded away in an irreversible way since 1776, neither even with the ascents of keynesian **welfare state** or the centralized planning that denied, in different degree, the viability of the mechanisms of the so-called free market to allocate resources efficiently. More than a return of the liberalism, in strict sense, it is the verification of its permanency, sometimes in a hidden way, but without altering the genetic load (at philosophical, political, economic levels,...) that provides with vitality the program in those phases of the cycle in which its participation is inexcusable for the defense of the reproduction of the capitalist system of which is tributary.

The versatility of neoliberalism to defend a certain socio-economic project is, apparently, surprising. and it does not hesitate to sacrifice a part of its inheritance to guarantee the high-priority objective: the reproduction of the order it serves. Historically, the liberal program has given up since the 19th century the emancipating part of the legacy of Illustration with the same agility put forward to recover Adam Smith's invisible hand with the steal mitten of the bloody military coups d'état in Latin America – during 70's- in view of the aim of commending to the respective armies the performance of the historical role of a nonexistent autochthonous bourgeoisie and in this way to consolidate the guidelines of accumulation and legitimization of the peripheral capitalism (Garcia Menendez, 1987).

The current neoliberal discourse, in my opinion, has accredited a critical reconstruction of its foundations through an armored hermeneutics that may not be deceived by the fascination produced by the politico-economic discourse. A discourse, the persuasive load of which is also fostered insofar as it is disclosed as an homogenous project (even, the only one viable) in a historical situation in which it is glimpsed the deep weakness of the keynesian question of the economic cycle, the decay of the welfare state and the crisis of the real socialism.

Recovering the expositive proposal of F. Kermode, the critical reconstruction of the neoliberal discourse in the peripheral capitalism -as apologetics of a certain social order and as a program of political and economic action- flows through a narration of social sciences with three unavoidable reflexive stops: from the prophetic announcements since 1945 around "the death of the ideologies" (the beginning) to the current prophecies about the end of History" (the outcome), reaching the threshold of the obscurantist hell (the prospective), in front of which we must not only abandon all hope (warning that K. Marx adopted from Dante) but, besides, we will not be able to forget the old aphorism advanced by Hobbes so caricatured and insulted by the neoliberalism, "... hell is nothing but the truth disclosed too late."

2. THE DEATH OF IDEOLOGIES

From De Tracy to Marx and Engels, ideology is an ambivalent notion that means both the rationalization of a group of ideas and values on certain social, political and economic system, and its çown disguise. Either as a speculation or prevailing practice, ideology is also a communicative phenomenon that is based - in Habermasian words of the Critical Theory of social sciences - on an instrumental distortion that reflects the link between knowledge (included the one accepted as "scientific") and interest (Habermas, 1982).

The conventional scientific practice, in this sense, continually boasts of not subjecting its postulates to a critical reflection on the interests that guide it, but this elimination attempt is, in itself, an ideological decision. The thought current agglutinated in the present neoliberalism means an ideological system of significance and representation of phenomena of social interest and, simultaneously, the negation of that ideological load. And in this contraposition lies one of the main legitimization sources: the merely technical character of regulation of the economic and seemingly neuter cycle regarding the sectoral, corporate and social class interests. As a technocratic and equidistant tool from the involved agents, it contains a high dose of persuasion on the public opinion that tends to judge the management of the policy-maker as a "healthy" exercise of objectivity and rigor, on the margin. of the "pollution" of ideologies and values (cf. Ricoeur, 1975).

In the overlapping of the economic and political cycles of representative democracies (with independence of their degree of imperfection), there exist

superimposed phases in which neoliberalism is indebted to an electoral support based on the attraction of a message with a strong sophist character. The politico-economic proposal offers its product in the electoral market appealing to the "weberian lucidity", consisting in denying the existence and the direction of the ideological and axiological vector of statements diffused as communicative phenomena.

In fact, neoliberalism as a leader of the "death of ideologies" becomes a sterile effort of the so-called science-ideology dissociation preached by Weber because a social group without an explicit ideology does not have either "utopia" or potentiality, it lacks political project and if has one it is nothing but a mere opportunity dossier. Unable to be distanced from the immediate thing, its program does not possess a global representation of itself and it is ineluctably condemned to continue a fragmented development in repetitive events and, consequently, historically insignificant.

The neoliberal manipulation of the nexus among the discourses about the "death of ideologies" and "the end of History" is channeled through the communicative phenomena of our time (from computing processes to the subtle networks of mass media). In the first place, computer science sophistication of modern society allows the control and the regulation of the market system to the point that the games of neoliberal rhetoric will become combinations of quasi-complete economic information, capturing in the politico-economic practice the theoretical prepotency of the stream of consciousness of neoliberal thought that preaches the death of "alien" ideologies by means of the consolidation of its "own", carrying out one of the most characteristic features in the current scientific knowledge (Lyotard, 1989): science as immanence of itself.

In the second place, the fragmentation of reality that neoliberalism makes with the support of mass-media channels does not require to provide evidence on partial events because the instruments that make the process intelligible disappear and a historical process can only be initiated when there is a consecutive development of same. (Baudrillard, 1990).

Besides, the mentioned scientific and communicative fragmentation means a selfish symbolic impoverishment of reality: the neoliberal diagnosis simplifies the main social and economic problems and proposes a program of persuasive action just because it is trivial. In this way, the neoliberal alternative is basically a cynic practice because it declares its theoretical prepotency to present itself as the only viable technical solution in front of the serious economic problems in the present situation of History that, paradoxically, is condemned to its imminent end (Garcia Menendez, 1989). Without a doubt, this is the critical mass of the discourse of certain. intellectuals who, in complicity with the dominant economic and communicative interests, apply a peculiar transitive property of the "death of ideologies" to the "end of History" and of the latter to the unavoidable "universalization of liberalism."

3. THE END OF HISTORY

D. Bell (1964) proclaimed the agony of ideologies understood as exhausted currents that are substituted by neoconservatism and neoempirism (sic) that the author does not surprisingly consider as ideologies. Neoliberalism adopts this technocratic point of view of the vulgar positivism to define the "ideology" concept by means of the curious diagnosis of its nonexistence.

It is not a catastrophist advocacy of the end of History but rather the beginning of the history of communicative routine that makes **tabula rasa** of specificity in the description of relevant facts, identifying selfishly the socio-economic reality with the mirror of its simulation. The argumentable sequence leads from "the dying situation of ideologies" to the "irreversible end of History" understood as a result of contrasts of alternative ideological viewpoints.

In the wide range of lineal and cyclical conceptions of the historical passing by of time only the Hegelian point of view postulates its ineluctable end, a paradoxical forecast for whom, as G.W. Hegel, approaches the topic both from the point of view of Philosophy and Science (Hegel, 1960 and 1980). In this thought source F. Fukuyama picks up a contribution in which the end of the cold war and the decay of the real socialism complete an interpretive role similar to that of the French Revolution and Napoleon's campaigns in the Hegelian work.

Indeed and from the neoliberal perspective, the disappearance of the dialectics of blocks does not only represent the breakup of geostrategic tensions but also unequivocal signs of the end of History. A terminal phase in which the dying evolution of ideologies will leave the way to the prophecy of an imaginary Nostradamus that, at the very end of a millennium, announces the progressive universalization of liberal democracy as a kind of government and the extensive domain of the market as a way of allocating the economic resources of society (cf. Fukuyama, 1990 and 1992).

The unifying announcement proposes an authentic historical amnesia and, thus, a somber prospective. A message diffused on the scale of the peripheral capitalism by a growing community of social and educational scientists fascinated by a theoretical system equidistant from the social Darwinism and the trust in the control of politico-economic uncertainty about a well-known future or, in any case, not subjected either to random, or to the risks of alternative ideological and belligerent projects.

The post-historical period led by a totalizing neoliberalism will be nothing but a mere mechanical and perpetual reproduction of itself. Surprisingly, the point of view of F. Fukuyama on the hegemonic future of neoliberalism accepts the well-known Marxist clause that identifies **History** as the "history of ideologies" and the "history of the fight of classes" and, in short, the absence of both means the end of the first one.

Nevertheless, our reference to the orthodox interpretation is not unaware of the emptiness caused by the reiterated verification (as a communicative phenomenon) of the death of ideologies and the end of History. To fulfill that emptiness, liberalism

makes a wild production of substitute images (about politics, economy, culture ...) and adopts an overelaborate imaginary group although neoliberals – such as Baroque artists- are skeptical and iconoclasts in private.

That analytic fragmentation of reality -product of an a-historical reflection on the immediate thing - that was mentioned in the first part of this paper ends up in being the profuse neoliberal elaboration of quasi-identical images, channeled by **mass-media**, but that do not show the perceptive transcription of outstanding politico-economic processes but the premonition that that Baroque accumulation of information is the mark, the sign of something - maybe History, maybe the neoliberal program itself- that is, respectively, fated to disappear or susceptible of being defeated the day when the victims of the social and economic cost of the neoliberalism find out, as it happens in the classic chronicles of Tacit about the military campaigns in Gaul, that fighting separately they were all together defeated.

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SOLVENCY II AND XBRL: NEW RULES AND TECHNOLOGIES IN INSURANCE SUPERVISION

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Abstract:
Purpose *– the aim of this paper is to analyze the way in which the insurance industry is confronting the renewal of its regulatory framework with respect to the levels of solvency that insurance entities should maintain, and how technological initiatives in general, and the implementation of the eXtensible Business Reporting Language (XBRL) mark-up language in particular, are making a key contribution to the process of adaptation to the new regulation.*
Design/methodology/approach *– In this general review, we analyse the particular advantages that the application of the XBRL standard can offer in this process, and highlight new lines for further research.*
Findings *– In this scenario, it is becoming urgent to have available a technological system such XBRL, that provides support to the important and periodical operations of consolidation of financial information, and to ensure the digital transparency of the insurer organisations that are engaged in this new regulatory challenge.*
Practical implications *– XBRL represents the key resource for the information support used in the European COREP project for implementation of Basle II in the Union, so, the implementation of Solvency II can take full advantage of this previous experience. For that reason, a proposal for action is incorporated.*
Originality/value *– the affiliation of the authors to the insurance sector, the academia and the XBRL community contributes to a complete view of the possibilities of this breaking project.*

Keywords*: Solvency II, European Union, E-finance, insurance sector, international regulation, XBRL.*
Article type: *Viewpoint*

1. INTRODUCTION

It is well-known that new regulatory frameworks have the capacity to drive or demand innovation in organisations (Lin and Wu, 2007) and that governments and regulatory agencies pressure emerges as the strongest factor in the application and acceptance of new rules and technologies (Hsu, *et al.*, 2006). The European Union continues its steady advance towards an effective harmonization of regulatory frameworks in respect of the financial system and collaboration between the various supervisory authorities (Vives, 2001). In the field of banking supervision, the

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directives with reference to the minimum solvency required of financial entities have recently been reformulated. All this is fruit of the transposition of the Basle standards, Basle II in particular, to the European system of juridical governance. The use of the "new technologies" has been fundamental in this process of change. The institutions of the EU have initiated a similar process for other non-banking intermediation activities. The insurance sector has also benefited from these improvements; the means by which information on performance itself is measured, recorded and communicated is being revolutionised, and a new regulatory framework is being established, known as Solvency II, which generates needs for new technological approaches in the insurance corporations and in the regulatory authorities. The free standard, eXtensible Business Reporting Language (XBRL), is transforming the way that financial information is transmitted (Locke and Lowe, 2007, Williams *et al*., 2006), and XBRL promises to play a central role in current developments in the insurance sector.

1.1 Solvency for the insurance sector

Solvency II was born as a proposal for a "Lamfalussy Process" for the elimination of obstacles to regulations aimed at creating a single financial space in Europe, an integrated European financial market as a consequence of the single currency. The new regulatory framework of Solvency II in the European Union represents not merely an evolution in the methods for calculating capital requirements: it is intended to bring about changes in companies' systems of internal control, styles of management, the listing of typologies of risk that are covered, and the means of communication used for company interactions with the supervisory authority and with the market. In the realm of a global knowledge-based economy, inter-organisational knowledge-networks are increasingly established with the aim of producing, using and disseminating new knowledge (Kreis-Hoyer and Gruenberg-Bochard, 2006). In the case of Solvency II, it is intended to generate a network formed by the national supervisors of the member states, in which the insurers participate as the active object of supervision and suppliers of basic information about their activity. From several different fronts come warnings of the need to apply technology to risk measurement (Karuppuswamy *et al*., 2007), and to use technology to provide support to corporate reporting which is becoming ever more essential (Chan and Wickramasinghe, 2006). The financial services industry has changed profoundly because of a new delivery channel, the Internet, the explosion of e-commerce and the emergence of a knowledge-intensive economy (Malhotra and Malhotra, 2006). In this context of regulatory change, because of all these developments, the new technologies will again become involved, widely and deeply, as facilitators of implementation.

1.2 The European organisms and the applicable international regulations

The insurers and reinsurers are of such economic and social importance that the need for the public authorities to intervene with prudential supervision is generally accepted. The insurers not only provide protection against future events that may result in losses, but they also channel the savings of families to the financial markets as capital needed by the real economy (Solvency II, 2007). The beginnings of the international regulation known as Solvency can be situated in the 1970's, as a regulatory framework for the insurance companies. The basic objective was to guard against possible crises in the insurance market. It was initiated in consequence of the opening of the markets, and its specific objective is to detect inappropriate behaviours of the insurers in order to protect their customers, those buying insurance. Solvency was intended as a common standard on the basis of which the European regulators and, in turn, the national regulators, could develop the standards most suitable for their particular environment. This gave rise to the existing legislation, the Directives, of the EU on solvency in the insurers.

Solvency II has emerged after diverse changes experienced in the regulation of Solvency. It was early in 2001 when the Commission of the European Union began the Solvency II project with the object of studying the possibility of initiating consultations to produce a new standard of common prudential supervision for insurance companies. In March 2003 there was an ostensible change of approach to the application of Solvency; the project passed from being based entirely on the risk of underwriting to an integrated risk approach whose particular feature is the position of the insurer against all the risks assumed.

The Solvency rules or standards have been binding since 2004, and the insurance companies were obliged to apply them before 2007. In the intervening period, the Directives in force underwent profound and significant modifications with the aim of reflecting the real situation more faithfully: for example, the minimum guarantee fund was increased and, in non-life insurance, the threshold for calculating the solvency margin was raised; and as an additional measure, the supervision was made stricter, and compliance of greater requirements was demanded.

To take account of the modifications imposed by the new regime, Solvency II, the 13 Directives (see Annex) have been recast in a single text, and new legislation that substantially modifies the background of the content has been added; these Directives covered the topics of life and non-life insurance, reinsurance, insurance groups and winding-up, which are enumerated below (EU Commission, 2007).

The application of the first standards of solvency proved to be simple and robust, and the results can be compared between different insurance companies. However, deficiencies were identified including, among others,

- the valuation of the financial variables of the entity in relation to the situation of the rest of the market was found to be impossible;
- it does not take account of all the risks to which the insurance entities are effectively exposed, such as the operating risk, which is dealt with next

Therefore the regulation that is being applied does not determine a valuation of global scope, so it is not possible to establish the entity's position in relation to the rest of the market, as a reference situation vis a vis other insurers. The behaviour of the markets and developments in the general economy also affect the insurance sector. The international presence of the insurers and the management of cross-border risks make it necessary to value the portfolio of risks on a global basis, and to obtain reference values vis a vis the rest of the market. These economic factors demanded the application of new regulatory rules, and demonstrated that the partial reforms of the previously-cited Directives were insufficient.

Solvency II emerged as a report proposing a type of "Lamfalussy Process". In this report, some general principles were established based on the regulation applied to the securities markets, whereby a European Securities Commission is created to determine the technical details and set up a framework to bring about greater cooperation among the European regulators.

In summary, the Lamfalussy-style report calls for the adoption of rules or standards covering the European market for financial services, on four levels, and

- these general principles have been approved by the European Parliament:
- the development of the rules or standards by separate committees for the stock market, banking and insurance, and pension funds, that are presided over by the Commission and formed by representatives of the member states at the political level;
- the convergence of the supervisory practices to be achieved through the work of the supervisory committees that are formed by representatives of the corresponding supervisory bodies of the member states; and
- the verification by the Commission itself that there exists adequate compliance with the measures adopted at the two first levels.

The objectives of Solvency II are set out in the work plan of this Lamfalussy-style proposal: to protect those insured; to establish capital requirements for solvency in accordance with the risks assumed by the insurance companies; to avoid complicated processes; to take into account the development of the sector; to establish principles without being excessively rule-bound; and to prevent unnecessary over-capitalisation. The capital requirements for solvency will not be the only rule that the insurers must comply with, since they will be accompanied by further requirements for the company managements and national government bodies to prevent the occurrence of financial scandals like Enron, TYCO International, Peregrine Systems or WorldCom; in addition there will be accounting regulation to

ensure greater transparency, by applying the IFRS (International Financial Reporting Standards). The Committee of European Insurance and Occupational Pensions Supervisors (CEIOPS) had an important part in the drafting of Solvency II. In particular, since the new Directive does not contain technical details on the implementation of Solvency II, CEIOPS will be asked to provide further advice concerning the detailed technical aspects of possible measures for implementing it.

Given the realities of the global insurance industry, and the particular complexities of marketing insurance in the framework of the single financial market that the EU is constructing, the European Commission has adopted a proposal concerning "the taking-up and pursuit of the business of Insurance and Reinsurance", to introduce a new framework of solvency, capital and supervision for insurers and reinsurers (EU Commission, 2007).

We can give details of the structure of the new supervisory approach (Solvency II FAQs, 2007):

- Pillar 1 consists of the quantitative requirements (i.e. how much capital an insurer should hold). This could be decided by the European Standard Formula. Currently, this formula is being calibrated on the basis of the reality and needs of the European insurance market. It is expected that this calibration will be finalised during the second half of 2009. As a notable innovation, it incorporates the measurement of Operational Risk, a concept that encompasses diverse types of loss not clearly financial, such as frauds, errors, faults in systems and external events (Fontnouvelle et al., 2003).
- Pillar 2 sets out requirements for the governance and risk management of insurers, as well as for the effective supervision of insurers. The increasing need for collaboration between national supervisory bodies, with the effective exchange of information that this implies, is the principal novel aspect of the new supervision scheme.
- The focus of Pillar 3 is on supervisory reporting and transparency requirements. Effectively, all the recent changes in regulation imply an increase in the transparency of financial corporations (Davenport and McDill, 2006). Here again, the technologies of information and communications will pay a significant role in support of the efficient release of information to the public and market, as well as in the correct communication of information to the supervisory authority.
- Additionally, the principle of proportionality is introduced, whereby less strict requirements are established for medium-size and small entities in respect of the calculation of risks and the handling of necessary information. Those entities may be concerned that they do not have adequate resources and administrative capacities for compliance, and this makes the use of the new

technologies an important point to prevent them suffering competitive disadvantages as a result of the new regulation.

Regarding the relationship of the new regulatory framework with the legal accounting framework, the IFRS will really provide the financial information support to enable the effective application of Solvency II; of particular relevance is IFRS 4, which specifically addresses contracts of insurance. This regulation has been drafted by a working group formed by insurers and auditors of accounts, and the following observer institutions have provided guidance during the drafting: EFRAG: “European Financial Reporting Advisory Group”; IOSCO: “International Organization of Securities Commissions”; IAIS: “International Association of Insurance Supervisors”; and the FASB: “Financial Accounting Standards Board”.

1.3 National transposition of the project

The implementation of Solvency II in the EU involves the need to monitor a series of steps, in which the participation of the private agents involved is of vital importance for discussing the regulation in detail and putting the finishing touches, particularly in regard to the transposition of the Directive, which currently has the reference COM(2007) 361 final, to each national regulatory framework. Thus, the European Directive will be a "directive framework", and in its later phases this will result in the regulation at national level, ensuring homogeneity and, at the same time, flexibility between countries. What is now necessary is to select the most suitable technological instruments and to obtain collaboration between entities and regulators, which will enable this flexibility to be achieved without losing the compatibility that will make mutual understanding possible. To sum up, this is an international project, at various levels, that requires strategic decision-making on the means that will make possible the exchanges of information that will be important throughout the whole regulatory process.

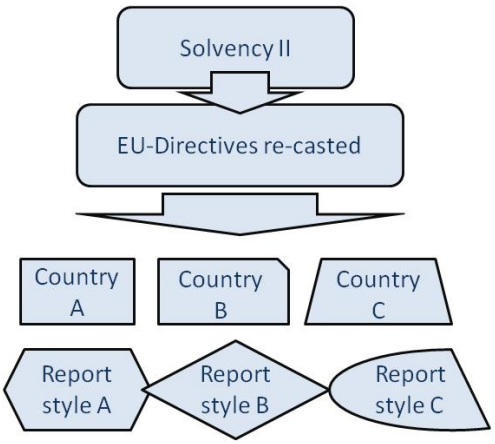

Figure 1 *National transposition of the project*

In this scenario (Fig. 1), it is becoming urgent to have available a technological system that provides support to the important and periodical

operations of consolidation of financial information, and to ensure the digital transparency of the insurer organisations that are engaged in this new regulatory challenge.

2. XBRL, TECHNICAL SOLUTIONS FOR BUSINESS PROBLEMS

Regardless of the adequacy of the new regulatory frameworks, the application of the IFRS and of Solvency II may increase financial risk through their own initial utilisation, due to the inherent technical complexities; many of these complexities are caused by the ways that information is handled in intermediate management processes, which can lead to confusion in the information that persons and systems are dealing with. Other factors that may cause errors in the application of Solvency II, through lack of knowledge or distraction, include the need to perform consolidation operations, and the pressing need to communicate information to the market and to the regulators, in addition to the novelty of the two regulatory frameworks. Rigour and order in the use of the information by controls on information systems will serve as an effective guide in their application; consequently the new information technologies will play a fundamental role when used as parallel supports to the application of the two regulatory frameworks, IFRS and Solvency II. These technological tools should not only be employed in the function of delivering complex and consistent information to the regulators; they should provide value to the company for its own control systems, since they will even enable simulation processes to be run as part of the internal management of information. In short, what is required is a tool for the representation and transmission of information that is both flexible and rigorous, that enables reliable and secure communication between the insurer entities, the market and the supervisory authorities, without neglecting the important communication between national supervisors within the framework of collaboration that they must maintain. Thus, by means of the use of the new technologies, the underlying objectives of ensuring the proper protection of those insured and the correct functioning of the European internal market can be achieved in an optimum way (EU Commission, 2007).

> *(21) In order to guarantee transparency, insurance and reinsurance undertakings should disclose at least annually essential information on their solvency and financial condition. Undertakings should be allowed to disclose additional information on a voluntary basis.*
>
> *(22) Provision should be made for exchanges of information between the supervisory authorities and authorities or bodies which, by virtue of their function, help to strengthen the stability of the financial system. It is therefore necessary to specify the conditions under which those exchanges of information should be possible. (...)*
>
> *(24) In order to limit the administrative burden and avoid duplication of tasks, supervisory authorities and national statistical authorities should cooperate and exchange information.*

All these constitute a clear call for the adoption of the technological tools referred to.

2.1 XBRL, the new language for financial information via Internet

XBRL (eXtensible Business Reporting Language) is the digital mark-up language successor to XML (eXtensible Mark-up Language) and serves as the nexus between different entities when transmitting business information telematically. The functioning of mark-up languages is based on attaching an electronic label to each datum that is being handled; in the case of HTML (Hyper-Text Mark-up Language), this electronic label provides information on the visual format that we want the datum to have on screen. In contrast, in the case of XML and XBRL, the label provides additional information (meta-information) on the nature of the datum that is transmitted. There are many de facto XML initiatives for vertical or horizontal B2Bi, such as ebXML, RosettaNet, HL7, and cXML. The diversity of XML formats causes difficulty in facilitating XML-based data exchanges (Ho *et al.*, 2004). For this reason, a new language based in XML has been created, to make it suitable for the area of financial management and communication. It is demonstrated that financial markets respond positively to announcements of proprietary XML schema standardization, but not to those of open XML schema standardization (Aggarwal *et al.*, 2006). But now, standardization is needed in this new framework in which regulatory information must be effectively shared, that it is not possible with proprietary systems.

XBRL is based on the production of different XBRL Taxonomies, which are generated and agreed by consensus in various working groups formed by specialists in computer software, systems and business. The principal mission of these Groups is to generate a specific Taxonomy; that is, the group analyses the model of business reporting that XBRL is intended to support and facilitate, and identifies univocally a dictionary of terms for utilizing these labels in the subsequent generation of Reports in XBRL containing real data that will be transmitted telematically. Therefore, the Working Group generates the Taxonomy, which is made available free on the Internet, and this allows users to generate various types of Report and validate them correctly; the taxonomy thus represents the best "substratum" for expressing business information of all kinds for utilisation by the numerous software applications that companies and other organisations must use to manage this information (Fig. 1).

When the XBRL taxonomy is generated, much care is taken to introduce different business rules into it. These rules take material form by way of standards of presentation, labels in different languages, rules of calculation and logical relationships; these are rules with which the real data "hosted" by the digital labels in the various XBRL Reports must comply. A plain text file with the .xml extension supports the transmission of the data expressed in this new language. XBRL Reports are usually very compact in size, which increases the capacity of existing computer systems, in addition to the advantages offered by the syntax that ensures that items

of data are conveyed intact and perfectly delimited. By means of this language a scenario is provided in which the issuers and recipients of this type of information find an efficient "substratum" for making use of it digitally and electronically in various ways, and particularly for using the latest high-performance analytical applications, since all the relevant business information is contained or can readily be contained in XBRL Reports (Fig. 2, Table 1).

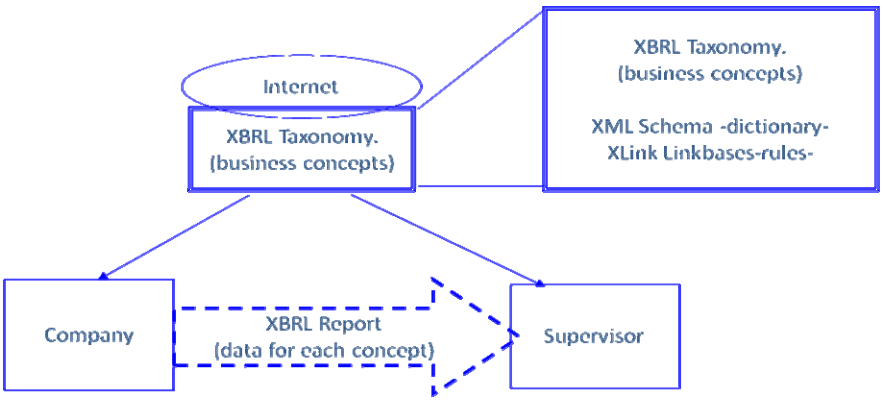

Figure 2 *How XBRL works*

XBRL is already providing technological and management advantages to a multitude of organisations that, previously, were managing information by more rudimentary methods (Bonsón and Escobar, 2002). Among the descriptive terms associated with XBRL are "better, faster and cheaper" (O 'hAonghusa, 2005). There exist various mechanisms for the calculation and logical validation of content of the labels that comprise an XBRL taxonomy. Because these labels, and the real data that these labels "host" when an XBRL report is produced, can be submitted to these mechanisms, they become simple but powerful tools. When business information is expressed by XBRL, this represents an additional guarantee of the quality of this information. Furthermore, XBRL taxonomies can be extended by the user privately; this facility ensures that, on the one hand, companies can make use of their own more detailed reporting models with particular characteristics specific to their own business, for internal use, and on the other, that there is no loss of compatibility with the general model that the company must use to report externally (Boixo and Flores, 2005). XBRL has arisen to meet the real need to "homogenize" business information and make it compatible in an environment where different entities must communicate rapidly and clearly with each other but where there are no pre-existing programs and formats that are mutually satisfactory and totally efficient. It is important to state that the IFRS standards are also supported by the new XBRL technology (IASB, 2007).

Kernel.xsd:

Here we define

- XBRL items, which only appear once in each report

- XBRLtuples, which could be replicated
- Attributes of these, e.g. datatypes, including proprietary datatypes.

Linkbases.xml:

Here we include

- Presentation rules
- Logical and linear combination rules
- Labels in different languages for each XBRL concept
- References, as legal notes.

In addition to this, one of the greatest advantages of XBRL lies in the property of the Taxonomies whereby they can be extended by the users. In other words, once a Taxonomy has been created at the European level, extensions can be created to cover the particular features of the adapted national regulatory frameworks, thus ensuring the homogeneity of the system of information while giving it the flexibility that the framework requires.

2.2 XBRL: previous European experience

XBRL also benefits from the support of an international consortium in which important public and private bodies are represented. The European Union has supported the standard by applying it to official communication between Banking Supervisory Authorities (COREP, 2006).

The COREP-FINREP Project is being undertaken within a complex structure (Fig. 3) formed by the European financial entities, the supervisory authorities at the national level, and the supranational entities that issue regulations, and promotes collaboration and the implementation of a common communications system among all the participants, using XBRL. The principal objective of this set of institutions is the implementation of the technological-legal system represented by the entry into force of both the regulation of banking risks under Basel II and the international accounting regulation in accordance with the IFRS standards. Notable among these supranational entities are the Committee of European Banking Supervisors (CEBS), a public body that reports to the EU Commission, and two private entities, the Bank of International Settlements of Basel (BIS) and the International Accounting Standards Board (IASB). The BIS puts into effect the regulations on banking risks under Basel II, and the IASB [12] issues the IFRS, in accounting matters. For its part, the CEBS collaborates with the national authorities to obtain the maximum consensus and harmonization in the application of these regulations in the European context.

With this objective, the CEBS collaborates in transposing the banking regulation agreed under Basel II to the EU, and in adapting European financial entities to the international accounting regulations proposed by the IASB through the IFRS. To fulfil this role it is carrying out the COREP-FINREP project, which is

aimed at putting at the disposal of all the regulatory and regulated entities the appropriate technological tools (the COREP-FINREP Taxonomies, in XBRL language) to support the efficient communication of all the information required in this new regulatory framework in which the European financial entities now have to conduct their activities. Lastly, the XBRL consortium is acting as a vital link, facilitating the meetings, encouraging the regulators to reach consensus, and offering the technical support necessary, from the phase of design of the Taxonomies to the more detailed aspects of implementation in each national context of the EU (Bonsón *et al*., 2007).

2.3 Solvency II: taking advantage of previous initiatives.

In the case of Solvency II, there exists an analogous structure in respect of the implementation of the new regulation: both cases concern a regulation of general character, with a consortium of agents involved that act in a highly participative way, and in both cases there is a pressing need for the new business rules to be established simultaneously with the availability of an efficient telematic system that enables the appropriate distribution and processing of the information generated by the sector, so that this information is passed correctly to the regulators and to the market.

2.4 Specific proposals for action.

On the basis of the analysis conducted, it becomes necessary to suggest to the agents mentioned a structured proposal for the implementation of XBRL for Solvency II, based on the following strong arguments:

- The standard possesses proven technological quality
- The organisational qualities of the XBRL consortium have been demonstrated to be of great help in the implementation of analogous regulatory frameworks
- Previous experience represents a background of inestimable value, with a substantial number of persons and entities ready to give support in this venture, from the XBRL consortium itself at the European and international levels, to the myriad entities that comprise the consortium, in their individual capacities.

Therefore, the application of XBRL to Solvency II would involve first the creation, under the auspices of XBRL International (European section), of a Working Group whose principal mission would be to monitor, assist and participate as far as possible in the Groups now working on Solvency II; thus from the initial phases of evolution of the regulatory framework, the Group would come to be in a position to foresee what reporting models will be needed. Similarly, as the detailed aspects of the regulatory framework are consolidated and then adapted to the national level, the Group would put in hand the creation of the various different taxonomies that be needed; the first to be defined would be the generally applicable

taxonomies, followed by the extensions to meet the particular national situations, all undertaken in a working environment in which the members of the various groups share previously-defined information and proposals. The XBRL language is already having a revolutionary impact on the ways whereby financial information is moved telematically, by Internet; and users in all spheres are appreciating the benefits of having raw material, i.e. data, of optimum quality for processing according to their particular needs, and for subsequent well-informed decision-making. XBRL represents the key resource for the information support used in the European COREP project for implementation of Basle II in the Union. The advantages derived from the application of this project, together with the particular characteristics of the Solvency II project, indicate that XBRL is the ideal telematic tool, and that it can make a valuable contribution to the reform of the regulatory framework for the insurance sector at the European level.

3. FINAL REMARKS

Solvency II is a European project for the fundamental reform of the system of regulations concerning risks and solvency of the insurance sector. As with Basel II, there is a change of philosophy that is profoundly affecting the methods of risk measurement, the role played by the supervisory authorities, and the priority given to corporate transparency in the strategies of all the entities involved. The complex inter-meshing of regulatory changes and adaptations in business practices inevitably affects the way that information on the entity's own activity is recorded and exchanged at various internal levels, and the ways and formats in which this information is disseminated externally, whether to stakeholders, the public, the market or the supervisory authority. In the case of world wide corporations, flexibility is needed in order to efficiently implement the standards (Svensson and Wood, 2008).

The XBRL language is already having a revolutionary impact on the ways whereby financial information is moved telematically, by Internet, and users in all spheres are appreciating the benefits of having raw material, i.e. data, of optimum quality for processing according to their particular needs, and for subsequent well-informed decision-making. XBRL represents the key resource for the information support used in the European COREP project for implementation of Basle II in the Union. Every insurance corporation should thus consider XBRL in its e-finance strategy (Ye and Keesling, 2006). Equally necessary will be an adequate measure of the success of this technological-regulatory project (Kutsch, 2007). The advantages derived from the application of this project, together with the particular characteristics of the Solvency II project, indicate that XBRL is the ideal telematic tool, and that it can make a valuable contribution to the reform of the regulatory framework for the insurance sector at the European level.

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ANNEX:

EU DIRECTIVES RE-INCORPORATED INTO SOLVENCY II

The following 13 Directives in the area of life and non-life insurance, reinsurance, insurance groups and winding-up were recast into a single text on the occasion of the new Solvency II amendments to be made:

Council Directive 64/225/EEC of 25 February 1964 on the abolition of restrictions on freedom of establishment and freedom to provide services in respect of reinsurance and retrocession.
First Council Directive 73/239/EEC of 24 July 1973 on the coordination of laws, regulations and administrative provisions relating to the taking-up and pursuit of the business of direct insurance other than life assurance.
Council Directive 73/240/EEC of 24 July 1973 abolishing restrictions on freedom of establishment in the business of direct insurance other than life assurance.
Council Directive 76/580/EEC of 29 June 1976 amending Directive 73/239/EEC on the coordination of laws, regulations and administrative provisions relating to the taking-up and pursuit of the business of direct insurance other than life assurance.
Council Directive 78/473/EEC of 30 May 1978 on the coordination of laws, regulations and administrative provisions relating to Community co-insurance.
Council Directive 84/641/EEC of 10 December 1984 amending, particularly as regards tourist assistance, the First Directive 73/239/EEC on the coordination of laws, regulations and administrative provisions relating to the taking-up and pursuit of the business of direct insurance other than life assurance.
Council Directive 87/344/EEC of 22 June 1987 on the coordination of laws, regulations and administrative provisions relating to legal expenses insurance.
Second Council Directive 88/357/EEC of 22 June 1988 on the coordination of laws, regulations and administrative provisions relating to direct insurance other than life assurance and laying down provisions to facilitate the effective exercise of freedom to provide services, and amending Directive 73/239/EEC.

Council Directive 92/49/EEC of 18 June 1992 on the coordination of laws, regulations and administrative provisions relating to direct insurance other than life assurance (third non-life insurance Directive).
Directive 98/78/EC of the European Parliament and of the Council of 27 October 1998 on the supplementary supervision of insurance undertakings in an insurance group.
Directive 2001/17/EC of the European Parliament and of the Council of 19 March 2001 on the reorganisation and winding-up of insurance undertakings.
Directive 2002/83/EC of the European Parliament and of the Council of 5 November 2002 concerning life assurance.
Directive 2005/68/EC of the European Parliament and of the Council of 16 November 2005 on reinsurance.

RESEARCH PAPER

NOMINAL CONVERGENCE*

Aurel IANCU**

Abstract: *After presenting the institutional construction during the pre-accession and post-accession to the Economic and Monetary Union (EMU), the exchange rate mechanisms (ERM) in several countries and the convergence criteria, we go on with a brief analysis of the way the CEE countries cope with the convergence criteria in accordance with the Maastricht Treaty. Then, the study deals with a topic often discussed in the scientific literature and included on the agenda of decision-makers at various levels, in order to clarify the following major issues: a shorter transition to the euro, the exchange rate equilibrium versus the inflation rate diminution and the Balassa-Samuelson effect, the exchange rates and the exchange rate deviation index, evidences concerning the real exchange rate equilibrium and the appreciation of the exchange rate in the CEE countries.*

Keywords: *Convergence criteria, exchange rate, exchange rate mechanisms, Euro Area, Balassa-Samuelson effect, tradable goods, non-tradable goods, exchange rate deviation index, purchasing power parity.*

European integration requires convergence not only on the institutional and real economy areas, but also on the nominal area, by the creation and consolidation of the monetary union and the transition of the EU member countries to the single currency (euro). Having joined the European Union – as a proof of the general achievement of institutional convergence – the countries become very soon members of the Economic and Monetary Union and are entitled, ex officio, to adopt the single currency while complying with the criteria of the Maastricht Treaty.

1. PRELIMINARY REMARKS

Nominal convergence is a multilateral process, defined by the gradual harmonisation, at a relatively high rate, of the national institutions and policies of the member countries with the EU ones, in the monetary and financial field.

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The European integration has covered several stages so far: Free Trade Area, Customs Union, Common Market, Internal Single Market (EU), Economic and Monetary Union (EMU) and full economic integration, as the last integration stage. The EMU is an upper stage of multinational integration that implies the following: common monetary policy, proper coordination of the economic policies of the member states, single currency, full liberalisation of the capital flow, an effective institutional system for the monetary policy coordination and control.

The principle of subsidiarity is excluded from the monetary field. As regards the common monetary policy, unlike other issues, the member countries transfer the decision-making from the national level to the Community one and give up their sovereignty over the monetary policy.

The history of the preparations for nominal convergence is relatively similar and closely connected to the history of the economic integration. Such preparations may include first the actions for the creation of the European institutions, such as: the European Union of Payments (1950), the European Monetary System (1979), the Committee for the Study of Economic and Monetary Union (1988), the European Fund for Monetary Cooperation (1973), the European Monetary Institute (1994), the European System of Central Banks (the European Central Bank and the central banks of the member states), the creation and updating of the exchange rate mechanism.

Without diminishing the importance and role of the above institutions, one may consider the Maastricht Treaty as the "birth certificate" of the EMU and the nominal convergence concept. Obviously, the Treaty: (1) caused the introduction of the common monetary policy based on a single currency, administered by a single independent central bank – the European Central Bank (ECB); and (2) set the nominal convergence criteria to be fulfilled by the member states in order to become members of the European Monetary Area.

The fundamental objective of the common monetary policy and exchange rate policy, set by the Treaty, is, on the one hand, price stability and, on the other hand, support (without any damage to price stability) for the general economic policy of the EU for real convergence, by catching up with the developed countries, in compliance with the principles of the market economy, competition and cohesion.

On the common monetary policy. It is a known fact that the EMU is based on three main pillars: monetary, fiscal and economic/structural[1]. The transition to the EMU entails differentiated changes in the policies and the decision systems for the three pillars. The monetary pillar is based on a very centralized coordination, achieved by the replacement of the national policies with Community policies. Moreover, action is taken to adapt the entire institutional system as well as its infrastructure, in support of the above changes.

[1] Lutaş, M., *Uniunea Economică şi Monetară*, Institutul European din România, Bucureşti, august 2005

The changes in the other pillars are less spectacular as regards the political and decision-making competence. The EMU member states model their responsibility for the economic policy in accordance with the subsidiarity principle and what is required by the open marked economies and the fair competitive environment. Here, the stress is laid, on the one hand, on extending the coordination of the fiscal policy to the EU and, on the other hand, on increasing the capability of the member states to gradually achieve convergence in the economic performance field.

On the nominal convergence criteria. These criteria are the minimal requirements to be met by an EU member state to enter the euro zone. Joining the euro area means that the states must give up their national currency and their national monetary policy and, equally, adopt both the single European currency and the common monetary policy, formulated and coordinated by the European Central Bank.

2. THE STAGES OF NOMINAL CONVERGENCE

Nominal convergence by monetary integration is a long process. This process is closely linked with the institutional and real convergence and implies tree main stages: pre-accession to the EU, post-accession to the EU and euroisation.

2.1 The pre-accession stage

This stage is connected with the institutional changes and construction, as well as with the mechanisms of the monetary system. It lasts until the accession to the EU. During the pre-accession stage, the applicant countries, on the one hand, maintain their monetary sovereignty, which enables them to choose the proper exchange rate regime, as a ground of the macroeconomic stability. On the other hand, the countries are compelled to adopt the Community acquis concerning the independence of the central bank, the liberalisation of the capital flows, the ban on the direct financing of the government by the central bank, the ban on the privileged access of the government to financial institutions.

At this stage to achieve macroeconomic stability by diminishing inflation, controlling the balance of payments, and keeping the budget deficit and public debt at a reasonable level, the applicant countries are free to use the most adequate/efficient exchange rate regimes. Actually, the regimes cover the entire range of arrangements: from the rigid/fixed regime imposed by the monetary council to the free floating regime. During the pre-accession to the EU (1999-2004 and 1999-2006)[2], the candidate countries established the exchange rate regimes presented in Table 4.1.

[2] We considered this interval since 1999 (the year when the European single currency – euro – was adopted) and 2004 witnessed the accession to the EU of ten countries: the Czech Republic, Cyprus, Estonia, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia and Hungary. As for Romania and Bulgaria, the pre-accession period ranged since 1999 up to 2006, for the same reasons.

Table 4.1

The exchange rate regimes in the countries which acceded to the EU in 2004 and 2007

Country	**Exchange rate regime**
Czech Republic	Controlled floating
Estonia	Monetary council (fixed rate)
Latvia	Monetary quasi-council (fixed target and special drawing rights)
Lithuania	Monetary council (fixed rate)
Poland	Sliding lane ± 15%(since 2001, free floating)
Slovakia	Controlled floating
Slovenia	Controlled floating
Hungary	Sliding lane ±15%
Bulgaria	Monetary council (fixed target, euro)
Romania	Controlled floating

Source: De Haan J.S.C., W. Eijffinger and S. Waller (2004), The European Central Bank: Centralization, Transparency and Credibility, Cambridge M.A., MIT Press; Irina Bălteanu, "Există riscul unui atac speculativ în ţările în tranziţie înainte de intrarea în Uniunea Economică şi Monetară?", in Daniel Dăianu, Mugur Isărescu, Noii economişti despre tranziţia în România, Ed. Enciclopedică, Bucureşti, 2003.

Practice proves that there is no single recipe to optimize the exchange rate regime in these countries. The selection of the regime was based on features and priorities specific to each country. Either opting for flexible solutions (free floating and controlled floating) or opting for the fixed exchange rates, governments managed to fulfil the main task concerning the inflation decrease, the balance of payments equilibrium, the protection against speculative attacks and the prevention of the negative effects of volatile capital.

The adoption of different exchange rate regimes was meant either to ensure price stability, whether they were compatible or not, or to achieve exchange rate stability. During the transition period (1991-2004), the countries shifted from quick mechanisms to flexible mechanisms to ensure disinflation and economic growth. Only the countries confronted with monetary crisis and excessive openness due to the small size of the national economy (Bulgaria, Estonia, Latvia, Lithuania) adopted a monetary council or fixed exchange rates in order to ensure monetary stability and prevent speculative attacks. In principle, the selected exchange rate regime is a key determinant of a country's macroeconomic stability, which influences the investment and business environment of the country; therefore, governments must use this regime as an important anchor of the economic policy.

Since there were no constraints during the pre-accession period, it was possible to adopt different types of exchange rate. The ten countries that joined the EU on May 2nd, 2004, and Romania and Bulgaria, on the 1st of January, 2007, must adopt another exchange rate mechanism, called the Exchange Rate Mechanism II (ERM II), as a lead-up to the accession to the euro area[3].

[3] Initially, the exchange rate mechanism was very restrictive, as the daily fluctuations had to range between ±2.5%, as against the two-year average. This mechanism was called ERM I. Following the frequent non-observance of these limits by the member states, the fluctuation range was extended to ±15%. This is the ERM II.

2.2 The post-accession stage

This stage ranges from the countries' official accession to the EU up to the accession to the Euro Area. The main feature of this stage is that the countries lose most of their monetary sovereignty, since the European Central Bank takes over most tasks from the national central banks in matters of monetary policy.

In the single market based on the free movement of the goods, services and factors, the effects of excessive fluctuations in the exchange rate of an EU member states extend freely to the entire Community economy and damage the other member states. That is why exchange rates are common problems that must be solved on the EU level. Under these circumstances, the monetary policy of the new EU member states is subject to a new exchange rate mechanism (ERM II), meant to assure price and exchange rate stability in accordance with the convergence criteria of the Maastricht Treaty, as a prerequisite to the accession to the Euro Area.

Any discussions about the advantages and disadvantages of various currency arrangements, as well as the desire for a shorter or immediate accession to the Euro Area are practically superfluous. The new member states can no longer have their own options that might contradict the official position of the EU, since either the problems are clarified by treaties and agreements, or the countries have no significant power of negotiation with the Community authorities in order to influence the decision-making.

According to the Copenhagen criteria, the new EU member states have to make every endeavour to accede to the EMU as soon as possible, provided that they meet the criteria. So, the new-comers are not allowed to delay the ERM II adoption and accession to the Euro Area, like the United Kingdom and Sweden were allowed to.

Romania, and other countries which signed the Accession Treaty, set different terms for the ERM II adoption and integration into the Euro Area, in accordance with their own pace (Table 4.2).

Table 4.2

The schedule of some CEE countries for joining the ERM and Euro Area

Country	EU accession time	ERM II joining time	Target-time for the accession to Euro Area
Poland	2004	2006	2009-2010
Czech R.	2004	2006-2007	2009-2010
Slovakia	2004	2006 (first half of the year)	2008-2009
Hungary	2004	2007-2008	2010-2011
Romania	2007	2010-2012	2012-2014

***Source*:** Mugur Isărescu, Programul economic de preaderare, ediția 2005, Obiectivele pe termen mediu ale politicii monetare şi cursului de schimb, Bucureşti, 20 iulie 2005; Napoleon Pop, "Adoptarea euro de către România. Recomandări pentru pregătirea unei strategii de success", INCE, Probleme economice, colecția "Biblioteca economică", vol. 173, 2005, p. 29.

According to the EC and ECB regulations, the new member states may accede to the Euro Area provided that they participated at least two years in the ERM II, which is a stage characterized by fixed, yet adjustable, exchange rates, but still

adjustable. Therefore, the new-comers become, within a short period (about two years), EMU members. The table shows that the accession to the EMU II takes two years after the accession to the EU. There are countries which adopted the ERM II at the accession time (Italy, Finland, Greece, Latvia, Cyprus, and Malta), while others adopted it one month later (Estonia, Lithuania, and Slovenia). This was mostly a consequence of the policy for the liberalisation of the international capital flows, as an important and sensitive part of the Community acquis, "although they became more vulnerable to speculative attacks"[4].

The formulation of the monetary policy in the pre-accession period is based on the four nominal convergence criteria stipulated by the Maastricht Treaty, namely: price stability, exchange rate stability, diminishing long-term interest rate and a sustainable fiscal status (non-excessive deficit) (Table 4.3).

Table 4.3

List of the nominal convergence criteria of the Maastricht Treaty[5]

Criteria	Explanation and limits
1. Price stability	The average inflation rate throughout one year before the accession to the Euro Area shall not exceed by over 1.5 percentage points the inflation rate of the three member countries with the best results in matters of price stability.
2. Sustainable fiscal status	• Budget deficit below 3% of the GDP. • Public debt below 60% of the GDP.
3. Exchange rate stability	Observance of the normal fluctuation lanes of ±15%, provided by the ERM at least in the last two years before the country accession to the EMU and no devaluation of the national currency in relation to the euro during the same period.
4. Lower long-term interest rate	The long-term interest rate shall not exceed by maximum two percentage points the average of the interests of the three countries with the lowest interest.

***Source*:** The Maastricht Treaty (Article 121), The Treaty for the Institution of a Constitution for Europe (Article III 198) and The Protocol on the Convergence Criteria (Annex to the Treaty for the Institution of a Constitution for Europe).

The nominal convergence criteria have a strong political motivation. This motivation is connected with the economic and monetary stability and the economic performance of the countries with the best practice, since these countries are considered as benchmarks for the evaluation of the nominal convergence criteria.

Although all the countries which joined the EU virtually became (after a certain period) EMU members also, still their status in relation to the Euro Area was not the same. Out of the 27 member states, twelve are integrated into the common

[4] It is a unilateral voluntary engagement of the countries, which does not mean an additional obligation for the ECB (Sylvester Eijffinger, "Comment", in European Central Bank, *The New EU Member States Convergence and Stability*, Third Central Banking Conference, 21-22 October 2004, pp. 177-8).

[5] According to the Protocol concerning the nominal convergence criteria (Annex to the Treaty), the inflation is computed by one consumer price index on a comparative basis, taking into account the differences in the national definitions.

monetary area (Euro Area)[6], two benefit from the so-called opting-out clause, which allows them to opt or not for the Euro Area[7], while the other countries (which joined the EU after signing the Maastricht Treaty) will become EMU members[8], that is, they will have access to the Euro Area and adopt the single currency only after participating, at least two years, in the ERM II[9] (as a lead-up period) and only if they prove by concrete results that they comply with the nominal convergence criteria. As long as these criteria are not attained, those countries remain member states with a derogation status, excluded *de jure* and *de facto* from the rights and obligations of the European System of the Central Banks, and the rights and obligations of the Euro Area.

As for the access of the EU member countries to the Monetary Union, The Treaty compels the EC and ECB to assess these countries' compliance with the nominal convergence criteria. The assessment is annual and included in the above-mentioned institutions' reports. For example, according to the 2004 reports, none of the countries which acceded to the EU after 1994 met the nominal convergence requirements. Table 4.4. contains the results of the assessment concerning the fulfilment of the four convergence criteria by the above-mentioned countries, to which we add Romania.

The table shows that no country that acceded to the EU in 2004 fulfilled all convergence criteria to be immediately accepted into the EMU. Analysing the assessment of the fulfilment of the criteria by each country, we find out the following: two countries (Poland and Hungary) fulfilled no criteria; two countries (Malta and Slovakia) fulfilled one criterion; five countries (Estonia, Czech Republic, Cyprus, Latvia, Slovenia) fulfilled two criteria; two countries (Sweden and Lithuania) fulfilled three criteria. In 2004, Romania fulfilled only one criterion (financial stability).

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[6] The following countries adopted the euro: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain.

[7] They are Denmark and the United Kingdom, members of the Community before signing the Maastricht Treaty. They benefit from the opting-out clause. It is a special status granted to these countries, which did not intend to accede to a certain field of economic cooperation. This exceptional status was meant to avoid the general blocking of the integration advance. For example, the United Kingdom did not wish to join some of the EMU institutions, especially those concerning monetary integration. As for Denmark, the exceptional status is extended to issues regarding EU defence and citizenship.

[8] This category of states includes all countries which acceded after signing the Maastricht Treaty. Sweden acceded to the EU in 1995, the Czech Republic, Estonia, Latvia, Lithuania, Poland, Slovakia and Hungary acceded in 2004, and Romania and Bulgaria in 2007.

[9] Until 1999, the ERM (as an important element of the European Monetary System) was a multilateral system of parities which allowed each currency to fluctuate within a limited lane in relation to every currency included in the system, by setting a central parity rate in ECU. It was called the first exchange rate mechanism (ERM I). With the adoption of the euro in 1999, a new exchange rate mechanism, called ERM II, was adopted. Therefore, the multilateral system was replaced with the bilateral one, according to which each national currency is defined by a central parity rate in euros.

Table 4.4

Degree of fulfilment of the convergence criteria in 2004 by the EU member countries that signed the Treaty after 1994, plus Romania

Country	Price stability	Governmental financial stability (deficit and public debt)	Exchange rate stability	Long-term interest rate
Czech Republic[10]	Yes	No	No	Yes
Estonia	Yes	Yes	No	-
Cyprus	Yes	No	No	Yes
Latvia	No	Yes	No	Yes
Lithuania	Yes	Yes	No	Yes
Malta	No	No	No	Yes
Poland	No	No	No	No
Slovenia	No	Yes	No	Yes
Slovakia	No	No	No	Yes
Sweden	Yes	Yes	No	Yes
Hungary	No	No	No	No
Romania	No	Yes	No	No

Source: European Commission, October 2004. Data from Assessment of the Fulfilment of the Maastricht Convergence Criteria and the Degree of Alignment of the Czech Economy with the Euro Area, Report 2005, by the Government of the Czech Republic; European Commission, Romania 2005 Comprehensive Monitoring Report, 25 Oct. 2005; European Commission, Bulgaria 2005 Comprehensive Monitoring Report, 25 Oct. 2005.

To assess the fulfilment of the convergence criteria by Romania and Bulgaria in comparison with the Czech Republic (a country on a higher development and integration level), we present in Table 4.5., on the one hand, the limit (reference) values computed in accordance with the rules stipulated by the Treaty, and, on the other hand, the effectively achieved indicators.

Also, to assess the exchange rate stability, we present graphically the daily fluctuations in Romania, the Czech Republic, Poland and Bulgaria in four years (2002-2005), and check whether the fluctuations ranged within ± 15 %, as against the reference average rate computed for 2002-2006[11] (called the central rate of parity), considered by the Treaty as one of the convergence criteria that condition the access to the Euro Area[12] (Figure 4.1).

The central parity is the daily rate average in 2003-2004. Although the daily rate fluctuation was significant, it remained within the corridor consisting of two lanes, +15% and -15%, except for the Polish currency in a short period in 2004. The plus sign and the upward movement of the exchange rate in the chart mean the national currency depreciation in relation to the euro, and the minus sign and the downward movement of the exchange rate mean the national currency appreciation.

[10] Later computations revealed that the Czech R. also fulfilled the criterion of the exchange rate stability

[11] For 2006, the data were available for the first months.

[12] The narrow lane of ±2.5% had been operational until 1992-1993, when the European Monetary System collapsed, since it was too restrictive. The narrow lane was replaced with a broader one, of ±15% around the central parity, considered as being comfortable enough (Wilhelm Salater, "Alegerea regimului de politică monetară în ţările aflate în proces de aderare la Uniunea Europeană; întreţinerea directă a inflaţiei şi Consiliul Monetar", in Daniel Dăianu and Mugur Isărescu (coord.), *Noii economişti despre tranziţia în România*, Ed. Enciclopedică, 2003).

Like the Czech Republic and the other countries, Romania is characterized by the appreciation of the national currency (leu) in relation to the euro and other currencies. It is not our intention to provide causal explanations of the above trend, but we only point out that this phenomenon causes tension in the economy, since it hinders exports and stimulates imports.

Table 4.5

Assessment of the fulfilment of some nominal convergence criteria of the Maastricht Treaty by Romania and Bulgaria in comparison with the Czech Republic

- percent -

	2001	2002	2003	2004
A. Indices of the corporate consumer price (inflation)				
1. Average in three countries with the lowest inflation	1.6	1.1	1.2	0.9
2. Reference value (line 1+1.5 p.p.)	3.1	2.6	2.7	2.4
3. Effective inflation value for:				
• Czech R.	4.5	1.4	-0.1	2.7
• Romania	34.5	22.5	15.3	11.9
• Bulgaria	8.9	7.3	3.8	7.6
B. General governmental deficit in relation to the GDP				
1. Reference value	-3.0	-3.0	-3.0	-3.0
2. Effective value for:				
• Czech R.	-5.9	-6.8	-12.6	-5.2
• Romania	-3.5	-2.0	-2.0	-1.4
• Bulgaria	1.4	-0.2	0.6	1.3
C. General governmental debt in relation to the GDP				
1. Reference value	60.0	60.0	60.0	60.0
2. Effective value for:				
• Czech R.	25.3	28.8	37.8	38.6
• Romania	23.2	23.3	21.8	18.5
• Bulgaria	78.6	65.1	60.5	63.0
D. Long-term interest rate				
1. Average in 3 countries with the lowest inflation	...	4.90	4.12	4.28
2. Reference value (line 1+2.0 p.p.)	...	6.90	6.12	6.28
• Czech R.	...	4.94	4.12	4.75
• Romania	...	....	....	6.75[13x)]

Source: *Assessment of the Fulfilment of the Maastricht Convergence Criteria and the Degree of Alignment of the Czech Economy with the Euro Area*, Report 2005 by the Government of the Czech Republic; European Commission, *Romania 2005 Comprehensive Monitoring Report*, 25 Oct. 2005; European Commission, *Bulgaria 2005 Comprehensive Monitoring Report*, 25 Oct. 2005.

[13] Isărescu, M., *Obiective pe termen mediu ale politicii monetare şi cursului de schimb, Programul economic de preaderare*, ediția 2005

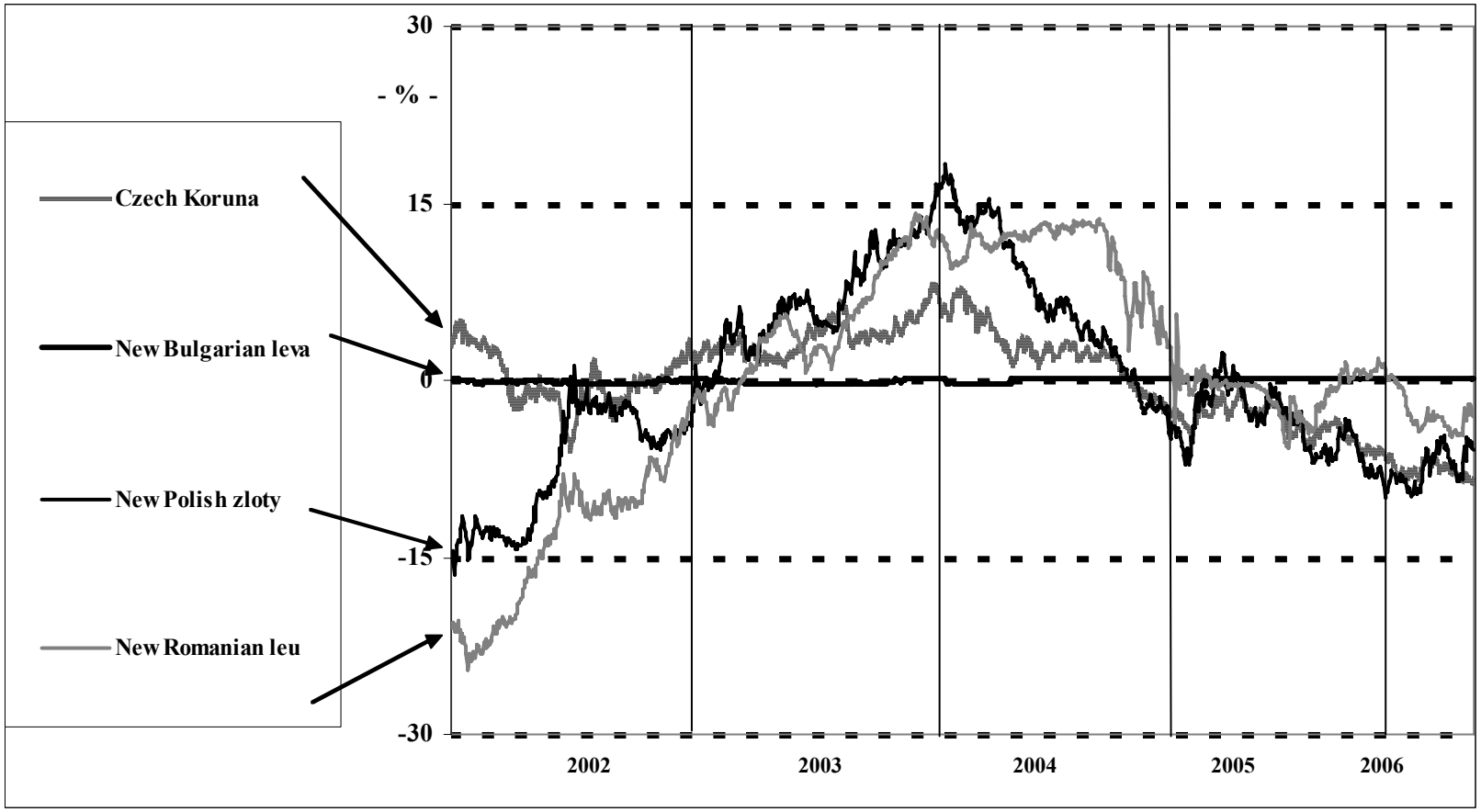

Figure 4.1. *Exchange rate fluctuation as against the 2002-2006 average (limit corridor ± 15 %).*

Source: Based on Eurostat.

3. CONTROVERSIES AND DEBATES CONCERNING THE TRANSITION TO THE EMU. THE QUESTION OF THE BALASSA-SAMUELSON EFFECT

While the applicant countries enjoyed, during the pre-accession to the EU, a high level of freedom in formulating and implementing their monetary policy, this freedom lowered during the post-accession period due to the convergence criteria imposed by the Maastricht Treaty and the obligation to join ERM II before adopting the euro, in the context of full liberalisation of the trade and capital flows. Therefore, the range of tools for the economy control diminished and the degree of vulnerability of the macroeconomic stability increased, which might affect, to a great extent, the real convergence process.

In this context, many questions, debate topics and controversies have occurred. We approach some of them in brief.

3.1 The shortening of the euroisation period

The economic literature reveals that, in the case of the recent CEE members of the EU which were imposed restrictive conditions, this period implies excessive costs in exchange for uncertain and delayed benefits. Moreover, all capital of trust invested in the national currency for 4-5 years to achieve its appreciation and in the supporting institutions is suddenly shattered and becomes nil with the transition to the euro. It looks like the Sisyphean labour or a Fata Morgana chaser. The appreciated national currency, sovereignty over the monetary policy, ERM, etc. will be no longer necessary after the adoption of the euro.

The earlier integration of these countries into the Euro Area would spare major efforts, useless for some authors, and bring significant advantages, consisting of:

- *on the microeconomic level,* the elimination of the risk and cost of the exchange rate fluctuation, the elimination of the currency transaction cost, the increasing transparency of prices;
- *on the macroeconomic level,* the diminution in inflation and interest rates to be possibly achieved in the very moment of the euro adoption.

As ordinary EU members, the countries are no longer able to use the adequate tools for protection against speculative capital flows and benefit from the EU support. Joining the Euro Area earlier could protect these countries against the possible volatility of the speculative capital or the speculative attacks.

The EMU authorities' and the EMU member countries' viewpoint is contrary to the above one. They consider that the new-comers must not join the EMU too early and reject unilateral euroisation. On adopting the euro, the CEE countries must not have a weak currency. Otherwise, it may endanger the euro stability and credibility, on the one hand, and force the countries to request, after joining the

EMU, financial support from the European Community in case of asymmetrical shocks after the euro adoption, on the other hand.

These countries should join the new club in good condition with sound economies, able to face the shocks caused by the enlarged competitive market. Having joined the EMU, the countries are deprived of their monetary policy tools and, consequently, their main means to avoid imbalances are those that ensure the flexibility of the real economies (production structure, workforce, wages, etc.) and the financial tools. To reach the EMU stage, the new EU members must finalize the intermediate stage – often compared to the Purgatory – for testing the financial tools and the competition institutions, as well as for adjusting the economic branches, the production and the production factors.

During the lead-up period, the countries must eliminate the causes of the internal shocks, avoid and diminish the external asymmetrical shocks and create more flexible adjustment mechanisms in the absence of national monetary policies. The EMU authorities wish that the euroisation of the new-comers took place gradually and orderly and ensured, at the same time, nominal and real convergence. They think that the exposure of unprepared economies, *i.e.* not very flexible ones, to the rigorous discipline of the European single currency could be very hazardous, first to the economies themselves, but also, to some extent, to the whole European economic system.

3.2 Exchange rate stability versus inflation rate diminution and the Balassa-Samuelson effect

A largely debated topic concerning nominal convergence is the impossibility that the CEE countries fulfil, after the pre-accession to the EMU, the following two conditions: *the exchange rate stability and the inflation rate diminution*. In fact, it is a return to a hypothesis formulated independently by Balassa and Samuelson in 1964 in connection with the effects of the economic relations between the developing and the developed countries. They started with the division of the economic branches into two large sectors – tradable for export and non-tradable ones – implying a faster productivity growth in the tradeable sectors than in the non-tradable ones, in the less developed countries. They proved that, in this case, not only a higher rate of inflation, caused by the non-tradable goods (services) sector would occur, but also the appreciation of the real exchange rate, caused by the higher productivity of the tradable goods sector, would take place.

The model of the Balassa-Samuelson (B-S) effect is fully valid for the CEE countries, in full process of integration into the EMU, due to some situations (hypotheses) similar to those considered by the two economists many years ago.

The first similar situation refers to the existence of economic development gaps between countries expressed by the GDP per capita and computed in relation to the purchasing power parity (PPP-euro). Even on the European level there are significant differences in economic development between the EU-15 and the countries which joined in 2004 and 2007. It is worth mentioning that these countries are less developed than Greece, Portugal and Spain at the time of their accession to the European Community (Table 4.6).

Table 4.6

The position of the countries acceding to the EU in relation to the development level (per capita GDP computed on the basis of the PPP-euro, percent)

EU 15 average	**100.0**
Czech R. (2004)	64.6
Estonia (2004)	47.1
Latvia(2004)	39.4
Lithuania (2004)	43.9
Poland (2004)	45.1
Slovakia (2004)	48.8
Slovenia (2004)	72.7
Hungary (2004)	55.3
Bulgaria (2007)*)	32.1
Romania (2007)*)	32.8
Greece(1981)	62.4
Portugal 1986)	60.8
Spain (1986)	73.7

Source: Eurostat; data on Greece, Portugal and Spain, in Laszlo Halpern and Charles Wyplosz, "Economic Transformation and Real Exchange Rates in the 2000's; The Balassa-Samuelson Connection", Chapter 6, in *Economic Survey of Europe*, 2001, No. 1, UN/ECE, Geneva, September 2001, p. 4.

Taking into account the special cases of Romania and Bulgaria the B-S effect might have a stronger impact on both the evolution of the inflation and the appreciation of the real exchange rate. But the size and direction of the impact on the two objectives might be different in the two countries due to the different existing exchange rate regimes.

*) The data on Bulgaria and Romania are based on the estimated PPP-euro in the accession year, 8700 and 8900 euros, and the relation to the EU average is based on the estimated PPP in 2007, *i.e.*, 27100 euros

The second situation (hypothesis) considered by the B-S theory, similar to that of the CEE countries, is related to the consequences or the effects of the implementation of the strategy for catch-up with the developed countries by productivity increase and trade integration. On the supply side, a more significant and faster improvement of productivity takes place in the tradable goods sector (industry) than in the non-tradable goods sector (services)[22], which includes the so-called public goods, as well as the public utilities with a monopolistic or semi-monopolistic character.

As a rule, an increase in productivity is accompanied by a rise in wages. Therefore, a faster increase in the productivity of the tradable goods sector than in the non-tradable goods sector causes a faster rise in wages in the former, as it exceeds the wage level of the latter. The possibility that the workforce will move towards better paid jobs exerts a real pressure on the non-tradable goods sector for a rise in wages, but without the corresponding increase in productivity. One should also consider the pressure exerted by the trade unions from the public services for a rise in wages, justified not by the productivity increase, but by the scarcity of the means of subsistence.

As the rise in wages is not matched by the rise productivity, the only way to cover the costs with the incomes, plus a minimum profit, in the non-tradable goods (services) sector is to raise the prices of such goods. Besides, there is something else that counts: since some of the goods produced by this sector are inputs of the tradable goods sector, a rise in the price of the latter may occur at a rate above the productivity rate increase in this sector. If the rise in price is not accompanied by at least equal productivity increases, then an inflation increase occurs.

In this equation, one should also include the demand-side dynamics, influenced by the rise in income, caused by the productivity increase. Demand is different in relation to the goods from the two sectors: either at equal rates for both categories of goods, or at higher rates for the tradable goods, or, finally, at higher rates for the non-tradable goods (services). Each alternative has a different impact on the inflation rise.

According to the analysis of the statistical data on the CEE countries, Halpern and Wyplosz (2001) conclude that non-tradable goods price inflation is higher in the

[22] Some authors doubt whether this hypothesis is true, since one should take into account that the services sector also feels the increasing effect of the scale economy, production diversification, as well as the elasticity increase with the sensible rise in the income of the population. For example, Halpern and Wyplosz (2001) write that the assertion that most of the productivity gain occurs in the tradable goods sector is not thoroughly true, as long as the non-tradable goods and services are inputs of the tradable goods production and, consequently, are confronted with indirect competition. Moreover, most services are superior goods that improve the standard of living and increase demand. Therefore, there is little doubt whether productivity will increase faster in the tradable goods sector than in the non-tradable goods sector (Laszlo Halpern and Charles Wyplosz, "Economic Transformation and Real Exchange Rates in the 2000's: The Balassa-Samuelson Connection", in *Economic Survey of Europe*, 2001, No. 1 UN/ECE Geneva, September 2001, pp. 7).

countries with a faster productivity increase. Therefore, countries with faster economic growth are expected to reach a higher price rise rate for the non-tradable goods. Obviously, this influences the general price index of the consumer goods, as an average of the prices of tradable and non-tradeable goods.

The third situation, similar to that analysed by Balassa and Samuelson, is related to the impact of trade integration on the exchange rate evolution. The analysis of the exchange rate and its evolution under the impact of trade integration is important from two viewpoints: the re-evaluation of the causes of the fluctuations on short and medium terms and the long-term balance (convergence) trend, which confirms the law of one price (LOOP). Both aspects are debated by experts and the outcome is remarkable. But our attention was drawn by the studies on the B-S effect in relation to the impact of the relations between the rise in productivity, wages and prices in the two sectors producing tradable and non-tradable goods on the evolution of the real market exchange rates, in comparison with the exchange rates based on the estimation of the purchasing power parity, taken as benchmark (Egert, Halpern and Mac Donald, 2005; Halpern and Wyplosz, 2001; Breuss, 2003, etc.). The studies of the CEE economies conclude that the real market exchange rates tend towards the balance (convergence) state, initially, by the prevention of the under-appreciation of the national currency against the reference currency and, later, by real appreciation, as a natural process of positive evolution of the real economy consisting in the increase in productivity and competitiveness based on quality.

3.3 Exchange rates and deviation indices

A largely discussed topic, especially by exporters and importers, is that of the currency appreciation or depreciation (in relation to the reference currency), as an important factor influencing competitiveness, knowing that a significant appreciation of the national currency hinders exportation and stimulates importation, while depreciation acts the other way round. The Romanian exporters' appeal to the national public authorities for preventing the appreciation of the leu is actually ineffective, since, in our case, it is a natural market process and the Government's intervention is contrary to the EU regulations.

Further, we try to explain and assess the appreciation of the CEE countries' (including Romania's) currencies in relation to the reference currency (euro), using as computation tools the market exchange rate and the purchasing power parity (PPP).

Denoting by E the nominal exchange rate of the national currency in relation to a foreign (reference) currency, by P the internal price, and by P^* the external price of the goods, the relation:

$$E = P/P^*, \qquad (1)$$

called the market exchange rate, expresses the number of units of the national currency per one unit of foreign currency in external transactions.

Value P can be computed by relation (2):

$$P = EP^*. \tag{2}$$

The exchange rates also can be expressed by a converse ratio:

$$\boldsymbol{e = P^*/P,} \tag{3}$$

which means the number of foreign currency units per one national currency unit. Relation (3) helps us to compute P^*:

$$P^* = eP. \tag{4}$$

There is an extensive literature dealing with the exchange rates produced by the free market mechanisms; it covers several aspects, among which the fluctuation, equilibrium (convergence) and international comparisons of the trend and behaviour of the exchange rates play a key role.

The analysis of the evolution of the market exchange rates reveals two requirements: on the one hand, to set benchmarks or convergence points for those rates, and, on the other hand, to consider comparable measures to be used for the comparisons between countries, especially between those showing considerable differences in the development levels.

In spite of the criticism of the purchasing power parity (PPP), the adoption and use of the exchange rate based on this concept, as a calculation and analysis tool, may help fulfil the above-mentioned requirements. To do that, some methodological clarifications are necessary.

Unlike the market exchange rates (E and e), that represent the natural outcome of the market mechanisms in the monetary-financial domain, the PPP exchange rates (E^{PPP} and e^{PPP}) are estimated on the assumption that the same set of international prices is used in two or more countries compared by the same goods and qualities of the so-called "basket of goods" (P_{BG}), in the following relations:

$$E^{PPP} = P_{BG}/P_{BG}^*, \tag{5}$$

where:

$$P_{BG} = E^{PPP}P_{BG}^*, \tag{6}$$

as well as the converse ratio:

$$e^{PPP} = P_{BG}^*/P_{BG}, \tag{7}$$

where from:

$$P_{CB}^* = e^{PPP}P_{BG}. \tag{8}$$

Theoretically, the PPP exchange rate is based on the law of one price.

As regards the utilisation and interpretation of the real market exchange rates[23] in relation to the PPP exchange rates, the time horizon (Rogoff, 1996) should be taken into account, as follows:

- on long and very long terms, when some real exchange rates tend towards the PPP exchange rate at a very low convergence speed;
- on short term, when there is a deviation of the market exchange rates from the PPP exchange rate, considered as benchmark.

On the basis of these simple relations concerning the two categories of indicators, an evaluation can be made on the position of the market exchange rates in relation to the equilibrium (convergence) state, since:

$$E/E^{PPP} = 1, \tag{9}$$

and

$$e/e^{PPP} = 1, \tag{10}$$

express the convergence state.

But if:

$$E/E^{PPP} > 1, \tag{11}$$

it means that the national currency is underevaluated in relation to the reference one, and the ratio does not express the convergence state. As long as the inequality is considerable and persistent, the market exchange rate is far from the convergence state.

On the macroeconomic level, all aggregated values that form the GDP can be expressed in two ways: 1) by means of the nominal exchange rate based on the consumer price indices (E); 2) by means of the nominal exchange rate based on the comparable PPP (E^{PPP}).

When expressed in the international currency (euro), the market exchange rate (E) may be underevaluated or overevaluated. It includes all current influences in the economy, including those from subjective factors. Expressed in the PPP, the exchange rate (E^{PPP}) reflects directly the effect of the law of one price (LOOP), according to which, in a competitive single market, there is an equalisation tendency for the prices of goods.

The overevaluation or underevaluation of the exchange rate may be determined by *the exchange rate deviation index (ERDI),* computed by means of the ratio between the two types of exchange rate as defined above (the market exchange rate and the PPP exchange rate): E_1/E_1^{PPP}; E_2/E_2^{PPP};...; E_n/E_n^{PPP}.

In time, the index may take on values higher, equal or smaller than 1 (one), which means, respectively, depreciated, convergent and overappreciated market

[23] The real exchange rates stand for the nominal exchange rates adjusted in accordance with the differences in the level of national prices.

exchange rate in relation to the PPP standard exchange rate calculated. As regards the CEE countries, which underwent profound economic transformation and are close to the accession to the EMU, the ERDI describes a downward curve: ($ERDI_0$>$ERDI_1$>$ERDI_2$>….>$ERDI_N$), asymtotic to unit (Figure 4.2).

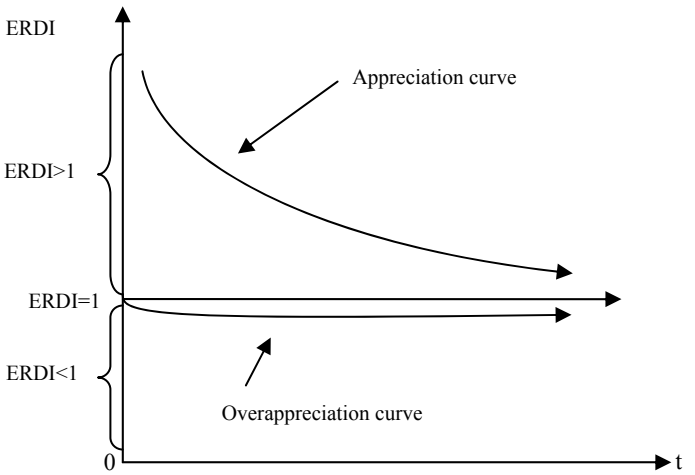

Figure 4.2. *The appreciation (convergence) of the national currency by ERDI*

The downward ERDI curve of the CEE countries shows the quick appreciation of the national currency in relation of the euro.

4. EVIDENCES CONCERNING THE REAL EQUILIBRIUM EXCHANGE RATE

The liberalisation of the national and international markets by removing the tariff and non-tariff trade barriers and strengthening integration, and market relations in all economic sectors, including public services (utilities, health, education, etc.) has contributed to the expansion of the tradable goods sector and the narrowing of the non-tradable goods sector. These actions led to the extension of the law of one price, *i.e.*, the cost of one good is the same both on the domestic market and abroad if the price is expressed in the same currency (Egert, Halpern, Mac Donald, 2005, p. 6).

In the countries or regions where such processes were completed and the economic distortions diminished due to reforms, the exchange rate deviation indices decreased and tended towards unit. Where the index was far above unit, the market exchange rate was underevaluated, and where the index was far below unit, the rate was overevaluated.

Table 4.7 shows the evolution of the market exchange rate deviation index as against the PPP in the CEE countries which joined the EU in 2004 and 2007, as well as in some EMU member countries. The indices represent the ratio of the GDP per capita assessed by PPP-euro to the GDP per capita assessed by the market exchange rates.

Table 4.7

The evolution of the market exchange rate deviation index in the new EU member countries and some EMU member countries, 1993-2006

	1993	1995	1999	2000	2001	2002	2003	2004	2005	2006
CEE member countries since 2004										
Czech R.	3.43	2.58	2.26	2.18	2.03	1.86	1.87	1.87	1.78	1.74
Estonia	5.01	2.60	1.92	1.90	1.80	1.76	1.74	1.74	1.67	1.63
Latvia	5.56	3.01	2.25	1.98	1.95	1.96	2.07	2.01	1.96	1.88
Lithuania	9.07	3.85	2.42	2.16	2.15	2.08	2.06	2.06	1.97	1.92
Poland	...	2.27	2.12	1.94	1.73	1.82	2.045	2.07	1.84	1.79
Slovakia	2.89	2.45	2.47	2.33	2.31	2.27	2.08	1.91	1.87	1.81
Slovenia	1.77	1.34	1.36	1.40	1.39	1.35	1.33	1.37	1.38	1.37
Hungary	2.31	2.28	2.21	2.13	2.03	1.82	1.77	1.69	1.66	1.69
CEE member countries since 2007										
Bulgaria	4.19	3.98	3.31	3.18	3.03	2.88	2.85	2.75	2.69	2.62
Romania	4.23	4.20	3.20	2.78	2.72	2.72	2.69	2.59	210	2.06
EMU member countries										
Greece	1.43	1.29	1.23	1.27	1.25	1.27	1.25	1.22	1.97	1.18
Spain	1.18	1.16	1.19	1.18	1.16	1.16	1.14	1.13	1.10	1.07
Portugal	1.46	1.34	1.35	1.35	1.32	1.31	1.20	1.20	1.19	1.19
Italy	1.14	1.19	1.08	1.09	1.06	1.05	1.01	1.01	1.00	0.99
France	0.93	0.87	0.94	0.96	0.97	0.96	0.94	0.93	0.93	0.93

***Source**:* Own calculation based on Eurostat data, using the GDP per capita, in current price expressed in euros, through the market exchange rate and the PPP exchange rate; the 1993 and 1995 data on Romania and 1993 data on the Czech Republic are taken from B. Egert, L. Halpern and R. Mac Donald, "Equilibrium Exchange Rates in Transition Economies: Taking Stock of Issues", Working Paper, No. 739/2005, William Davidson Institute, Michigan.

Considering the values in the table, we may conclude the following:

1. The real exchange rates are, in general, extremely underevaluated in the CEE countries. The underevaluation took place especially in the early 1990's; it began with the elimination of the constraints on the demand for hard currency and was further amplified by the shocks caused by some actions of the economic reform, such as: price liberalisation, privatisation, poor management on every level, re-orientation of the trade flows, increasing corruption, legislative void, strong economic recession, along with a high inflation, close to hyperinflation, in some cases. One may also add to them political actions for the national currency devaluation in order to improve the foreign balance of the countries.
2. The significant underevaluation of the real exchange rate in the early 1990's, when Romania, Bulgaria and the Baltic countries were at the top, was followed by the appreciation in all countries, along with the economic recovery and productivity improvement at rates higher than those of many EU member countries. In spite of the progress made in this respect, the CEE countries are still affected by a relatively significant underevaluation. Therefore, there still are many resources of appreciation of the real exchange rates. But it may cause commercial troubles: export discouragement and import encouragement.

3. Unlike the CEE counties, the developed EU member countries witnessed the overevaluation of the real exchange rate. According to the data presented in Annex 4.1, the annual deviation index ranged between 0.95 and 0.96 in EU 15, between 0.78 and 0.96 in Germany, and between 0.87 and 0.98 in France, etc. Also, the developed non-EU countries reached overevaluated real exchange rates.

Transposing some of the Annex 1 data into a chart (Figure 4.3), one may see the tendency towards convergence of the market exchange rates and the PPP exchange rates in all CEE countries, including Romania, illustrated by the evolution of ERDI. This tendency confirms, on the one hand, the appreciation of the national currency as an effect of the productivity rise, and, on the other hand, the effect of the law of one price in the context of the competitive market enlargement along with the integration into the EU. The free movement of goods, services, capital and individuals induces the significant diminution of transaction costs due to the elimination of all tariff and non-tariff barriers. The liberalisation of the capital account, the inflows of heavy direct investments in these countries, as well as the extension of partnerships among domestic and foreign companies cause the equalisation of capital costs, the restructuring of production branches by improving the quality and technological levels, as well as the improvement of products and services in a much larger market. But the main element that makes the difference in the EU prices is still the transportation and labour cost, knowing the low elasticity of labour in the European countries.

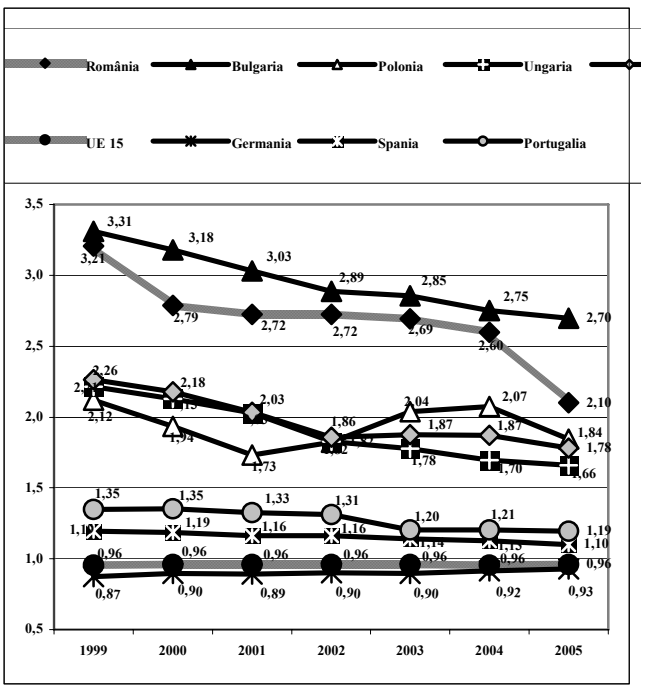

Figure 4.3. *The evolution of the ERDI in relation to the convergence (equilibrium) state of some EU member countries (1999-2005)*

Source: Based on Annex 4.1. data.

Also, the trend towards real exchange rate convergence confirms the theory concerning the B-S effect. Due to the restructuring and economic reform, market forces penetrate the non-tradable products sectors and, consequently, diminish the proportion of the ones that, without the corresponding productivity (therefore, unjustified), get a wage rise which influences inflation. Their openness and the acceptance of the competitive market forces are proved by the gradual elimination of controlled prices; therefore, their share in the consumer price index diminished between 1991-2004, from 47% to 22.5% in Romania, from 27.9% to 10.9% in the Czech Republic, from 11.0% to 1.0% in Poland. The action taken to push the non-tradable goods sector towards the market competition mechanisms brings about not only the dependence of the wage rise on labour productivity, but also the significant appreciation of the real exchange rates. This can be proved by the Table 4.8 data that reveal the significant difference in the ERDI by category of goods classified in accordance with the market relations. In general, the ERDI of the non-tradable goods – either industrial goods or services – is lower than that of the non-tradable goods.

If the data on the ERDI level of various groups of goods and services in the CEE countries that joined the EU in 2004 are linked to the upward trend characterizing the transition of the sectors from a closed (protected) to an enlarged competitive regime, we may conclude that this process also contributes to the general trend of appreciation of the real exchange rates of these economies.

Table 4.8

The ERDI level by group of goods and services of the new in 2004 EU members (CEE 8), 2002

Tradable industrial goods			**Services**		
Durables	Semi-durables	Food	Tradable services	Non-tradable services	Property prices[24]
1.13	1.47	1.46	1.80	2.42	2.41

Source:Balász Égert, Lásló Halpern and Ronald Mac Donald, *Equilibrium Exchange Rates in Transition Economies: Taking Stock of the Issues*, Williamson Davidson Institute, Working Paper, No. 793, October 2005, p. 14.

The results of the above analyses reveal the progress made by the CEE countries towards nominal convergence during the lead-up to the transition to the Euro Area. They deserve to be the object of further thorough research and scientific debates concerning the nominal convergence theory in close connection with the real convergence and institutional convergence theories.

[24] This category of products and services includes those concerning intellectual property and industrial property, at semi-monopolistic prices

Annex 4.1

Exchange Rate Deviation Index: GDP per capita expressed in PPP-euro and GDP per capita expressed in market exchange rate-euro, in the EU member countries

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
UE15	…	…	…	…	…	0.95	0.95	0.95	0.95	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Belgium	1.03	1.05	1.03	0.97	0.95	0.87	0.90	0.93	0.93	0.93	0.96	0.97	0.98	0.97	0.97	0.96	0.96	0.96
Czech R.	…	…	…	…	…	2.59	2.44	2.41	2.22	2.26	2.18	2.03	1.86	1.87	1.87	1.78	1.75	1.75
Denmark	0.78	0.80	0.80	0.78	0.78	0.72	0.73	0.75	0.75	0.77	0.78	0.78	0.76	0.75	0.76	0.75	0.74	0.74
Germany	…	0.96	0.93	0.86	0.86	0.78	0.82	0.85	0.86	0.87	0.90	0.89	0.90	0.90	0.92	0.93	0.94	0.95
Estonia	…	…	…	5.05	3.66	2.60	2.20	2.11	1.97	1.93	1.90	1.80	1.77	1.75	1.74	1.67	1.64	1.62
Greece	1.55	1.52	1.49	1.43	1.40	1.29	1.24	1.22	1.25	1.23	1.27	1.26	1.27	1.25	1.22	1.20	1.18	1.17
Spain	1.13	1.10	1.09	1.18	1.24	1.16	1.14	1.17	1.18	1.19	1.19	1.16	1.16	1.14	1.13	1.10	1.07	1.05
France	0.94	0.98	0.97	0.93	0.93	0.87	0.88	0.93	0.93	0.94	0.96	0.97	0.96	0.94	0.93	0.93	0.94	0.93
Ireland	1.08	1.12	1.11	1.12	1.11	1.06	1.04	0.98	0.98	0.95	0.92	0.89	0.86	0.84	0.85	0.84	0.83	0.82
Italy	1.02	1.00	1.02	1.14	1.17	1.19	1.08	1.06	1.08	1.08	1.09	1.07	1.05	1.01	1.00	1.00	1.00	1.00
Cyprus	…	…	…	…	…	1.16	1.18	1.16	1.15	1.15	1.14	1.14	1.13	1.08	1.11	1.09	1.10	1.10
Latvia	…	…	10.29	5.57	3.49	3.02	2.75	2.49	2.42	2.25	1.99	1.95	1.97	2.07	2.01	1.97	1.88	1.81
Lithuania	…	…	15.43	9.07	5.32	3.86	3.20	2.58	2.47	2.42	2.16	2.15	2.08	2.07	2.06	1.98	1.92	1.91
Luxembourg	0.98	1.01	0.99	0.91	0.88	0.80	0.82	0.85	0.86	0.89	0.89	0.88	0.88	0.89	0.91	0.88	0.87	0.86
Hungary		4.30	4.48	2.31	2.29	2.28	2.29	2.17	2.22	2.21	2.13	2.03	1.82	1.78	1.70	1.66	1.69	1.70
Malta	…	…	…	…	…	…	…	…	1.56	1.52	1.45	1.41	1.44	1.47	1.47	1.46	1.44	1.42
Netherlands	1.03	1.05	1.04	0.98	0.97	0.89	0.92	0.95	0.95	0.95	0.95	0.95	0.94	0.92	0.94	0.94	0.94	0.95
Austria	1.01	1.02	1.00	0.94	0.93	0.85	0.88	0.92	0.92	0.94	0.96	0.95	0.95	0.94	0.96	0.96	0.95	0.95
Poland	…	…	…	…	…	2.27	2.15	2.10	2.03	2.12	1.94	1.73	1.82	2.04	2.07	1.84	1.79	1.81
Portugal	1.70	1.60	1.45	1.46	1.45	1.34	1.32	1.33	1.34	1.35	1.35	1.33	1.31	1.20	1.21	1.19	1.19	1.18
Slovenia	…	2.02	1.92	1.77	1.70	1.34	1.39	1.38	1.35	1.37	1.40	1.39	1.35	1.33	1.37	1.38	1.38	1.37
Slovakia	…	…	…	2.90	2.75	2.45	2.43	2.29	2.29	2.47	2.33	2.32	2.27	2.08	1.91	1.87	1.81	1.81
Finland	0.74	0.79	0.93	1.05	0.98	0.82	0.86	0.88	0.89	0.89	0.90	0.89	0.89	0.88	0.89	0.90	0.91	0.91
Sweden	0.76	0.72	0.74	0.88	0.88	0.83	0.78	0.79	0.81	0.83	0.81	0.86	0.84	0.84	0.85	0.87	0.88	0.89
United Kingdom	1.07	1.04	1.08	1.12	1.12	1.12	1.10	0.95	0.92	0.90	0.85	0.87	0.89	0.94	0.92	0.92	0.92	0.92
Bulgaria	0.98	10.26	10.01	4.20	4.95	3.98	4.77	3.95	3.37	3.31	3.18	3.03	2.89	2.85	2.75	2.70	2.62	2.56
Romania	3.99	4.29	6.20	4.23	…	…	4.20	…	…	**3.21**	**2.79**	**2.72**	**2.72**	**2.69**	**2.60**	**2.10**	**2.06**	**2.08**

***Source**:* Own computation based on Eurostat data

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SMALL PACKAGE TRANSPORTATION COMPANIES: AN EXPLORATORY ANALYSIS

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Abstract:

Purpose: *To determine the evaluative criteria used when choosing small-package transportation companies, the level of importance of selected criteria, and how selected package carriers are perceived by small business decision makers.*

Methodology: *Data were collected via self-administered questionnaires from a total of 31 decision makers in small businesses. The self-administered questionnaire was designed with four sections that handled separate but related topics. Questions from all four sections were taken from Parcel Shipping and Distribution's Best Practice Survey (2006), located at www.psdmag.com/bpsurvey. asp.*

Results: *Findings suggested that on-time delivery was the most salient evaluative criterion used by respondents. Surcharges were the least important criteria when selecting a small package transportation company. Even though, on-time delivery was ranked the highest by all job functions, office managers felt it was second to price/rates.*

Research/Practical Implications: *First is the recognition that package shipping appears to have become more of a commodity service. Even though on-time delivery and reliability of service were considered most important, price/rates were the most important criteria for office managers. For that reason, marketers, when targeting this group must focus efforts towards bottom line cost savings, in essence, justifying the price. When targeting CEOs, presidents, CFOs, accounting personnel, directors of transportation, and shipping managers, marketers should focus efforts on the benefits of on-time delivery and reliability. In other words, "on-time delivery" seems to be the motivating factor for favoring one carrier over another in an acceptable price/rate level.*

Keywords: *Business Marketing, Transportation, Logistics, Small Package Delivery, B2B, Organizational Buying Behavior*

1. INTRODUCTION

On a daily basis, businesses are faced with the decision of which small-package carrier should they utilize for their shipping needs.. The decision can be

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difficult, even more so since the small package transportation and freight industry have been projected by the U.S. Department of Transportation to increase by 67 percent domestically and 75 percent internationally between 1998 and 2020 (USDOT, 2002). Given this, the industry is estimated to be a $30 trillion market by 2020 (USDOT, 2002).

In 2006, Standard and Poor companies (S&P) saw approximately five percent growth in the air cargo sector, while small packages experienced an eight percent increase internationally and three percent domestically (Stovall, 2006). The volume of activity is now coming out of Asia, particularly China, and will feed air freight volumes over the next couple of years (Stovall, 2006).

Since the formation of the United States Postal Service in 1775, three independent carriers entered the market to compete for the delivery of small packages. These are: the United Parcel Service (UPS), Federal Express, and DHL. The emergence of alternative small package transportation companies has created a highly competitive marketplace, giving more choices to consumers and businesses, and has rendered the decision making process a lot more complex..

The increased competition in the small package delivery market has had a visible impact on market share. Companies in need of these services are aware of their choice alternatives and often shift their business around to gain more leverage with a particular carrier. Longtime market leader UPS has seen some of its market share snatched by growing rivals DHL, the U.S. Postal Service and FedEx (Hannon, 2005). SJ Consulting, the shipping industry analyst group in Pittsburgh, estimated that UPS had more than half (51%) of the market share in 2004 (Hannon, 2005). while FedEx had 27% share, the United States Postal Service garnered nearly 13% and the latest U.S. kid on the block DHL had between seven and eight percent (Hannon, 2005).

The United States Postal Service, UPS, DHL, and FedEx are all reputable and successful small package transportation companies. The question is how is the choice made to use one provider or the other?

Due to the size, nature, and consequences of some organizational decisions, decision making units within businesses can be large and complex. Large, highly structured businesses regularly involve more individuals in a purchase decision than do smaller, less formal ones (Brown and Brucker, 1990). Further, critical decisions are likely to welcome others from a wider variety of functional areas and organizational levels (Brown and Brucker, 1990).

The decision-making unit can be partitioned by functional responsibility and area of influence (Hawkins, Best, Coney, 1995). Functional responsibility can include specific functions such as engineering, manufacturing, transportation, research and development, sales, and purchasing, as well as general management (Hawkins, Best, Coney, 1995). Each entity views the needs of the business

differently and as a result, weighs different evaluative criteria differently (Hawkins, Best, Coney, 1995).

How the final purchase decision is made is determined in part by individual power (Kohli, 1989), expertise (Thomas, 1984), and the degree of influence each functional area possesses in the decision process (Lambert, Boughton, and Banville, 1986). The means by which the organization resolves group decision conflicts (Lambert, Boughton and Banville, 1986) and the nature of the decision will also influence the final purchase decision (Wilson, Lilien, and Wilson, 1991).

Perception is important when it comes to organizations choosing which product or service to go with (Hawkins, Best, Coney, 1995). To build a position with organizational customers, a business must go through sequential stages of exposure, attention, and interpretation (Hawkins, Best, Coney, 1995). Just as the perceived characteristics of an individual is affected by nearly everything associated with them — including his or her neighborhood, friends, activities, clothes, and manner of interacting — so too is a brand or an organization (Aaker, 1996). A potential buyer develops certain images of a seller's organization from its products, people, and organizational activities. Organizations have memories and base their decisions on images or memories they have constructed (Hawkins, Best, Coney, 1995). Once an image is formed by an organization, it is difficult to change; therefore, it is important for a business to develop a sound communications strategy to build and reinforce the desired image or brand position (Hawkins, Best, and Coney, 1995).

Given, the above, the purpose of this study was to determine how businesses choose small package transportation companies. Specifically, this study sought to:

1. Determine attitudes and perceptions toward selected small package transportation companies (DHL, FedEx (Express), FedEx (Ground), UPS, USPS),
2. Determine the criteria that are considered important when choosing a small package transportation company, and
3. Determine the level of importance of selected criteria when choosing a small package transportation company among different individuals in an organization.

2. RELEVANT LITERATURE

2.1 United States Postal Service

The United States Postal Service (USPS), an independent establishment of the Executive Branch of the United States Government, has annual operating revenues of nearly $70 billion and delivers to every household and business in the U.S. (USPS, 2006). They deliver 212 billion pieces of mail, including small packages, to over 144 million homes, businesses and post office boxes in virtually every state,

city, and town in the country, including Puerto Rico, Guam, the American Virgin Islands and American Samoa (USPS, 2006). Furthermore, the USPS handles more than 44% of the world's letter and card mail volume — delivering more mail to more addresses and to a larger geographic area than any other postal service in the world (USPS, 2006). They also deliver around the world.

For the USPS to be successful at fulfilling their obligations they have reached out to their competitors for assistance. For example, FedEx Corp. had a $1.3 billion annual contract with the USPS since 2001. FedEx carried all forms of mail for the USPS, including overnight Express Mail, two-day Priority Mail and first-class (Dade, 2006).

In June 2006, United Parcel Service Inc. (UPS) and the U.S. Postal Service reached a three year agreement that put mail on planes of the package-delivery company; a move that improved the reliability of the USPS. This move by the USPS was to reduce its use of passenger airlines that have failed to meet on-time delivery standards (Dade, 2006). The partnership is expected to generate revenues of more than $100 million a year for UPS and expand it's business relationship with the USPS beyond its current status (Dade, 2006).

2.2 United Parcel Service

The United Parcel Service (UPS), founded in 1907 as a messenger company in the United States, has grown into a $36 billion corporation by focusing on facilitating commerce around the globe (www.UPS.com, 2006). Today UPS is a global company which in 2006 was noted in the *Business Week's* 2006 Best Global Brands issue, as one of the most recognized and admired brands in the world (www.UPS.com, 2006). Further, they have become the world's largest package delivery company and a leading global provider of specialized transportation and logistics services (www.UPS.com, 2006). Each day, UPS manages the flow of goods, funds, and information among more than 200 countries and territories worldwide, as well as provides logistics advice and distribution networks to its customers (www.UPS.com, 2006). In 2005, supply-chain consulting and international shipping accounted for a third of this company's revenues (Anderson, 2006). Moreover, the expansion of global commerce and the desire of businesses to cut costs will enhance future growth in both supply chain consulting and distribution networks (Anderson, 2006).

In 2001, UPS acquired Mail Boxes Etc. for $191 million, and 87% of the franchisees were re-branded as UPS Stores. The company expanded its retail reach in 2006 by adding 300 more UPS Stores bringing the total to approximately 4500 stores.(Gibson, 2006).

2.3 Federal Express

Federal Express was founded in 1971 and ultimately became FedEx Corporation in January 2000 (www.FedEx.com, 2006). FedEx provides strategic leadership and consolidated financial reporting through its various divisions that include FedEx Ground, FedEx Express, FedEx Freight, FedEx Kinko's, FedEx Trade Networks, FedEx Custom Critical, FedEx Supply Chain Services and FedEx Services (www.FedEx.com, 2006). Today's FedEx is a $29-billion dollar network of companies, offering a mix of transportation, e-commerce, and business solutions (www.FedEx.com, 2006). FedEx links companies and consumers to more than 220 countries and territories with support services such as customs clearance, freight forwarding, and supply chain services (www.FedEx.com, 2006).

Like UPS, in 2004 FedEx purchased Kinko's to provide mailing, printing, and other business services. However, unlike UPS, FedEx has not entered into supply chain consulting due to low profit margins (Creamer, 2005).

Even with price increases, FedEx's ground shipments, for example, are expected to remain solid as the market grows more competitive (Dade, 2006). Over the past three years, the Memphis, Tenn., company has expanded globally as well as increased business on the ground in the U.S. (Dade, 2006).

2.4 DHL

DHL has been in business for more than 35 years and continues to build a global delivery network by streamlining express shipping in one country after another (www.DHL.com, 2006). With Germany's government holding an indirect stake of 41.7% in the company, DHL is in over 220 countries and territories and is considered the global market leader of the international express and logistics industry (www.DHL.com, 2006). Further, with $54.47 billion in annual revenues abroad, it is larger than FedEx Corp. and United Parcel Service Inc. combined (Esterl, 2006).

DHL specializes in providing customers with innovative and customized transportation solutions from a single source. (www.DHL.com, 2006) In recent years, DHL has made a concerted effort to penetrate the U.S. market.

In a market dominated by UPS and FedEx, DHL's share is at a meager seven percent. And though DHL rings up less than 10% of its revenue in the U.S., more than 50% of its global express deliveries are to the U.S.; hence, failure here could jeopardize business in other parts of the world (Esterl, 2006).

According to Esterl (2006), DHL may deliver packages in more than 200 countries and territories, but it has failed to deliver investor value (Esterl, 2006). The German delivery and logistics giant is stumbling in the market that matters most and where many of its investors reside: the U.S. (Esterl, 2006). DHL predicted initially that its USA unit would become profitable by the fourth quarter of 2006. The

company however continued to post losses through 2007. Currently, DHL is losing roughly half a billion dollars a year in the U.S. (Esterl, 2006).

To counteract this lackluster performance, DHL is looking to differentiate itself in this highly competitive market with exceptional service. A recent advertising campaign portrayed extreme examples of bad service to highlight its own focus on treating customers better (Howard, 2005).

3. ORGANIZATIONAL DECISION MAKING AND BUYING BEHAVIOR

In organizational decision-making a number of roles may play out by key players. There is the information gatherer, key influencer, decision maker, purchaser, gatekeeper, and ultimately the user (Berkowitz, 1986). A marketing manager could play all five roles, while sales managers may simply be sources of information. The role an individual plays in an organizational decision varies by type of decision and corporate culture (Hawkins, Best, and Coney, 1995).

Because organizational decisions typically involve more individuals in more complex decision choices than household or individual decisions, marketing attempts to influence the decision process are much more complex (Abratt, 1998).

To have a chance at winning a substantial contract, the selling firm must provide relevant information to each potential source of influence (Hawkins, Best, and Coney, 1995). This can be challenging given that each source has different motives and criteria for evaluating products, as well as different information absorption habits (Hawkins, Best, and Coney, 1995). To the extent the selling firm manages to satisfy the information needs of each source of influence; their odds of success improve immensely (Hawkins, Best, Coney, 1995).

3.1 Problem Recognition

Within a decision making unit of an organization, there are key influencers whose role is recognition of a need (Hawkins, Best, and Coney, 1995). For example, a continuing problem between field sales representatives and internal administrative clerks can lead the office manager and sales manager to recognize this problem. Aiding recognition of the need may be the accounting department as will as the finance manager who calls on the main decision maker (Hawkins, Best, Coney, 1995).

Businesses marketing to organizations have to understand how their products or services will impact the client's bottom line cost and overall performance. While a client's organization is always seeking ways to economically streamline its operations, it may not recognize problems that prevent them from improving. Thus, the selling organization must understand the needs of the client so that they can bring to surface problems and solutions that they may not have yet recognized (Hawkins, Best, Coney, 1995).

3.2 Information Search

Information search can be both informal and formal (Weiss and Heide, 1993). Informal information investigating occurs during discussions with sales associates, while attending business meetings, or reading trade publications (Hawkins, Best, and Coney, 1995). Site visits to a potential vendor, laboratory tests of a new or improved product, and exploration of possible product specifications can be part of the information search (Hawkins, Best, Coney, 1995).

3.3 Evaluation and Selection

According to several marketing researchers, the evaluation of choices and the selection often follow a two-stage decision process (LeBlanc, 1987; Day and Barksdale, 1992; Lockett and Naude, 1991). The first phase is making the buyer's qualified vendor list. A conjunctive decision process, whereby a minimum requirement of performance standards is established for each evaluative criterion and all brands that surpass these minimum standards are selected (Hawkins, Best, Coney, 1995). In this manner, the organization screens out potential vendors or options that do not meet the minimum criteria (Hawkins, Best, Coney, 1995).

The second phase involves decision rules such as disjunctive, lexicographic, compensatory, or elimination-by-aspects (Hawkins, Best, Coney, 1995). Disjunctive decision making involves establishing a minimum level of performance for each important attribute (Hawkins, Best, Coney, 1995). Lexicographic requires customers to rank criteria in order of importance (Hawkins, Best, Coney, 1995). Compensatory decision making involves selecting the brand that rates highest on the sum of relevant evaluative criteria (Hawkins, Best, Coney, 1995). Finally, elimination-by-aspects requires ranking the criteria's importance and to establish a cutoff point for each (Hawkins, Best, Coney, 1995).

This process is further complicated by different members of the decision-making unit having different criteria and assigning different weights to these criteria (Hawkins, Best, and Coney, 1995). For example, engineers are more concerned with product knowledge, product operations, and applications knowledge; purchasing is more concerned with pricing policies, terms and conditions, and order status (Hawkins, Best, Coney, 1995). Hence, the salesperson must be knowledgeable in these areas. If a purchasing director is concerned with the quality of a product, the salesperson should emphasize quality in the presentation.

3.4 Purchase and Decision Implementation

Once the decision to buy from the selected business is made, the method of purchase must be determined (Hawkins, Best, and Coney, 1995) and from the seller's point of view, this means how and when they will get paid. Most businesses offer terms that may include price discounts for payments within 10 days of the

invoice anticipation and volume discounts while others extend credit and encourage prolonged payment over 30, 60, 90, or even 120 days (Hawkins, Best, Coney, 1995).

When doing business internationally, purchase implementation and method of payment is more critical and complicated. When doing business in some countries, like Nigeria, obtaining letters of credit is needed to insure the seller will get paid (Hawkins, Best, and Coney, 1995). Further, some countries may prohibit the removal of capital from their country without an offsetting purchase (Hawkins, Best, and Coney, 1995). Terms, conditions, payments, warranties, customs, quotas, tariffs, and delivery dates are both complex and critical in business-to-business environments both domestically and internationally (Hawkins, Best, Coney, 1995).

3.5 Usage and Post Purchase Evaluation

After-purchase many organizations conduct detailed in-use tests to determine the life-cycle costs of competing products or spend considerable time evaluating a new product before placing large orders (Hawkins, Best, and Coney, 1995). A major component of post purchase evaluation is the service the seller provides after the sale. Satisfaction is dependent on a variety of criteria and on the opinions of many different people and each of these individuals has to be satisfied with the criteria important to them (Hawkins, Best, Coney, 1995).

4. METHODOLOGY

4.1 Sample and Population

The population of study was decision makers of businesses with small package transportation needs, and who are located in a southwestern state. The sample consisted of 536 randomly selected small package transportation decision makers, of whom, 31 responded to the survey yielding 5.78% response rate.

Individuals were contacted via e-mail and asked if they were willing to participate in a study regarding their experiences and perceptions with small package transportation companies. The three page survey was attached with an e-mail requesting the respondents to complete the survey and e-mail it back. After a two week period another e-mail letter with the attached survey was sent.

4.2 Instrument

The current study investigated what criteria businesses use to choose small package transportation companies. The study also sought to assess the respondents' attitudes and perceptions toward selected firms (DHL, FedEx (Express), FedEx (Ground), UPS, USPS). Additionally, the researchers sought to determine the importance of the selection criteria when choosing a small package transportation company among individuals of various levels of the organization.

A self-administered questionnaire was utilized to einsure the most accurate results regarding the decision making process and salient criteria. The self-administered questionnaire was designed with four sections that handled separate but related topics. Questions from all four sections were taken from Parcel Shipping and Distribution's Best Practice Survey (2006), located at www.psdmag.com/bpsurvey.asp.

Section One. The first section asked for the demographic characteristics of the respondent's organization. Respondents were asked the following: "What is your job title?" "What functions do you manage?" "How long have you been in the current position?" "What industry are you in?" "What is your company's primary business?" And "What are annual company sales?"

Section Two. The second section determined the criteria and importance of each when choosing a small-package transportation company. The criteria included on-time delivery, price/rates, service offerings, service standards, surcharges, and technology. Criteria were measured using a modified Likert scale of 1 through 6, where 1 was "most important" and 6 was "least important."

Section Three. In the third section, the respondents were asked to rate each small package transportation carrier using a modified Likert scale, from 1 to 10 (10 being the best). The areas included customer service, on-time service performance, delivery performance (driver courtesy and package handling), claims processing, refunds for late delivery, and pricing. Respondents were asked to only rate the carriers they have used in the past year and included DHL, FedEx Express, FedEx Ground, United Parcel Service, and the United Stated Postal Service.

Section Four. In the final section, the researchers sought to determine attitudes and perceptions regarding selected small package transportation companies. In accordance with their job position, the survey sought to assess the respondents agreement or disagreement with a number of attitudinal statements presented in a Likert scale ranging from 1 to 5 whereas 1 was definitely disagree and 5 was definitely agree.

The statements used in this section included: "Streamlining a complex global supply chain is important to me," "Enhancing my company's customer service is important to me," "It is important for my business to trade internationally," "Improving my logistics operations is important to me," "It is important to increase my speed to the market," "Improving my cash flow is important to me," "It is important to have shipping technology that is easy to use," "Having access to shipping companies when and where I need to is important to me," and "It is important to keep track of all my shipments."

5. RESULTS

Demographic Characteristics of Respondents

The sample totaled 31 decision makers of businesses located in a southwestern state with small package transportation needs. Approximately 19 percent of respondents were CEO's, Presidents, or in similar positions. Another 16.12 percent were CFO's, controllers, accounting managers, or similar. Almost 13 percent were directors of transportation or similar and 19.35 percent were warehouse and shipping managers or similar. Finally, 16.12 percent of respondents were identified as Office Managers.

Regarding the areas of responsibility of each respondent, approximately 68 percent managed the shipping and delivery functions and about 55 percent oversaw the order entry and returns process. Concerning the length of time in their position, about 29 percent noted that they had been in their job function for two to five years, while nearly one fourth (25.81%) had been in their job function for over ten years.

Regarding industry of participants, 29.03 percent were in consumer products; 19.35 percent were in manufacturing, and the same percentage reported being in the retail industry. When asked about the company's primary business, approximately 68 percent were in the manufacturing, wholesaling, and distribution industries and almost 23 percent were in retail. As to annual revenues, almost 39 percent of the respondents reported sales between $25 million and $99 million. Nearly 10 percent had company sales between $100 million and $499 million and the same percentage for sales over $1 billion.

Section Two dealt with the evaluative criteria considered when selecting a small-package carrier. Respondents reported "on-time delivery" as the most important motivating factors in their negotiations, scoring a mean of 1.73. "Price and rates" were second with a mean of 2.07 (Table I).

Table 1.

Respondents Importance Ratings of Selected Attributes

Attributes	Most Imp. 1	2	3	4	5	Least Imp. 6	Mean
On-Time Delivery	13	12	3	1	0	1	1.73
Price	14	6	5	2	1	1	2.07
Service Offerings	0	4	6	6	5	6	4.11
Service Standards	3	4	6	7	4	2	3.42
Surcharges	0	2	2	6	8	8	4.69
Technology	0	1	7	3	9	8	4.57

N=31

In the attribute importance level and job function, CEO's, presidents, or individuals in similar positions selected "on-time delivery" as the most important attribute with a mean of 2.0. For CFO's, controllers, and accounting managers,

"on-time delivery" was also the most important attribute when choosing a small package transportation company, with a mean of 1.2. Directors of transportation also reported on-time delivery as their number one criteria when choosing a small package transportation company, with a mean of 1.75.

Similarly, warehouse and shipping managers indicated that on-time delivery was also the most important criteria when choosing a small package transportation company, with a mean of 1.6. However, Office Managers listed price and rates as the most important criteria when choosing a small package transportation company, with a mean of 1.5.

Results showed that on-time delivery was the most important criteria when choosing a small package transportation company among CEO's, Presidents, CFO's, controllers, accounting managers, directors of transportation, warehouse and shipping managers. Prices and rates were the most important criteria for office managers. Surcharges were the least important criteria for the majority of respondents in a variety of positions. Moreover, both surcharges and technology were tied for the least important motivating factors for office managers.

In the third section, respondents were to rate selected small package transportation carriers, using a modified Likert scale. The carriers that were rated included DHL, FedEx Express, FedEx Ground, United Parcel Service, and the United Stated Postal Service (Table II). Regarding customer service, UPS had the highest score (8.07) and DHL had the lowest (6.00). When asked to rate the carriers on on-time service performance, FedEx (Express) scored the highest (8.42) and USPS scored the lowest (6.44). Regarding delivery performance, FedEx (Express) came out on top (8.11) and USPS had the lowest score (6.44). Regarding claims processing, FedEx (Ground) scored the highest (7.20) and the USPS scored the lowest (5.25).

For refunds for late delivery, UPS had the highest score (7.67) and DHL had the lowest (5.60). When asked about pricing, UPS had the highest score (8.00) and USPS had the lowest (6.52). When averaging the scores for all six categories, customer service, on-time service performance, delivery performance, claims processing, refunds for late delivery, and pricing, UPS scored the highest (7.87) and USPS scored the lowest (6.11).

Table 2.

Respondents' Ratings of Small Package Carriers

	DHL	FedEx (Express)	FedEx (Ground)	UPS	USPS
Customer Service	6.00	7.90	7.67	8.07	6.05
On-time Service Performance	6.92	8.42	7.74	8.24	6.72
Delivery Performance	6.93	8.11	7.53	8.07	6.44
Claims Processing	6.75	7.00	7.20	7.15	5.25
Refunds for Late Delivery	5.60	7.18	6.86	7.67	5.67
Pricing	7.67	6.75	7.37	8.00	6.52
Mean	**6.65**	**7.56**	**7.40**	**7.87**	**6.11**

N=31

Section Four explored attitudes and perceptions regarding small package transportation companies. The study indicated that the statement, "reliability of service is important to me", had the highest mean of 4.80, followed by "It is important to keep track of all my shipments" with a mean of 4.77. "Improving my cash flow is important to me" also had a high mean of 4.74 (Table III).

Table 3.

Responses to Likert-type Attitudinal Statements

Statements	**Definitely Disagree 1**	**2**	**3**	**4**	**Definitely Agree 5**	**Mean**
Streamlining a complex global supply chain is important to me	2	2	8	9	10	3.74
Enhancing my company's customer service is important to me	0	0	2	6	23	4.68
It is important for my business to trade internationally	3	4	7	6	10	3.53
Improving my logistics operations is important to me	1	0	3	11	15	4.30
It is important to increase my speed to the market	1	0	5	6	19	4.50
Improving my cash flow is important to me	0	0	2	4	25	4.74
It is important to have shipping technology that is easy to use	0	0	1	7	23	4.71
Having access to shipping companies when and where I need to is important to me	0	0	1	12	17	4.53
It is important to keep track of all my shipments	0	0	1	5	24	4.77
The ability to track my shipments from start to finish is important to me	0	0	4	8	18	4.47
The ease of processing and handling returns is important to me	0	0	8	11	11	4.10
Reliability of service is important to me	0	0	0	6	24	4.80
The ease of claims processing is important to me	0	1	2	12	16	4.39
It is important to have protection against risks associated with trade	0	2	3	14	11	4.13
Having inexpensive shipping rates is important to me	0	1	3	3	24	4.61
It is important to have a shipping rep that clearly understands my business	1	1	3	7	18	4.30

N=31

6. DISCUSSION AND IMPLICATIONS

The purpose of this study was to better understand the nature of the decision making process for shippers of small packages, and to determine the attitudes and perceptions of organizational shippers toward selected small package transportation companies (DHL, FedEx (Express), FedEx (Ground), UPS, USPS).

The findings suggest that "on-time delivery" is by far the most important criterion used when deciding to use a small package carrier followed by the overall reliability of service. This was the case for most of the respondents who identified themselves as having a CEO, CFO, or General Manager type position in their respective organizations. Low end office mangers however rated price or rates as being the most important evaluative criterion.

The study indicated that surcharges were the least important criteria when selecting a small package transportation company. This is interesting due to the fact that price/rate were the second most important decision making characteristic among the majority of job functions. Even though surcharges do affect the total cost of shipping, surcharges according to the results, were not perceived as being a significant influencer of the carrier selection process.

As for the respondents' attitudes towards the four major carriers, UPS rated best in customer service, on-time service performance, delivery performance, claims processing, refunds for late delivery, and pricing. With UPS marking a 100 years as of August 28, 2007 and being the first in the market, it appears that they have managed to learn from their years in business and building a widely held positive reputation, developing brand equity, and creating brand loyalty (www.UPS.com, 2006).

Even though UPS received the best average rate overall, it is interesting to note that FedEx (Express) was rated higher than UPS on "on-time delivery performance" which according to the study, was the most important decision making criteria for choosing a small package carrier. Fed Express however lost to UPS on price/rates, overall customer services, and refunds for late delivery.

The study also indicated that "keeping track of shipments" and "improving cash flow" were important hygiene factors for the decision makers.. Although these weren't in first place, they came in second and third as factors impacting the selection decision process. It is clear that respondents need to keep their shipment history to provide superior customer service. Having a shipping record allows for quick order recognition, customer buying history, consumer trend tracking, and inventory referencing. By improving cash flow more capital will be available sooner to increase or replenish inventory, to enhance marketing efforts, and to generate interest from investment. This, in turn, helps the organization's bottom line.

The findings suggest several implications. First is the recognition that package shipping appears to have become more of a commodity service. Even though

on-time delivery and reliability of service were considered most important, price/rates were the most important criteria for office managers. For that reason, marketers, when targeting this group must focus efforts towards bottom line cost savings, in essence, justifying the price. When targeting CEOs, presidents, CFOs, accounting personnel, directors of transportation, and shipping managers, marketers should focus efforts on the benefits of on-time delivery and reliability. In other words, "on-time delivery" seems to be the motivating factor for favoring one carrier over another in an acceptable price/rate level.

The results further indicate that the package carriers must focus their marketing effort at two levels. The buyers who may actually be at the lower levels of management find it essential to prove to the hire ups that they are doing their part to contain cost and thus may seek to patronize the carrier with the best rates on a given route. Upper management that have more security in their jobs focus more on getting their documents or packages to their destination in the shortest possible time irrespective of the rates their company may have to pay. To have a chance at winning a substantial contract, a marketer must provide relevant information to each source of influence (Hawkins, Best, and Coney, 1995). This can be challenging, given that each source of influence has different motives and different criteria for evaluating alternative services, as well as different information absorption habits (Hawkins, Best, and Coney, 1995).

In addition to reliability, results showed that keeping track of shipments and improving cash flow were important to all respondents. All package carriers these days are finding it essential to invest significantly in logistics management systems and tracking software that allow the customers to track their packages for anticipated dates and times of deliveries. Such investment is essential to grow and develop an image of an innovative, customer-oriented package carrier.

Future Research

This study was exploratory in nature and sought to establish a snap shot of how decisions are made to select small-package carriers. The study had major temporal and monetary constraints which resulted in a relatively small sample size. Future research should address these deficiencies to ensure a higher response rate. Moreover, due to the global nature of the services needed and provided in this market, it would be useful to perform some comparative analysis of these decision-making processes in different industries and locations around the world.

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LOCAL VOLATILITY CALIBRATION USING AN ADJOINT PROXY

Gabriel TURINICI [*]

Abstract: *We document the calibration of the local volatility in a framework similar to Coleman, Li and Verma. The quality of a surface is assessed through a functional to be optimized; the specificity of the approach is to separate the optimization (performed with any suitable optimization algorithm) from the computation of the functional where we use an adjoint (as in L. Jiang et. al.) to obtain an approximation; moreover our main calibration variable is the implied volatility (the procedure can also accommodate the Greeks). The procedure performs well on benchmarks from the literature and on FOREX data.*

Keywords*: calibration, local volatility, implied volatility, Dupire formula, adjoint*

1. MOTIVATION: THE LOCAL VOLATILITY SURFACE

Let us consider a security S_t (e.g. a stock, a FOREX rate, etc.) whose price, under the risk-neutral [Musiela and Rutkowski(2005)], [Hull(2006)] measure, follows the stochastic differential equation

$$dS_t/S_t = r(t)dt + \sigma dW_t \tag{1}$$

with $r(t)$ being the time dependent risk-free rate and σ the volatility (we will make explicit its dependence latter) and W_t a Brownian motion.

Les us consider (for now) plain vanilla call options contingent on S_t and recall that when the volatility (and the discount rate r) are constant the Black-Scholes model [Black and Scholes(1973)] gives a closed formula for the price $C(S,t)$ of such claims. Is is standard to note that the reverse is also true, i.e., provided r is constant and known, from the observed market prices denoted $C^{market}_{K_l,T_l}$ (with strikes K_l and maturities T_l, $l=1,...,L$) one can find (i.e. calibrate) the unique *implied volatilities* $\sigma^I_{K_l,T_l}$ that, when introduced in the Black-Scholes

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formulae, match the observed market prices $C^{market}_{K_l,T_l}$. However the implied volatilities $\sigma^I_{K_l,T_l}$ thus obtained are not the same for all K_l and T_l (the *smile* effect) which is inconsistent with the initial model. To address this issue it was independently proposed by Rubinstein [Rubinstein(1994)], Dupire [Dupire(1994)] and Derman and Kani [Derman and Kani(1994)] to take the volatility σ as depending on the time and the security price S : $\sigma = \sigma(S,t)$; the model is named *local volatility*. Historically the proposals in [Rubinstein(1994)],[Derman and Kani(1994)] build on the Cox-Ross-Rubinstein binomial tree [Cox et al.(1979)] and are described as *implied trees*.

Let us make clear that we do not discuss here the local volatility model itself nor its dynamics. We only see the local volatility as a way to express the non-arbitrage relationships between the set of derivatives contracts contingent on the same (set of) underlying instruments (much similar to the the way one uses the *risk neutral* probability measure as a tool to compute prices but does not necessarily want to assign it to any real world probabilities).

Matching the observed prices, i.e. calibrating the local volatility $\sigma(S,t)$ is not straightforward as no closed formula exists to express the dependence $\sigma \to C$. The problem becomes now an inverse problem [Bouchouev and Isakov(1997)], [Bouchouev and Isakov(1999)].

When the number of quoted market prices $C^{market}_{K_l,T_l}$ is large enough (i.e. K_l, T_l cover well the range of S and t) the local volatility can be expressed using the Dupire formula [Dupire(1994)],[Hull(2006)], [Achdou and Pironneau(2005)] or different asymptotics [Berestycki et al.(2002)]. However, when only a few prices are known, the Dupire formula is less effective and other methods have to be used [Avellaneda et al.(1997)Avellaneda, Friedman, Holmes, and Samperi],[Bodurtha and Jermakyan(1999)]. Among those, Coleman, Li & Verma [Coleman et al.(2001)] introduced a parametric procedure which we refine in this contribution. Further, L. Jiang, and co-authors established a mathematical grounding for formulating this problem as a control problem [Jiang et al.(2003)]; we will retain in this paper the adjoint state technique that we adapt to take into account the constraints (see [Lagnado and Osher(1997)], [Lagnado and Osher(1998)] for related endeavors). Our procedure combines the approaches above and is accelerated by the use of an approximation of the functional through the use of the adjoint (7). A particularity of the procedure is to calibrate directly the implied volatility (and can accommodate any Greeks); this choice enhance not only the efficiency of the numerical procedure but, in some extreme cases, its selection of adequate local surface as was confirmed in numerical experiments. This approach (rather natural since option traders often only quote the implied volatility and not the price) is especially useful in markets

that heavily rely on Greeks (as is the case in the FOREX market that quotes *risk reversals* which involve Deltas and the implied volatility. Further, since in general only limited data is available, the local surface is non-unique: to eliminate improper candidates we set lower and upper bounds on the volatility. The resulting procedure is stable with respect to the number of price information used and in particular no interpolation is required to fill this information when missing.

2. ADJOINT FORMULAS AND THE COST FUNCTIONAL

Under the local volatility model, the price $C(S,t)$ of a derivative contract on S_t with pay-off $h(S)$ at maturity $t=T$, will satisfy the (Black-Scholes) equation [Hull(2006)] for all $S \geq 0$ and $t \in [0,T]$:

$$\partial_t C + rS\partial_S C + \frac{\sigma^2 S^2}{2}\partial_{SS} C - rC = 0 \tag{2}$$

$$C(S, t=T) = h(S) \tag{3}$$

Remark 1 *Similar considerations apply if the security S_t distributes dividends at a known proportional rate $q(t)$ or if S_t is a FOREX spot (in this case r is the domestic discount rate and $q(t)$ is the foreign rate).*

The price at $t=0$ of the contract is $C(S_{t=0}, t=0)$; recall that the pay-off of an European call of strike K is $h(S)=(S-K)_+$ (with the notation $x_+ = \max\{x,0\}$). Note the retrograde nature of the equation (2)-(3).

We will use the technique of the adjoint state and view the price as a implicit functional of σ (here δ is the Dirac operator):

$$C(t=0; S=S_0) =< \delta_{t=0,S=S_0}, C(S,t) > . \tag{4}$$

Then the variation $\frac{\delta C}{\delta(\sigma^2)}$ of C with respect to σ^2 (and respectively the variation with respect to σ) will be

$$\frac{\delta C}{\delta(\sigma^2)} = \frac{S^2}{2}(\partial_{SS} C)\chi, \tag{5}$$

$$\frac{\delta C}{\delta \sigma} = 2\sigma\frac{S^2}{2}(\partial_{SS} C)\chi. \tag{6}$$

Here the adjoint state χ is the solution of:

$$\partial_t \chi + \partial_S(rS\chi) - \partial_{SS}(\frac{\sigma^2 S^2}{2}\chi) + r\chi = 0 \tag{7}$$

$$\chi(S, t=0) = \delta_{t=0,S=S_0} \tag{8}$$

Same technique works for any other quantity dependent on the price. A very important example of such quantity is the implied volatility, denoted here σ^I. Recall that an explicit formula links the price to the implied volatility $\sigma^I = \sigma^I(C)$ and as such $\frac{\partial \sigma^I}{\partial \sigma} = \frac{\partial \sigma^I}{\partial C}\frac{\partial C}{\partial \sigma}$. We recognize in the term $\frac{\partial \sigma^I}{\partial C}$ the inverse of the Black-Scholes vega, that we will denote ν^I. We obtain

$$\frac{\partial \sigma^I}{\partial \sigma} = \frac{1}{\nu^I}\frac{\partial C}{\partial \sigma}. \tag{9}$$

Remark 2 *Both problems (2) and (7) can be solved e.g. through a Crank-Nicholson finite-difference scheme [Hull(2006)], [Andersen and Brotherton-Ratcliffe(1998)]; is is best to use for (7) the numerical adjoint of (2).*

To illustrate the nature of this gradient we display an example in Figure 1 where we note two singularities appearing in $(t = 0, S = S_0)$ (from eqn (8)) and $(t = 1, S = K)$ (from $\partial_{SS}(S-K)_+$) (see also [Avellaneda et al.(1997)Avellaneda, Friedman, Holmes, and Samperi] for similar conclusions).

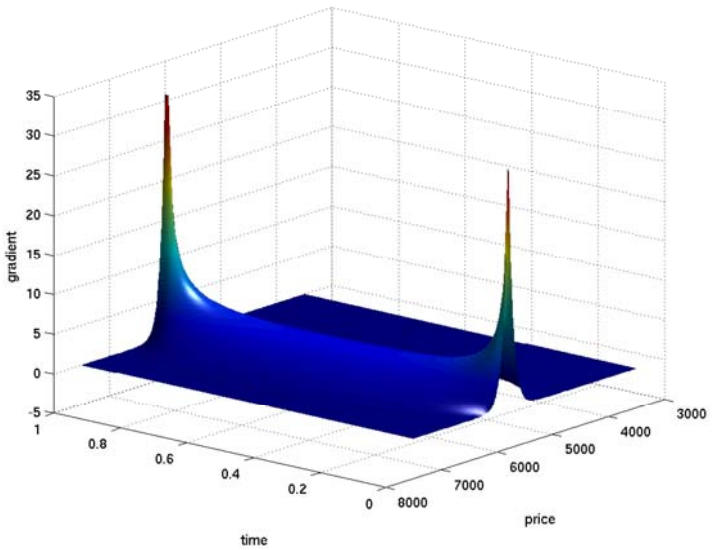

Figure 1: *Gradient* $\frac{\delta C}{\delta(\sigma^2)}$ *(see eqn. (5)) of the price* C *of a derivative (e.g. a plain vanilla call) with respect to the volatility surface squared* σ^2. *Note the two singularities at the initial time (around the spot price) and at the expiration around the strike. These singularities prevent the direct use of any gradient method otherwise the resulting surface will be singular*

Since in general several option prices (or Greeks) are available and have to be accounted in the calibration, we introduce a cost functional (depending on σ) which is the sum of relative errors of the prices computed with a given σ and the market prices. Moreover, depending on the market (e.g. the FOREX market quotes risk-reversals in terms of implied volatility and deltas directly) one would also want to fit the implied volatility. Of course, if a perfect calibration is achieved, both results will give the same implied volatility; in practice fitting the implied volatility in addition or instead of the prices give better numerical stability of the procedure. Numerical tests (not shown here) display, for the FOREX market, a clear improvement in the calibration quality when the implied volatilities are used instead of just prices.

The cost functional so far is

$$\eta_1 \sum_{l=1}^{L} \left(\frac{C_l(0;S_0)}{C^{market}_{K_l,T_l}} - 1 \right)^2 + \eta_2 \sum_{l=1}^{L} \left(\frac{\sigma^I(K_l;T_l)}{\sigma^{I;market}_{K_l,T_l}} - 1 \right)^2 . \tag{10}$$

Here $\sigma^{I;market}_{K_l,T_l}$ is the market implied volatility while $\sigma^I(K_l;T_l)$ is the implied volatility corresponding to the local volatility σ; η_1 and η_2 are some positive weights.

Repeated application of the chain rule and the formulas (6) and (9) allow to compute the variation $\frac{\delta J_e}{\delta \sigma}$ of the J_e with respect to σ. Note that for each index l one needs to solve a PDE for the price C_l and a corresponding PDE for the adjoint χ_l and use them as in (6).

Remark 3 *Other forms of the cost functional can also be treated, for instance the distances*

$$\sum_{l=1}^{L} (C_l(0;S_0) - C^{market}_{K_l,T_l})^2 . \tag{11}$$

or, when bid/ask quotes are available, i.e. $C_l(0;S_0) \in [C^{bid}_{K_l,T_l}, C^{ask}_{K_l,T_l}]$ one can use as in [Coleman et al.(2001)]

$$\sum_{l=1}^{L} \left[(C_l(0;S_0) - C^{bid}_{K_l,T_l})_+ \right]^2 + \left[(C^{ask}_{K_l,T_l} - C_l(0;S_0))_+ \right]^2 . \tag{12}$$

Remark 4 *A naive approach is to use a standard optimization algorithm [Bonnans et al.(2006)]; for instance, a fixed step ($\rho > 0$) gradient algorithm would read:*

$$\sigma_{n+1} = \sigma_n - \rho \frac{\partial J_e}{\partial \sigma}(\sigma_{n+1}). \tag{13}$$

In this case the singularities of $\frac{\partial J_e}{\partial \sigma}$ will propagate into the solution which will have a full list of singularities at $(0, S_0)$ and (T_l, K_l), $l = 1,...,L$. Such properties are not natural for the local volatility surface $\sigma(t,S)$ and the inversion procedure has to address them. Note that obtaining a smoother local surface is possible because of its underdertermination : in the extreme situation $L = 1$ only one price $C^{market}_{K_1,T_l}$ is available which brings a limited information on the volatility surface that will not be unique; in this case the most natural volatility surface will a constant, equal to the Black-Scholes implied volatility.

A traditional choice to avoid singularities and address the non-uniqueness is to parametrize the surface $\sigma(S,t)$ [Achdou and Pironneau(2005)],[Coleman et al.(2001)]; the result will be the optimal surface in the class.

In order to ensure smoothness we add to the cost functional terms that avoid large variations of σ by penalizing its gradient with respect to S and t (η_3 and η_4 are positive weights):

$$\eta_3 \left\| \frac{\partial \sigma(S,t)}{\partial S} \right\|^2_{L^2_{S,t}} + \eta_4 \left\| \frac{\partial \sigma(S,t)}{\partial t} \right\|^2_{L^2_{S,t}} \tag{14}$$

(recall that $\|F(x)\|^2_{L^2_x} = \int F^2(x)dx$). The final cost functional is

$$J_e(\sigma) = \eta_1 \sum_{l=1}^{L} \left(\frac{C_l(0;S_0)}{C^{market}_{K_l,T_l}} - 1 \right)^2 + \eta_2 \sum_{l=1}^{L} \left(\frac{\sigma^I(K_l;T_l)}{\sigma^{I;market}_{K_l,T_l}} - 1 \right)^2$$
$$+ \eta_3 \left\| \frac{\partial \sigma(S,t)}{\partial S} \right\|^2_{L^2_{S,t}} + \eta_4 \left\| \frac{\partial \sigma(S,t)}{\partial t} \right\|^2_{L^2_{S,t}}. \tag{15}$$

3. SURFACE SPACE AND THE OPTIMISATION PROCEDURE

Continuing the arguments of the previous section, we give here a possible choice to describe the space of available surface shapes. We consider continuous affine functions with degrees of freedom being the values on some grid $(S_i = S_0 + i\Delta S, t_j = t_0 + j\Delta t,)$, $i \le I$, $j \le J$. We denote by $f_{ij}(S,t)$ the unique piecewise linear and continuous function that has value of 1 at (t_i, S_j), and is zero everywhere else. The surfaces are linear combinations of the shapes $f_{ij}(S,t)$:

$$\sigma(S,t) = \sum \alpha_{ij} f_{ij}(S,t). \tag{16}$$

The advantage of linear interpolation is that the shape functions have nice localisation properties: the scalar product of two such functions (or their gradient) is

zero except if they are neighbors i.e. matrices (22)-(23) are sparse. Also setting constraints e.g. $\sigma(S,t) > \sigma_{min}$ for all S,t is equivalent to asking that all α_{ij} are larger than σ_{min}.

However we also tested cubic splines interpolation and it performed equally satisfactory.

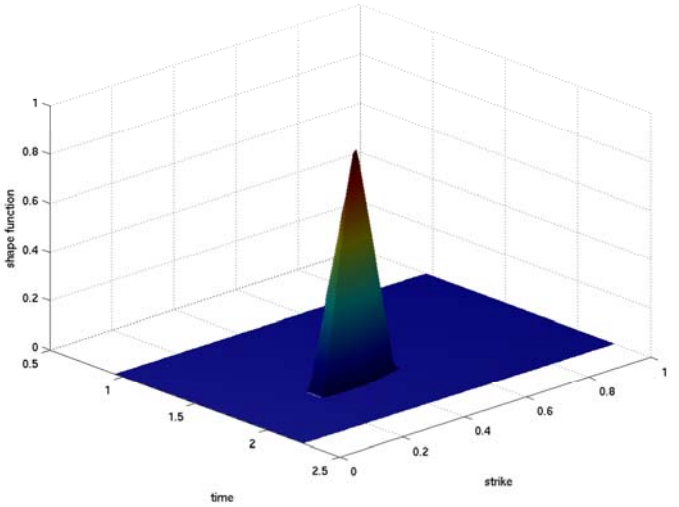

Figure 2: *The local volatility $\sigma(S,t)$ is sought after as a linear combination of basic shapes $f_{ij}(S,t)$: $\sigma(S,t) = \sum_{ij} \alpha_{ij} f_{ij}$. A possible option is to take $f_{ij}(S,t)$ as the (unique) linear interpolation which is zero except in some point (S_i, t_j) (part of a grid in S and t). We display here such a shape*

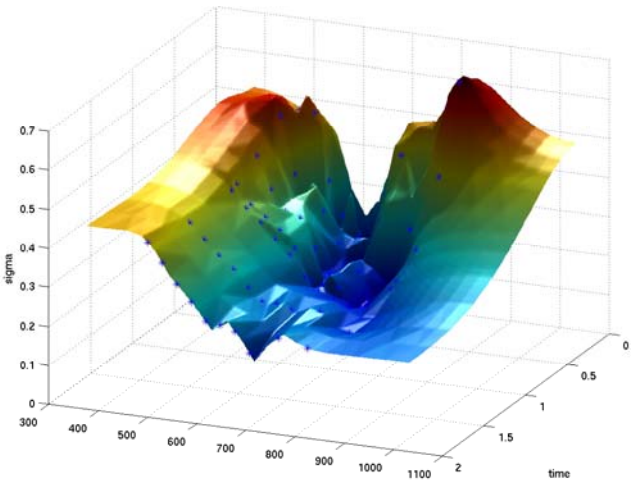

Figure 3*: Local volatility surface of the S&P 500 index as recovered from the published European call options data [Andersen and Brotherton-Ratcliffe(1998)], [Coleman et al.(2001)]; spot price is* $590*; discount rate r = 6%, dividend rate 2.62%. The blue marks on the surface indicate the option prices that were used to invert i.e. the K_l and T_l (L = 70). After 10 iterations the prices are recovered up to 4.e – 4 and the implied volatility up to 0.18%. Setting regularization parameters η_3 and η_4 to smaller values give better fit but less smooth surfaces*

Remark 5 *A possible procedure would be to optimize the cost functional (15) expressed as a function of the coefficients* α_{ij} *of* σ *in (16). But this dependence may be highly nonlinear and the resulting optimization will have many unwanted local extrema.*

Chain rule gives the gradient of any derivative contract $C(S,t)$ (among C_l, $l=1,...,L$) with respect to variations of the local surface σ inside the admissible surface space. This is in fact just a matter of projecting the exact gradient (6) onto each shape f_{ij}. We obtain an approximation formula around the current local volatility σ:

$$C\left(\sigma+\sum_{ij}\alpha_{ij}f_{ij}(S,t)\right)\cong C(\sigma)+\sum_{ij}<\frac{\partial C}{\partial\sigma},f_{ij}>_{L^2_{S,t}}\alpha_{ij}. \qquad (17)$$

Same works for the implied volatility

$$\sigma^I\left(\sigma+\sum_{ij}\alpha_{ij}f_{ij}(S,t)\right)\cong\sigma^I(\sigma)+\sum_{ij}<\frac{\partial\sigma^I}{\partial\sigma},f_{ij}>_{L^2_{S,t}}\alpha_{ij}. \qquad (18)$$

In discrete formulation the cost functional will employ the matrices

$$M^C_{ij;rs}=\sum_l<\frac{\partial C_l}{\partial\sigma},f_{ij}>_{L^2_{S,t}}<\frac{\partial C_l}{\partial\sigma},f_{rs}>_{L^2_{S,t}} \qquad (19)$$

for the first part of (10) and

$$M^\sigma_{ij;rs}=\sum_l<\frac{\partial\sigma^I_l}{\partial\sigma},f_{ij}>_{L^2_{S,t}}<\frac{\partial\sigma^I_l}{\partial\sigma},f_{rs}>_{L^2_{S,t}} \qquad (20)$$

for the second part.

Note that (18) and (17) already provide (some) second order information for J_e; also note that for $\sigma=\sum_{ij}\beta_{ij}f_{ij}(S,t)$ the smoothness terms (14) can be written as

$$\eta_3<\beta+\alpha,Q_S(\beta+\alpha)>+\eta_4<\beta+\alpha,Q_S(\beta+\alpha)> \qquad (21)$$

with

$$(Q_S)_{ij;kl}=\iint\frac{\partial f_{ij}(S,t)}{\partial S}\frac{\partial f_{kl}(S,t)}{\partial S}dSdt \qquad (22)$$

and

$$(Q_t)_{ij;kl}=\iint\frac{\partial f_{ij}(S,t)}{\partial t}\frac{\partial f_{kl}(S,t)}{\partial t}dSdt. \qquad (23)$$

A last ingredient involves bounds on the local volatility surface; indeed, it seems natural that the local volatility cannot be negative. Even when this is the case, local volatilities with very low values (e.g. 3% !) are obviously not realistic. Enforcing constraints on the local volatilities is a very important step towards

selecting meaningful candidates. A choice that is consistent with other observations in the literature [Rubinstein(1994)],[Derman and Kani(1994)] is to ask

$$\sigma_{min} \le \sigma(t,S) \le \sigma_{max} with$$

$$\sigma_{min} = \frac{1}{2}\min\{\sigma^{I;market}_{K_l,T_l}; l=1,...,L\},\ \sigma_{max} = 2\max\{\sigma^{I;market}_{K_l,T_l}; l=1,...,L\}. \quad (24)$$

Optimization procedure

The algorithm operates as follows: first we choose as initial guess σ_0 to be the (projection on the space $Vect\{f_{ij}\}$) of the implied volatility surface (eventually corrected to be between bounds σ_{min} and σ_{max}). One can also use more specific formulas relating implied and local volatility see e.g. [Gatheral(2006)] formula 1.10 page 13.

The iterative procedure operates at each step in the following order:

1/ computes the gradient of the price and implied volatility with respect to variations of σ in the admissible space i.e. formula (17) and (18);

2/ constructs and solves the (quadratic) optimization problem

$$\min_{\sigma_{min} \le \alpha \le \sigma_{max}} \frac{1}{2} < \alpha^T, (\eta_1 M^C + \eta_2 M^\sigma + \eta_3 Q_S + \eta_4 Q_t)\alpha > + w^t \alpha \quad (25)$$

3/ update the local volatility σ; if the replication error J_e is too high return in 1/ otherwise exit.

In practice very few cycles 1/-3/ are necessary. We tested on several indices and in the FOREX markets and the numbers varied between 5 and 10 cycles.

Remark 6 *The quadratic problem (25) can be solved by any suitable algorithm; for instance Matlab uses by default a subspace trust-region method based on the interior-reflective Newton method described in [Coleman and Li(1996)]. We also tested a simple projected gradient which performed very satisfactory. The advantage of the approach is precisely to separate the optimization itself from the formulation of the problem.*

Remark 7 *Should a bid/ask functional (e.g. as in (12)) be used then the problem will not be quadratic any more but (17) is still used; the constraints arise from the requirement that* α_k *be in* $[\sigma_{min}, \sigma_{max}]$*; additional constraints, in a "trust-region" style, can be put to remain in a region where the approximation (17) holds.*

4. RESULTS AND CONCLUSIONS

A specificity of the approach is that instead of a unique optimization in the parametric space we perform one optimization around each current point; this reduces the number of computations of the PDE (2). But, equally importantly, the separation between the optimization and the approximation of the functional

provides flexibility in the information that can be fitted, e.g. we can readily accommodate any derivative contract (as soon as an gradient formula like (5) exists for it; when it does not one can use Malliavin calculus) such as options on futures, strategies, structured products etc. This allows for instance to be very flexible in the information available and to ignore some prices should them not be available or if one wants to arbitrage against them (in contrast with the pioneering approaches [Rubinstein(1994)], [Dupire(1994)], [Derman and Kani(1994)] that need a uniform set of data to perform the inversion); in particular no interpolation is required to fill this information when missing.

The use of the gradient not in an optimization procedure but to obtain an approximation of the functional around the current point is a acknowledgement of the fact that the main difficulty is not finding a solution but choosing one among all compatible surfaces (i.e. ill-posedness).

We noted that in practice the implied volatility term in the cost functional i.e. $\eta_2 M^{\sigma}$ in (25) is more helpful to orient the optimization procedure than the price term $\eta_1 M^{C}$. In fact in all cases we tested putting $\eta_2 \neq 0$ and $\eta_1 = 0$ gave better results than the reverse.

We used throughout a grid with $I = 24$ values of S and $J = 13$ values of t i.e. 312 shapes f_{ij}, cf. eqn. (16).

Let us now iterate through several benchmarks from the literature; we begin with the European call data on the S& P index from [Andersen and Brotherton-Ratcliffe(1998)],[Coleman et al.(2001)]. Similar to [Andersen and Brotherton-Ratcliffe(1998)], [Coleman et al.(2001)], we use only the options with no more than two years maturity in our computation. The initial index, interest rate and dividend rate are the same. We first checked (not shown) that for $L = 1$ the problem recovers the implied volatility; it did so with only one cycle. When we took all the $L = 70$ data the resulting local volatility surface is given Figure 3.

We next moved to a FOREX example (from [Avellaneda et al.(1997)Avellaneda, Friedman, Holmes, and Samperi]) where synchronous option prices (based on bid- ask volatilities and risk-reversals) are provided for the USD/DEM 20,25 and 50 delta risk-reversals quoted on August 23rd 1995. The results in Figure 4 show a very good fit quality with only five cycles 1/-3/.

We remain in the FOREX market and take as the next example 10,25 and 50-Delta risk-reversal and strangles for USD/JPY dated March 18th 2008. We recall that e.g. a 25 Delta risk reversal contract consists in a long position in a call option with delta$=0.25$ and a short position in a put option with delta $= -0.25$; the contract is quoted in terms of the difference of the implied volatilities of these two options. Note that at no moment the price of the options appear in the quotes. In order to set the input implied surface we used 10 and 25 Delta strangles which are

quoted as the arithmetic mean of the implied volatilities of the two options above. Of course, from this data one can next recover the implied volatilities of each option, then all other characteristics. We present in Figure 5 the implied and the calibrated local volatility from the data in Tables 1,2 and 3. The procedure was also tested (not shown here) on other currencies pairs (GBP, CHF, EUR, KRW, THB, ZAR all with respect to USD) and performed well.

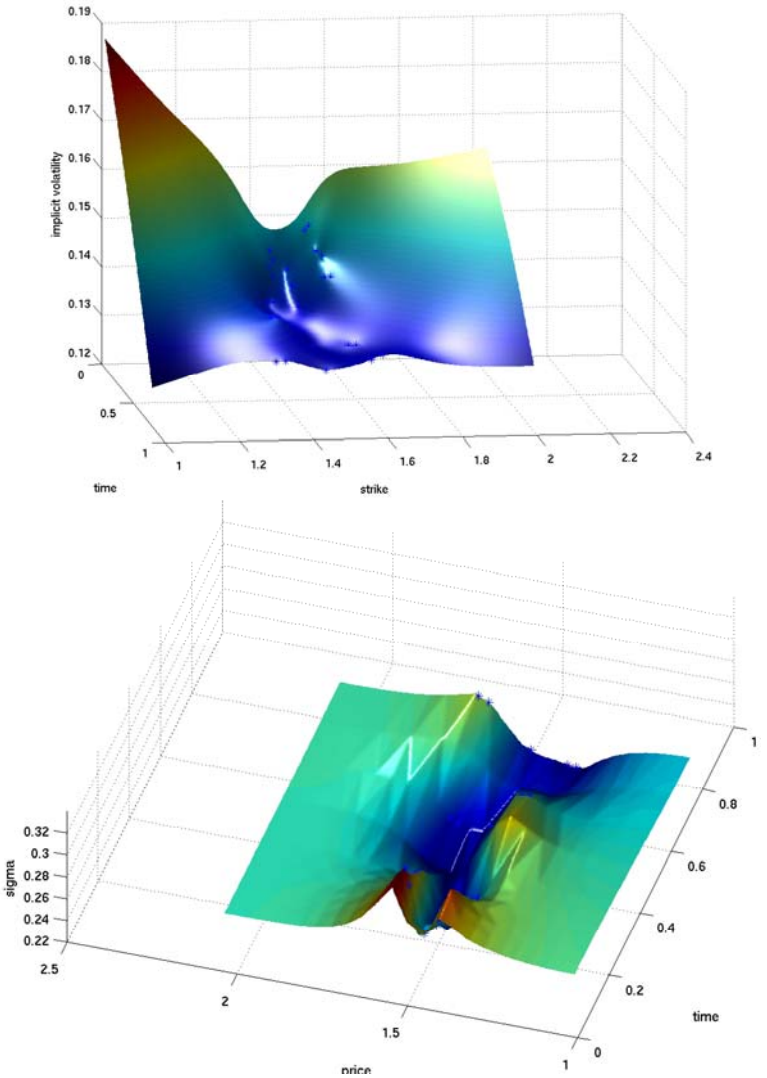

Figure 4: *Top: implied volatility surface of the USD/DEM rate from [Avellaneda et al.(1997)Avellaneda, Friedman, Holmes, and Samperi]; blue marks on the surface represent the available prices (to be matched). Bottom: local volatility surface as recovered from quoted 20,25 and 50-delta risk-reversals [Avellaneda et al. (1997) Avellaneda, Friedman, Holmes, and Samperi]; (mid) spot price is 1.48875; USD discount rate r=5.91%, and DEM rate 4.27%. The blue marks on the surface indicate the option prices that were used to invert i.e. the K_l and T_l (L=30). After* 5 *iterations the prices are recovered up to 3.e – 4 (below the PDE resolution) and the implied volatility up to 0.11% (below the bid/ask spread).*

Table 1:

Strikes of the USD/JPY data derived from March 18th 2008 10,25 and 50 Delta risk-reversals and stradles corresponding to results in Figure 5.

Delta	**0,1**	**0,25**	**0,5**	**0,75**	**0,9**
Days to Expiry					
7	102,1251	99,3063	96,9952	95,1694	93,6024
31	107,8654	101,6879	96,9690	93,5651	90,8528
59	111,7766	103,1709	96,9199	92,5985	89,1782
92	114,8469	104,2600	96,8815	91,9514	88,0360
184	121,3632	106,3836	96,7118	90,6389	85,9581
365	130,2719	108,8945	96,4476	89,1926	83,6142

Table 2:

Implied volatilities of the USD/JPY data derived from March 18th 2008 10,25 and 50 Delta risk-reversals and stradles corresponding to results in Figure 5.

Delta	**0,1**	**0,25**	**0,5**	**0,75**	**0,9**
Days to Expiry					
7	28,650%	24,888%	21,925%	20,113%	19,850%
31	27,875%	23,650%	20,150%	17,800%	17,075%
59	26,875%	22,400%	18,750%	16,350%	15,675%
92	25,525%	20,950%	17,275%	14,900%	14,325%
184	23,800%	19,013%	15,275%	12,888%	12,200%
365	22,000%	16,913%	13,100%	10,788%	10,100%

Table 3:

Premiums of the USD/JPY data derived from March 18th 2008 10,25 and 50 Delta risk-reversals and stradles corresponding to results in Figure 5.

Delta	0,1	0,25	0,5	0,75	0,9
Days to Expiry					
7	0,18045	0,49350	1,16092	2,19256	3,47666
31	0,36338	0,97079	2,20858	4,01619	6,18843
59	0,47829	1,25624	2,80961	5,04651	7,77740
92	0,56290	1,45728	3,21362	5,71523	8,84255
184	0,73105	1,84665	3,97784	6,94374	10,64520
365	0,93469	2,28318	4,76650	8,17769	12,57431

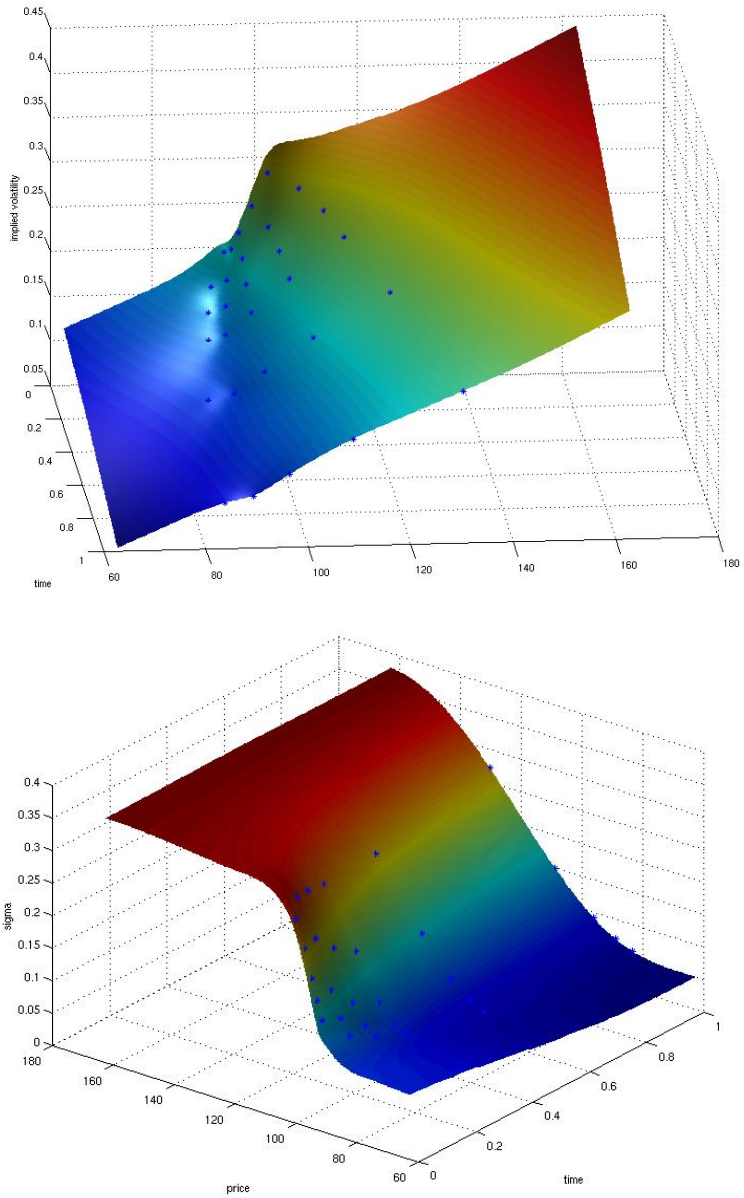

Figure 5: *Top: implied volatility surface of the USD/JPY rate from Tables 1,2 and 3); marks on the surface represent the available prices (to be matched). Bottom: local volatility surface as recovered from quoted 10,25 and 50-delta risk-reversals and stradles; (mid) spot price is 96.98;* JPY *discount rate was set to* $r_{JPY} = 0.89\%$, *and* $r_{USD} = 2.53\%$. *The blue marks on the surface indicate the option prices that were used to invert i.e. the* K_l *and* T_l *(*$L = 30$*). After 10 iterations the prices are recovered up to* $5.e-4$ *and the implied volatility up to* 0.7%.

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INSIGHTS INTO CENTRAL AND EASTERN EUROPEAN COUNTRIES COMPETITIVENESS: ON THE EXPOSURE OF CAPITAL MARKETS TO EXCHANGE RATE RISK

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Unexpected fluctuations in exchange rates represent a matter of concern for all businesses nowadays as the volatility in exchange rates impacts businesses' cash flows, revenues and expenses, and eventually is reflected in the company's risk-return profile. Companies' exposures to exchange rate risk have considerably increased in the past decades, given the boost in international operations and the continuous diversification of businesses' activities at the global level. Despite the attention that businesses display to nominal exchange rates changes, it is the real exchange rate that should be of more concern to corporate managers, since they induce changes at the level of the competitiveness of the business. Our paper comparatively analyzes the exposure to changes in the nominal and real exchanges rates of the local currencies that companies from a number of four Central and Eastern European countries (Romania, Hungary, Czech Republic and Poland) and investigates the nature of the relationship between stock market performance and exchange rates in the four countries under consideration. We find limited evidence for contemporaneous and asymmetric exposure to nominal and real exchange rate risk in all four countries, but consistent evidence for three to four months lagged exposure.

***Keywords**: exposure, exchange rate risk, nominal exchange rate, real exchange rate*

***JEL classification codes**: F23, F31, G15*

1. INTRODUCTION AND THEORETICAL CONSIDERATIONS

Unexpected fluctuations in exchange rates represent a matter of concern for all businesses and particularly for those involved in international business, since the generalized adoption of floating exchange rates, at the beginning of 1970's. The volatility in exchange rates impacts businesses' cash flows, revenues and expenses, and eventually is reflected in the company's risk-return profile. At the same time, the increased globalization process that took place in the last decades has made exchange rates an issue that cannot be ignored by any company, no matter its degree of international involvement. Works in the field of international finance consider exchange rate risk as one of the most relevant components of financial management

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in modern times, since companies' exposures to exchange rate risk have considerably increased in the past decades, given the boost in international operations and the continuous diversification of businesses' activities at the global level.

In international finance research, corporate exposure to exchange rate risk is built upon the impact of exchange rate changes on a number of key-elements: shareholder's wealth, firm's assets and liabilities or company's financial position. Adler and Dumas (1984) define exposure to exchange rate risk as the change in the value of the firm induced by changes in exchange rates. This is one of the broadest definitions of exposure, followed by others, more specific. Eiteman, Stonehill and Moffett (2004) measure exposure by the potential change in company's profitability, its net cash flows and market value, determined by exchange rate changes. Holland (1993) locates foreign exchange exposure at the level of companies that own assets abroad, thus ignoring companies that operate in a purely national environment. Another definition is provided by Shapiro (2002) that understands by exchange rate exposure the degree to which a company is affected by exchange rates changes. Beyond the mere definition, international research demonstrates a higher homogeneity with regard to the exchange rate exposure types that a company faces. Depending on the moment in time when exchange rates change, a company might face: (1) *transaction exposure*, that arises whenever the firm commits or is contractually bounded to make or receive a payment at a future fate denominated in a foreign currency; (2) *translation exposure*, arising from the need to globally consolidate the financial reports of a multinational company, starting from affiliates' reports denominated in various currencies; and (3) *economic exposure*, seen as the change in the firm's present value as result of changes in the value of the firm's expected future cash flows and cost of capital, induced by unexpected exchange rate changes. As opposed to transaction and translation exposure, a firm will be confronted with economic exposure to exchange rates when unanticipated real, not only nominal exchange rate changes, have a non-zero effect on its expected future cash flows. Two main mechanisms that generate economic exposure can be identified: a conversion effect – given the lower amount in home currency that will be obtained after converting the same amount in a foreign currency at a lower exchange rate; and a competitive effect – given the change in the firm's competitive position that follows an asymmetric sensitivity of its revenues and expenses to exchange rate changes.

Empirical evidence on corporate exposure to exchange rate risk is almost entirely concentrated on the case of companies originated from developed countries, given the higher data availability for performing tests. At the same time, in most studies, the impact of nominal exchange rate changes, as opposed to real exchange rate changes is tested, following the rationale that inflation rates are small and that

any change in the nominal exchange rate level will directly generate changes in the real exchange rate level. Albeit this might be true for developed countries, traditionally displaying low inflation rates, in the case of less developed countries, where inflation rates are higher, the connection between nominal and real exchange rates is not as direct. Jorion (1990) examines US multinational corporations exposure to exchange rate risk for a 17 years period and concludes that share prices of these companies are not systematically influenced by changes in nominal exchange rates, but further research on American multinationals conducts to mixed results: Bartov and Bodnar (1994) and Choi and Prasad (1995) confirm Jorion's findings, while Allayannis (1996), Miller and Reuer (1998), Gao (2000) and Koutmos and Martin (2003) seem to detect a more significant link between the American companies share prices and changes in the nominal exchange rate of the dollar against various currencies. Research in the field also identifies lagged exposures, as well as asymmetric responses of share prices to changes in the dollar value. Outside the United States, Glaum et al. (2000) investigate German companies' exposure to changes in the nominal exchange rate of the German mark against the dollar during1974-1997 and find it as being significant. Their result is confirmed by Entorf and Jamin (2002), which identify the company's degree of involvement into international business and the level of the exchange rate as being two important factors in explaining the exposure. Dutch companies have been researched by De Jong et al. (2002) that find more significant exposures in phases of the Dutch guilder depreciation, after investigating 117 companies over a 5-year period (1994-1998). Doukas et al. (2003) examine the relation between the rate of return on a number of 1079 Japanese companies' shares and unexpected changes in the Japanese yen exchange rates between 1975 and 1995 and find significant exposures, which are higher in the case of multinational and exporting companies, being also positively linked to the degree of international involvement of the firm, on one hand, and negatively linked to the firm's size and its financial leverage. British companies also display significant exposure, according to El-Masry (2003), but depending to a large extent on the industry.

As mentioned above, less developed countries were less interesting for researchers: to our knowledge the only study released so far – Kyimaz (2003) – investigates Turkish companies for the period 1991-1998 and finds significant exposures to exchange rate risk, but also variable in magnitude from one industry to another. Companies from Central and Eastern Europe benefit from less attention in the literature. Horobet and Lupu (2005) analyse for the first time the Romanian companies' exposure to changes in the Romanian currency exchange rates against the euro and the U.S. dollar over the January 2000 – October 2005 period and find weak significant exposures to both currencies. They explain their findings by the reduced importance of the euro or dollar denominated cash flows and/or assets and

liabilities in the financial flows of Romanian companies, by the possible presence of internal hedging operations or by the low capital market efficiency. At the same time, they find that exposure to euro is asymmetric, by contrast with the dollar exposure. Horobet and Lupu (2006) extend their analysis to a number of 10 Central and Eastern European countries (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovenia, Slovakia and Romania) by taking into consideration changes in these countries' real exchange rates measured against the U.S. dollar and the euro. The results indicate the lack of contemporaneous and lagged exposures, which may be interpreted as a failure of stock market investors to incorporate changes in the competitive positions of firms in these countries in the stock returns. Horobet and Ilie (2007) investigate the link between exchange rate changes and stock market performance using cointegration and Granger causality tests, in order to capture the bi-directional influences between stock prices and exchange rates, applied to monthly data over 1999 to 2007. They conclude that there is a long-term equilibrium relationship between the stock market performance and the nominal and real effective exchange rates, while the information is generally transmitted from the stock prices to exchange rates with a one-month lag in the case of cointegrated variables. Also, the exchange rates are the leading variables for the stock prices and the stock market adjusts quite dramatically to changes in the exchange rates in one month time in the case of cointegrated variables.

Our paper studies the exchange rate exposure of national stock markets from Central and Eastern Europe, using nominal bilateral and effective exchange rates, as well as real effective exchange rates. When the stock market is studied, as opposed to individual companies or industries, we implicitly study how exporting, importing and import-competing firms are affected by exchange rate surprises. At the economy-wide level, one would normally expect that some activities should be affected positively by changes in exchange rates and some negatively: typically, a depreciation of the domestic currency should boost the revenues and profits of exporting companies, while an appreciation of the domestic currency should represent good news for importing companies. These effects on the stock market index could compensate each other, which may lead to the finding of a lack of exposure of stock markets to unexpected changes in exchange rates.

Exchange rate exposure cannot be interpreted only as the effect of purely exogeneous movements in the exchange rate on the value of the firm. It may very well happen that the estimate of exposure may reflect that exchange rates and stock prices are driven by the same shocks, which becomes more relevant if one studies the exchange rate exposure of an entire stock market as opposed to studying the exposure of a particular firm. At the same time, one may recognize that developments in the stock market may influence or may be influenced by monetary policy decisions and interest rates. This would perhaps lead one to examine the

interrelationships between the stock market and the currency markets in a VAR framework, using cointegration and Granger causality models. The authors choose in this paper to stay closer to the tradition in the exchange rate exposure literature that of including the exchange rate as the only independent variable in the main analysis.

The significant adding to the traditional analysis is the test for the presence of asymmetric exposures of Central and Eastern European capital markets to nominal and real exchange rate changes. Miller and Reuer (1998) observe that previous studies were based on the assumption that the financial performance effects associated with exchange rate appreciation and depreciation are symmetric. But this framework excludes the firms' ability of use real options to hedge economic exposures to foreign exchange rate movements: if they use them, then one should observe different exposure coefficients for periods of foreign currency appreciation and depreciation. Therefore, real option theory suggests that operational flexibility allows the firm to selectively exploit currency movements to its advantage while protecting the firm during periods when exposure would adversely affect firm value. If firms do not possess options for managing foreign exchange exposures, one would observe symmetric exposures for both appreciation and depreciation of foreign currencies. Also, one may observe firms with no exposure, regardless of movements in real values of foreign currencies. Miller and Reuer split their time series data into periods of currency appreciation and periods of depreciation and estimate two exposure coefficients for a firm. They find limited evidence for asymmetric exposures, but also no empirical evidence that U.S. manufacturing firms are exposed to foreign exchange movements in a symmetric fashion. Koutmos and Martin (2003) study nine U.S. sectors over the 1992-1998 period and find that in 25% of the cases the significant exposures are asymmetric, while using one-lag, 79% of the exposures are asymmetric. When investigating Korean companies, Oh and Lee (2004) observe that most domestic firms face asymmetric exchange rate exposures and that the pricing-to-market theory carries more conviction that the real option theory.

The paper is structured as follows: Section II overviews the conceptual distinctions between nominal and real exchange rates, Section III describes the nominal and real exchange rates evolution in Central and Eastern Europe after 1998, Section IV presents the data and methodology used in our analysis, Section V outlines our main findings, and Section VI concludes and delineates further research directions.

2. NOMINAL AND REAL EXCHANGE RATES

Analogous to concerns with the effects of inflation in the domestic setting on nominal versus real price levels, the effects of relative inflation rates between the home economy and the foreign economy matter for the exchange rate between the two countries. When the foreign inflation is higher and the home inflation does not change, the foreign currency would be expected to depreciate against home currency. Although the foreign currency will cost less now in home currency terms, this does not necessarily imply that the real value of goods and services purchases across borders decreased. The explanation resides in the fact that the increase in foreign prices for goods and services has exactly offset the decline in the value of the foreign currency, given higher inflation rates abroad than at home. Another way of expressing this phenomenon is to say that purchasing power remains the same in the two countries. In this case, while the foreign currency has undergone a nominal depreciation, it has not undergone a real depreciation. Therefore, what eventually matters for purchasing power between any two countries is not the simple change in the nominal exchange rate, but the change in nominal rates after adjustments for the changes in the relative inflation rates between the two countries have been made. The *real exchange rate* can be defined as the nominal exchange rate that takes into account the inflation differentials among the countries. When a currency appreciates in real terms, its purchasing power abroad has increased; when it depreciates in real terms, its purchasing power abroad has decreased. The importance of the real exchange rate to international business and finance research stems from the fact that it can and it is widely used as an indicator of relative competitiveness in the foreign business of a country.

Because of this important role it plays in an economy, the real exchange rate has been one of the most debated issues both in theory and practice. The debate over the real exchange rate is observable at the definition level, on one hand, and at the test level, on the other hand. Since the purpose of this paper is to link real exchange rates with changes in the competitiveness level, we will briefly review only the definition debate, as it is revealed by the existing calculation methods and interpretation of real exchange rates.

The various definitions of the real exchange rate can be categorized under two main types: the first type is linked to the theory of purchasing power parity, while the second is based on the distinction between the tradable and non-tradable goods. Although they may coincide in some special cases, applying these two types of definitions typically leads to different results. According to Purchasing Power Parity (PPP), the real exchange rate can be defined as the nominal exchange rate, adjusted by the ratio of the foreign country price level to the domestic country price level. In terms of this definition, the benchmark level of the real exchange rate equals 1, while a value higher than one can be interpreted as a real appreciation of the foreign

currency. The reverse is true when the real exchange rate has a value lower than 1. The definition on the basis of tradable and non-tradable goods takes the relative price of the tradable and non-tradable goods in a specific country as an indicator of the country's competitiveness level in the foreign trade. The rationale behind this definition is the related to the fact that cost differential between the countries are closely related to the relative price structures in these economies. Under the terms of this definition, a decline in the real exchange rate indicates a real appreciation of the domestic currency. Given an unchanged price structure in a country, a higher relative price of non-tradables leads to a decrease in the country's level of competitiveness against its trade partners. In practice, applying the second definition proves complex (it can only be made by considering the ratio of the prices of exportable or importable goods to the prices of the non-tradables) and for this reason the first definition is widely used.

Although more used, the PPP-based definition of the real exchange rates raises the issue of the price index employed in the computation. The wholesale price index (WPI) and the consumer price index (CPI) are two of the leading indices that can be used in these calculations, other alternatives being the gross domestic product (GDP) deflator and producers' price index (PPI). All these indices support criticism. The most important criticism to the real exchange rates calculated by using the WPI is that commodities included in this index are formed of tradables that are similar in nature and, therefore, their prices are not expected to differ substantially when measured in a common currency. Consequently, the changes in the real exchange rate calculated using the WPI would not sufficiently indicate the changes in a country's competitiveness level. The same criticism applies for the PPI as well: although in theory the PPI includes the prices in the services sector – categorized as non-tradables –, in practice such an index includes the prices in the primary and secondary sectors, which are categorized as tradables. On the other hand, the main problem with the real exchange rates calculated by using the CPI is that this index includes the non-tradable commodities, while the main problem with the GDP deflator is that the time series is not available on the monthly basis.

Apart from bilateral nominal and real exchange rates, international financial statistics operates with the concepts of nominal effective and real effective exchange rates. The *nominal effective exchange rate* of a country (NEER) or, equivalently, the "trade-weighted currency index" of the country aims to track changes in the value of the country's currency against the currencies of its main trading partners. The *real effective exchange rate* (or, equivalently, the "relative price and cost indicators") aims to assess a country's competitiveness in terms of prices and costs against its main competitors in international goods and services markets. The existing literature employs a wide range of prices to calculate real effective exchange rates, such as: consumer price index (CPI), GDP deflator, industrial production prices index (PPI),

nominal unit labour costs for the total economy or for the manufacturing industries, and the ratio between the prices of tradable and non-tradable goods. As an indicator of international competitiveness, the real effective rate is best to be used over a long-run horizon. Still, despite its widespread use, this indicator has some disadvantages. Specifically, the concept of international competitiveness is difficult to be measured at the economy level, as the indicator does not take fully into account the competition at firm level that includes factors such as product quality, innovation and reputation. Nevertheless, the use of real exchange rates may be explained by the fact that firms' international performances are highly influenced by macroeconomic evolutions, particularly in emerging countries. The methodologies used for the computation of the effective exchange rates differ between the International Monetary Fund, European Central Bank and OECD. In our research we have used the rates calculated according to the European Central Bank methodology. Specifically, the NEER is calculated as a weighted geometric average of the bilateral exchange rates against the currencies of trade partner countries and reported as an index; a rise in the index indicates a strengthening of the currency in nominal terms. The REER corresponds to the NEER deflated by nominal unit labour costs for the total economy and consumer prices (CPI/HICP); a rise in the index signifies a real appreciation of the currency and, by consequence, a loss of competitiveness.

3. EXCHANGE RATES IN CENTRAL AND EASTERN EUROPE

The enlargement of the European Union in May 2004, by the accession of ten Central and South-Eastern European countries, of which eight were former communist countries (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia), followed by a second wave of accession at the beginning of 2007, that also involved two former communist countries (Bulgaria and Romania), represents an economic and political experiment that is entirely different from all previous accessions. The integration process of all these countries will directly impact their capital, money and currency markets, with a precise goal represented by the adoption of the common euro currency. The adoption of the euro is by far the greatest challenge all these countries were faced with since the moment of their accession to EU, and one of them – Slovenia – proved that the criteria imposed by the EU in order to adopt the euro can be achieved, as the country adopted the euro as its currency at the begging of 2007.

The exchange rate regimes of the former communist countries in the region are quite diverse, ranging from free floating to currency boards. The four countries included in our analysis currently used more flexible regimes, as compared to the remaining of the twelve former communist countries in the region: Czech Republic has a managed floating with no-predetermined path, as well as Romania, Poland uses an independent floating regime, Hungary enjoying the least flexible regime, as

its currency is pegged to the euro with a predetermined band of ±15%. It is worth pointing that during the past ten years, all the four countries have transformed their monetary policies by adopting the inflation targeting framework: Czech Republic in 1998, Poland in 1999, Hungary in 2001 and, more recently, Romania in 2005. Nevertheless, all of these countries will see their currencies replaced by the euro, but not until they will stay in the Exchange Rate Mechanism II (ERMII) at least two years before the euro adoption. This exchange rate arrangement, similar to the Exchange Rate Mechanism I that eventually led to the euro adoption by the initial twelve EU countries was introduced on January 1, 1999, and its role is to ensure convergence and easier euro adoption, by inducing higher stability at the level of exchange rates against the euro. Participation in ERMII is voluntary for all non-euro area member states; however, as ERMII membership is one of the convergence criteria for the eventual euro adoption, all new member states are expected to join the mechanism sooner or later. For the currency of each member state participating in the mechanism, a central rate against the euro and a standard fluctuation band of ±15% are defined.

When one observes the evolution of the four countries' exchange rates between January 1999 and December 2007 interesting patterns are revealed. Figures 1 and 2 depict the bilateral exchange rates of the domestic currencies against the U.S. dollar and the euro, respectively. The first observation is that the Romanian currency (RON) behave differently as compared to the other three currencies: while the Czech koruna (CZK), Hungarian forint (HUF) and Polish zloty (PLN) deppreciated until the end of 2000 against the U.S. dollar, afterwards entering an appreciating period until the end of 2007, RON depreciated heavily against the U.S. dollar until the end of 2001, then it somehow maintained its value against the U.S. dollar until mid-2004, but afterwards the trend was reversed and the Romanian currency began an overall appreciating phase against the U.S. dollar, also accompanied by higher volatility in the foreign exchange market. The same general pattern is to be discovered in the evolution of the four currencies against the euro, with two noteworthy observations: (1) CZK, HUF and PLN appreciated less against the euro as compared to the U.S. dollar during the considered timeframe; (2) the volatility of all four currencies against the euro was lower when compared to the volatility against the U.S. dollar – the standard deviation of monthly changes in exchange rates was 3.14% against the U.S. dollar and 1.47% against the euro in the case of CZK, 3.22% against the U.S. dollar and 1.84% against the euro for the HUF, 3.16% against the U.S. dollar and 2.64% against the euro for the PLN, and 3.07% against the U.S. dollar and 2.84% against the euro in the case of RON - , which suggests that central banks in these countries have made efforts to reduce the band of fluctuation against the common European currency, given the entrance of their currencies in the ERMII arrangement.

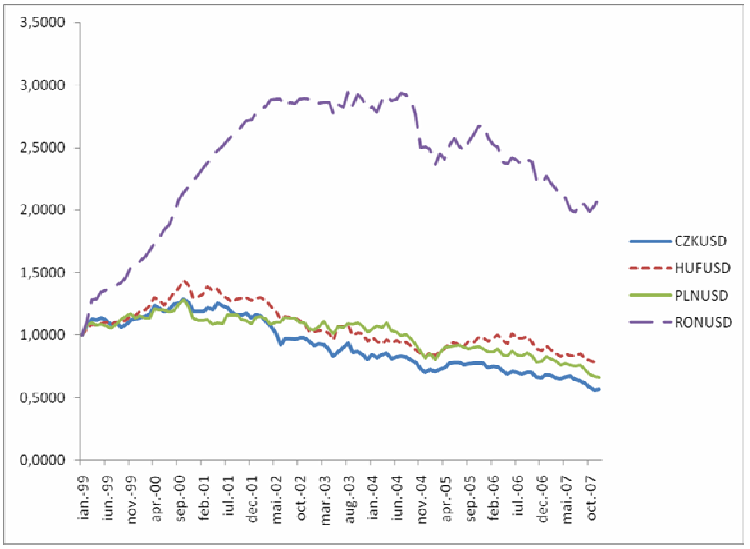

Figure 1. *Exchange rates of domestic currencies against the U.S. dollar, 1/1999-12/2007; January 1999=1*

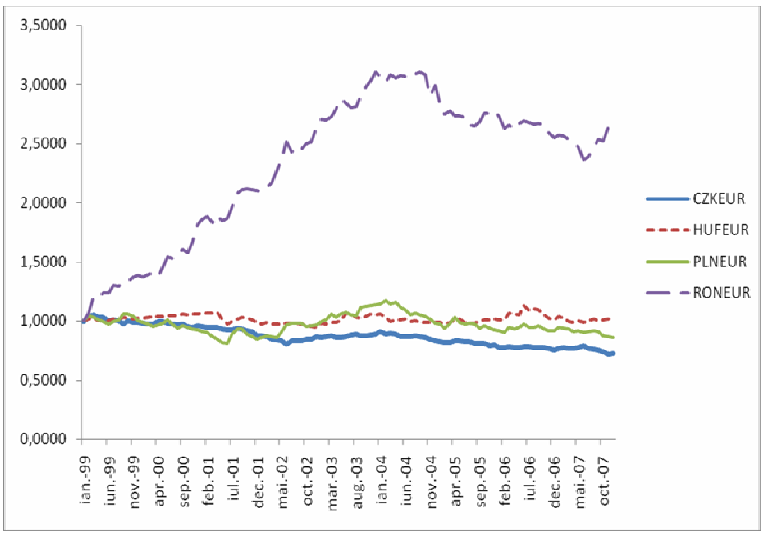

Figure 2. *Exchange rates of domestic currencies against the euro, 1/1999-12/2007; January 1999=1*

The nominal effective exchange rates, as measures of overall strength of the currencies against the currencies of their main trading partners, tell a slightly different story for the currencies in our study. As mentioned above, a rise in the NEER index indicates an appreciation of the currency in nominal terms. Figure 3 depicts the evolution of the NEER27 over the 1998-2007 period[1] and allows us to observe that the only currency showing a clear appreciating pattern is the Czech

[1] The evolution of currencies against NEER13, NEER36 and NEER41 is similar to NEER27.

koruna, while the Romanian currency depreciated massively by the end of 2007, reaching 40% of its value in January 1998. At the same time, the Hungarian forint and the Polish zloty fluctuated in value, with the forint having at the end of 2007 approximately the same value as the one in January 1998, and the zloty increasing by 10% its value at the end of 2007 as compared to January 1998.

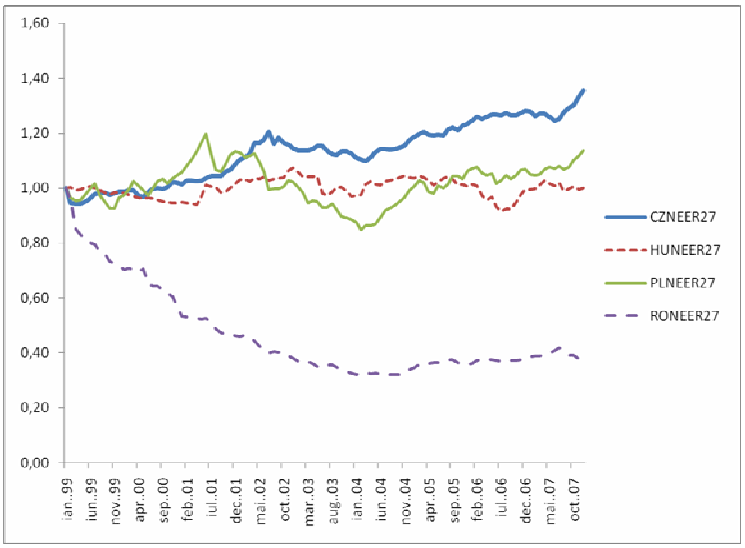

Figure 3. *Nominal effective exchange rates (NEER27) of domestic currencies against the euro, 1/1999-12/2007; January 1999=1*

Although in nominal terms the four currencies showed different patterns of evolution, when one analyzes the trends in these countries' competitiveness using the real effective exchange rates it may clearly observe the losses in competitiveness suggested by the real appreciations of domestic currencies during the 1998-2007 period. Of the four countries, Romania shows the heaviest loss in competitiveness, as its currency appreciated in real terms against its major trading partners by approximately 50% during the period, followed by the Hungarian forint, the Czech koruna and the Polish zloty. The RON real appreciation was more accentuated after the end of 2004 and it was coupled with a nominal appreciation of the currency against the U.S. dollar and the euro, as well as with a nominal depreciation against the currencies of trading partners.

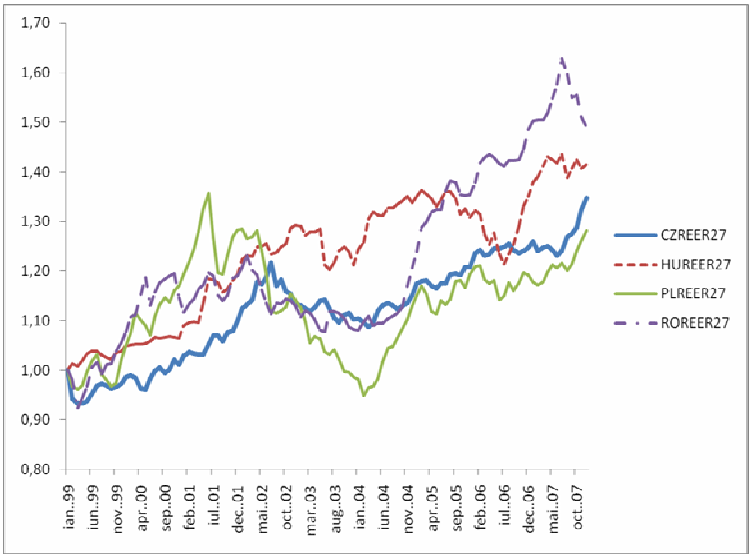

Figure 4. *Real effective exchange rates (REER27) of domestic currencies against the euro, 1/1999-12/2007; January 1999=1*

4. DATA AND RESEARCH METHODOLOGY

The research employs two sets of data on each of the four countries – Czech Rep., Hungary, Poland and Romania -, over the January 1999 – December 2007 period. The first set of data covers monthly values of local stock market indices, denominated in the local currencies. In order to track the performance of stock exchanges in the region we have used the MSCI (Morgan Stanley Capital International) indices for Czech Rep., Hungary and Poland, as well as their local stock exchange indices (PX50 for the Czech market, BUX for the Hungarian market, and WIG for the Polish market) and the BET and BET-C indices of Bucharest Stock Exchange for Romania. For what concerns the exchange rates data, we have used bilateral nominal exchange rates of the local currencies against the euro and the U.S. dollar, nominal effective exchange rates computed against the euro-13 are countries (NEER13), the EU-27 countries (NEER27), the main 36 trading partners (NEER36) and the main 41 trading partners (NEER41), and real effective exchange rates computed against the same trading partners as for the nominal effective rates (REER13, REER27, REER36 and REER41)[2]. The bilateral rates are end-of-month exchange rates collected from the websites of central banks from the respective countries, while data on nominal and real effective rates were collected from the

[2] The trading partners included in the construction of NEER13 and REER13 are: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Slovenia and Spain. NEER27 and REER27 include also Bulgaria, Czech Republic, Cyprus, Denmark, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Sweden and United Kingdom. NEER36 and REER36 supplementary include Australia, Canada, Japan, Mexico, New Zealand, Norway, Switzerland, Turkey and United States. NEER41 and REER41 include above the already mentioned countries Brazil, China, Hong Kong, Korea and Russia.

database of the Directorate General for Economic and Financial Affairs of the European Commission.

In order to identify the relevance and magnitude of corporate exposures to changes in the exchange rates in these countries, we estimated ordinary least squares (OLS) regressions as follows:

$$(1) \qquad R_{i,t} = \beta_{0,t} + \beta_{1,t}\Delta S_{i,t} + \varepsilon_{i,t}$$

$$(2) \qquad R_{i,t} = \chi_{0,t} + \chi_{1,t}\Delta S_{i,t-k} + \eta_{i,t}$$

$$(3) \qquad R_{i,t} = \gamma_{0,t} + (\gamma_{1,t} + \gamma_{D,t}D_t)\Delta S_{i,t} + \omega_{i,t}$$

For market i, $R_{i,t}$ is the return on the national stock market (logarithmic change in the monthly value of the stock market index). $\Delta S_{i,t}$ is the logarithmic change in the nominal bilateral exchange rate of the local currencies against the euro and the U.S. dollar and in the nominal and real effective exchange rates of the domestic currencies. A positive change in the nominal bilateral exchange rates is interpreted as an appreciation of the foreign currency and a depreciation of the domestic currency, while a positive change in the nominal effective exchange rate is interpreted as an overall strengthening or appreciation of the domestic currency. On the other hand, a positive change in the real effective exchange rate signifies a real appreciation of the domestic currency against its trading partners and, consequently, a decrease in the competitiveness of the respective economy. The regressions indicated by (2) above test for the presence of lagged exposures up to 4 months: k=1 to 4. We also investigate for the presence of asymmetric exposure in regressions indicated by (3) above, using the following methodology: we constructed a dummy variable that captures the changes in the exchange rates and takes the value of one if $\Delta S_{i,t}>0$ and zero otherwise when bilateral exchange rates were used, and the value of one if $\Delta S_{i,t}<0$ and zero otherwise when nominal and real effective exchange rates were used.

The value of regression coefficients $\beta_{1,t}$, $\chi_{1,t}$ and $\gamma_{1,t}$ indicates the magnitude of the respective market overall exposure to exchange rate risk: the higher the value of the coefficient, the higher the exposure. The regression coefficient signs should be interpreted differently, depending on the exchange rate being used, as follows: (1) when bilateral rates against the U.S. dollar and the euro are used, a positive coefficient signifies that a depreciation of the domestic currency against the foreign currencies results in an increase in the value of the stock index and, consequently, in the value of companies in the respective country, the reverse being true for a negative coefficient; (2) when nominal effective exchange rates are used, a positive coefficient indicates that a strengthening of the domestic currencies is reflected in increases in the stock index' value, the reserve being true for negative coefficients: (3) when real effective exchange rates are used, a positive coefficient suggests that a real appreciation of the domestic currency, which is linked to a decrease in the

economy-wide competitiveness, results in positive returns in the local stock market, the reverse being true for a negative value of the coefficient.

5. EMPIRICAL RESULTS

5.1. Unit root tests

A stylized fact of individual economic time series is that they are non-stationary in levels and stationary in the first differences; that is, they are *I*(1). In particular, shocks in the level of an *I*(1) series are permanent, whereas shocks to the first difference are transitory. We used two traditional unit root tests, namely the augmented Dickey–Fuller (ADF) test and the Phillips–Perron (PP) test, to investigate the *I*(1) property. Both of these tests investigate the presence of a stochastic trend in the individual series. The standard ADF test for a unit root is based on the following equation:

$$\Delta x_t = \alpha + \beta t + \delta x_{t-1} + \sum_{i=1}^{k} \Delta x_{t-1} + \varepsilon_t$$

where $e \sim IDD(0, \sigma^2)$. The PP test is a non-parametric method of controlling for higher order serial correlation in a series. Both ADF and PP test statistics failed to reject the null hypothesis of the existence of a unit root in log levels but reject the same null hypothesis in the log first difference of the series. Thus, all the time series used in this study are integrated of order 1, or *I*(1).

5.2. Contemporaneous and lagged exposure to exchange rate risk

Table 1 presents the results of contemporaneous exposures to changes in nominal and real exchange rates for the fours markets in Central and Eastern Europe. All markets except Czech Republic show the presence of exposure to changes in the bilateral rate of their currencies against the U.S. dollar, and all markets except for Romania show exposure to changes in the bilateral rates against the euro. In all cases when exposure is identified, the coefficients are negative, implying that domestic currencies' appreciation against the dollar and the euro lead to increases in the value of stock indexes, indicating increases in companies' values. When nominal effective rates are used, Poland and Hungary are exposed to changes in all categories of rates, Czech Republic shows exposure only to changes in the NEER13, while no exposure was detected for Romania. While the overwhelming majority of coefficients is positive, suggesting that appreciations of domestic currencies lead to increases in companies' market value and depreciations generate decreases in companies' value, in the case of Czech Republic our results point to an inverse relation: for this country, an appreciation of the domestic currency is reflected in decreases in companies' market value, while a depreciation of the domestic currency leads to increases in firm's value. These results suggest, with the

exception of the Czech Republic, an exposure that is typical to importing companies, whose activities are boosted by appreciations of the domestic currency. When real exchange rates are used, only Hungary and Poland show positive exposure coefficients, which indicate that real appreciations of domestic currencies are reflected in positive returns in the stock market and in increases in local companies market value. This result is puzzling, since currencies real appreciations normally indicate losses at the economy-wide competitiveness, which should be reflected in turn by declines in companies' market values. We interpret our finding by the lack of representativeness of the companies listed in the stock markets in these countries for the economy-wide performance.

Table 1.

Contemporaneous exchange rate exposures for national stock markets, 1/1999-12/2007

Country	Regression coefficients $\beta_{1,t}$									
	USD	*EUR*	*NEER13*	*NEER27*	*NEER36*	*NEER41*	*REER13*	*REER27*	*REER36*	*REER41*
Czech Republic										
MSCI	0.133	0.049	-15.512**	0.730	0.689	0.653	0.848	0.725	0.681	0.642
	(0.230)	(0.491)	(6.416)	(0.604)	(0.581)	(0.566)	(0.527)	(0.544)	(0.525)	(0.511)
PX	-0.135	-0.655***	-3.018	0.002	-0.059	-0.075	0.350	0.125	0.059	0.036
	(0.164)	(0.344)	(4.691)	(0.434)	(0.417)	(0.406)	(0.379)	(0.391)	(0.377)	(0.367)
Hungary										
MSCI	-0.380***	-1.145*	1.306*	1.284*	1.263**	1.189**	1.094**	1.085**	1.070**	1.009**
	(0.217)	(0.369)	(0.461)	(0.481)	(0.486)	(0.481)	(0.448)	(0.468)	(0.477)	(0.473)
BUX	-0.391**	-0.928*	1.624*	1.577*	1.530*	1.483*	1.478*	1.450*	1.422*	1.382*
	(0.162)	(0.276)	(0.324)	(0.342)	(0.347)	(0.344)	(0.316)	(0.333)	(0.341)	(0.339)
Poland										
MSCI	-0.726*	-1.235*	0.966*	1.012*	1.051*	0.359	-0.279	0.934*	0.974*	0.967*
	(0.227)	(0.258)	(0.328)	(0.337)	(0.346)	(0.345)	(0.508)	(0.328)	(0.337)	(0.342)
WIG	-0.505*	-0.533*	0.955*	0.980*	1.008*	0.428***	0.069	0.930*	0.959*	0.971*
	(0.158)	(0.191)	(0.219)	(0.225)	(0.231)	(0.238)	(0.354)	(0.219)	(0.225)	(0.228)
Romania										
BET	-0.387	-0.273	0.039	0.048	0.025	0.043	0.221	0.390	0.401	0.427
	(0.281)	(0.306)	(0.370)	(0.380)	(0.396)	(0.402)	(0.382)	(0.452)	(0.482)	(0.495)
BET-C	-0.515**	-0.399	0.368	0.382	0.314	0.331	0.300	0.439	0.382	0.395
	(0.245)	(0.268)	(0.324)	(0.333)	(0.348)	(0.353)	(0.336)	(0.398)	(0.425)	(0.436)

Heteroskedasticity consistent standard errors within parenthesis.
* Significant at 1%; ** at 5%; *** at 10%

Table 2 presents the results for the lagged exposures and allows us to observe that all markets are exposed to past changes in exchange rates, in most cases the number of lags for which significant exposures were identified being three or four, with the only exception of Hungary, where one-month and two-month lagged exposures to changes in the value of the domestic currency against the U.S. dollar and the euro, respectively, were found. All markets suffer from exposure to nominal and real exchange rate risk, but the most interesting result, in our view, is indicated by the changes in the coefficients' sign, as opposed to contemporaneous exposure

coefficients. For euro exposures, coefficients are positive in Czech Republic, Hungary and Poland, suggesting that past appreciations of domestic currencies against the euro generate decreases in the current value of companies traded in these countries' exchanges, and past depreciations lead to increases in the current value of companies. When exposure is considered towards changes in the nominal effective rates, all countries show negative coefficients for three lags (Czech Republic, Poland and Romania) and four lags (Hungary and Poland). This indicates that the strengthening of domestic currencies is acknowledged by capital market investors as decreases in the current value of the firms with a three to four months distance. In terms of exposure to real exchange rate risk, the same number of lags – three and four – indicate significant exposures in all countries, while all coefficients are negative, suggesting that past real appreciations of domestic currencies are reflected in decreases in the current market value of companies from the respective markets.

Table 2.

Lagged exchange rate exposures for national stock markets, 1/1999-12/2007

Czech Rep.			*Hungary*			*Poland*			*Romania*		
Index	*Exchange rate and lag*	$\chi_{1,t}$	*Index*	*Exchange rate and lag*	$\chi_{1,t}$	*Index*	*Exchange rate and lag*	$\chi_{1,t}$	*Index*	*Exchange rate and lag*	$\chi_{1,t}$
MSCI	EUR [3]	0.860*** (0.480)	BUX	EUR [1]	-0.615** (0.284)	MSCI	EUR [3]	0.586** (0.276)	BET	NEER13 [3]	-1.011* (0.006)
MSCI	NEER13 [3]	-16.262* (6.141)	BUX	USD [2]	0.319** (0.161)	MSCI	EUR [4]	0.510*** (0.279)	BET	NEER27 [3]	-1.051* (0.370)
MSCI	NEER27 [3]	-1.536* (0.579)	BUX	NEER13 [4]	-0.627*** (0.351)	MSCI	NEER13 [3]	-0.817** (0.327)	BET	NEER36 [3]	-1.105* (0.385)
MSCI	NEER36 [3]	-1.408** (0.559)	BUX	REER13 [4]	-0.738** (0.335)	MSCI	NEER13 [4]	-0.714** (0.331)	BET	NEER41 [3]	-1.124* (0.391)
MSCI	NEER41 [3]	-1.297** (0.547)	BUX	REER27 [4]	-0.700** (0.352)	MSCI	NEER27 [3]	-0.864** (0.336)	BET	REER27 [3]	-1.058** (0.452)
MSCI	REER13 [3]	-1.448* (0.505)	BUX	REER36 [4]	-0.625*** (0.359)	MSCI	NEER27 [4]	-0.729** (0.341)	BET	REER36 [3]	-1.179** (0.482)
MSCI	REER27 [3]	-1.433* (0.522)				MSCI	NEER36 [3]	-0.895** (0.346)	BET	REER41 [3]	-1.219** (0.494)
MSCI	REER36 [3]	-1.322* (0.506)				MSCI	NEER36 [4]	-0.749** (0.351)	BETC	NEER13 [3]	-0.614*** (0.323)
MSCI	REER41 [3]	-1.227** (0.495)				MSCI	REER27 [3]	-0.790** (0.326)	BETC	NEER27 [3]	-0.627*** (0.331)
PX	EUR [3]	0.778** (0.348)				MSCI	REER27 [4]	-0.771** (0.329)	BETC	NEER36 [3]	-0.662*** (0.345)
PX	NEER13 [3]	-10.707** (4.524)				MSCI	REER36 [3]	-0.824** (0.336)	BETC	NEER41 [3]	-0.665*** (0.350)
PX	NEER27 [3]	-1.100** (0.425)				MSCI	REER36 [4]	-0.799** (0.339)	BETC	REER27 [3]	-0.805** (0.399)
PX	NEER36 [3]	-0.966** (0.411)				MSCI	REER41 [3]	-0.805** (0.341)	BETC	REER36 [3]	-0.903** (0.425)
PX	NEER41 [3]	-0.867** (0.402)				WIG	USD [4]	0.286*** (0.170)	BETC	REER41 [3]	-0.922** (0.436)
PX	REER13 [3]	-1.006* (0.371)				WIG	EUR [4]	0.624* (0.193)			
PX	REER13 [4]	-0.672*** (0.367)				WIG	NEER13 [3]	-0.587** (0.234)			
PX	REER27 [3]	-0.985** (0.384)				WIG	NEER13 [4]	-0.828* (0.227)			
PX	REER36 [3]	-0.869** (0.373)				WIG	NEER27 [3]	-0.625** (0.241)			
PX	REER41 [3]	-0.790** (0.365)				WIG	NEER27 [4]	-0.859* (0.234)			

Czech Rep.			*Hungary*			*Poland*			*Romania*		
Index	*Exchange rate and lag*	$\chi_{1,t}$	*Index*	*Exchange rate and lag*	$\chi_{1,t}$	*Index*	*Exchange rate and lag*	$\chi_{1,t}$	*Index*	*Exchange rate and lag*	$\chi_{1,t}$
						WIG	NEER36 [3]	-0.645** (0.247)			
						WIG	NEER36 [4]	-0.879* (0.241)			
						WIG	REER27 [3]	-0.533** (0.234)			
						WIG	REER27 [4]	-0.846* (0.226)			
						WIG	REER36 [3]	-0.555** (0.241)			
						WIG	REER36 [4]	-0.870* (0.233)			
						WIG	REER41 [3]	-0.546** (0.245)			
						WIG	REER41 [4]	-0.853* (0.237)			

Lags within squared parenthesis. Heteroskedasticity consistent standard errors within round parenthesis.

* Significant at 1%; ** at 5%; *** at 10%.

5.3. Asymmetric contemporaneous exposure to exchange rate risk

Table 3 presents the results of the tests performed in order to assess the asymmetry in the exposure to exchange rate risk. Our findings show that Czech companies carry as asymmetric exposure to nominal and real exchange rate risk, while indications of asymmetry are limited for Hungary – only the exposure to changes in the forint against the U.S. dollar exchange rate is asymmetric – and Poland – here the asymmetry is identified for the nominal effective rate against the main 41 trading partners. At the same time, for Romanian companies the exposure to nominal and real exchange rate risk is symmetric, none of regression coefficients being statistically significant even at 10%.

Table 3.

Asymmetric exchange rate exposures for national stock markets, 1/1999-12/2007

Country and market index	*Exchange rate*	$\gamma_{1,t}$	$\gamma_{D,t}$
Czech Republic			
MSCI	NEER27	-1.003 (1.050)	3.386** (1.689)
MSCI	NEER36	-1.172 (0.982)	3.695** (1.589)
MSCI	NEER41	-1.110 (0.946)	3.565** (1.551)
MSCI	REER27	-0.794 (0.984)	2.936*** (1.593)
MSCI	REER36	-0.979 (0.938)	3.233*** (1.524)
MSCI	REER41	-1.025 (0.905)	3.262** (1.473)
PX			-0.966***
	USD	0.261 (0.284)	(0.569)
PX	EUR	0.367 (0.589)	-2.307** (1.087)
PX	NEER27	-1.221 (0.754)	2.391** (1.213)
PX		-1.376***	
	NEER36	(0.705)	2.616** (1.141)
PX	NEER41	-1.382** (0.678)	2.644** (1.110)
PX	REER13	-0.773 (0.710)	2.188*** (1.175)

Country and market index	*Exchange rate*	$\gamma_{1,t}$	$\gamma_{D,t}$
PX		-1.238***	
	REER27	(0.701)	2.633** (1.134)
PX	REER36	-1.354** (0.668)	2.750** (1.086)
PX	REER41	-1.398** (0.643)	2.807* (1.047)
Hungary			
BUX			-1.031***
	USD	0.122 (0.310)	(0.533)
Poland			
MSCI	NEER41	0.131 (0.342)	1.683* (0.573)
WIG	NEER41	0.208 (0.226)	1.633* (0.379)

Heteroskedasticity consistent standard errors within round parenthesis.
* Significant at 1%; ** at 5%; *** at 10%.

The small evidence for asymmetric exposures in Central and Eastern Europe may be explained by the inability of companies in the region to use real or financial options either in order to capture the positive effects of changes in exchange rates as reflected in higher market values, or with the intention of hedging the undesired exposures to adverse changes in exchange rates. At the same time, the result may indicate that stock market investors do not generally include in the market's return a premium for asymmetric changes in exchange rates, recognising in this manner the inability of domestic companies to benefit from periods of depreciations and appreciations of the local currency. In this framework, Czech companies seem to project a different image, as our results indicate the presence of positive asymmetric exposures when nominal rates are used – thus showing that companies take advantages from times when the local currency appreciates against the currencies of trading partners, and of negative asymmetric exposures when the bilateral rates against the U.S. dollar and the euro are being used – confirming that appreciations are positively used by local companies to increase their market value. On the other hand, the asymmetric exposure to changes in the real exchange rate of koruna indicates that real appreciations of the currency are hurting local companies by diminishing their market values.

6. CONCLUSIONS AND FURTHER RESEARCH

Our paper investigated the exposure of national stock markets from a number of four countries in Central and Eastern Europe – Czech Republic, Hungary, Poland and Romania – to nominal and real exchange rate risk, using monthly data on exchange rates and stock market returns over the January 1999 – December 2007 timeframe. We find that companies from the region show contemporaneous and lagged exposure to nominal and real exchange rate risk and that these exposures are of the same type in all countries, suggesting a similarity in the economic structure in terms of foreign operations activity – exporting versus exporting. Romania is the country where the evidence for exposure is mostly limited, indicating a lower market

efficiency and a poorer understanding from the part of capital market investors of Romanian companies operations. Another possible explanation for the low exposure in case of the Romanian market may be linked to the likely hedging of exposures through the use of internal techniques – such as cash flow matching, contractual clauses etc. – since one cannot identify a market for financial derivative contracts in Romania. An interesting result, which applies to all four markets, refers to lagged exposures. Two aspects are noteworthy, in this respect: first, significant exposures are mostly found for three or four lags (months, in our analysis), possibly linked to the typical maturity of commercial credit, suggesting that some time needs to pass until changes in exchange rates are captured by stock market returns; second, lagged exposures are the opposite of contemporaneous exposures, which may indicate that investors react immediately to depreciations/appreciations of domestic currencies against the U.S. dollar and the euro by increasing/decreasing the stocks' prices, while after a couple of months they change their perceptions and react inversely. The situation is different when the overall strength of the domestic currency is considered, as immediately investors seem to link appreciations to increases and depreciations to decreases in the market value of companies, while after three to four months they assess in an opposite manner the effects of exchange rate changes in companies' value.

For what concerns the impact of changes in the competitive positions of countries against their trading partners, contemporaneous exposures are found only in the case of Hungary and Poland and are somehow puzzling, as they show that real appreciations of these countries' currencies, which signify decreases in competitiveness, are immediately reflected in positive returns in the stock market. Lagged exposures, on the other hand, tell the expected story: negative changes in the competitive positions of all four countries are reflected in decreases in market returns. The small evidence in favour of asymmetric exposures may be explained by the inability of companies in the region to use real or financial options either in order to capture the positive effects of changes in exchange rates as reflected in higher market values, or with the intention of hedging the undesired exposures to adverse exchange rates changes.

The research on the topic of exchange rate exposure needs to be continued on several directions: (1) the analysis of exchange rate exposure of individual companies on these markets, aiming at evidencing the particularities of their operations that have a significant impact on the type and size of exposure; (2) the use of daily and weekly data, in order to better understand the short-term reactions of investors in the market to surprises in exchange rates; (3) the investigation of second-moment exchange rate exposure, besides the first-moment exposure, which will shed light on the effects that changes in the volatility of exchange rate changes may have on companies cash flows and market value.

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CASE STUDY

NORTHERN ROCK: THE CRISIS OF A UK MORTGAGE LENDER

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Abstract: *The global market liquidity squeeze for securities that initiated in 2007 has increased pressure among banks to sell, pushed down prices, and impacted the market for interbank loans, leading to a funding gap at Northern Rock, Britain's fifth largest mortgage bank. This paper presents an analysis of the events that lead to the collapse of Northern Rock in the second half of 2007 and its rescue by the UK Government towards the end of the same year and the beginning of 2008. The paper presents the implications and banking reforms proposed by the UK financial authorities.*

Keywords*: financial crisis, banking reforms, financial regulation*

JEL Classification*: G21, G28, G38*

OVERVIEW

"The period between 14-17 September 2007 experienced the first run on the retail deposits of a UK bank since Victorian times" (UK Treasury Committee). This was related to the funding difficulties faced by Northern Rock plc (NR). Its reliance on wholesale market funding, identified by the Treasury Select Committee as the primary cause of its difficulties, led it to seek emergency liquidity assistance from the Bank of England (BoE) in September 2007, when it became unable to secure sufficient funding from the wholesale markets. Publicity about the position of the firm precipitated a sudden withdrawal of funds by retail customers. Since then, the authorities have put in place funding arrangements to enable the firm to take strategic decisions about its future.

In January 2008 the UK Treasury Committee published a report entitled "The Run on the Rock" examining what caused the run on the bank, the consequences for NR and the wider financial stability, the way the events were handled by public authorities and the lessons to be learned. The report called for large-scale reforms to the way the tripartite regulatory system – the Treasury, the Financial Services Authority (FSA) and the BoE – operates, and argues that complacency, lack of communication and clumsy decision-making between the three bodies made a bad

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situation worse. The report, following several months of inquiries, is the most comprehensive assessment yet of the lessons to be learnt from the near collapse of NR last September. The FSA has also instigated an internal review (due to report in March 2008) into the lessons of the events surrounding NR in 2007, and what changes these suggest for the FSA's risk assessment and risk mitigation practices in general.

SUMMARY OF CAUSES

The failure of NR, while a failure of its own Board, was also a failure of its regulators.

Causes related to Northern Rock: The directors of NR were the main creators of the difficulties faced by the company since August 2007. They pursued a reckless business model that was excessively reliant on wholesale funding.

Causes related to the FSA: FSA did not supervise NR properly. It failed in its regulatory duty to avoid a systemic risk. It did not allocate sufficient resources or time to monitoring a bank whose business model was clearly an outlier. Its procedures were inadequate to supervise a bank whose business grew so rapidly.

Causes related to the Tripartite system: the Tripartite authorities did not prepare adequately for the systemic risk support operation. The Tripartite arrangements lack a clear leadership structure or a strategy for effective communication with the public[1].

BACKGROUND ON NORTHERN ROCK

Northern Rock plc was – until its collapse – one of two Financial Times Stock Exchange (FTSE) 100 headquartered in the North Eastern part of England, creating economic opportunities for the region.

NR was formerly a building society which demutualised on 1 October 1997. Between 1997 and the end of 2006, its consolidated balance sheet had grown more than six-fold, reaching an asset value of £101 billion. The assets were comprised mainly on secured lending on residential properties.

[1] The roles of the Tripartite authorities as set out in the Memorandum of Understanding signed in 1997 and updated in 2006 are based on four principles: 1) clear accountability – each authority must be accountable for its actions, so each must have unambiguous and well-defined responsibilities; 2) transparency – Parliament, markets and public must know who is responsible for what; 3) avoidance and duplication – each authority must have a clearly defined role; 4) regular information exchange – helps each authority to discharge its responsibilities efficiently.

In 1997, at the time of its demutualisation, NR set up the NR Foundation, to which it paid out 5% of its pre-tax profits; according to NR 2006 Annual Report, since 1997 the Foundation received £175 million from NR Plc. The importance of the Foundation is reflected in the fact that, should NR be taken over, it would have 15% of the share capital.

The shareholder base of NR reflects its demutualisation. A significant number of its employees were also represented in the shareholder base (75% according to the company).

NR described itself as a "specialised lender, whose core business is the provision of UK residential mortgages funded in both retail and wholesale markets". As at end of 2006, 89.2% of its assets were residential mortgages.

Northern Rock Assets. According to NR: the analysis taken as part of the Basel II process had shown that NR's lending in the 18 months prior to August 2007 was better quality than the previous two or three years. The Bank of England was also supportive of the quality of the asset book. While introducing subprime borrowers to a third party, NR did not hold such subprime loans on its balance sheet.

Northern Rock Liabilities. In order to achieve this level of growth in assets, the company changed the structure of its liabilities. NR had adopted an "originate-to-distribute" model[2] of funding and began to borrow money from the wholesale markets, parceling up mortgages and using them as collateral for further funds, a process known as "securitisation". Thus a new entity was created called Granite, which was their securitisation vehicle. FSA stated that the entity was functioning normally. The overall funding of NR was comprised of: 50% securitisation with an average life of 3 ½ years; 10% was covered bonds with an average life of about 7 years; 25% wholesale borrowings, from which half had a duration no longer than one year and the other half less than one year. While the wholesale funding of NR grew, there was no corresponding growth in its retail funding. Retail deposits and funds fell significantly comparing to other banks that were previously building societies: from 62.7% at end-1997 to 22.4% at end-2006.

[2] Most banks made a transition from the 'originate-to-hold' model to 'originate-to-distribute' model, where banks no longer hold loans to maturity but instead sell on loans to investors. This shift has been stimulated by the rapid innovation in financial instruments, in particular with regards to the interaction of the credit derivatives markets with the rapid growth of securitisation technology. The originate-to-distribute model has several consequences on the financial market, in particular related to the way financial institutions manage their risk exposures. Risks are more widely distributed outside the banking system, they are more transparent and there are more tools to manage risk concentration. As a result, deteriorating credit exposures can be managed more actively at an earlier stage. The new model also raises new risks for banks.

THE EVENTS OF 2007: AUGUST CRISIS

NR expanded its mortgage lending facilities in the first half of 2007, with a net increase of £10.7 billion. NR denied that this was a departure from the trend of the preceding decade.

In March the company picked up the warning signs that the US subprime position led to a tightening in pricing and therefore it slowed down its rate of growth.

In April the BoE identified the increasing wholesale funding of banks as a potential risk if markets became less liquid.

In May a review of NR's stress-testing was undertaken as part of its Basel II waiver programme. This review led to the conclusion in July that the FSA was not comfortable with NR's test scenarios.

In June the FSA approved NR's application for a Basel II waiver[3]. This lead to an announcement by NR of an increase in its interim dividend of 30.3%

The company started to obtain retail funding from Denmark besides the UK retail market, and increased its liquidity at half-year stage.

On 9 August NR noted a dislocation in the market for its funding, due to the global financial shock with the US subprime mortgage market at its centre. This surprised the company, which believed that "high-quality assets and transparency was the way to maintain liquidity"; it also did not foresee all its funding markets closing simultaneously, as it happened after 9 August.

NR continued to find some funding. It stated that the company had "two or three months' worth of liquidity"; until it fell into a retail run which reduced its liquidity. This situation led to the necessity to receive funding support from the BoE. NR became reliant on exceptional, state-backed financing.

During these months, several directors announced resignation or retirement.

Throughout the first half of the year, before the financial market crisis hit, NR's share price had been in steep decline.

THE RESCUE OF NR (AUGUST 2007 – FEBRUARY 2008)

NR and the Tripartite authorities pursued a three-fold strategy to salvage NR from its difficulties. There was considerable overlap between consideration of the several options, which are described below.

- Resolving its liquidity crisis through its own actions in short-term money markets and by securitising its debt; this option was pursued until abandoned on 10 September.

[3] When adopting the Basel requirements for capital adequacy, a bank may choose to adopt certain "advanced approaches" to their management of credit risk.

- Obtaining the "safe haven" of a takeover by a major retail bank. The search for a private buyer started on 16 August and continued until 16 September. Two institutions showed interest in acquiring NR: one only showed a slight interest without pursuing it; the other interest was showed by a high street retail bank, however no offer was made. There was conflicting evidence from NR and the Tripartite over the details of the support facility requested by the potential bidder, which inhibited the solution.
- Receiving a support facility from the BoE guaranteed by the Government; this possibility was raised on 16 August.
- Possibility for NR to access European Central Bank (ECB) funding, taking advantage of its collateral requirements, more generous than BoE's, and its willingness to adjust the timing of its credit supply. NR could have made use of this liquidity via its operation in Ireland. NR did not however recur to this solution due to length of time necessary to set up the legal process to provide the collateral through the Irish branch[4].
- A fifth solution was the one preferred by the BoE: a covert support operation; this was abandoned on 11 September. There were two obstacles to such an operation: the requirement for NR to make an announcement to the stock market about their situation (according to the Market Abuse Directive (MAD)) and the practical difficulties associated with the possibility of a leak of a covert operation[5].

On 13 September rumours in the market started in relation to BoE's proposed support operation. NR hoped to use the facility as a "backstop" and had hopes that the facility would not be drawn down; in reality, because of the loss of retail deposits, NR was forced to use the facility almost as soon as it became available.

The run on the deposits of NR took place between 14 September and 17 September and was the central element in the problem that NR faced subsequently. This gathered momentum in part because of the difficulties encountered by NR customers in seeking to withdraw their money.

[4] Although banks are regulated and supervised at the national level, many banks conduct their business across borders and many have access to the credit supplied by more than one central bank. A bank is able to gain access to central bank funding in any country where they operate. For example, a UK-registered bank with operations in the euro area is able to access ECB funding throughout the crisis, taking advantage of its credit supply. However, such operations would neither be conducted in sterling, nor accept sterling-denominated collateral, which is a significant obstacle to UK banks extending their use of these facilities.

[5] Covert support operations only appear to be permitted under the MAD in instances when the issuer can be assured of confidentiality.

On 17 September the BoE made the announcement that it would guarantee NR's deposits, which halted the momentum of the run. This was the initial Government guarantee and was referred to all the existing deposits in NR; subsequently, this was extended to cover accounts re-opened in the future by those who closed them in the days of crisis; the guarantee was further extended to all deposits made with NR since 19 September.

On 9 October the BoE announced that additional facilities would be available to NR, which were intended to enable NR to pursue its strategy options and were limited to the period needed to pursue such options, by February 2008. These facilities were different from the earlier ones, as being from the Government through the BoE, with the risk born entirely by the Government. These were secured against collateral.

On 18 December the Government granted a further extension of the earlier guarantee arrangements at the request of NR, which covered nearly all the wholesale deposits.

In the period September – November 2007, NR searched for a private sector takeover solution to its difficulties. The proposals already received were of two types: 1) proposals to invest in the company through an injection of assets as well as new capital; 2) proposals to acquire parts of the business or assets of the company. On 12 October Virgin Group submitted a non-binding indication of interest to the NR; on 12 November Olivant Advisors Ltd indicated that it was preparing a bid. Small shareholders' groups, and many individually, were hostile to the first option of the takeover, fearing shareholders will see their stakes diluted for Virgin's gain; the Olivant bid was much more strongly favoured.

Another potential route for saving the bank was its nationalisation, which would pass many of NR activities to other institutions in the public sector and would see a new management team and a new ownership.

NR's nationalisation was announced on 17 February 2008. The Treasury acquired all of the bank's shares in Northern Rock. This represents the first nationalisation of a sizeable British bank in a quarter of a century. It put NR into public ownership, which infuriated shareholders and stopped the two private bidders from taking over the mortgage lender.

At the end of March 2008, NR reported a loss for the last year that reflected the interest payments to the BoE for the emergency loans, as well as writedowns and fees to advisors incurred before the nationalisation. Nevertheless, the FSA stated that the bank had a good mortgage book.

BOARD'S RESPONSIBILITIES

Since the beginning of 2005, banks have been required to undertake stress testing and scenario analysis, to have in place contingency funding plans and to document them adequately. Under Pillar 2 of Basel II banks are required to assess regularly and regulators to review their liquidity funding plan in a stressed situation. Regulators have the right policy tools to quiz banks about their stressed liquidity plans.

The Board has the responsibility to run the company prudently; the stress test scenarios are designed by the Board (not by the FSA).

The Board acknowledged that the company's funding strategy had been looked at and discussed by the Board. Part of the liquidity strategy was conducted by the Risk Committee chaired by a non-executive of the Board.

NR took advice from the FSA, the UK Listing Authority and its own legal advisors, and stated that it was fully satisfied that they followed the best advice.

CENTRAL BANKS ACTIONS

The BoE, the ECB and the US Federal Reserve (FED) each pursued a different course of action in response to the money market turmoil in August 2007.

The BoE was the only one that did not take contingency measures in August in order to protect against moral hazard – the fear that an injection of liquidity would offer incentives for banks to take on more liquidity risk.

The BoE injected additional liquidity into the money markets in September, when the ECB and Fed did not. In December 2007 the BoE started its three-month lending against mortgage-backed securities; in April it introduced a "special liquidity scheme", by offering to swap 'difficult-to-sell' mortgage-backed assets for Treasury bills, making the liquidity scheme twice as big as the existing December scheme.

It cannot be assessed whether an open market liquidity operation of the kind asked for by a number of banks in August would have prevented NR's need for emergency support from the BoE in September. The BoE liquidity support facility for NR was formally announced on 14 September 2007.

The ECB attached less weight to the moral hazard argument. It adopted a proactive approach in resolving the problem of a lack of confidence in the banking system by satisfying the immediate liquidity demands of the Eurozone banking sector. Although it did not inject any additional liquidity in August, it altered the timing and term profile of its regular operations, front-loading its credit supply towards the start of August and draining this liquidity before the end of the maintenance period.

The acceptance by the BoE and the ECB of a wide range of collateral, including relatively illiquid assets, assisted European banks throughout the crisis.

The environment is prone to stigmatisation – whereby financial institutions do not approach the central bank for assistance for fear of being regarded as weak by the public is a problem in money markets across the world, including the UK.

ACCUSATIONS TO NORTHERN ROCK

The BoE raised the issue of NR's lack of insurance against the trouble it faced in August. The BoE also stated that it was the business strategy that was fatally flawed as once the markets were closed for mortgage-backed securities, NR was unable to finance its illiquid assets. The company became dependent on liquidity support from the BoE.

According to the FSA, the failure of NR should first and foremost be attributed to the failure of its board and executives to create a durable funding model which could withstand the exceptional set of market circumstances that occurred in summer 2007.

The directors of NR were the main creators of the difficulties faced by the company since August 2007. The failure of the strategy is attributed to the Board. They pursued a high-risk, reckless business strategy, with reliance on short- and medium term wholesale funding, with insufficient insurance and a failure to arrange a standby facility or cover that risk.

The formulation of strategy, which was a fundamental role of the Board, was overseen by some directors, regardless of the fact that they had the NR experience since demutualisation.

The non-executive directors – in particular the Chairman of the Board, the Chairman of the Risk Committee and the senior non-executive director – failed to ensure that the company remained liquid as well as solvent, to provide against the risks that it was taking and to act as an effective restraining force on the strategy of the executive members.

There are concerns that the CEO was not a qualified banker, although he did have experience.

ACCUSATIONS TO SUPERVISORY AUTHORITIES / FAILURE OF REGULATION

Although the FSA undertook greater "regulatory engagement" after acknowledging the signals about the risks associated with NR's business model, this approach failed to tackle the fundamental weakness in its funding model and did nothing to prevent the problems occurred from August 2007 onwards.

The FSA acknowledged that its supervision of NR in the period leading up to July 2007 was not of sufficient intensity or appropriate rigour to challenge the company's board and executives on their risk management practices and their understanding of the risks posed by their business model.

While the problems affecting NR were those of liquidity and funding rather than solvency, the FSA's concerns were focused on capital adequacy and solvency issues, rather than on liquidity issues. The UK regulatory regime for liquidity of banks is flawed. This regime did not prevent the problems that arose at NR.

Although NR's problems were ones of liquidity, it was wrong of the FSA to allow the company to weaken its balance sheet at a time when the FSA was itself concerned about problems of liquidity that could affect the financial sector.

If the FSA was unsatisfied with the stress testing conducted by NR, it appears to have failed to convey its concerns to the Board of NR and to secure remedial action.

The FSA should not have allowed two appointments of a Chairman and a Chief Executive to a "high-impact" financial institution where both candidates lack relevant financial qualifications.

The BoE took no contingency measures at all during August 2007 in order to protect against moral hazard. The BoE should have adopted a more proactive response to the liquidity crisis and consider injecting liquidity in due time.

Although it was considered that the BoE took a reasonable cautious stance regarding collateral, it should have broadened the range of acceptable collateral at an earlier stage in the turmoil.

The questionable BoE's system of voluntary reserves: banks are able to choose their reserve requirement for each maintenance period[6].

The possibilities for a covert support operation should have been properly considered in due time.

The Tripartite authorities and NR should have pushed and announced the support operation within hours rather than days of the decision to proceed with it. A swift announcement would have been assisted by early preparation of such an announcement. The delay prolonged the run on NR deposits and damaged the company.

The Tripartite communication strategy with the public and the markets for handling the 2007 crisis was weak.

Although legislation had been in preparation before the crisis hit, the preparation process was not well-advanced. This refers to the legislative framework for financial stability and crisis management.

[6] A distinctive feature of the UK system is that, each month, banks choose the level of reserves they wish to target over the 'maintenance period' between meetings of the Monetary Policy Committee. Banks can therefore access more central bank money by, in aggregate, setting themselves higher targets.

PROPOSALS FOR UK REFORMS

Although there are concerns over the operation of the Tripartite system, its dismantle is not what is desired, but its reforming with clearer leadership and stronger powers. The Governor of the Bank of England described the UK's system for dealing with bank insolvency (and deposit insurance) as "markedly inferior to other countries" and "inadequate". "We now require a serious reform of deposit insurance, of the administration of banks, of the clash between the wish for transparency of companies to their shareholders, the tension between that and how it applies to banks when in difficulty, and the length of time it takes to deal with transfer of ownership of banks".

Currently, the following reform proposals are being discussed:

- A single authority should be given powers for handling failing banks and this should not be the FSA.
- The BoE is reviewing elements of its money market operations over the following period in consultation with banks, the other Tripartite authorities and other central banks.
- All banks and building societies should be covered by a deposit insurance scheme so that, in cases such as NR or a larger bank, the Government would not be required to step in to protect depositors.
- There should be a requirement in law that all insured deposits should be paid within a few days of a bank failing and calling on the deposit protection scheme.
- Banks should have systems to inform the FSA at "short notice" their liquidity situation.
- The "prompt corrective action" approach adopted in the US and other countries should also be considered by the UK. This enables the relevant authority to rapidly identify banks' situation and immediately take steps to lessen the wider impact of its difficulty.
- Any new legislation must clearly set out any changes to the status of shareholders of banks and members of building societies. In the event of a bank failure, the relevant authority should be endowed with the decision-making powers currently held by the shareholders, whilst protecting those shareholders' financial interest.
- The relevant authority must ensure that information systems and procedures are capable of a speedy release of funds, which is of critical importance.
- FSA should undertake an urgent review of the current qualifications of senior directors in financial firms, especially in those with "high impact" and ensure that the current approved person regime requirements are adequate.

- Reform of the management structure of the BoE[7] is required to ensure that proper weight is given to the increased responsibilities within the management structure, while also maintaining the appropriate priority for the conduct of monetary policy

The FSA will implement a Supervisory Enhancement Programme designed to strengthen its overall supervisory process, due to be completed by December 2008. The programme will be a key component of the authority's three-year plan (2007 – 2010) which, in terms of internal change, has as its primary objective the creation of an effective management, operational and cultural framework to deliver more principles-based regulation.

FURTHER CORPORATE GOVERNANCE LESSONS

Banks should be allowed to fail, to preserve market discipline on financial institutions. However, it is important that such 'failure' is handled in an ordered manner, managed in such a way as to prevent further damage to the economy, the financial system and the interests of small depositors.

A bank's recourse to the Central Bank in its capacity as lender of last resort is not an ideal trigger for prompt corrective action. This option should be approached as a last resort and the relevant authorities must be able to identify a bank as failing prior to this stage.

As the external auditor can only provide an assurance of a snapshot of the past state of the company, accounting bodies should consider what further assurance auditors should give to shareholders in respect of the risk management process of a company. Attention should be given by banking supervisors to the conflicts of interest between the statutory role of the auditor and the other work it undertakes for the financial institution.

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[7] E.g. the creation of a new post of Deputy Governor of the BoE and Head of Financial Stability.

IS EGYPT READY TO APPLY INFLATION TARGETING REGIME?

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Abstract: *The purpose of this study is to answer the question 'Is Egypt ready to apply IT regime? The researcher presumed that; a country is ready to apply IT regime once the prerequisites for IT regime are available. Comparing the current position of Egypt with some emerging market economies, the conclusions point to the following: (i) the CBE is not factually independent. Although the CBE has been granted legal independent instrument, the existence of the government representatives as voting members in the MPC and the coercion of the CBE to extend finance to the government are two elements sufficient to underpin the de facto independence of the CBE; (ii) inflation targets are expected to be missed under the possibility that the behavior of the CBE will be similar to the behavior of the majority of emerging market economies, i.e. adopting IT regime whereas implicitly targeting FX rate; and (iii) the current level of knowledge about some central issues of designing IT regime and the quality of the available data are not satisfactory to support the adoption of IT regime. The study concluded that Egypt is still not ready to apply IT regime.*

Keywords: *Inflation Targeting Regime; Prerequisites for Inflation Targeting regime; Inflation targeting in Egypt.*

JEL Classification: *E500, E580, E600*

1. INTRODUCTION

A recent survey by IMF staff expected that the trend towards the adoption of Inflation Targeting (IT) regime by the emerging market economies is still continuing. More than half of 88 non-industrial countries covered by this survey expressed a desire to move to explicit or implicit quantitative inflation targets and nearly three quarters of these countries envisage a shift to full-fledged inflation targeting by 2010 (Batini, Nicoletta, et al., 2006, pp. 7-8).

Egypt, in the above mentioned survey, is one of the prospective candidates to switch monetary policy regime to an IT regime in the near-term (1-2 years). Also, the Central Bank of Egypt (CBE) announced in several occasions about its intention to adopt IT regime as a framework for its monetary policy once the fundamental prerequisites are met (IMF, 2007 ; CBE, 2005). Moreover, the CBE (2007) stated that it is currently applying an implicit inflation targets which will be announced

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once the CBE completes building up its inflation targeting framework in coordination with the IMF[1].

To date, the CBE did not match words with deed. On one hand, it did not confess with any degree of details about which *prerequisites* are still unfulfilled. On the other hand, the steps taken by the CBE to apply IT regime are still unsatisfactory[2].

The purpose of this study is to answer the question 'Is Egypt ready to adopt/apply IT regime? The study starts from the hypothesis that; a country is ready to apply IT regime once prerequisites for IT regime are available. To explore this hypothesis in the case of Egypt the study will answer the following questions; (i) what are prerequisites for IT regime?; (ii) did emerging market economies satisfy prerequisites for IT in the early days of their adoption of IT regime?; and (iii) comparing the current position of Egypt to the emerging market economies in the early days of their adoption of IT regime, did Egypt satisfy prerequisites of IT regime? Given the willingness to adopt IT regime, we assume that a country will adopt/apply IT regime once it becomes ready for it.

I divided this paper as follows; Section 2 defines IT regime. Section 3 reviews the literatures regarding the prerequisites of IT regime. Section 4 emphasizes the lessons from the experience of some emerging market economies including Czech Republic, Poland and Brazil. Section 5 answers the question; to what extent Egypt satisfied the prerequisites of IT regime? Section 6 presents conclusions.

2. DEFINITION OF IT REGIME

IT regime is a framework for monetary policy in which price stability is the primary goal for monetary policy[3]. Within the IT regime the central bank (CB) is committed to achieve a publicly announced target for inflation rate, typically at a medium-term horizon of one to three years (Bernanke, Ben S. & Woodford, Michael, 2005, P. 1). According to Mishkin, Frederic S. (2000), Mishkin, Fredric S. and Schmidt-Hebbel, Klaus (2001) and Schmidt-Hebbel, Klaus and Tapia, Matias

[1] This statement by the CBE was in the context of its response to the critique of Morgan Stanley report, published on March 28, 2007, about the overriding of the government, specifically the prime minister, on the decision making process inside the CBE.

[2] The CBE of Egypt does not yet publicize a precise inflation target, and lacks the internal capacity for measuring and forecasting inflation on a regular basis. There have also been delays from the Central Agency for Public Mobility and Statistics (CAPMAS) in producing a reliable consumer price index (Oxford Analytica, 2005, p.107).

[3] Alen Greenspan reportedly once defines price stability as a rate of inflation so low that private sector do not have to take into account in making economic decisions. A strict definition of price stability suggests an inflation rate at or very near zero. Despite the change in the CPI is widely used to measure the inflation rate the CPI may involve some bias. That is why some economists indicate that targeting the rate of inflation at zero may create serious problems. These problems refer to the fact that both inflation and deflation have negative impact on the economic activity. IT from this perspective is designed for achieving price stability (fighting both inflation and deflation) through hitting a target of inflation (Bernanke, Ben S., et al., 1999, pp. 28-30).

(2002) IT regime encompasses five main elements : (i) public announcement of medium-term numerical targets for inflation; (ii) an institutional commitment to price stability as a primary goal of monetary policy; (iii) an information inclusive strategy in which many variables, and not just monetary aggregates or the exchange rate, are used for deciding the setting of policy instruments; (iv) increased transparency of the monetary policy strategy through the communication with the public and the markets about plans, objectives, and decisions of the monetary authorities; and (v) increased accountability of CB for attaining its inflation targets.

3. PREREQUISITES FOR IT REGIME

There have been considerable debates among economists about prerequisites/ preconditions that a country has to meet before adopting IT regime. These debates reflect the fact that there is no generally agreed set of preconditions.

Preconditions that are frequently considered necessary by most economists (Khan, Mohsin S., 2003, p.10; Truman, 2003, p. 49; Batini, Nicoletta, et al., 2006, p. 18; Jonas, Jiri & Mishkin, Frederic S., 2003, p. 6) include; (i) a commitment to price stability as the primary goal of monetary policy; (ii) central bank independence; (iii) macroeconomic stability; (iv) healthy financial system; (v) transparency of monetary policy and accountability of central bank; (vi) absence of fiscal dominance; and (vii) institutional elements include; determining monetary policy transmission mechanisms, forecasting inflation, and coordination between monetary and fiscal policy.

Nevertheless, there is no agreement among economists regarding the question; do prerequisites have to be met prior to the adoption of IT regime in the emerging market economies? Eichengreen, Barry, et al. (1999) argue that emerging market economies lack technical capacity and central bank's autonomy. Consequently, these countries will be better off with conventional monetary policy framework; e.g. targeting exchange rate or targeting monetary aggregates. But Carare, Alena, et al. (2002) think that the absence of some of preconditions should not preclude the adoption of IT, especially when policies are being introduced to establish them in the short or medium-term. Truman (2003) thinks of preconditions as a part of "full-fledged" inflation targeting that may follow a transitional period. Assessing the role of "preconditions" for adopting IT, Batini, Nicoletta, et al. (2006, p. 176) found that no inflation-targeting central bank had all "preconditions" in place prior to the adoption of IT.

Three basic elements are usually highlighted in the vast majority of literature as prerequisites of IT regime. These elements are as follow:

3.1 Factual (de facto) independent of CB[4]

CB independency has to be *de facto* and not only *de jure*. Full legal independency of CB (goal independent and instrument independent) is a controversial point among economists but factual instrument independent of CB is indispensable requirement as a precondition for a successful application of IT. CB should freely choose the appropriate tools and change them whenever it is necessary without any pressures by the government. Also, CB should have instruments and technicians to achieve its objective without substantial external interference. That is, inflation targets and its tolerance intervals may be formulated by the government and delivered to the CB which becomes responsible for achieving it. In the course of achieving inflation targets, CB should not seek or take instructions from any other body. Therefore, the existence of the government representatives in the Monetary Policy Committee (MPC) as voting members should be prohibited.

More importantly, with fiscal dominance CB independency is not factual even if CB possesses both independent legal instrument and there are no government representatives in the MPC. The existence of fiscal dominance will make it risky for any country to adopt IT regime[5]. The most visible version of fiscal dominance is the formal obligation of CB to finance budget deficit[6].

Masson, Paul R., et al. (1998), Debelle, Guy, et al. (1998) and Khan (2003) add another dimension that the shallowness of capital market is also a common indication of fiscal dominance. On the one hand, a weak financial system may prevent the CB from using interest rate freely to return inflation forecasts to the targeted path. That is because a fragile financial system is likely to be unable to afford an increase of nominal interest rates associated with the CB moping up the liquidity that has been provided at the previous discount window. On the other hand, financial system is often a by-product of government schemes to extract revenues using various forms of financial repression (interest rate ceiling, high reserve requirements, selective interest rates, and compulsory placement of public debt). In such circumstances, the CB may resist an increase in the market interest rates to

[4] Several studies stressed this point under the meaning included in the text, See: Truman (2003, PP. 49-52), Masson, Paul R., et al. (1998, P. 35), Batini, Nicoletta, et al. (2006, P. 18), Debelle, Guy, et al.(1998 PP. 11-13), Fraga, Arminio, et al. (2003, PP. 24-25) and Mishkin, Fredric S. and Schmidt-Hebbel, Klaus (2001, P. 5).

[5] Fiscal dominance is the situation in which monetary policy is dominated by the financial needs of the government. The connection between factual independence of central bank and fiscal dominance is often presented as follow; if government dose not have sufficient resources to finance its operations in the economy and requires systematically and significantly amounts of finance to meet its obligations, then a country's fiscal requirements are likely to dominate and determine central bank's operations. In such case, CB will not be able to achieve the target of inflation or keep it inside a determined path (Khan 2003).

[6] In a previous study about political pressure on CBs in the emerging market economies, we evaluated the de facto independent of CB in terms of the ability of CB to keep its target of money supply despite government's pressures for higher credit. We found that the Central Bank of Egypt (CBE) could not keep the target of money supply, and such failure refers to fiscal dominance (Awad, I.L., 2008)

correct deviations of forecasted inflation from the target because of the potential impact on the fiscal position. A related argument is that if the cost of bailing out a weak banking system becomes a large fiscal burden, it may lead to fiscal dominance (Truman, 2003, p. 52). However, with reasonably effective monetary policy instruments, e.g. the overnight interest rate and the open market operations, CB will be able to follow up its target more efficiently.

To sum up, factual independence of CB depends on three basic pillars; (i) legal instrument independent of CB; (ii) non-existence of the government representatives in the MPC as voting members; and (iii) absence of fiscal dominance including no obligation for CB to finance budget deficit, and domestic financial markets should have enough depth to absorb placements of public debt such as treasury bills.

3.2 Commitment to price stability as a primary goal of monetary policy

CB should not target any other variables, e.g. exchange rate or employment. On the one hand, monetary policy under the commitment to other targets will be confined to those targets and as a result monetary authority is more likely to fail in hitting the announced target of inflation. On the other hand, the public will have no assurance that the monetary authorities will give priority to the inflation targets. Such situation is likely to deteriorate individuals' expectations about the future path of inflation because of uncertainty about the credibility of the announced target. Nevertheless, CB should intervene to prevent undesirable effects of the change of the other macroeconomic variables on the future path of inflation (Khan, 2003, 10).

The commitment to price stability as a primary goal of monetary policy requires some degree of accountability for CB about realizing inflation targets. The lessons from the international experience as indicated by Bernanke, Ben S., et al. (1999, p.38, p.296) delivered two forms of accountability: *first*, by comparing inflation outcomes with the targets; and *second*, by CB's obligation to provide the public with convincing rational for the policy choices it makes. Given the fact that that inflation responds to policy after some lags and inflation targets are rarely hit exactly in the short-term, the second means becomes the only alternative of maintaining accountability. Practically, many CBs prefer to be more transparent and credible to the public by announcing the escape clauses, i.e. the exceptions from the obligation to fulfill the inflation target. On the one hand, this explains why accountability of CBs is less formalized in practice and, on the other hand, why a transparent monetary policy is so important not only as a device to tie down individuals expectations around an announced inflation target but also as a means for accountability of CBs to the public.

To sum up, a commitment to price stability requires two basic elements; (i) CB should not target any other variables rather than the rate of inflation; and (ii) CB

should be transparent to the public about the exemptions of its inflation target. That is CB should announce the escape clauses for its inflation target. Such a transparency is a practical device to make CB accountable to the public for achieving the inflation target.

3.3 Forecasting capabilities

Because of time lags between the change of monetary policy instruments and their associated effects on inflation, IT regime has to be pursued in a forward-looking manner where, the current adjustment of monetary policy instruments has to be established on a systematic assessment of the future path of inflation. Consequently, the adoption of IT regime by announcing some targets for inflation to be reached in the future and the way it will be used to reach such targets requires (Debelle, Guy, et al., 1998, pp. 3-4): (i) a model for inflation forecasting and inflation projections have to be set up in advance; (ii) CB needs to have clear vision regarding monetary policy transmission mechanisms and the associated lags; also (iii) the availability of an inclusive and updated database with high quality economic variables is an indispensable task.

4. LESSONS FROM THE EXPERIENCE OF SOME EMERGING MARKET ECONOMIES

Appendix 1 outlines the experience of some emerging market economies including Czech Republic, Poland and Brazil (henceforth CPB)[7]. It mainly stresses on the following dimensions: (i) the factors standing behind the decision of adopting IT regime in each country; (ii) the level of legal independence granted to the CB and whether there was legal obligation for CB to finance budget deficit; (iii) the commitment to price stability as a primary goal of monetary policy, the price index used to formulate and gauge inflation targets, and the reaction of the CB to supply shocks; and (iv) the level of knowledge for both inflation forecasting and monetary policy transmission mechanisms.

Different lessons may be learned from the experience of these countries under the adoption of IT as a framework for their monetary policy regime:

4.1 These countries were seriously keen on and willing to achieve the goal of price stability; the real intention to achieve the goal of price stability was the stimulus behind the preparation for the adoption of IT regime in these countries. As such intention was real it was swiftly translated into tangible steps on the ground. From Brazil experience, when the BCB and the government became convinced with the adoption of IT as a means to achieve the goal of price stability, the preparation

[7] Appendix 1 includes extended details about the experience of Czech Republic, Poland, and Brazil. It is available upon request.

and the switching to the IT regime occurred during very limited time, i.e. during the period from March to June of the year 1999. Until the beginning of March 1999 the BCB was not granted formal independent instrument, forecasting capabilities were very limited, and the majority of the BCB staff did not know even what an IT regime was about (appendix 1).

4.2 IT was adopted to serve as a new nominal anchor for monetary policy; after floating their currencies, the CPB found that IT regime is the only available alternative to achieve the goal of price stability upon forward-looking bases. On the one hand, monetary policy regime without explicit nominal anchor was not the appropriate alternative to tie down individuals' expectations about the future path of inflation where CBs in these countries did not have track record of credibility. On the other hand, a monetary targeting regime was not the appropriate alternative especially after the liberalization of capital flows and financial markets which undermined the relationship between money supply and price level.

Why CPB floated their currencies? The CPB were, in fact, forced to float their currencies not to lose influential part of their foreign reserves on the aftermath of the economic crises. The decision of floatation came on the aftermath of speculative attacks on domestic currency triggered by both Asian crisis and external imbalances of their current accounts. The imbalances of current accounts emerged as a result of pegging foreign exchange rate in conjunction with high domestic inflation thereby depreciation of domestic currency occurred.

4.3 IT is problematic if the pass-through effect is higher; the problematic issue here is that CB, on the one hand, has to be credible with the announced target of inflation to make it serve as a nominal anchor for individuals' expectations. But CB, on the other hand, may encounter a high effect of the exchange rate pass-through which may undermine the ability of CB to hit the inflation target. To be credible, CB has to determine in advance the escape clauses for its targets.

After Brazil was forced to float its currency (real) in order not to lose an influential part of its foreign reserves under the pegging of foreign exchange, the BCB was afraid of a higher level of the pass-through effect in the economy. The BCB estimated the pass-through effect during that time at 30-40 percent based on the estimated share of tradable goods in the economy. Despite the fact that pass-through effect was higher, the BCB did not explicitly continue targeting the foreign exchange but rather the BCB announced its intention to apply IT regime. The reason for IT regime was that a nominal anchor for monetary policy was essentially needed during that time to mitigate the panic in the economy (Fraga, Arminio, 2000). Practically, the high level of the pass-through effect led the BCB to, implicitly, target the exchange rate in asymmetric way by fighting devaluation and tolerating revaluation.

4.4 Missing inflation targets was generally referred to forecasts flaws; Although the escape clauses were defined explicitly in the case of the CNB and implicitly in the case of NBP[8], CBs in both countries missed inflation targets several times. In its assessment of ten years of IT, the CNB concluded that the forecasts flaws were responsible for missing the most of its targets (appendix 1). Although the NBP was less transparent regarding the real reasons behind the missing of its targets, it took similar steps to the CNB to improve its ability for forecasting by building up more accurate and sophisticated models and improving its knowledge about monetary policy transmission mechanisms.

4.5 CB independence was factual; According to the aforementioned criterion about factual independence, CBs in these countries possesses independent legal instrument with absence of both governments' representatives in the MPC as voting members and fiscal dominance in the form of formal obligation to the CB to finance budget deficit.

4.6 Factual independence of CB was not granted by the government but taken by the CB; The CBs, especially in the Czech Republic and Brazil, were initiators to propose IT regime to the government. Perhaps, the CNB did not spend much effort in convincing the government to adopt the IT regime because the government was mainly motivated by the accession to the EU but the BCB played an active role in convincing the government to adopt the IT regime.

5. TO WHAT EXTENT EGYPT SATISFIED PREREQUISITES OF IT REGIME?

This section explores whether Egypt satisfied the aforementioned prerequisites for IT regime in such a way that it makes the adoption of IT regime in Egypt feasible to anchor individuals' expectations around the potential inflation targets. In this context, I will exploit the experience of the CPB by comparing their position during the early days of their adoption of IT regime with the current position of Egypt. Such a comparison may enable us to assess whether Egypt is able to apply IT regime or not.

The economic circumstances in Egypt during the nineties were very similar to those countries. The application of the economic reform program in the advent of the nineties and the pegging of foreign exchange rate for long periods of time are two common aspects between Egypt and other countries. The main difference, however, was the reaction of the CBE to the economic crises which occurred in the second half

[8] The stance of the NBP to shocks was defined to depend on the scale and duration of such shocks. The NBP does not respond to shocks which deems temporary and which lie within the tolerance range around the target. Rather, the NBP respond to the shocks which viewed as leading to a permanent deviation from the inflation target (appendix 1).

of the nineties. While these countries reacted to the economic crises by floating domestic currency and adopting IT regime the CBE did not (see; appendix 3)[9].

The first prerequisite; factual independence of CB*:* as mentioned above, factual independence of CB depends on three basic pillars; (i) independent legal instrument of CB; (ii) non-existence of the government representatives in the MPC as voting members; and (iii) absence of fiscal dominance including no obligation for CB to finance budget deficit, and domestic financial markets should have enough depth to absorb placements of public debt such as treasury bills.

We may explore these elements for the CBE in the light of the Law No. 88 of the year 2003, amended by the Law No. 162 of the year 2004 and the Law No. 93 of the year 2005 known as the new law of CB, banking sector, and money (henceforth the new legislation)[10].

(i) The legal independence of the CBE; similar to the CPB, the new legislation determined the primary objective of monetary policy to achieve the proposed price stability and banking system soundness within the context of the general economic policy of the state. The CBE sets, in agreement with the government, the objectives of monetary policy through a coordinating council formed by decree of the president of the Republic[11].

The governor of the CBE is appointed by decree of the president, upon his/her nomination by the prime minister, for a renewable term of four years, and is treated the same as a minister in terms of his/her pension. The resignation of the governor is accepted by decree of the president. The governor has two deputies appointed by decree of the president, upon their nomination by the governor, for a renewable term of four years.

Like the CPB, the CBE possesses an independent instrument where the board of directors (BoD) or MPC of the CBE is the authority responsible for carrying out the objectives of monetary policy by implementing monetary, credit, and banking policies. The MPC also determines the instruments required to achieve the objectives; particularly, the instruments of monetary policy to be followed, the structure of credit and discount rates, the regulatory and supervisory standards to guarantee the soundness of the financial position of banks, and the regulation of auctions and tenders.

(ii) The government representatives in the MPC*;* unlike the CPB the MPC of the CBE includes government's representatives as voting members. It consists of

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[9] Appendix 3 includes details about the reasons forced Egypt to float FX rate. It is available upon request.

[10] Available at: http://www.cbe.org.eg/public/Banking%20Laws/Law%2088,%20amendments,%2013-7-2005.pdf

[11] The Coordinating Council of Monetary Policy (CCMP), headed by the prime minister, formed of 12 members; 6 of whom are independent from the private sector and international organizations; 3 from the CBE and 3 ministers from the government.

fourteen members including; two deputy governors, the chairman of the capital market authority, three members representing the ministries of finance, planning and foreign trade, and eight experts in monetary, financial, banking, legal, and economic affairs designated by the president of the republic for a renewable term of four years.

(iii) The obligation of the CBE to finance budget deficit: The CBE acts as a financial advisor and agent for the government. Consequently, the CBE executes banking transactions pertaining the government and public legal persons, as well as internal and external finance, with banks according to the conditions set by the MPC.

Unlike to the other CBs of the CPB the CBE has to extend finance to the government, upon its request, to cover the seasonal deficit on the general budget, with amount not exceed 10% of the average revenues of the general budget in the three previous years. The term of such finance is three months renewable for other similar periods, with a maximum of twelve months. The conditions concerning such finance are determined upon agreement between the ministry of finance and the CBE. Also, the CBE has to guarantee the finance and credit facilities obtained by public legal persons from banks, financial institutions, and foreign or international institutions.

Moreover, the comparison between Egypt and the CPB in the early days of their adoption of IT regime may sheds lights on the position of Egypt relative to these countries, and highlights both the downsides and the upsides of the economic policy applied in Egypt.

Table 1 exhibits some indicators of macroeconomic stability for both Egypt and the CPB. Both inflation rate and output growth rate in Egypt during the periods of 1995-1998 and 2005-2007 were better than the CPB during the period 1995-1998. Also, the coefficient of variation (v) for both inflation and growth in Egypt during the period 2005-2007 was better than the CPB during the period 1995-1998.

Table 1:

Some indicators about macroeconomic stability[12]

Country	Time of adopting IT[1]	CPI annual inflation			The rate of growth of GDP			Real short-term interest rate		
		M	S	V	M	S	V	M	S	V
CZ (1995-1997)	December 1997	8.84	0.31	.035	3.05	3.41	1.12	.95	4.1	4.31
Poland (1995-1998)	March 1999	18.63	7.07	.379	6.25	0.95	.152	5.85	7.65	1.3
Brazil (1995-1998)	End of June 1999	22.96	29.16	1.27	2.57	1.76	.684	71.17	9.2	.13
Average		16.81	12.18	.56	3.95	2.04	.65	26	6.98	1.9
Egypt (1995-1998)		7.86	5.48	.697	4.77	0.66	.138	6.18	2.58	.417
Egypt (2005-2007)[2]		7.97	3.42	.43	6.2	1.39	.22	-	-	-

M = Mean, S= Standard deviation, V= Coefficient of variation (S/M)

Source: The author: [1] Appendix 1, [2] Calculated from Appendix 2, Table 2.3. The rest is calculated from Appendix 2, Table 2.1.

Although the average rate of inflation in Egypt during both the period of 1995-1998 and the period of 2005-2007 was very near, the rate of inflation during

the latter period was ascendant and hit two-digit number in mid-2007 according to the formal statistics (Appendix 2, Table 2.3). Theoretically, the higher of the rate of inflation and the lower of the rate of growth are more likely correlated with the adoption of IT regime (Hu, Yifan, 2003). The high level of inflation rate in the CPB during the period of 1995-1998 and the reaction of their CBs by tightening monetary policy explain the relatively high value of the coefficient of variation (V) of the real interest rate in these countries comparable with Egypt in which the rate of inflation was climbing down during the same period.

Table 2 delivers another piece of information pertaining financial depth and symptoms of fiscal dominance. Williamson, John and Mahar, Molly (1998) suggest that financial depth, measured by M2/GDP, is helpful indicator to determine a financial system's efficiency in mobilizing funds. According to this indicator, as shown in Table 2, Egypt exhibits better shape than the CPB even during the period 1995-1998. Also, the claims on government (annual growth as % of M2) seem reasonable comparable with Poland and much better than Brazil.

Currently, the main shortcoming and the downside of macroeconomic policy in Egypt is the performance of the general budget. Although budget deficit (% of GDP) in Egypt was reasonable comparable with the CPB during the period 1995-1998 it had been exacerbated during the successive periods after 2002 (see Table 3).

The higher of the ratio of budget deficit in conjunction with both the existence of government's representatives in the MPC and the legal obligation of the CBE to finance budget deficit represented the greatest danger for both CBE's independent and macroeconomic stability in Egypt.

Table 2:

Some indicators about financial depth and symptoms of fiscal dominance

Country	Time of adopting IT [1]	Budget deficit (% of GDP)			Claims on government (annual growth as % of M2)			Financial depth = M2 / GDP (%)		
		M	S	V	M	S	V	M	S	V
CZ (1995-1997	December 1997	1.27	.37	.29	-1.32	3	-2.27	65.5	1.12	.02
Poland(1995-1998)	March 1999	-	-	-	3.66	1.77	.48	29.7	2.62	.09
Brazil(1995-1998)	End of June 1999	.43	.6	1.4	32.43	27.73	.86	24.9	.87	.03
Average		.85	.48	.84	11.6	10.83	-.93	40	1.53	.04
Egypt(1995-1998)		1.14	.5	.43	2.1	2.3	1.1	73.9	2	.03
Egypt(2003-2007)		8.43 [4]	1.07	.12	3.77 [2]	.39	.1	97.36 [3]	.7	.001

M = Mean, S= Standard deviation, V= Coefficient of variation (S/M)

Source: The author: 1 Appendix 1. 2 Claims on government for Egypt are calculated from Appendix 2, Table 2.4 for periods 2003-2006 excluding 2005. 3 Financial depth for Egypt is calculated from Appendix 2, Table 2.4 for periods 2003-2007. 4 Budget deficit for Egypt is calculated from Appendix 2, Table 2.3 for periods 2005-2007. The rest is calculated from Appendix 2, Table 2.2 for periods 1995-1998.

Table 3 mirrors the interaction among these factors. The high ratio of both budget deficit and public debt, averaged 9.1% and 63% successively for the period

[12] Tables 1 included in the text depend in some parts on the data included in appendix 2. It is available upon request.

2003-2007, was in conjunction with high contribution of both the banking system and the CBE in financing budget deficit. The contribution of banking system was in average 45% of the overall budget deficit for the period 2003-2006 and the involvement of the CBE in financing budget deficit was in average 58% of the banking system contribution during the same period 2003-2007, excluding the year 2006.

Table 3:
Banking system and CBE contributions in financing budget deficit in Egypt (2003-2007)

Years	Overall Budget deficit (% of GDP)	Banking finance to budget deficit (% of budget deficit)	CBE finance to budget deficit(% of banking finance)	Public debt (% of GDP)
2003	10.4	44.3	26.6	60.4
2004	9.5	45.8	112	60.3
2005	9.6	60.8	78.88	64.84
2006	8.2	29.37	-77.44	62.77
2007	7.5	-38.25	15	65.4
Average	9.1	28.41	31	63

***Source**:* Appendix 2, Table 2.3

To sum up, Although the new legislation determined the primary objective of monetary policy to be achieving the goal of price stability, and granted the CBE legal instrument independent, the existence of the government representatives as voting members in the MPC and the coercion of the CBE to extend finance to the government are two elements sufficient to underpin any meaning of the *de facto* independent of the CBE. Consequently, legal instrument independent granted to the CBE is sketchy and does not go beyond the *de jure* independent[13]. Moreover, although the comparison between Egypt and Czech Republic, Poland, and Brazil came in favor of Egypt in many areas the main shortcoming of macroeconomic policy in Egypt is the performance of the general budget including the high ratio of both budget deficit and public debt with high contribution of banking system and CBE to finance it.

The Second prerequisite; commitment to price stability as a primary goal of monetary policy*:* as mentioned above, a commitment to price stability requires two basic elements; (i) CB should not target any other variables rather than the rate of inflation; and (ii) CB should be transparent to the public about the exemptions of its inflation target, i.e. CB should announce the escape clauses for its inflation target. We may explore these elements in the case of Egypt as follow:

(i) CB should not target any other variables; the rational behind this condition, as mentioned, is that targeting any other variables beside inflation is more

[13]One of the tough critiques of the CCMP was coming from Morgan Stanley report about the overriding of the government, specifically the prime minister, on both CCMP and the MPC of the CBE (Cevik, Serhan, 2007).

likely to make CB unable to hit the target of inflation either because of goals confliction in the short-run or because of inflationary expectations induced by uncertainty steaming from lack credibility of CB to achieve the targets of inflation.

As a threshold for switching their monetary policies regimes towards IT regime, emerging market economies announced floating foreign exchange (FX) rate, although practically they apply managed-floating regime. Under the managed-floating regime CB has unannounced/implicit target for FX rate in the form of some ranges in which FX fluctuates. CB intervenes in the FX market from time to time to return FX rate back to the target. The reason that emerging market economies applied a managed and not a completely free floating regime may refer to the long history of these countries with the FX turbulences, the volatility of international financial flows, and the vulnerability to the FX rate shocks[14]. Therefore, the managed- floating FX rate is intended to avoid the undesirable effects of FX rate volatility on both real economy and price level.

Why implicitly not explicitly targeting FX rate? From the experience of the CPB; these countries were actually pegging foreign exchange rate but forced to abandon it on the aftermath of the economic crises in order not to lose influential part from their foreign reserves. After the abandonment of pegging foreign exchange rate and floating domestic currencies IT appeared to be the only available alternative to anchor individual expectations especially when it became clear that the association between money supply and prices has broken down. That is why many countries switched their monetary policy regimes to the IT regime after floating foreign exchange rate.

However, adopting IT regime under the implicit targeting of FX rate may cause two problematic situations for CB; (i) the first is the case in which domestic currency depreciates, especially when the pass-through effect is higher. In such a case CB may increase short-term nominal interest rate to return FX rate back to the target. The increase of the short-term nominal interest rate may not lead to miss the target of inflation if the forecasted level of inflation was higher than the targeted level. But CB may miss the target of inflation if the forecasted level of inflation was lower than the targeted level. In this case increasing nominal interest rate to fix the depreciation of domestic currency will cause undershooting the target of inflation; (ii) the second is the case in which domestic currency appreciates. With the preliminary success of CB to hit the inflation target domestic inflation is turning down but, unfortunately, domestic currency appreciates as well. One reason for such appreciation of domestic currency is the convergence of both domestic and foreign inflation which lead real exchange rate to increase (Holub, 2004). In such a case the intervention of CB by cutting nominal interest rate to return the nominal exchange

[14] In fact, all central banks occasionally exercise interventions in the FX markets even with the announcement of free-floating of the FX rate.

rate back to the target may not lead to miss the inflation target if the forecasted level of inflation was lower than the targeted level. But CB may miss the inflation target if the forecasted level of inflation was higher than the targeted level. In this case cutting nominal interest rate to fix the appreciation of domestic currency will cause overshooting the target of inflation.

Regarding Egypt, the question is; may the aforementioned scenario repeated in case of Egypt, i.e. adopting IT regime whereas implicitly targeting FX rate? Three reasons support the possibility that the behavior of the CBE will be similar to the behavior of the majority of emerging market economies after the floatation of their currencies.

The first reason; the relationship between money and prices in Egypt has broken down. Consequently, after the decision of floatation FX rate the CBE is more likely to adopt IT regime as an anchor for its monetary policy[15].

The second reason; FX rate regime in Egypt is not completely floating. After long periods of pegging FX rate and the insistence to maintain it despite economic crises occurred in the second half of nineties the CBE was forced to float FX rate after influential loses of its foreign reserves (see appendix 3). Although foreign exchange rate is now unified and reasonably flexible it is still dominating monetary policy decision making in the CBE. Figure 1 clearly indicates that the change in the short-term nominal interest rates in the last periods (2006-2007) was oriented to adjust the changes in the FX rates.

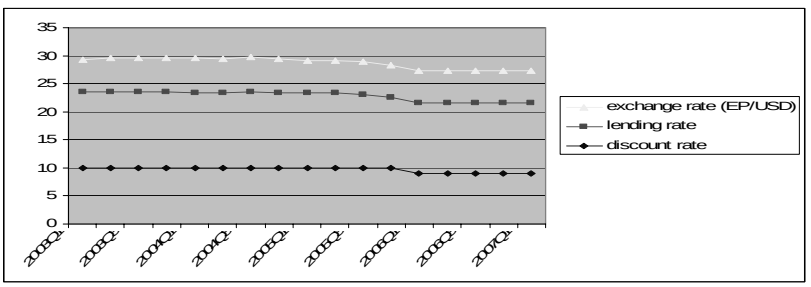

Figure 1: *Interest rates and exchange rate during the period 2003-2007*
Source: prepared using the data from IMF, IFS, CD-R, 2008

[15] In a previous study, we assessed the efficiency of the currently applied monetary targeting regime in Egypt by measuring; whether there is a relationship between money and prices, the stability of the velocity of circulation, and the stability of the demand for money function. The results of the econometric study indicated that the relationship between money and prices in the Egyptian economy is loosened either in the short-run or in the long-run, the velocity of circulation is found nonstationary, there is no cointegration relationship between money supply and nominal GDP, and the long-run demand for money function is not stable (Awad, Ibrahim L., 2008).

The third reason; the pass-through effect in Egypt is high. Rabanal, Pau (2005, P. 4, P. 8) estimated the exchange rate pass-through effect in Egypt to both the wholesale price index (WPI) and the consumer price index (CPI) during the period of the exit from the pegging to the floatation of FX rate, i.e. the period of 2000-2004. While the pass-through effect was higher to the WPI (from 30% to 60%) and statistically significant it was lower and not statistically significant for the CPI. The weak relationship between exchange rate shocks and the changes of the CPI is referred to the relatively large share of goods with administrated prices included in the CPI series that was used until July 2003 (roughly one third to one half of the CPI items).

Totally, the above reasons support the possibility that the behavior of the CBE, in case of the adoption of IT regime, will be similar to the behavior of the majority of emerging market economies, i.e. adopting IT regime whereas implicitly targeting FX rate. Under this possibility inflation targets are expected to be missed especially in the first stages of the application of IT regime.

(ii) CB should announce the escape clauses for its inflation target; from the experience of the CPB, not all of CBs announced escape clauses for their inflation targets. While the BCB didn't announce escape clauses the CNB preferred to be more transparent to the public by explicitly announcing the escape clauses whereas the NBP did not explicitly announce the escape clauses but rather defined its stance from a shock which depends on the scale and the duration of such a shock.

Although the BCB did not announce escape clauses, perhaps for some reasons pertained credibility, it used a relatively wide rang, 2 percentage point tolerance interval, around the central target of inflation. Also the CNB did not announce escape clauses for its inflation targets in the early days of adopting IT regime because the CNB during this period was targeting the so-called net inflation which covers 80% from the CPI. The CNB announced the escape clauses immediately after the abstaining from targeting the net inflation and the announcement in April 2001 about its intention to target the headline inflation measured by the CPI.

Different alternatives, however, are available to the CBE when it comes to the decision of adopting IT regime; (i) explicitly announce the escape clauses, like the case of the Czech Republic; (ii) defining shocks and determining the scale and the duration of a shock which lead the CB to respond, like the case of Poland; (iii) using a wide range for its inflation targets without announcing the escape clauses, like the case Brazil.

The third prerequisite; forecasting capabilities: from the experience of the CPB, inflation targets were missed several times (appendix 1). Upon the explanation of the CNB about the decisive element standing behind the undershooting inflation targets, the non-fulfillment of inflation forecasts, owing to a combination of supply

shocks and imperfections in the forecasting system, was the main element behind such undershooting.

As mentioned, forecasting capabilities require three basic elements; (i) a model for inflation forecasting and inflation projections has to be in place; (ii) CB has to have clear idea about monetary policy transmission mechanisms and their associated lags; and (iii) the availability of inclusive, updated, and high quality data.

To what extent these elements are currently available in Egypt? *Regarding the first and second element:* Al-Mashat, Rania (2008, PP. 25-26) reported information about the status of inflation modeling and forecasting inside the CBE as shown in Table 4. Since this information is not available by normal way for any scholar, then it casts a question regarding the degree of discloser of the CBE which represents a cornerstone of a successful IT regime.

Table 4:
Status of forecasting and modeling in the CBE

	Status (Yes/No)	Details
CPI and core inflation		
Construct core CPI	Yes	The CBE constructs its own core inflation measures, excluding regulated items and volatile food items. To date, these measures have been for internal circulation, not for publication. Going forward, there are plans to publish these measures.
Seasonally adjusted estimates of CPI	Yes	
Estimate sub-groups of CPI	Yes	The CPI basket has been split into sub-groups, food, non-food and service.
Modeling		
- Analysis of exchange rate pass-through	Yes	The degree of pass-through from the exchange rate to the CPI and WPI inflation rates was quantified in an empirical study, utilizing a 5-variable VAR model. The responses of CPI and WPI to exchange rate shocks have been obtained.
- Effect of interest, credit and exchange rate channels	Yes	VAR analysis has been conducted. The relationships between the variables and the response have been obtained.
- Inflation forecasting	Yes	The CBE carries out near-term forecasts for one quarter ahead. In addition, there are medium-term forecasts.
- Quantitative	Yes	
- Graphic and numeric	Yes	
- Stochastic	Work in Progress	Developing these types of models is underway in the CBE.
Estimate of potential GDP	Yes	
Quarterly structural model (multi-equation)	Work in Progress	Developing these types of models is underway in the CBE.
Other		
Business surveys with inflation indicators (wage, profitability, capacity constraints, input and output prices, and inflation expectations)	Yes	The ECES puts out a business barometer, which surveys business confidence. However, more needs to be accomplished in this area.
Household surveys of inflation expectations	No	

Source: Central Bank of Egypt (CBE)[16]

[16] CBE cited in Al-Mashat, Rania, 2008, p. 26.

Moreover, the construction of the CPI core inflation by the CBE may serves as a useful tool for the MPC to follow up and evaluate the behavior of inflation but it will be risky if the CBE is planning to use it for the purpose of IT. As the CBE does not have track record of credibility, the CPI core inflation or any other price index planned to be used for the purpose of IT has to be calculated by an independent entity, i.e. the CAPMAS in the case of Egypt.

However, under the assumption that the information reported in table 4 is corroborated, this information does not, in fact, reflect a satisfactory level of knowledge about some central issues that have to be tackled before the adoption of IT regime. Such issues include; the relationship between money supply and prices, the stability of the demand for money function, the exchange rate pass-through effect, the level of the real exchange rate, the relative importance of monetary policy transmission channels and the associated time lags, the rate of inflation which should be targeted without causing eruption of public debt, inflation forecasting, and inflation projections under different scenarios for supply and demand shocks. The CBE should have different models under different methodologies for each individual issue to compare and subtract accurate information.

Regarding the third element; using the Data Quality Assessment Framework (DQAF), the IMF staff (2005) assessed the quality of data in Egypt. Their assessment included the national accounts, the price indices, the government finance, the money, and the balance of payment statistics. Despite several shortcomings in many areas the most defects in the Egyptian data were found in the accuracy and reliability, the serviceability, and the accessibility. The accuracy and reliability was mainly found in the national accounts and the price indices prepared by the Ministry of Planning (MOP) and the CAPMAS successively. The serviceability of the data included that the dissemination of macroeconomic statistics does not in all cases fully meet the users' needs and there is no general oversight regarding the development and coordination of macroeconomic statistics. The accessibility to data included the difficulties of the availableness of data among all interested parties equally and simultaneously.

6. CONCLUSION

The purpose of this study is to answer the question 'Is Egypt ready to apply IT regime? The study started from the hypothesis that; a country is ready to apply IT regime once the prerequisites for IT regime are available. The hypothesis of the study has been explored in the case of Egypt as to answer the following questions; (i) what are the prerequisites for an IT regime?; (ii) did emerging market economies satisfy the prerequisites for IT in the early days of their adoption of the IT regime?; and (iii) comparing the current position of Egypt to the emerging market economies

in the early days of their adoption of IT regime, did Egypt satisfy the prerequisites for the IT regime?

The conclusions of the study came as follow: (i) the CBE is not factually independent. Although the new legislation determined the primary objective of monetary policy to be achieving the goal of price stability and granted the CBE independent legal instrument, the existence of the government representatives as voting members in the MPC and the coercion of the CBE to extend finance to the government are two elements sufficient to underpin any meaning of the *de facto* independence of the CBE. Moreover, the comparison between Egypt and Czech Republic, Poland, and Brazil indicated that the main shortcoming of macroeconomic policy in Egypt is the current performance of the general budget; (ii) there are many reasons which could support the possibility that the behavior of the CBE, in case of the adoption of IT regime, will be similar to the behavior of the majority of emerging market economies, i.e. adopting IT regime whereas implicitly targeting FX rate. Under this scenario, inflation targets are more likely to be missed especially in the first stages of the application of IT regime; and (iii) the current level of knowledge of the CBE about some critical issues that have to be tackled before the adoption of IT regime is not satisfactory and the quality of the currently available data are not likely to support the adoption of IT regime.

In the light of these results, the study concludes that the availability of prerequisites for IT regime in Egypt is still unsatisfactory. Consequently, Egypt is still not ready to apply the IT regime.

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PRINCIPLES OF INFORMATION VISUALIZATION FOR BUSINESS RESEARCH

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Abstract: *In the era of data-centric-science, a large number of visualization tools have been created to help researchers understand increasingly rich business databases. Information visualization is a process of constructing a visual presentation of business quantitative data, especially prepared for managerial use. Interactive information visualization provide researchers with remarkable tools for discovery and innovation. By combining powerful data mining methods with user-controlled interfaces, users are beginning to benefit from these potent telescopes for high-dimensional spaces. They can begin with an overview, zoom in on areas of interest, filter out unwanted items, and then click for details-on-demand. With careful design and efficient algorithms, the dynamic queries approach to data exploration can provide 100 msec updates even for million-record databases. Visualizations of business information are therefore widely used in actually business decision support systems, and by business researchers also. Visual user interfaces called dashboards are tools for reporting the status of a company and its business environment to facilitate business intelligence and performance management activities. In this study, we examine the research on concepts, and the principles of business information visualization, because we hope to be using correctly by business Ph.D. students in their researches. Visual representations are likely to improve business managers, and business researchers efficiency, offer new insights, and encouraging comparisons.*

Keywords: *business quantitative data, visual presentation, visual interfaces, performance management, business intelligence*

1. INTRODUCTION

Two previous revolutions have relied on visual presentation of business information – the spread of PCs, which began reaching a much wider audience with the invention of the GUI (Graphical User Interface), and the spread of the Web (World Wide Web). When the business manager, business analyst or business researcher shift from desktop to the Web, it goes from a small and highly controlled environment to a vast, chaotic one, and yet the visual tools for handling the complexities of the Web are much less well-developed than the desktop. Even the desktop is a glorified filing system, all but useless for extracting patterns from large amounts of business information. Likewise, the ability to handle the large and

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growing quantities of business data stored in databases is very limited, as most of the tools we have for searching or extracting business information are visually thin.

Recent advances in information technology have enabled the automatic collection of massive amounts of business, accounting and non-accounting data from a wide variety of sources, including the Web. The challenge is for business information users, especially managers, analysts and researchers to think hard and elegantly. The rapid increase in the size of modern data stores also imposes new challenges for the efficient presentation of information. The data contained within a large data store can reveal significant, valuable and even previously unknown facts to people, if they are summarized and presented in an appropriate and illustrative manner. A visual format is often the best choice for this purpose.

Information visualization is an old concept, because the business statistical data has been visualized for over two centuries already (Tufte,2001). The goal of visualization is to create a graphical representation of abstract quantitative data that is concise and easy to interpret even when the amount of presented data is very large. Its foundation lies in the study of human visual perception. Understanding the properties of the visual system may explain why one image is considered clear and simple by most people and another one very difficult to perceive, even if those two images are merely different presentations of the same information. The presentation format is especially important in complex situations, when a lot of business information needs to be displayed in a small space, such as a single computer screen. An efficient visualization at its best is an extremely powerful cognitive tool that integrates the ingenious pattern-finding mechanisms of the human visual system with the computational power and information resources of modern computer systems (Ware, 2004).

Visualizing information involves not only collecting and processing the business data that are to be displayed, but also defining the graphical elements that will display them on the screen as well as the relationships between these elements. Displaying business data outside its logical context, without any context or even in the wrong context might lead to incorrect interpretation of the information it is supposed to convey.

However, when the appropriate data are presented together in the right context, they can help the reader to understand the situation they are depicting or even discover new relationships that have been previously hidden in the data. In addition to the context, the type of graphical element chosen to display certain data is of great importance.

There are numerous different types of graphical elements available for displaying business data, such as line graphs, bar graphs, sparklines and bullet graphs (Tufte,2001; Few,2006). Not all elements are suitable for different kinds of data, however. This only emphasizes the importance of choosing the display

element. On the other hand, numerical values do not always require a graphical representation - sometimes the information is best conveyed by showing the actual numbers instead of an image.

A decision support system is a general term for an information system used for acquiring business information for decision-making purposes. Decision support systems have been used for several decades in many different fields, such as industry, agriculture, medicine, or environmental crisis management, but they have had an important role especially in assisting business decision-making. For historical reasons, business decision support systems are known by many names, such as management information systems or executive information systems. *Recently, decision support systems in business have been focused to support business intelligence (BI) activities and performance management.* These concepts are related to the strategic and operational management of a company and involve collecting data both inside the company and from its business environment. The large quantities of data create a need for effective presentation of summarized information in order to avoid an "information overload".

Information visualization techniques provide a solution to this problem, and therefore most tools for reporting (called dashboards) and analysis are based on visualization. Table 1 provides examples of commonly available visualization tools with applications for marketers and consumers. For each tool, Table 1 indicates whether it affects the visual perspective and/or the information context. We propose that the visual perspective and information context influence decision processes and outcomes by changing the decision-making frame—that is, what information a decision maker uses and how he or she uses it to gain insights and make decisions.

Table 1

Examples of Visualization Tools

Visualization Tool	Characteristics Affected	
	Visual Perspective	**Information Context**
TableLens (http://www.inxight.com/products/sdks/tl/) creates a visual representation of large amounts of tabular (e.g., spreadsheet) data, including an interactive interface that enables the user to sort columns, expand and contract rows, and drill down for more details.	✓	
SmartMoney.com's MarketMap (http://www.smartmoney.com/marketmap/). A Treemap (i.e., a two-dimensional representation of hierarchical data in which each element is represented by a cell whose arrangement, size, and color represent attributes of that data element) application used for the reporting of stock portfolio information.	✓	✓
Newsmap (http://www.marumushi.com/apps/newsmap/newsmap.cfm). A Treemap application that visually reflects patterns in news reporting.	✓	✓
ArcGIS (http://www.esri.com/products.html). Geographic information software used for business-mapping applications, such as displaying results by sales territory or other regions.		✓
Lands' End's My Virtual Model (http://www.landsend.com/). An interactive virtual reality application that enables customers to build a virtual image of themselves and then "try" on clothing.	✓	

Visualization Tool	Characteristics Affected	
	Visual Perspective	Information Context
Fish-Eye Visualizations. Nonlinear magnification enables the user to see details of immediate interest (i.e., focus) and the overall picture (i.e., context). Examples include maps, charts, and text-based applications.	✓	
Spotfire DecisionSite v. 8.2.1 (http://support.spotfire.com/release/DecisionSite821/). Platform for integration with many different 3rd party statistical tools, enabling experts to distribute statistically rich workflows throughout the organization	✓	✓

Note: Table 1 identifies which characteristics of visual representation a given tool is likely to affect: (1) the visual perspective (i.e., interactivity or depth of field) or (2) the information context (i.e., vividness, evaluability, or framing).

This study has two main objectives: 1) to review literature on the concepts and principles of information visualization and the underlying principles of visual perception in order to understand which factors influence the effectiveness of visual presentations of business data, and 2) to learn how these principles can be utilized in designing visual reporting and analysis interfaces in business intelligence and performance management systems.

The sources referred to in this study include Edward Tufte (Tufte, 2001; Tufte, 2006), Colin Ware (Ware, 2004), Ben Shneiderman (Shnei&Plais, 2004) and Stephen Few (Few, 2006). Tufte and Shneiderman are perhaps the best known specialists in the field of visualization; references to them ideas are found in numerous books and research articles throughout the field, as well as in many articles of cognitive science and psychology. Ware has a less general point of view, related more to computer science than Tufte's, and he also considers the technical aspects of visualization. His work, too, is very often cited. Few is not very well known in the academic community, since his playground is the business world. His ideas rely on Tufte and Ware to a great extent, but he has made some significant contributions of his own as well, especially related to dashboards. In addition, he tries to bridge the gap between academic visualization research and the business world, which, he argues, unfortunately are too far apart[1].

2. CONCEPTS AND PRINCIPLES OF INFORMATION VISUALIZATION

Information visualization is defined as *the use of interactive visual representations of abstract, nonphysically based data to amplify cognition* (Card et al,1999). This definition captures several key aspects of the field and explains its importance. First of all, constructing visual representations of business data takes full advantage of the capabilities of human visual perception and enable rapid finding of interesting and unknown patterns and relationships. Secondly, the nature of the data is abstract - such as revenue from sales information or the gain or loss on

[1] The IEEE InfoVis 2007 conference, http://vis.computer.org/vis2007/session/tutorials.html#t1

disposition. In fact, the term scientific visualization is used for visualization of data based on physical measurements, for example the depreciation of equipment of a company or costs of materials. Moreover, the overall purpose of visualization is to assist the user in understanding the meaning of the business data; to provide insight and increase the user's knowledge. It aims to help the user to complete cognitive tasks with little effort compared to e.g. textual representations.

Although the result is meant to be as simple to the user as possible, designing visualizations is anything but simple. Figure 1 illustrates different phases of the visualization process. It shows that visualization includes not only encoding the original data in a visual format by using different visual attributes, such as shape, size, position, orientation and color.

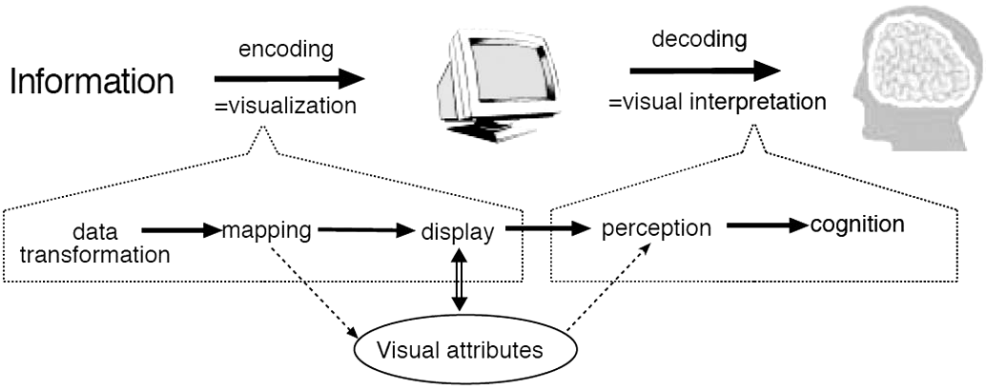

Figure 1 *Information visualization process (Wünsche, 2004)*

It also includes a decoding step: transforming the visual attributes into a mental representation in the brain of the viewer, and the patterns perceived in this representation are combined with knowledge stored in the long-term memory to finally construct the interpretation of the image.

This fact emphasizes the inter-disciplinary nature of the information visualization field: mastering it requires expertise in several fields, such as cognitive psychology, computer science, mathematics and statistics, and even art and architecture (Erbacher,2007). Also knowledge of the specific domain for which the visualization is created is crucial in order to make it effective.

2.1 Maximizing the business information content

Examples from existing statistical graphics indicate that many graphical displays of data are filled with irrelevant or redundant visual information, which only complicates understanding the actual content of the display and creates undesired "visual clutter". Tufte (Tufte,2001) has therefore presented the *concept of data-ink ratio* to measure the proportion of the graphic's ink (the data-ink[2]) that is

[2] Naturally the concept can be applied in the computer world just by replacing "ink" with "pixels"

used to present the actual information in the graphic: *Data-ink ratio =data-ink/ total ink used to print the graphic*.

One of the main principles in business statistical graphics should be to maximize the proportion of data-ink, which can be done e.g. using a method called erasing (Tufte,2001): editing the graphical content by removing all unnecessary components that represent the non-data-ink. Figure 2a shows a box plot, in which each data point is presented by a box and dashed lines.

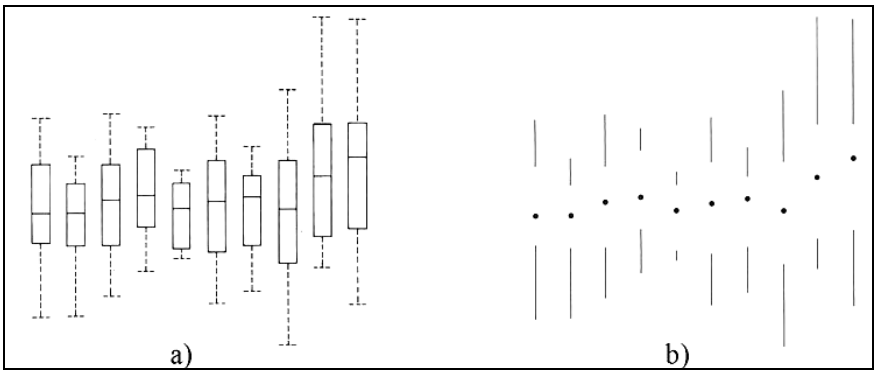

Figure 2 *Maximizing the data-ink ratio (Tufte, 2001)*

A single data point thus describes five numbers: median, high and low quartiles and minimum and maximum values. These elements are quite commonly used to present e.g. data from physical measurements or stock markets. Nevertheless, after erasing all non-data-ink the graphic in Figure 2b is what results. Both graphs now display the same five values for each data point, but the erased version looks much "lighter" and clearer. The median dots are now perceived as a continued line due to the Gestalt principle of continuity (Palmer,1999), allowing one to assess the trend of change in the data. Such a trend line is not easily seen in the original graph, because the large boxes distract the display.

It has been claimed (Tufte,2001) that the numerous graphical tools and effects available in commercial spreadsheet software have dramatically increased the amount of irrelevant information in statistical graphs. These tools and effects are provided to assist in creating different kinds of decorations, but while looking impressive and attractive, they severely obfuscate the information content. This is why Tufte (Tufte,2001) has introduced the term *chartjunk*, which is divided in three categories:

- *Unintentional optical art*. Using texture fill effects, such as thin parallel lines of different orientations, to fill up certain areas of the graph (for example the bars in a bar graph) often cause moiré effects[3] that bring a sense of "vibration" or movement to the display. This is an effective way to cause irritation and to

[3] A moiré effect is an optical illusion that occurs when thin lines are close to each other (Spillman,1993).

draw the viewer's attention away from the main target of interest of the data. Research (Tufte,2001) indicates that this is a surprisingly common phenomenon found in scientific journals, user manuals for computer graphics programs and even handbooks of statistical graphics.

- *The Grid.* Very often dark gridlines are present in statistical graphics, causing distraction and competing with the data (Tufte,2001). In many cases, however, the grid is very useful and helps to read and interpolate the data. Nevertheless, if a grid is present, it should not be too dense and preferably light in color.
- *Self-promoting graphics*: The Duck. An analogy to architecture describes this phenomenon: in United States, there is a store called the "Big Duck", and the building itself has the form of a duck (Tufte,2001). This means that the graphic is taken over by decoration and the data measures and structures become merely design elements. Such a graph is only meaningful as an exhibit of graphical style. For example, the graph in Figure 3 vividly resembles a mountain landscape (there are even "snowcaps" on the "blue mountain" in the center), and the overall impression efficiently draws attention away from the main issue: the actual revenues.

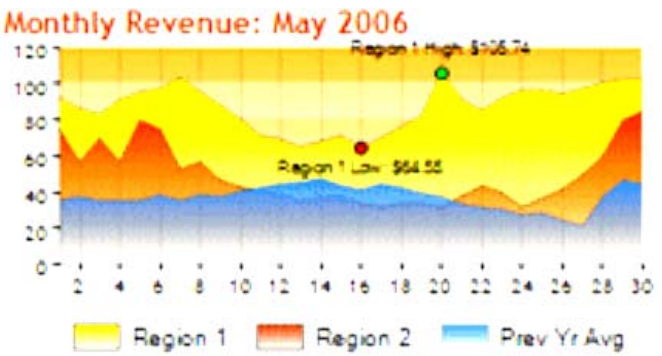

Figure 3 *Exhibiting graphical style rather than data*

Tufte's principles and opinions about effective statistical graphics (Tufte,2001; Tufte,2006) may seem strange and perhaps provocative at first, but his observations are very sharp and his arguments well-founded.

2.2 Color coding

Humans can generally distinguish only about 200 different hues (Ware,2004; Goldstein,2007). The millions of colors in modern computer screens are therefore meaningful only for situations which do not require exact discrimination between each hue, e.g. scientific visualizations or viewing digital photographs of the real world. For purposes of color coding in graphical displays of statistical data where the accurate discrimination of hues is important, one must be careful when selecting the color palette. Colors that are too similar in terms of hue, lightness or contrast

might be easily confused. One way to avoid confusion is to choose all colors used for coding should from different categories of hues, meaning that for example multiple shades of green should not be used as color codes (Ware,2004). Figure 4 displays a set of 12 colors that are distinct enough so that they can "safely" be used for color coding without causing judgmental errors (Ware,2004).

Figure 4 *The "safe" categories for color coding (Ware,2004)*

The primary colors red, green, blue and yellow are naturally the most distinctive colors, so they should be the first four categories. After them, black and white are also easy to distinguish - although the use of black and white is somewhat questionable, since white is very often the color of the background and black the color of text.

One benefit of using color to label information is that it may ease the classification of data into separate categories that are in no particular order (Ware,2004). However, it easy to misuse color; the most common mistake is to use too much of it. A useful guideline is that if color is to be used for highlighting, the display should be quite homogeneous with respect to other colors, and the highlighting color should have a great contrast to other colors (Ware,2004; Tufte,2001). The extensive highlighting adds noise to the display, thus decreasing the signal-to-noise ratio (Tufte,2006): if every item is highlighted, in fact none are. It has even been proposed that in statistical graphics the data should always be presented in varying shades of gray (Tufte,2001), thus reserving other colors only for highlighting purposes and perhaps categorizing data values.

A serious problem with color is that some people have color deficiencies. The issue of using color in displays of business quantitative data is quite complicated and its usefulness seems to be somewhat questionable. So and Smith (So&Smith, 2002) point out that the effect of color in visual representations has not been studied very much, and most of the existing studies focus on educational or search and identification tasks. Thus very little is actually known about how color affects the perception of statistical graphics in decision-making tasks; it is often considered self-evident that color naturally eases the comprehension of graphical displays. However, this was not confirmed in So and Smith's experiment (So&Smith, 2002). They concluded that color coding results in performance benefit only when the task at hand is complex and that even in complex tasks the benefit applies only to females and has only a small effect.

We therefore conclude that in general, the use of color is not recommended in business statistical graphics, with the exception of special highlighting and categorization purposes as mentioned above. However, it has been pointed out that gray shades are not the only possible option (Few,2006): any palette containing a single hue with varying saturation and lightness levels is perceptually equivalent with the grayscale palette even for a color-deficient viewer, but may add to the visual aesthetics of the display.

2.3 Scaling

Scale is a very important factor in presenting business data. A good example of the importance of scale is a geographical map. If we look at a map of Europe, for instance, it is impossible to see any details of a certain city. On the other hand, if we look at a map of a single city, we miss the information about the surrounding regions outside the city. Just like the scale of a map, the scale of a graphical representation of business quantitative data may reveal important details (or hide them, if chosen poorly). The correct scale naturally depends on the characteristics of the data and the information that should be conveyed.

An example of a positive effect achieved by rescaling a graph is shown in Figure 5. It contains two graphs that display historical changes in the number of sunspots during 175 years. Both graphs clearly show that solar activity has peaks once in every eleven years. However, the graph in Figure 5b reveals another interesting fact: the higher peaks rise very fast and decline slowly, while the lower peaks are less dramatic.

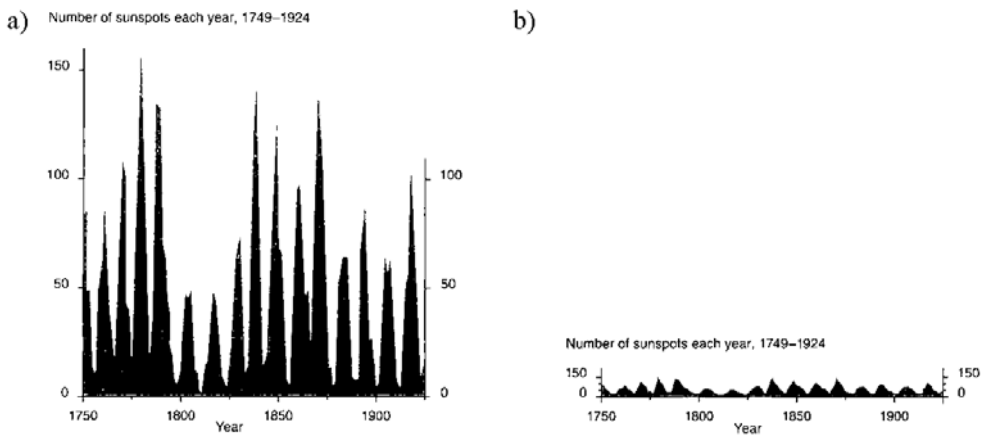

Figure 5 *Two scales for historical solar activity data (Tufte,2001)*

This cannot be easily seen in the graph of Figure 5a, which has a larger scale on the value axis. The relative heights of the peaks are still visible despite the change of scale, so the small graph presents the same information as the large one, and a little more.

The method used to change the scale is called banking to 45. It maximizes the discriminability of the orientations of line segments in the graph by finding an aspect ratio (width/height) such that the slopes are as close to 45 as possible. This method works especially well with cyclic data sets when the inclinations and declinations of the slopes are relatively similar, such as the sunspot data in Figure 5.

If the data contains many different kinds of slopes, some of which are steep and some gentle, a choice must be made about whether to emphasize the gentle slopes (and make the high peaks very sharp) or clarify the steep slopes. Naturally this choice depends on the data set and also the information that is considered most valuable for that data.

2.4 Ordering the business data set

Sometimes simply changing the ordering of business data points may reveal previously undiscovered patterns in the data. If the business data includes a time dimension “which is very common” it is an easy solution to use time as the ordering criteria. But the data usually includes many other dimensions as well, and ordering the data by some of those dimensions might be more useful than just ordering by time. Friendly and Kwan (Friendly&Kwan,2003) have studied the methods for ordering different kinds of multivariate data in visual displays. Their idea is that the data could be sorted by the effects to be observed. Several statistical methods for effect-ordering both numerical and categorical data. They may be generalized as optimization problems whose solutions may be expressed in terms of singular vectors, and the angles between these vectors provide the ordering for the data (Friendly&Kwan,2003). The ordering of categorical data for visualization has also been studied by Beygelzimer et al. (Beygelzimer et al, 2002), who have developed an algorithm for efficiently finding the optimal ordering of the values of two categorical variables in large data sets. Friendly and Kwan (Friendly&Kwan,2003) note that the ordering of data has great significance especially when the user's taks is to perform comparison or to detect patterns, trends or anomalies in the graph. Information may be available in the display, but it might not be accessible if the ordering of the data is ineffective. Similar arguments can be found in other sources as well (Spence, 2001; Beygelzimer et al, 2002). Friendly and Kwan (Friendly&Kwan,2003). have studied the methods for ordering different kinds of multivariate data in visual displays. Their idea is that the data could be sorted by the effects to be observed. The ordering of categorical data for visualization has also been studied by Beygelzimer who have developed an algorithm for efficiently finding the optimal ordering of the values of two categorical variables in large data sets. Friendly and Kwan note that the ordering of data has great significance especially when the user's taks is to perform comparison or to detect patterns, trends or anomalies in the graph. Information may be available in the display, but it might

not be accessible if the ordering of the data is ineffective. Similar arguments can be found in other sources as well (Spence, 2001; Beygelzimer et al, 2002).

Tufte (Tufte,2001) has introduced the term small multiples for displays of multivariate data. The idea is equivalent to that of Cleveland's: a series of small graphics that show multiple combinations of several variables is very e_ective for comparisons and clearly display the relationships between variabels (Tufte,2001). The psychological properties of the human visual system explain the usefulness of small multiples. Because each of the graphs in the display are quite small, it is easy to perceive the overview of a single graph without moving the point of focus; eye movement is only required when shifting the attention from one graph to another, which reduces the cognitive effort required in interpretation. Fortunately the interaction capabilities provided by computers enable the dynamic rearrangement of the graphic with little effort.

2.5 Interactive visual displays

One of the most important features of computer-based visual displays is that they allow the reader to interact with the business information and perform dynamic queries on the data. Especially in business intelligence systems there are vast amounts of summarized information available. This requires that users must be able to focus on the details on some part of the data that seems important and to dynamically explore the properties of individual pieces of that information. This operation is usually referred to as drill-down (Ware,2004). The famous visual information seeking mantra condenses the idea in a few simple words (Shneiderman,1996): *Overview first, zoom and filter, then details-on-demand*.

Another similar suggestion is that a statistical graphic should contain at least three viewing depths (Tufte,2001):

1. What is seen from a distance - overview of the data
2. What is seen up close and in detail - the fine structure of the data
3. What is seen implicitly, underlying the graphic - the “story” being told by the data.

The visual information seeking mantra is a result of business empirical research, whereas the proposition of the three viewing depths is purely intuitive, but they have a lot in common. In most visual problem-solving tasks the users indeed want to take these steps when they are exploring and analyzing the data set; this is called exploratory data analysis (Ware,2004). The large-scale overview facilitates comparisons between data points and the detailed views provide the lookup functionality that is often necessary for analyzing the data set (Ware,2004). These two together help to reveal the “story” of the data to the viewer.

There are a lot of methods to choose from when designing and implementing the interaction in visual displays. The traditional approach for moving from the

overview to the detailed level is changing the magnification of the display, i.e. zooming, which can be done by either selecting an area to focus on or sometimes simply clicking the mouse on the desired focus point in the graph (Spence, 2001).

In addition to these, Cleveland (Cleveland,1993) has introduced a technique called *brushing*, which means that the details of a data point are displayed when the mouse pointer is moved on top of that point. The details displayed may be just a single value of the data point, but sometimes the popup may include several attributes of the data point or even information about other data points related to the current point. Such extended popups are referred to as hover queries, since they actually present additional information about the data set (Ware,2004). Brushing and hover queries enable very fast exploration of the data set as the user can retrieve information by simply moving the mouse pointer over the display.

Another popular method of interaction in visualizations is the use of different distortion techniques. Distorting the graphic means that the scale of the data is intentionally varied in different parts of the display (Spence, 2001). A subset of the data is in focus and it has a smaller scale to enable displaying more details of the focused data, while other parts outside the focused subset have a larger scale thus showing the context of the focused data.

The *Table Lens* introduced by Card (Card et al,1999) is one of the many applications using distortion in visualization, and it is well suited for displaying multivariate relational information. It combines the traditional spreadsheet with graphical representations by showing a small graph in each cell. Figure 6 displays statistics for two players in a Table Lens. It has one row for each player and 17 variables for each player in the columns. In columns containing numerical values, each cell contains a horizontal bar, whereas in categorical columns (there are six of them in this example) the cell's graphical element is a colored and positioned small rectangle.

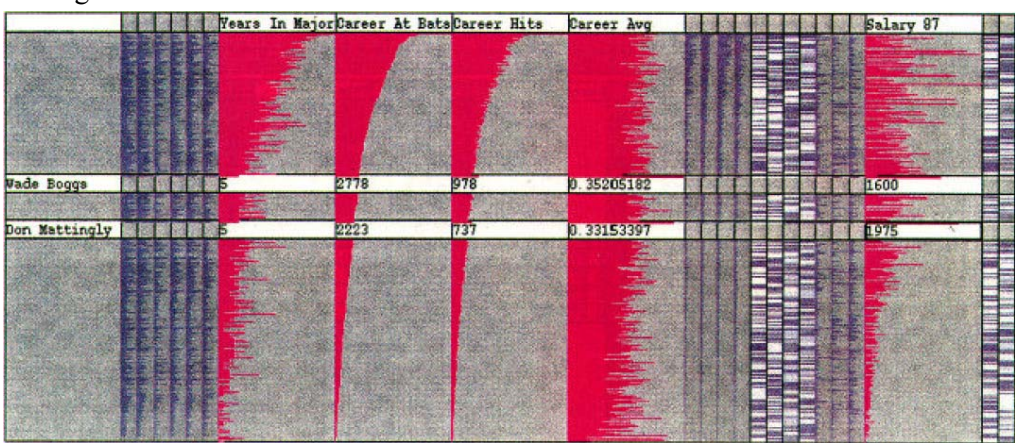

Figure 6 *The Table Lens (Rao&Card,1999)*

As we see, multiple rows and/or columns may be focused at the same time independently, and focused cells also display the value of the cell. Columns can be sorted by clicking the column title, which reveals correlations between variables, clearly visible. The Table Lens thus provides the overview of the entire data set and details about selected individual objects in a single display.

3. DASHBOARD - VISUAL INFORMATION INTERFACE FOR BUSINESS INTELLIGENCE AND PERFORMANCE MANAGEMENT TOOLS

The advantages of displaying numerical data in a graphical format have been recognized centuries ago, and even the first management information systems produced results in a graphical format. Today, most vendors of Business Intelligence and Performance Management tools now offer dashboards as the graphical user interface for business reporting, but none of them really explain what a dashboard is (Few,2006).

The origin of the term is in the French performance measurement framework *tableau de bord*, which literally means "dashboard". The thinking behind the dashboard metaphor is probably that performance management is often regarded similar to driving a car, flying an aeroplane or steering a ship. Nonetheless, the term has been adopted by the end users to the extent that this tool is not likely to be known by any other name, even if its current name is quite misleading and non-descriptive. S. Few is the first who decided to create a definition applicable to all dashboards: *A dashboard is a visual display of the most important information needed to achieve one or more objectives; consolidated and arranged on a single screen so the information can be monitored at a glance*.

This definition is very general in nature and carefully avoids any specific association with performance measurement or business intelligence; in fact, considering that after all a dashboard is a graphical user interface, it could be used to display any information that is necessary, meaningful and possible to represent in a concise visual format. However, the applications of dashboards are at the moment limited to business intelligence and performance management, since dashboards were originally introduced in this context.

The dashboard is only a "tip of the iceberg" behind it there is a massive infrastructure in which the business data are collected in their operational sources (databases, spreadsheets, text files or the web pages), moved into a data warehouse or mart through an extract-transform-load (ETL) process, and then processed in OLAP (On-line Analytical Processing) cubes that provide an integrated, multi-dimensional view on the data. Although the underlying structures play a significant role, we may say that the dashboard is the most important part of the information processing chain in the sense that it is the interface through which the human interacts with the computer system and the business data. The user only sees the

consolidated results on the dashboard, not the intermediate components of the business data processing chain. The dashboard is thus a tool for reporting, not a full-scale analysis tool (unless the user is allowed to build the dashboard from scratch, which is quite laborious), although some means of simple interaction with the data are usually featured. In order to achieve its goal, to provide information about the data that is turned into knowledge in the human mind, the dashboard must communicate the information as efficiently as possible and preferably in a manner that requires little cognitive effort. A visual presentation format makes it possible to fulfil these requirements, but not any given visual format. As we have discussed earlier, there are certain principles that the human brain follows when the visual image is interpreted; therefore some formats are more suitable than others, depending on the context. We will see here, how these principles can be taken into account in the design of a dashboard.

A business intelligence system is usually based on data warehouse technology (Watson&Wixon,2007). Collecting all data in a single repository offers an integrated view on all information regardless of its original source, and it also facilitates improving and controlling the quality of data, especially when some data are transferred from legacy systems that may have different encodings for the same information (Howson, 2007) .In large companies, the data may be further replicated to subunits as data marts, which are similar to the main warehouse, but each data mart contains only a subset of the warehouse data (based on e.g. geographic location or business function) that is relevant to that subunit (Turban et al, 2005); smaller companies might resort to independent data marts that are essentially “small warehouses”. Data in the warehouse or data marts can be utilized for business intelligence activities in many ways (see Figure 7). These include data mining, ad hoc querying, reporting and predictive analysis (Watson&Wixon,2007).

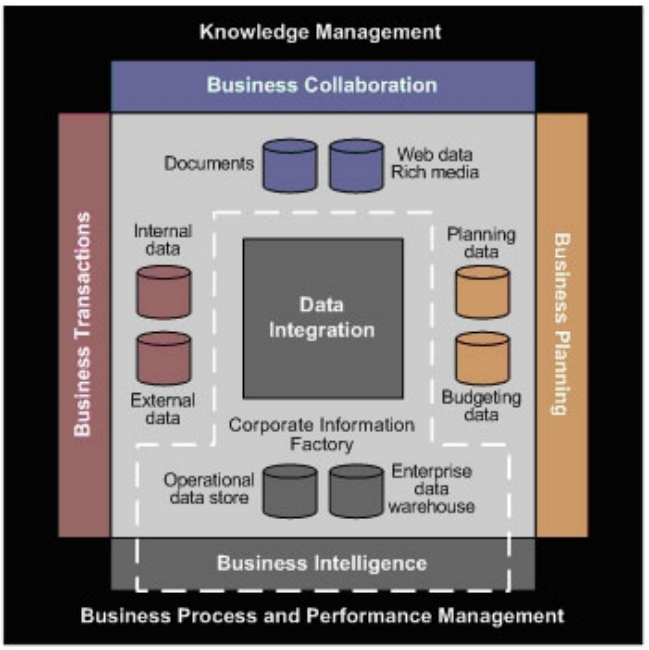

Figure 7 *The Smart BI Framework (White, 2005)*

As we see in Figure 7, key to collaboration and the sharing of information is knowledge management, which brings together portals, content management and collaboration tools. The growing importance of business intelligence also means that it too must be integrated into the knowledge management environment. Especially in reporting, visual displays of summarized data, i.e. dashboards, seem to be the most common format for user interfaces; some software products also include information visualization techniques for analysis functions. This may indicate either that the advantages of visual displays over text and tables have been implicitly recognized by software vendors and business users, or that they have become popular just because they make the interfaces more appealing. Whatever the reason, the trend is that - business intelligence methods and tools are highly visual in nature. At present, business intelligence is data-centric, but as it becomes more integrated with business operations it will need to become more process-centric so that business intelligence results can be more easily related to business processes and their associated business activities. This involves integrating performance management and process management technologies. In Europe, business intelligence is generally understood as gathering and processing both internal and external information (Pirttimäki,2007). Performance management and business intelligence are related to each other, but not synonyms. For example, the Balanced Scorecard includes measures for both external information (customer satisfaction, market share etc.) and internal information, and collecting data for these measures may be regarded as an intelligence activity. On the other hand, the business intelligence process itself can be subject to performance measurement, as suggested by Pirttimäki (Pirttimäki,2007). One differentiating

character between these two is that performance measures serve as a reporting function: the values of the measures are based on static predefined rules and formulas, whereas business intelligence is an analytical process that dynamically refines the raw information (by automatic data mining and modeling processes or through user interaction, such as ad hoc querying) to produce a deeper insight for decision-making (Pirttimäki,2007). Business intelligence can thus also be seen as the operation that provides the data for performance management. However, both functions are important and useful for managing a business. We therefore consider both performance management and business intelligence systems as the latest step in the continuum of decision support systems' evolution. In Figure 8 we present a concret visual interface to support an exploratory relationship between the users and the data with *Spotfire's DecisionSite* software, an analytic application environment based on user behavior. *DecisionSite* is designed to be able to import data from a variety of sources, then offer users several different possible representations of that data. Users can pose and alter queries and receive instant responses, enabling them to shape their questions accordingly and to manipulate the interface to better support their needs as they learn the data set.

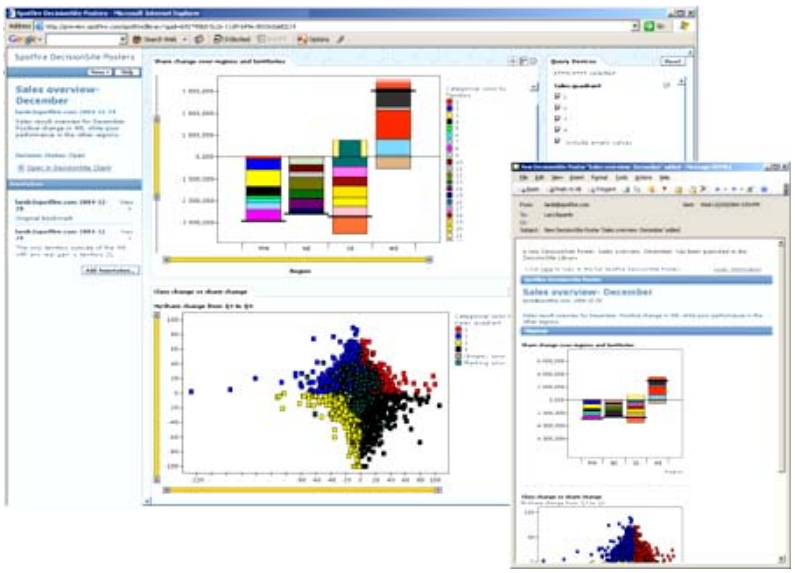

Figure 8 *Businesss managers optimize investment projects based on performance (DecisionSite)*

4. CONCLUSION

The business world needs information visualization. My paper in this field is important – too important to remain isolated in small enclaves. It's hard to imagine that any of us don't want our work to count for as much as possible in the management and research of business world. In my role as an Ph.D. students

supervisor, teacher, and writer, I work with a broad range of businesses, research groups on business intelligent systems, students, and universities. This puts me in touch with diverse communities that have one thing in common: they must make sense of and present business data to do their jobs, and most of them must do so in ways that require little statistical or technical sophistication. These aspects don't receive enough attention from the information visualization research community. Business researchers tend either to work on dissertations and articles or other research projects that are technically interesting to themselves as computer scientists or to focus on the needs of professions that are statistically and technically sophisticated. All of them must be interested by the using of information visualization tools and techniques.

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