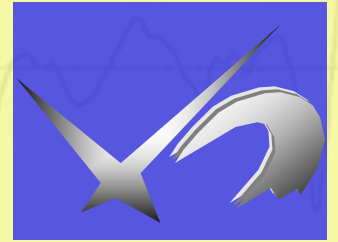
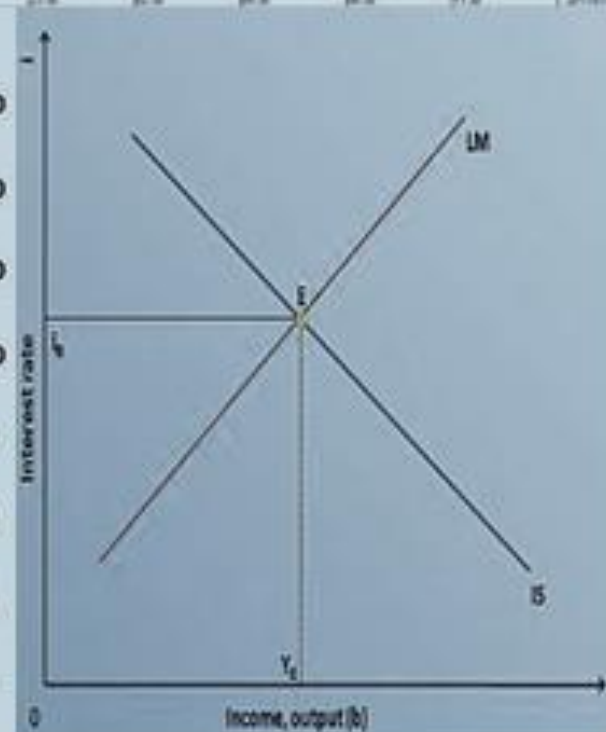


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**Modeling Risk Convergence for European Financial Markets****Radu LUPU, PhD***Institute for Economic Forecasting, Romania***Adrian Cantemir CALIN, PhD***Institute for Economic Forecasting, Romania,  
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**Abstract:** This article studies the convergence of risk on a sample of 13 European indexes. We use a set of 31 model specifications of a significant number of models belonging to the GARCH class and on their estimates we build an aggregate index in a Value-at-Risk approach. We use this index as a base for our convergence analysis. The results indicate a positive and significant tendency of convergence growth for the European financial market.

**Keywords:** convergence, financial risk, Value-at-Risk, European Financial Markets

**JEL classification** C58, G17, G15

**1. Introduction**

Lately, the convergence of international financial market has become an area of interest for the academic literature. This wave of interest is associated to financial globalization which contributed to the exclusion of restrictions on financial transactions, harmonization of regulatory frameworks and accounting procedures and the propagation of foreign direct investments. These phenomena accelerated the international flows of capital which theoretically lead to a higher degree of convergence among international financial markets.

Financial convergence was intensively studied, both at a global level, and from the perspective of the European Union especially given the efforts of the EU in obtaining a higher degree of financial harmonization among member states.

In this paper we aim to extend the existing literature by studying and assessing the degree of risk convergence present on the European financial markets. In a volatility oriented approach we use a relevant set of GARCH models as preliminary elements in the construction of an index on which we conduct our convergence investigation.

The remainder of the paper is organized in the following manner. Section II offers a brief review of the literature. Section III is dedicated to a discussion on the data employed and on the methodological aspects relevant to this study. The final section presents the results obtained and concludes.

## 2. Literature review

As stated before, the study of the convergence of financial markets has been an active topic of the academic community. Arouri (2004) and Jayasuriya and Shambora (2008) investigate the returns gained by US investors involved in transactions in emerging markets. The authors report a diminishing tendency of the levels of returns which can be traced back to an enhancement of the degree of market convergence.

Hartmann et al (2003) state that the degree of integration and convergence of international markets reduces significantly the diversification potential, from the point of view of a portfolio. Similar evidences have been put forward by Baca *et al.* (2000) or Ferreira (2004).

The financial integration in the EU is a captivating area of research, receiving attention from both academics and investors. Despite certain elements like the building of a single market, the relaxation of some national regulation, policies encouraging financial integration and the introducing of the Euro, the scientific literature has observed that the European markets are still less homogenous than the US market. (Carporeale et al, 2014).

Hardouvelis et al. (2007) report a correlation between the reduction of the cost of capital and the growth of financial convergence in Europe. Similar results are observed by Chen and Knez (1995) and Fratzscher (2002) in arbitrage based approaches. Baele *et al.* (2004), and Portes and Rey (2005) provide ample studies that bring evidence of the influence of the Euro currency in the convergence of the equity market. Horobet and Lupu (2005) also provides an analysis of the connections between currencies and stock market performance, which could be considered in the wider framework of the importance of foreign exchange for the convergence of financial markets in general.

Contrasting results are presented by Brooks and Del Negro (2004). The authors state that the correlations observed among national financial markets are only a temporary aspect enabled by the development of the IT sector.

In an interesting approach from the point of view of our study, Ferreira and Gama (2005) advance a system of volatility decomposition that allows the study of equity volatility from an international, national and local perspective.

The scientific literature addresses the convergence phenomenon on markets that exceed the European space. For example, in the case of Asian markets, Piesse and Hearn (2002) and Cerny (2004) determine a very weak level of convergence. On the other hand, Yang *et al.* (2003), report that this inadequate tendency is only valid for the period following the Asian crisis.

Some scientific studies focus on the North American markets. Darrat and Zhong (2005) and Aggarwal and Kyaw (2005) study convergence related aspects for the NAFTA member states. Other similar results can be found in Ciner (2006), Chukwuogor-Ndu (2007) and Chukwuogor-Ndu and Kasibhatla (2007).

Apergis et al (2014) and Caporale et al (2014) extend the convergence methodology developed by Phillips and Sul (2007) in order to study the convergence of stock markets. In another recent contribution, Albu, Lupu and Calin (2014) investigate the connection between market capitalization and GDP per capita through a convergence based approach. The authors put forward a non-linear model that simulates the convergence in Central and Eastern Europe and apply it to both macroeconomic variables and market capitalization.

## 3. Methodology and data sources

In this study we used daily prices for a series of 13 European indexes. Thus, we collected values for the following indexes: BEL20 Index, BET Index, BGTR30 Index, BUX

Index, CAC Index, DAX Index, FTSEM Index, FTSEMIB Index, IBEX Index, PSI20 Index, PX Index, UKX Index, and WIG Index. The data were gathered for a period ranging from January 2005 to November 2014. In order to achieve our objectives, the methodology used is organized in three stages. The first stage is dedicated to the estimation of the volatility with an extensive arsenal of GARCH models. In the second phase we construct a volatility index on the basis of the above mentioned estimations. The final stage of our methodology aims to estimate the volatility convergence.

### Stage 1. Volatility models

In the following section we briefly review the volatility models used in this analysis. These models are validated by the scientific literature and are capable of capturing the statistical properties of the data series. For a detailed discussion on GARCH modeling see for example Călin et al. (2014) or Lupu and Lupu (2009). Other relevant results using GARCH models have been reported by Albu et al (2014a), Albu et al (2014b), Horobet et al (2011).

The first instrument used of the estimation of the volatility is the classical GARCH modeling background.

$$R_t = \mu_t + \epsilon_t \quad (1)$$

$$\sigma_t^2 = \omega + \alpha_1 \epsilon_{t-1}^2 + \alpha_2 \epsilon_{t-2}^2 + \dots + \alpha_p \epsilon_{t-p}^2 \quad (2)$$

One of the most relevant extension of the GARCH model from the perspective of risk modeling appeared through the study of Nelson (1991). The EGARCH model - *Exponential Generalized Autoregressive Conditional Heteroskedasticity* is able to capture an interesting feature of the financial assets, namely the presence of a dose of asymmetry different from zero. The general form of the model is:

$$R_t = \mu_t + \epsilon_t \quad (3)$$

$$\ln(\sigma_t^2) = \omega + \sum_{p=1}^P \alpha_p \left( \left| \frac{\epsilon_{t-p}}{\sigma_{t-p}} \right| - \sqrt{\frac{2}{\pi}} \right) + \sum_{o=1}^O \gamma_o \frac{\epsilon_{t-o}}{\sigma_{t-o}} + \sum_{q=1}^Q \beta_q \ln(\sigma_{t-q}^2) \quad (4)$$

The GJR-GARCH model (*Glosten - Jagannathan - Runkle Generalized Autoregressive Conditional Heteroskedasticity*) extends the classic GARCH specification by adding the possibility to capture asymmetric properties such as the leverage effect. The GJR-GARCH (Glosten et al (1993)) is defined by the following set of equations:

$$R_t = \mu_t + \epsilon_t \quad (5)$$

$$\sigma_t^2 = \omega + \sum_{p=1}^P \alpha_p \epsilon_{t-p}^2 + \sum_{o=1}^O \gamma_o \epsilon_{t-o}^2 I_{[\epsilon_{t-o} < 0]} + \sum_{q=1}^Q \beta_q \sigma_{t-q}^2 \quad (6)$$

The APARCH model (*Asymmetric Power Generalized Autoregressive Conditional Heteroskedasticity*) refines the GJR-GARCH having basically the same objective. The model established by Ding, Engle and Granger (1993) has the following form

$$R_t = \mu_t + \epsilon_t \quad (7)$$

$$\sigma_t^\delta = \omega + \sum_{j=1}^{\max(P,0)} \alpha_j (|\epsilon_{t-j}| + \gamma_j \epsilon_{t-j})^\delta + \sum_{q=1}^Q \beta_q \sigma_{t-q}^\delta \quad (8)$$

The ZARCH model is an approach that allows the standard deviation to depend on the sign of past invocations. The model was put forward by Zakoian in 1994 and is better known in the scientific literature as TARCH or TGARCH.

$$R_t = \mu_t + \epsilon_t \quad (\epsilon 15)$$

$$\sigma_t = \omega + \sum_{p=1}^P \alpha_p |\epsilon_{t-p}| + \sum_{o=1}^O \gamma_o |\epsilon_{t-o}| I_{[\epsilon_{t-o} < 0]} + \sum_{q=1}^Q \beta_q \sigma_{t-q} \quad (9)$$

The NAGARCH model developed by Engle and Ng (1994) is known in the specific literature as the *Nonlinear GARCH*. This model assumes a non-linear dependence between the standard deviation and the sign of anterior shocks. The general form of the model is the following:

$$R_t = \mu_t + \epsilon_t \quad (\epsilon 18)$$

$$\sigma_t = \omega + \sum_{p=1}^P \alpha_p (\epsilon_{t-p} - \gamma \sqrt{\sigma_{t-p}})^2 + \sum_{q=1}^Q \beta_q \sigma_{t-q} \quad (10)$$

The IGARCH - *Integrated GARCH* (Engle and Bollerslev (1986) extends the GARCH family by allowing a non-stationary dynamics to the standard deviation. The specification of the model is:

$$R_t = \mu_t + \epsilon_t \quad (\epsilon 21)$$

$$\sigma_t^2 = \omega + \sum_{p=1}^P \alpha_p (\epsilon_{t-p})^2 + \sum_{q=1}^Q \beta_q \sigma_{t-q}^2 \quad (11)$$

The last model considered in our study was introduced by Baillie et al. (1996) and it is called FIGARCH (*Fractionally Integrated GARCH*).

$$R_t = \mu_t + \epsilon_t \quad (12)$$

$$\sigma_t^2 = \omega + (1 - \beta L - \phi L(1-L)^d) \epsilon_t^2 + \beta \sigma_{t-1}^2 \quad (13)$$

According to the mathematical aspects presented above, we calibrated a series of specifications for each model:

- For the GARCH model we calibrated the following specifications: GARCH (1,1), GARCH (1,2), GARCH (2,1) and GARCH (2,2)
- For the EGARCH model we calibrated the following specifications EGARCH (1,1,1), EGARCH (1,1,2), EGARCH (2,2,1) and EGARCH (2,2,2).
- For the GJR-GARCH model we calibrated the following specifications GJR-GARCH (1,1,1), GJR-GARCH (1,1,2), GJR-GARCH (2,2,1) and GJR-GARCH (2,2,2)
- For the APARCH model we calibrated the following specifications APARCH (1,1,1), APARCH (1,1,2), APARCH (2,2,1) and APARCH (2,2,2).
- For the ZARCH model we calibrated the following specifications ZARCH (1,1,1), ZARCH (1,1,2), ZARCH (2,2,1) and ZARCH (2,2,2)
- For the NAGARCH model we calibrated the following specifications NAGARCH (1,1), NAGARCH (1,2), NAGARCH (2,1) and NAGARCH (2,2)
- For the IGARCH model we calibrated the following specifications IGARCH (1,1), IGARCH (1,2), IGARCH (2,1) and IGARCH (2,2)



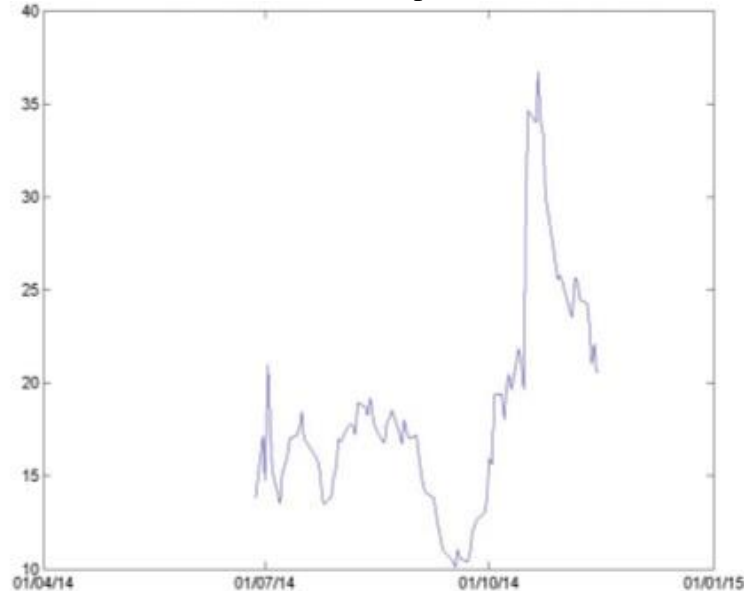
- For the FIGARCH model we calibrated the following specifications FIGARCH (1,1), FIGARCH (0,1) and FIGARCH (1,0).

In total, during this phase we calibrate 31 models in order to capture the volatility of the 13 European indexes.

### **Stage2: Constructing an aggregate index for the volatility of the European market**

During this phase we calculated an aggregate index using the entire sample of mathematical models described and calibrated in the previous section. The volatility index represents a measure of the risk and uses all the financial assets included in this study. The relevance of this index derives from its capacity to describe a clear image of the risk specific to the European financial market. The dynamic of this index is presented in Figure 1.

**Figure 1:** The dynamics of the volatility index for the 13 financial indexes and for all the models constructed in the previous section



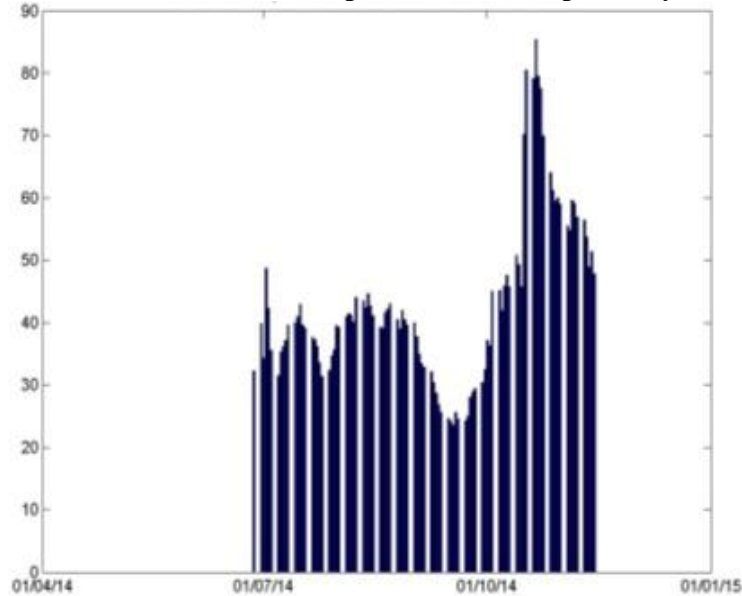
Source: Authors' work

Technically, financial indexes have the role of informing the general public about the nature and evolution of the financial assets traded on a capital market and to serve as guidelines in investing strategies.

In order to achieve our objective for this section we computed the (Value-at-Risk) indicators for each asset considered in this study. From this construction we continued with the calculation of the aggregate index and with the characterization of the financial market in terms of volatility.

Conceptually, the Value-at-Risk derives from the need of a stable indicator that can describe the risk for a certain investment. Statistically, VaR represents a probabilistic measure of a potential loss. The evolution of the aggregated VaR is shown in Figure 2.



**Figure 2:** The evolution of VaR of the capital market composed by the chosen indexes

Source: Authors' work

**Stage 3. Modeling the convergence analysis**

In order to assess the convergence of volatility we studied the macroeconomic model advanced by Kočenda and Papell (1997) and extended by Albu, Iordan and Lupu (2012). We translated the logic of the model towards the measures of risk on the European financial market.

Kočenda and Papell (1997) consider the existence of a group of countries and a series of values. Assuming  $X$  to be the growth rate of a variable, the authors derive the average for each moment by computing the following equation.

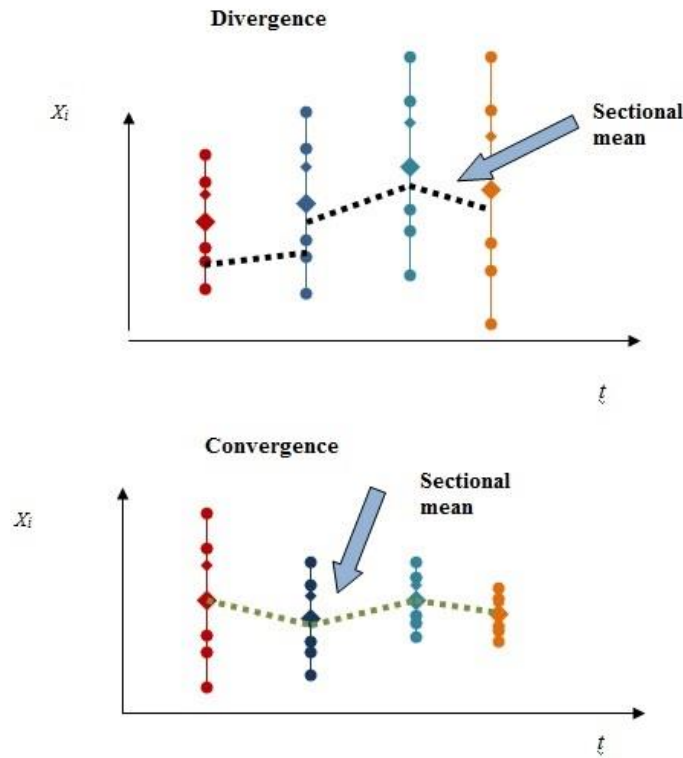
$$\overline{X}_t = \frac{1}{n} \sum_{i=1}^n X_i \quad (14)$$

The next step involves the calculation of the distances:

$$d_{i,t} = X_{i,t} - \overline{X}_t \quad (15)$$

The economic theory states that in the case of convergence, the above mentioned distance should decrease, in the sense that the values of  $X$  should tend towards the values of the group.

Symmetrically, in the situation of divergence, the results will indicate a growth of the distance values. The logic of the methodology is summarized in Figure 3.

**Figure 3.** Divergence and convergence

Source: Adaptation of Albu et al (2012) for volatilities

Kočenda and Papell (1997) state that  $X$  follows an AR(1) process

$$X_{i,t} = \alpha + \phi X_{i,t-1} + \epsilon_{i,t} \quad (16)$$

In this context, the dynamics of the sectional average is described by the relation:

$$\bar{X}_t = \alpha + \phi \bar{X}_{t-1} + \epsilon_{i,t} \quad (17)$$

From this moment, the evolution of the difference is given by the following equations.

$$d_{i,t} = X_{i,t} - \bar{X}_t = \phi(X_{i,t-1} - \bar{X}_{t-1}) + \epsilon_{i,t} \quad (18)$$

$$d_{i,t} = d_0 e^{-rt} \quad (19)$$

$$d_{i,t+1} = X_{i,t+1} - \bar{X}_{t+1} = \phi(X_{i,t} - \bar{X}_t) + \epsilon_{i,t+1} = d_0 e^{-r(t+1)} \quad (20)$$

$$d_{i,t} = X_{i,t} - \bar{X}_t = \phi(X_{i,t-1} - \bar{X}_{t-1}) + \epsilon_{i,t} = d_0 e^{-rt} \quad (21)$$

$$\phi(X_{i,t-1} - \bar{X}_{t-1}) = d_0 e^{-rt} \quad (22),$$

$$d_0 e^{-r(t+1)} - d_0 e^{-rt} = \phi(d_0 e^{-rt} - d_0 e^{-r(t+1)}) \quad (23)$$

$$d_0 e^{-r(t-1)}(e^{-2r} - e^{-r}) = \phi d_0 e^{-r(t-1)}(e^{-r} - 1) \quad (24)$$

$$e^{-r} = \phi \quad (25)$$

$$r = -\ln(\phi) \quad (26)$$

For the estimation of the convergence coefficient ( $\phi$ ) we use the Augmented Dickey Fuller (ADF) regression in order to eliminate any potential autocorrelations:

$$\Delta d_{i,t} = (\phi - 1)d_{i,t-1} - \sum_{j=1}^k \Delta d_{i,t-j} + \epsilon_{i,t} \quad (27)$$

By extending the methodological aspects put forward by Kočenda and Papell (1997) Albu, Iordan and Lupu (2012) from the macroeconomic area to the topic of financial markets we obtained the value of the  $\phi$  parameter for the aggregate index calculated in the previous section. All the above mentioned computations have been conducted in Matlab.

#### 4. Results and conclusions

Table 1 shows the results that characterize the level of convergence for the volatilities of the financial instruments.

**Table 1: The results of the convergence coefficient**

	$j$	$r = -\ln(j)$	T-stat	Test 1%	Test 5%	Test 10%
<b>Volatilities</b>	0.9362***	0.0659	-20.3395	-0.0247	-0.0180	-0.0140

Source: Authors' calculations

The results indicate a  $\phi$  coefficient that is positive and above 1. This fact indicates the expansion of the convergence phenomenon for the Var coefficients calculated using the aggregation procedure mentioned previously.

By translating the methodological assumption used by Kočenda and Papell (1997) and Albu, Iordan and Lupu (2012) to the topic of financial assets, we conclude that for the analyzed period (January 2005 to November 2014) there are solid traces of a positive dynamics of the convergence of the volatility.

The significant level of the convergence coefficient is influenced by the evolution of the European financial markets during the economic crisis and by a similar evolution in terms of volatility for the following years.

This research can be extended to a study of the convergence indicator for sub periods (ante, during and post-crisis), in order to obtain a more complete and efficient estimation of the risk convergence process.

#### 5. Acknowledgement

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## Occupy the Financial Niche – Saturation and Crisis (discontinuous decisions)

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**Abstract:** The model presented is proposing an approach that could verify the nonlinear behaviour during a crisis, such that to quantify and predict potential discontinuous behaviour. In this case, the crisis behaviour associated with financial funds reallocation among various credit instruments, described as memes with the sense of Dawkins, is shown to be of discontinuous nature stemming from a logistic penetration in the financial behaviour niche. Actually the logistic penetration is typical in creating cyclic behaviour of economic structures as shown by Marchetti and others from IIASA. A Fokker-Planck equation description results in a stationary solution having a bifurcation like solution with evolution trajectories on a ‘cusp’ type catastrophe that may describe discontinuous decision behaviour.

**Key words:** nonlinear models, decision, financial crisis, meme

**JEL classification:** C3, C61, C62, D7, D87.

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### 1. Social Reality and Collective Behaviour

In a paper from the '80-ties, Marchetti was identifying the spread out of ideas (e.g. technological innovation) as possessing biological properties such as mutation, selection and diffusion. He was concentrating on the most obvious of the three mechanisms i.e. diffusion, identifying logistic penetration and waves of economic behaviour in different domains such as energy. Earlier on Dawkins has developed the notion of meme as a concept that presents biological properties such as reaction, diffusion, mutation, selection, etc. Fashion, as well as other types of behaviour, is described by using this concept.

It occurred to me that several credit memes with the sense of Dawkins are penetrating the niche of the financial instruments portfolio evolving in a logistic way i.e. slowly at the beginning, then bursting to finally saturate. The decision to allocate money to the newly penetrating financial meme may be described by a Fokker-Planck equation whose stationary solution is showing nonlinear behaviour. This model may describe the discontinuous decision to abandon a certain type of credit and allocate the money to the rest of the portfolio. The parameters driving this decision are: cost of risk (potentially measured by e.g. spread or volatility) and benefit (measured by e.g. interest).

### 2. Dynamics of Memes

The movement of ideas and principles among the members of a collectivity creates a dynamic where socio-cultural niches are formed as described by Popper (1973). To look deeper into the dynamic we will consider the memes introduced by Dawkins (the ‘virus-like sentences’, in Douglas Hofstadter’s terminology) that describe the basic conceptual framework for such an analysis. (Purica, 1988)

There exists a certain intercorrelation of memes in a society that reacts and diffuses among the individuals. If looking at the financial world one may see it meets the typical criteria described above for a niche where the various financial instruments coexist as financial

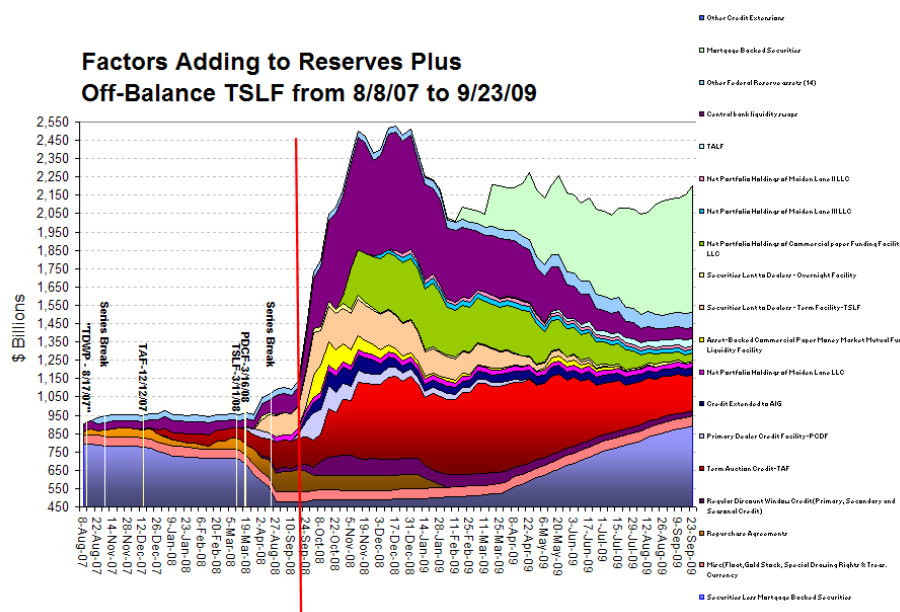
memes and have a specific dynamics. In what follows we will analyze the way financial memes penetrate and occupy the niche. We must underline that the fact that a given meme species is having a larger part of the niche (call it financial market) depends of the perception by the decision makers of the potential advantage of the instrument. Moreover, it is important to stress that the decision to extend the use of a given instrument is based on perception that feeds from the creation of a collective effect.

The penetration of new financial instruments is done slowly at the beginning and then accelerated, to saturate toward the end. This is typically described by a logistic function. One may notice that this type of behaviour has been shown to describe technology penetration in niches associated to technologies. Marchetti, Nakichenovich, as well as other researchers from IIASA in Laxemburg have extensively done research on the logistic penetration of technologies with important results on the process understanding.

We may note that Marchetti is making an attempt to analyze the evolution of credit taking from banks that identifies some features of the same behaviour, but without identifying the general cause of such behaviour, which is related to decision makers behaviour in the situation of financial institutions. This is where we are bringing some added value in introducing the memes as defined above and describing the discontinuous decision to enhance or abandon money allocation to a given meme.

The logistic behaviour is perceived in the case of financial instruments as moments of crisis when a given instrument after having occupied a large portion of the market (niche) saturates i.e. falls fast.

The data from the previous crises and from the 2007 one are showing the same type of behaviour obviously in relation to different instruments. As we have shown in the beginning of our analysis it seems there are periods of repeated penetration and decrease of some financial meme. See Figure 2 below.



**Figure 1.** Evolution of various financial instruments in 2007-2008, Source: IAES Conference, Boston oct.2009. A typical logistic behaviour is seen in the niche of financial instruments used, described as memes, showing increase in the sum allocated to some instruments as they occupy larger parts of the financial market to diminish after saturation and switching to other financial memes.

But in the world of today, planning the development of financial systems means having to take into account a large and intricate pattern of various indicators not only



connected with economical aspects, but also with the political, sociological, environmental, etc.

The good fitting of the statistical data by the logistic function is only providing the financial planner with a method to predict the evolution of financial instruments penetration in the future. It does not show how to change and control such an evolution.

The table 1 and associated figure 2, show such penetration related to the evolution of the subprime financial instruments and show their position in the allocation of assets evolution in the US during 1999-2007. This is given in the table 1 below that summarizes the average collateral composition for of 742 Security Asset Backed CDO deals originated between 1999-2007:

**Table 1. Average Principal Allocations by Asset-Class.** The abbreviations stand for: REL – residential equity loan (includes all RSMB less than prime), RSMB – residential securities mortgage-backed (by prime borrowers), CSMB – commercial securities mortgage backed, other OSAB – other securities asset-backed (including auto-loans, credit-cards, etc.). Source: Lehman Live and Barnatt-Hart (2009)

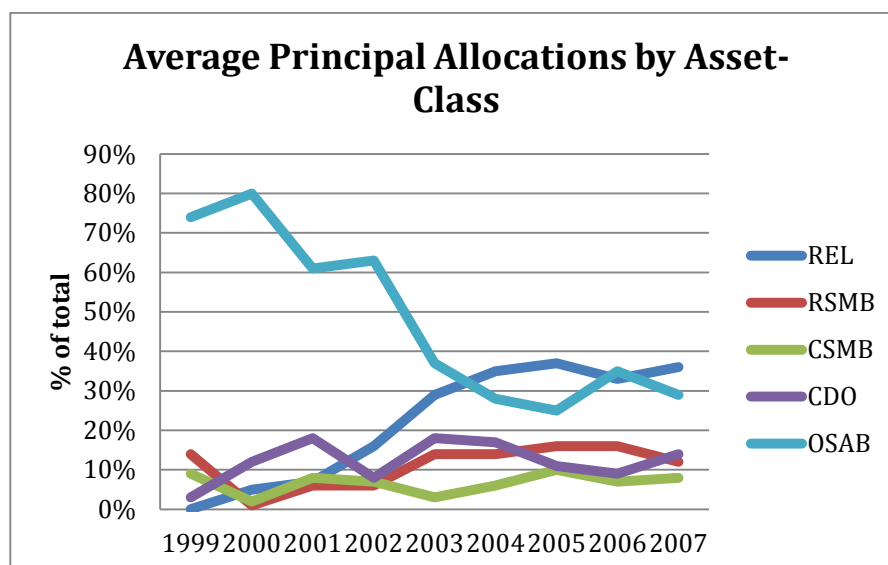
<b>Year Originating</b>	<b>Deals</b>	<b>REL</b>	<b>RSMB</b>	<b>CSMB</b>	<b>CDO</b>	<b>OSAB</b>
1999	1	0%	14%	9%	3%	74%
2000	16	5%	1%	2%	12%	80%
2001	28	7%	6%	8%	18%	61%
2002	47	16%	6%	7%	8%	63%
2003	44	29%	14%	3%	18%	37%
2004	101	35%	14%	6%	17%	28%
2005	153	37%	16%	10%	11%	25%
2006	217	33%	16%	7%	9%	35%
2007	135	36%	12%	8%	14%	29%

One thing to mention is that we have purposefully slightly changed the names of the instruments from the usual literature ones. This is done specifically to make the reader get out of the interpretation reflexes created by seeing the same names and pay more attention to the fact that more information is taken out of the same data by using the approach we describe here. It is in fact a question of memes perception that we try to change<sup>1</sup>.

The evolution of the allocations in table 1 is also shown in the figure 2, below:

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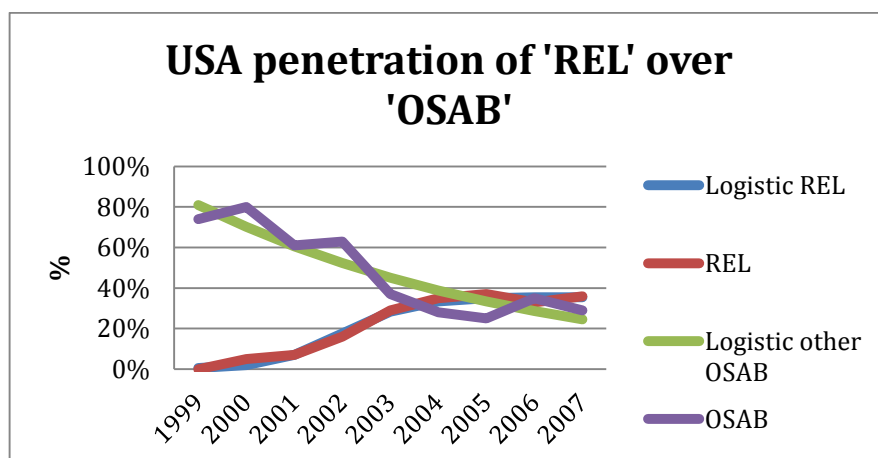
<sup>1</sup> The literature names are: (REL) HEL – home equity loan (includes all RMBS less than prime), (RSMB) RMBS – residential mortgage-backed securities (by prime borrowers), (CSMB) CMBS – commercial mortgage backed securities, (OSAB) other ABS – other asset-backed securities (including auto-loans, credit-cards, etc.).



**Figure 2. Source: Author calculations based on Lehman Live data in table 1. above.**

We are concentrating now on the REL – representing the subprimes. One may see that the evolution in this niche of financial instruments shows a typical case as described above, of logistic penetration of an instrument, REL, to the detriment of another, previously dominant one OSAB.

The following figure (3) represents the two instruments and the respective logistic functions resulting from a logistic regression on the two sets of data.



**Figure 3. Source: Author calculations based on Lehman Live data**

The set of logistic function is presented below:

For REL:

Logistic

REL

$$a = 263.5$$

$$b = 1.388$$

$$c = 0.3554$$

$$REL = c / (1 + a * \exp(-b * x))$$

For OSAB

Logistic OSAB

$$a = 8.11$$

$$b = -0.158$$

$$c = 8.5$$

$$OSAB = c / (1 + a * \exp(-b * x))$$

As seen from the description of the logistic penetration we have here a case of a slow at the beginning, then fast, followed by saturation, penetration of a new financial instrument in the financial niche. This follows a 'sigmoid' curve and takes the niche away from the previous dominant instrument that decays, also following a logistic curve. It is a process described by Marchetti, Nakicenovic, Pry, as well as others having studied this type of process in various domains (niches).

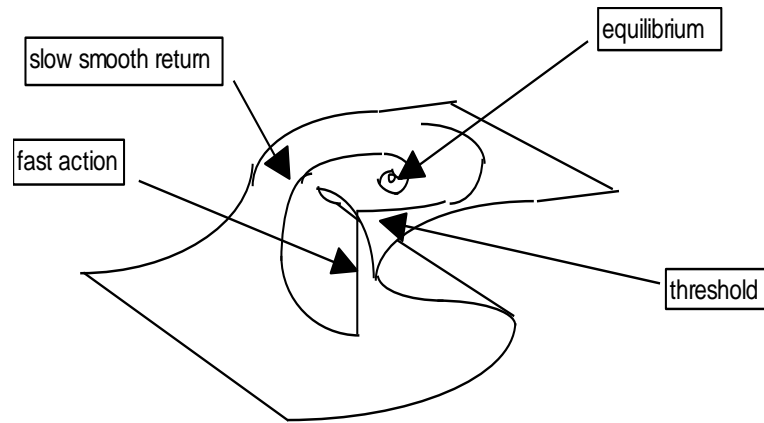
We have shown in our analysis that the process of logistic penetration is actually also happening in the niche of financial instruments that is at the basis of financial systems' operation.

This represents just an experimental assertion, a very important and necessary one, but not a consistent theory, which would provide the criteria and the means for deciding and influencing the evolution of financial systems.

We are trying to provide a means to fill this gap by analysing the case of funds allocation, measured in monetary units, for the intensification of one or the other of two financial instruments in competition, with the imposed or wished variations of the external parameters represented by indicators of benefits and costs of risk control. This way, development decisions may be taken to avoid sudden, unprepared and large discontinuities resulting in impacts that may affect the evolution of the financial programmes.

### 3. Description of the Model

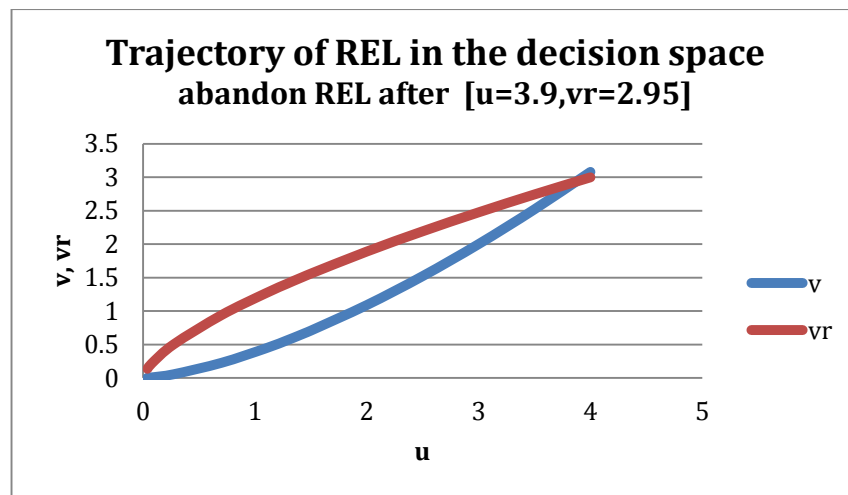
The main ideas, which have led to the construction of the model are presented extensively in Gheorghe and Purica (1979), Ursu, Gheorghe, Vamanu and Purica (1985), Purica (1991) and Purica (2010). We will only mention that based on the logistic penetration, a Fokker Planck equation is determined for the decision process to allocate funds to a given financial instrument (meme) in competition with the others. The stationary solution of this equation shows a behaviour that can be represented as a trajectory evolving on a cusp type catastrophe having as control parameters the benefits ( $u$ ) and the costs of risk control ( $v$ ) (see figures 4 and 5). Close to the edge of the fold, described by the limit curve value  $v = \sqrt{4u^3/27}$ , a small change in the perception of the parameters may trigger a sudden change of behaviour associated to the decision to abandon financing a given financial instrument i.e. 'a financial crisis'.



**Fig. 4.** A flow of trajectories on the cusp fold – potential crisis behaviour Source: done by the Author

The critical border is not crossed if the benefits of the first instruments are increased by, for example, finding new applications for it that are of interest to the society.

In the case of the subprime instruments considered above the trajectory on the cusp surface, as compared to the limit of discontinuity, is depicted in the figure 5 where the limit curve value is  $v = \sqrt{4u^3/27} = 2.96$  while the value of  $v_r = \text{POWER}(u^2/16 * 27, 1/3)$  associated to  $u$  on the decision trajectory is 2.95, which is a good indication that the evolution trajectory has gone beyond the limit requesting a discontinuous decision to abandon allocating money to this instrument



**Figure 5.** REL trajectory in the decision parameters' space Source author's calculations

The above is another example where numbers that are having a meaning, given by a nonlinear model, may have a greater prediction capacity than the usual linear models we are accustomed with. Of course, the image of a decision trajectory controlled by benefits and cost of risk evolving in a space having various types of limits (possibly moving limits) that may or may not be crossed with associated consequences, is a much better way to visualize this type of behaviour.

#### 4. Conclusions: Beyond resilience – decisions for safety

The question arises of what are the amplitude and frequencies of such shock like efforts, which the nation's economy can still absorb and sustain without being completely perturbed.

We have here the very definition of resilience as given by Haefele (1977). But our model goes beyond that by first being able to discern between the amplitudes of shocks and their frequencies of occurrence, thus giving a limit on amplitude – transferred funds – a limit on frequency, and a limit on the total number of shocks. When any of these are reached, the economy is drastically perturbed.

By extending the mechanical analogy we may define a fatigue limit, measured by the number of cyclic shocks (funds reallocation) an economy can sustain before becoming completely exhausted and being forced to change its whole development in order to recover.

Combined amplitude and frequency effects of shocks may be accommodated within our model.

Another feature of this approach is the possibility to predict the arrival of shocks and, based on their predicted amplitude, to decide the most appropriate variations of the control parameters in order to avoid the shock or to mitigate its consequences if it is accepted.

Being able to make such decisions gives the financial system's planner the possibility to optimize the social effort for financial development, thus contributing to an increase in the nation's economic, social and ecological safety.

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## Empirical Investigation of Risk Tacking Channel of Monetary Policy in Iran

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**Abstract:** This study deals with investigation of existence of monetary policy risk channel in the economy of Iran. For the same purpose, the seasonal data of macroeconomic variables are used in such a manner that changes in interest rate as an indicator of monetary policy and bank leverage ratio as an indicator of risk are considered. Using VAR approach and Impulse response functions, the experimental test of channel of monetary policy risk in the economy of Iran was examined. The results showed that an expansionary monetary policy which occurs by decrease in interest rates causes that risk of bank system to be increased. In addition, it should be stated that inflation had positive impacts and economic growth had negative impacts on the risk of bank system.

**Classification of JEL:** E31 and E52

**Key words:** Monetary Policy, Risk Tacking Channel, VAR

### 1. Introduction

In financial market, the financial mediators (including banks, retirement funds, life insurers and other institutes and finance institutes(which are allocated to collecting data, evaluation of projects and monitoring the debtors, play an important potential role. Banks and similar institutes play an essential role in the financial market since they are specialized to transfer the saving of deposit holders to the usage such as different loans of business whose evaluation is so specialized and costly. The significant part of literature is dedicated to this issue since institutes and banks are able to use the credits in the intended applications more efficient than individual savers and other competing institutions. (The most studies in this regard includes: Diamond and Dybvig (1983), Diamond (1984), Boyd and Prescott (1986), Calomiris and Khan (1991).

From experimental respect, there are many evidence that shows banks and other similar institutions play a special role in 'the process of creating credit', for example, Fama (1985) and James (1987) showed that bank loan borrower in comparison with deposit holders typically bear an implicit tax related to legal reserves.

There are several studies which emphasize on importance of relationship between lending of banks, small and newly-established institutions.<sup>2</sup>

One of the most important influencing factors on banks credits for granting loan is monetary policy. This policy is made by the central bank and by using several means such as legal reserve rate, rediscount and open market operations. The monetary policy is effective on production through different channels such as interest rate, foreign exchange rate, price of

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<sup>2</sup>Elliehausend and Wolken (1990), Peterson and Rajan (1994)

other assets and credit channel. The economists had reached a consensus on this approach that the monetary policy influence the economy real part in the shortest time but they are in disagreement about the influencing channels and their importance in relation to each other. However, the new channel of monetary policy effectiveness is through risk channel which is examined experimentally in the economy of Iran in this paper.

## 2. Risk Tacking Channel of Monetary Policy

In the recent studies in the area of monetary transfer mechanism and the role of monetary policies in economy, the role of and credits and special importance of their risk are dealt with and a new approach to the impacts of monetary policy on the real variables of economy was emphasized through Risk-Taking Channel. Boroi and Zhu, (2008), Angeloni, EstarFaia and Duca, (2011) and Bruno and Song Shin, (2012) tried to introduce a new channel for monetary mechanism and a new relation between real section and financial section of economy. In fact, the monetary policy is able to influence the real variables by influencing the banks' risk. The main hypothesis which is examined in the risk channel of monetary transfer mechanism is that decrease of interest rate in a long term causes bank lending to be more risky and this risk increase bank's portfolio and affects the real variables and price levels with increase in the bank credit default.

### 2.1. Mechanism of Risk Tacking Channel of Monetary Policy

Bank theoretical literature has only recently begun to explicitly analyze the role of the monetary policies in decision-making and risk-taking of banks (Agur and Demertzis 2010, Dell'Ariccia et al. 2010).

In the models of Dell'Ariccia et al. (2010), the only channel through with the bank's risk can be decreased in monitoring the credit granting but the other way is taking pledge from the facility recipients (Bester and Hellwig 1987).

In Dell'Ariccia et al. (2010) the banks do not receive any pledge for covering the credit risk. Now without changing the model essentially, we assume that the value of facilities paid by the bank is equal to the value of pledge.

The bank's interest can be stated as follows:

$$\Pi = \left[ q(r_L - r_D(1-k)) + (1-q)w - r_E k - \frac{1}{2} c q^2 \right] L(r_L)$$

Where the profit of assets only includes the loans.  $L(r_L)$  indicates the request for loan which is a negative function of loan interest rate.  $\frac{\partial(L(r_L))}{\partial(r_L)} < 0$

The banks are affected by the probability of success in projects for which the loan is granted in such a manner that if the probability of project success is indicated with  $q$ , then the monitoring cost of the borrowers will be a quadratic function of  $q$ :  $\frac{1}{2} c q^2$

Now, if the project fails (with the probability of  $1-q$ ), then the amount earned by bank is equal to the rate of  $w$  which is less than risk-free interest rate ( $r$ ) ( $w < r$ ) where  $w$  is the ratio of the volume of loans granted.

Banks are financed through public deposits or equity, which is a constant proportion of bank assets ( $k$ ). We assume absorption rate of deposits equal to the risk-free rate ( $r_D = r$ ). Absorption rate of deposits are not affected by loan non-payment risk. In fact, here we assume there is no liquidity risk. In conditions that the project is successfully performed, the deposits



are financed through loans and in the circumstances that the project fails, the deposits are insured with a fair rate.

Rate of return on equity is related to the rate financing. Return on equity is dependent on two factors: 1 - the rate of bank financing and 2 - the equity risk premium which is the descending and linear function of banks' probability success.  $r_E = r + \xi - aq$

The model can be solved by two-stage Backward Induction. In the first stage, the banks get loans optimal rate. Then in the second stage, the banks assume the loans rate as a determined rate and then we obtain the optimal probability of success of the project. (It shall be noted that the possibility of the project success is as same as monitoring probability on the borrower since a project is successful for banks which was appropriately under supervision.) The banks obtained optimal monitoring intensity as follows:

$$\frac{\partial \Pi}{\partial q} = [(r_L - r_D(1-k) - w - ak - cq)]L(r_L) = 0$$

$$\hat{q} = \frac{1}{c}(r_L - r_D(1-k) - w + ak).$$

Thus the optimal limit of monitoring has an inverse relationship with central bank's policy-making rate ( $r_D = r$ ), cost of monitoring and pledges value and direct relationship with facilities granting rate and degree of capitalization. For certain level of interest rates of banks with higher monitoring costs consider greater response than the pledges value.

$$\frac{\partial \hat{q}}{\partial w} = -\frac{1}{c}$$

$$\frac{\partial^2 \hat{q}}{\partial w \partial c} = \frac{1}{c^2}$$

Increase effects of interest rate of monetary policy on are shown as follows:

$$\frac{\partial \hat{q}}{\partial r} = -\frac{1}{c}(1-k), dr_L = 0$$

Moreover, one can also show that banks with higher monitoring costs display greater response to changes in monetary policy rate:

$$\frac{\partial^2 \hat{q}}{\partial r \partial c} = \frac{1}{c^2}(1-k)$$

Also banks with a change in the monetary policy rate adjust its lending facilities rate. By solving the first stage of the model, we can show that if monetary policy rate declines, then banks with good percent of capital require less supervision, while banks with less capital need more supervision.

It can be said that for banks with low capital ratio, risk-shifting effect is greater, because the lower interest rates will increase the profit margins of the bank ( $r_L - r_D$ ), so the banks that more percent of their financing is fulfilled by the deposits are more motivated to increase their level of supervision in order to gain better revenue. So the monitoring of banks increases or risk reduces. But the banks that more percent of their financing is fulfilled by the equity (have greater capital ratio) has no incentive to increase the level of supervision in order to obtain more money. In these banks, pass-through impacts are dominant. So monitoring reduces and the risk increases in these banks.

### 3. Empirical Studies

Few studies have been conducted on new channels of monetary policy risk, including Wickens (2011) that examined the relationship between credit default risk and macroeconomic shocks (such as monetary policy shocks and fiscal policy) and showed that

the credit default risk is affected by macroeconomic shocks and it influence real variables and prices level of the economy.

Lown and Morgan (2006) has used the ratio of capital to assets of banks in America as an indicator of bank risk-taking and sought to examine the impacts of risk tacking channel of monetary policy by using VAR and taking into account variables such as GDP, price level, interest rate of central bank, commercial loans of banks. The results of their study showed that a reduction policy in interest rates of banks will increase the ratio of capital to assets.

De Graeve et al (2008) examined the role of monetary policy on the default probability of loans granted (as an indicator of the banks risk) by using data from the German banking system. For this purpose, they used VAR and the variables of economic growth and inflation were included in the model as control variables. Their results showed that an expansionary monetary policy (lowering of interest rates of the central bank) can reduce the banks risk.

Ioannidou et al (2009) examined the channel of monetary policy transfer by Time-Varying Duration models, using financial statement data of Bolivia banks and calculating default probability of new loans by using hazard model. They announced Indicator of monetary policy as the central bank interest rate and considered the variables of economic growth, inflation and the special characteristics of banks as control variables. The results showed that reduction of interest rate of central bank will increase the probability of default on the new bank loan, so the banks which have more liquidity power and borrows fewer loans from the other banks to finance their liquidity, increase in the default of new bank loans will be higher.

Eickmeir and Hofmann (2010) investigated the risk transfer channels using a new model to analyze Factor Analysis Vector Auto Regressive (FAVAR) for time series data of America's banking system. In this study, credit profit margin was used as a risk index and presented the monetary policy shocks using the same constraints in FAVAR and variables of GDP, inflation, and other financial variables were included in the model as control variables.

Angeloni et al (2010) examined the impacts of monetary policy on financial markets. For that purpose, they examined the risk of bank's balance sheet, leverage ratios of banks and fluctuations of stock markets in America and in Europe. The results showed that a tighter monetary policy increased the risk of a balance sheet in America and Europe and increased the leverage ratio of banks in America but it had no significant impacts on the leverage ratio of banks in Europe. Meanwhile, a tighter monetary policy had no significant impact on fluctuation of stocks market in America and Europe.

#### 4. Experimental test of Risk tacking Channel of Monetary Policy

In order to estimate the review of risk transfer channel of monetary policy, the monthly data of economic variables and bank variables for the years 2006 to 2012 are used.

In order to evaluation of the risk tacking channel of monetary policy in the economy of Iran, according to empirical studies, VAR is use. In this equations system, changes of interest rates is used as a monetary policy indicator and the ratio of bank leverage (ratio of debts to asset) is considered as an indicator of risk in banks. Other variables included in the model are as follows: indicator of monetary policy (interest rates of banking system), GDP, inflation and banks investment. The estimated regression function can be demonstrated as follows:

$$Leverage_t = \beta_0 + \beta_1 Policy_t + \beta_2 Inf_t + \beta_3 Gdp_t + \beta_4 Capital_t + \varepsilon_t$$

Where Leverage represents the leverage ratio of the Bank, Policy is indicator of Monetary Policy, Inf indicates inflation, Gdp is for Gross domestic production, Inv indicates total investment in the economy and Cap indicates bank's investment.

Before estimating the intended model, we examine the reliability of variables. Therefore, Dickey Fuller unit root test was used and the results are shown in the table below.

#### 4.1. Experimental results

The results of Augmented Dickey-Fuller test (ADF) show that all of the variables used in the model would become integrated by one differentiation.

**Table 1: Augmented Dickey-Fuller Unit Root t (ADF) Test Result**

ADF Test		
Variables	levels	1 <sup>st</sup> difference
Leverage	-0.53	-5.67**
Policy	-2.09	-6.62**
Inf	-.3.28	-3.38**
Gdp	-2.39	-3.35**
Capital	-1.57	-3.30

**Note:** \*\* Represents significance at 5 % level of significance

##### 4.1.1. Long-Term Relationship and Co-integration Analyses Tests

Considering non-sustainability levels of variables, subject of study, in the next stage, Co-integration among the levels of variables must be tested, inspired by the economic theory. Thus, at this stage, co-integration among the said variables is tested using Johansson's Methodology. The results have been given in Table 2.

**Table 2: Unrestricted Co-integration Rank Test (Trace and Maximum Eigen value) for estimation of the number of Co-integration vectors**

$\lambda_{\text{trace}}$ Test				$\lambda_{\text{Max}}$ Test			
Critical quantity 95%	Statistics Test	Con Theory	Hypothesized No. of CE(s)	Critical quantity 95%	Statistic Test	Con Theory	Hypothesized No. of CE(s)
63.87	307.54	$R \geq 1$	$R=0$	32.11	220.29	$R=1$	$R=0$
18.39	42.91	$R \geq 2$	$r \leq 1$	25.82	45.08	$R=2$	$r \leq 1$
3.84	25.87	$R=3$	$r \leq 2$	19.38	30.89	$R=3$	$r \leq 2$

**Note:** - Trace test indicates 3 cointegratingeqn(s) at the 0.05 level.

- Max-eigenvalue test indicates 3 cointegratingeqn(s) at the 0.05 level.

After confirming the existence of long-term relationship, we dealt with estimation of long-term relationship.

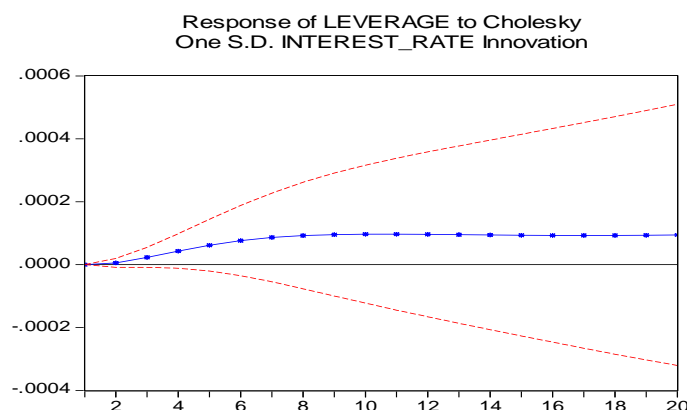
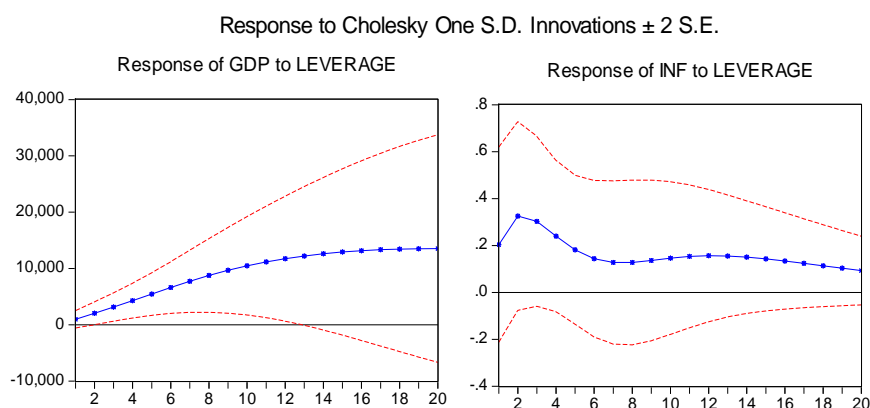
Co-integration Equation:

$$\text{Leverage}_t = \beta_0 + \beta_1 \text{Policy}_t + \beta_2 \text{Inf}_t + \beta_3 \text{Gdp}_t + \beta_4 \text{Capital}_t + \varepsilon_t$$

**Table 3: Co-integration Equation**

	coefficient	t- static
<b>Policy</b>	0.11	4.21
<b>Inf</b>	0.0001	2.32
<b>Gdp</b>	-2.92E-08	-4.20
<b>Capital</b>	1.29E-05	0.16

Impulse response function:

**Figure 1: Risk taking Channel****Figure 2: Response of Gdp and Inflation to Risk**

## 5. Conclusion

Regarding the estimation results of long-term relationship, it can be said that an expansionary monetary policy which happens by lowering interest rates, causes increase in risk of the banking system. It should also be said that inflation had the positive impacts and economic growth had a negative impact on the risk of the banking system.

The results of impulse response function showed that any changes in the interest rate cause increase in the risk of the bank system which will continue till 20 courses. On the other hand, as it was shown in the figure 2, increase in the risk of banking system has led to increase in inflation and economic growth. In fact, it can be said that through increase in the volume of the bank's demands, the bank risk has caused the money flow in the economy to face problem and in this way, it had remarkable impact on inflation in Iran. So, it is clear that there is a risk tacking channel of monetary policy in the economy of Iran.

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## The Effect of Political Risk on Foreign Direct Investment: The Case of Algeria

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**Abstract :** Both political risk and financial risk represent a great loss of profitable opportunities in the host countries and a serious threat on the attractiveness of foreign direct investments (FDI) in almost all developing countries among them Algeria .

**Methods & results:** This paper attempts to study the significant relationship between political risk, financial risk and their effects on Foreign Direct Investment (FDI) in Algeria during 1990 to 2012. In fact, our analysis revealed that political has a negative relationship with (FDI) however financial risk was strong.

**Key words:** Political risk, financial risk, foreign direct investments.

**JEL classification:** C23 ;F21 ;F23.

### 1. Introduction

Most important determinants of FDI have been studied and analysed deeply among them the size and growth of the host country, high natural resource, sufficient economic development, foreign exchange reserves Beugelsdijk, S., Smeets, R., & Zwinkels, R. (2008) . However, the effect of both political risk and financial components didn't receive a great care in the analysis of their role as determinants on the attractiveness of foreign direct investments which play a main role in the analysis of any foreign direct investments decision. This paper aware and provide the policy makers about the importance of the political environment and the financial risk in developing countries in general and in Algeria in Particular in order to build a favorable political stability which attract more and more foreign direct investments. Foreign direct investment (FDI) plays a major role in influencing the level of economic activity in industrialized countries, as well as in the developing world. No doubt, that Non-government channel such as strikes, terrorism, ethnic revolutions, intolerance and social instability produce a bad influence on the business environment. Besides, the Government is guilty by generating unfair and discriminatory law that affects foreign investors and multinational firms.

The financial risk which represent any changes in the current financial climate that could either cause the increase in value or cause the option to drop. According to Beck, T., & Levine, R. (2002) the financial structure has a serious impact on FDI and gave the host country a comparative advantage. As a matter of fact, it is important to reduce the financial

risk. King and Levine(1993) analyzed how important are financial market and countries with a high financial risk which occurs with any type of financial investment.

## 2. Literature review

One of the main concerns of policy maker is to attract enough foreign direct investments but this remains a difficult task in developing countries such as Algeria where the political stability is still uncertain. (Buckley and Casson, (1976)<sup>(4)</sup> argued that location and ownership advantages are the most important determinants for firms to undertake FDI. The relationship between either political risk or FDI or between Financial risk and FDI must be well studied to contribute in the world trade growth.

Busse, M., & Hefeker, C. (2007) studied the linkage between political risk ,institution and their impact on FDI For a data sample of 83 developing countries . They found that government stability, internal and external conflict, corruption and ethnic tensions, law and order, democratic accountability of government, and quality of bureaucracy are highly significant determinants of foreign investment inflows.

The political risk varies from a country to another and according to Loikas, A(2003) the paradigm of political risk was developed by dividing risks into micro- and macro levels depending on whether they affected a specific company or all the companies in a host country,Krifa-Schneider, H., & Matei, I. (2010).

Foreign investors in developing countries such as Algeria face many kinds of political risks due to the lack of political stability and to the effect of the Arabic spring which inflected this part of the world and which is often ranked as a risky Zone.

Examining the determinants of FDI attractiveness to Algeria Sissani, M., & Belkacem, P. Z. (2014) found a positive relationship between foreign exchange reserves and foreign direct investments. They didn't include the effect of political risk although Algeria stayed dependent on the hydrocarbon sector policy. However political risk remain as a main factor that may attract or deter foreign Investment to Algeria.

## 3. Theoretical frame

As the level of competition continued to rise, foreign direct investments has become quite essential for lot countries in the world especially with the international business expansion and the recent world foreign direct investments trends. Numerous political and financial risks have become a real threat for international firms in host countries, affect FDI and lead to different investments pattern which make some countries more attractive than others.

### 3.1 Definition of Risk

Risk effect decision in most economic situation because of its uncertainty .Therefore First, its necessary to know what is meant by risk .The concept of risk refers to the loss, potential or possibility of danger, adverse consequences which may occur towards someone or something. Thompson, Simon G., et al(1995). However we distinguish between risk and uncertainty although both deal with likelihood. According to Henrich, J., & McElreath( 2002) R. (2002).The risk may even pay off and not lead to a loss, it can be also calculated and it may lead to a gain however, Uncertainty involves choices with unknown probabilities , on the other hand, is unpredictable.

### *3.2 Definition of political risk*

The most popular commercial publisher of political risk were Coplin and O'Leary's<sup>(\*)</sup> Coplin, W. D., & O'Leary, M. K. (1990) and Dirick T Haner's attempted to assess the political risk climate in a set of countries using a Delphi method and a panel of experts. Now experts with high diploma in political science and experts in sociopolitical conditions and include scenarios for future in the political climate.

Political risk is not a new phenomenon, the concept goes back to the deep past but it emerged strongly in economic literature with events of 1960's by new independent countries tried to overcome their lack of capital by simply taking over the foreign subsidiaries of multinationals. This concept was clearly used by some researchers after 1970 and this period was called the Nationalism period. According to Kobrin, S. (1979) political risk is the probability of occurrence of some political events in the host country which may occur and change the prospects for the profitability of a given investment. This risk occurs when investing in a host country with changes in its political structure or policies happen suddenly, such as tax laws, tariffs, expropriation of assets, or restriction in repatriation of profits.

### *3.3 Definition of Financial Risk*

The interaction between risk and reward was known by the financial theory De Giorgi, E. (2005). However, in this paper we focus on the financial risk which encompasses the risk of cash insolvency according to Gabriel, S. C., & Baker, C. B. (1980). It is the probability of loss inherent in financing methods which may provide adequate return. It also refers to the possibility of a government or firms defaulting on its bonds, which would cause the bondholders a loss.

### *3.4 Foreign direct investments*

Foreign Direct Investment (FDI) has increased between 1980 and 1990 and globalization was its channel towards developed and developing countries in the whole world. FDI reinforce international finance and trade on the micro-economic macro-economic level. By International Monetary Fund (IMF) standards, (FDI) is defined as new equity purchased or acquired by parent companies in overseas firms beside reinvestment of earnings by controlled firms, and Finally intra-company loans from parent companies to controlled firms Bitzenis, A. (2006).

## **4. Analysing investment climate and FDI trends in Algeria**

Algeria has made a great progress to reach a market economy. Everything started with the application of the law 90/10 which allowed Central Bank the authority to formulate and implement monetary and foreign-exchange policies. The law allowed full foreign ownership of new investment projects, encouraged unrestricted joint ventures between foreign companies and Algerian private concerns too. The government introduced a major liberalization of external trade and devaluated the dinar value to 100 % between 1990 and 1991. Although, the positive macroeconomic outlook, there are still vulnerabilities especially the great dependence on hydrocarbon revenue, risks posed by rising inflation which climbed to 8.9% in 2012. No Doubt that, Algeria with its hydrocarbon wealth, foreign exchange reserves which reached 193.4 billion dollars at the end of December 2012 against 181.5 billion dollars in December 2011, expanding infrastructure needs, growing consumer product demand, is really attracting interest from foreign investors and companies around the world.

Algeria has made a great performance in its macroeconomic results where its real GDP Grew at 3.3% in 2010 and decreased to 3.1 in 2012 due to the oil sector and in a total absence a diversification and a higher unemployment which reached 8.9% in 2012.

**Table 1: Macroeconomic indicators: 2009-2012**

	2009	2010	2011	2012
Nominal GDP	138.0	160.8	190.7	206.5
Real GDP Growth (%)	2.4	3.3	2.5	3.1
Oil GDP Growth (%)	-6.0	-2.6	-2.1	-0.7
Fiscal Balance (% GDP)	-6.4	-2.4	-3.6	-1.0
Reserves (US \$ B)	148.9	162.2	181.5	193.4
Population (M)	34.9	35.5	36.0	36.5
Unemployment (Labour force %)	10.4	11.1	9.9	8.9

*Source: IMF, Staff Country report 2011. Report 12/20, P9.*

The restrictive foreign investment rules enacted in 2009 and 2010, which imposed a requirement of at least 51/49 % Algerian ownership of foreign investments, have created a sort of threat and uncertainty to foreign Investors. The private sector remained weak with 1.07 % and incapable to contribute in the local economy where the public sector is dominant with almost 98.81%.

**Table2 : Development of FDI by legal sectors in Algeria 2002 -2011.**

Legal sectors	Nb of Project	%	Employment
Private	47028	98.81%	656817
public	509	1.07 %	80934
Mixed	56	0.12 %	17419
Total	47593	100 %	755170

*Source: Andi. From: <http://www.andi.dz/index.php/ar/secteurs>*

Algeria has also expanded more than 286 USA billion in infrastructure development, making the local market sufficiently profitable for firms to explore opportunity especially in the different sectors such as energy, Trade, water, health, telecommunications and transportation. The 2012 Finance Law included measures to ease tax and customs procedures for companies. The political environment was stable, but not successfully strong to attracting FDI flows during this period. The world economic and financial indicators in 2012 revealed that Algeria rank remained Under Performers and suggested an economy diversification to avoid economic crisis.

**Table 3: International Rankings and indicators of Algeria in 2012**

Measure	Year	Index/Ranking
Corruption Index (CPI)	2012	105 (out of 176)
Heritage Economic Freedom	2012	140 (out of 183)
World Bank Doing Business	2012	152 (out of 185)
Global Peace Index (GPI)	2012	118 (out of 156)

*Source : According to : Corruption perception index 2012 report - Heritage Economic Freedom 2012 report- Doing Business & (GPI) 2012 reports.*

## 5. Methodology

### 5.1 Source of data

The data source are provided by (PRS Group) and Unctad covering 23 years from 1990 to 2012. The methodology part consisted of two independent variables cited above and FDI as the unique dependent variable. The basic model is algebraically expressed as follows:

$$Y_j = \beta_0 + \beta_1 x_1 + \beta_2 x_{2j} + \varepsilon_j \quad (1)$$

Where  $\beta_0$  is called the intercept and the ( $\beta_1, \beta_2, \beta_3, \beta_4$ ) are called the coefficients however  $\varepsilon_j$  is the estimated errors. The multiple linear regression will be as follow:

$$FDI = \beta_0 + \beta_1 \text{Poli Risk} + \beta_2 \text{Fin risk} + \quad (2)$$

Where,

FDI = Foreign direct investments

Poli Risk = Political risk

Fin Risk = Financial risk

Using multiple regression techniques for the period (1990 to 2012), assess the relationship between political risk, financial risk and their effects on the attractiveness of foreign direct investments in Algeria as a host country.

**Table 4 :The Algerian data as listed by(ICRG)**

Date	FDI	Financial Risk	Political Risk
1990	40	26,5	60,42
1991	80	30,5	56,17
1992	30	32,42	45,25
1993	90	31	47,5
1994	150	31,92	49,08
1995	210	34,17	45
1996	270	36,42	49,17
1997	260	36,25	47,67
1998	607	36,67	42,25
1999	292	31,63	41,42
2000	280	33,21	44,25
2001	1108	39,25	45,13
2002	1065	38,71	46,42
2003	634	42,58	45,08
2004	882	44,92	53,71
2005	1081	46,63	63,21
2006	1795	47,46	63,29
2007	1662	48,78	62,42
2008	2594	49	61,71
2009	2746	47,58	60,96
2010	2264	47,58	60,96
2011	2571	48,21	57,21
2012	1484	47	58

## 6. Results

The results of our estimation were quite different from what we were expecting .We do agree that low levels of financial and political risks leads to a high and better business climate. In the Model Summary table 5, the value of the correlation coefficient  $R = 0.89$  and the Adjusted R-Square is about 0.80 which is quite very high. The R-square coefficient specifies how data used independent variables in the estimation of the dependent variable and note that the estimated model expresses the (independent variables together) 80% of the data is explained and that the proposed model adequately.

**Table 5: Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	0,895 <sup>a</sup>	0,801	0,781	426,04643	,801	40,244

As we can see From ANOVA table 6, we find that Sig.=000which is less than the specified significance level of 0.05 ,so we will reject the null hypothesis .As a matter of fact ,The regression is significant and of course, the relationship between the independent variables and the dependent variable is confirmed .

**Table 6. ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14609670,743	2	7304835,372	40,244	,000 <sup>b</sup>
	Residual	3630311,257	20	181515,563		
	Total	18239982,000	22			

The central question is which component risk matter most and affects the attractiveness of FDI. The analysis in the coefficients table7 revealed that the regression equation and the amount of errors in the estimation which are in the reasonable limits (std.Error 14.98 and 15.77).We also notice that the financial risk has the greatest coefficient (96.92) and sig = 0.000.So, we conclude that the financial component is the component which matters most for the attractiveness of FDI inflows to Algeria. However, we were astonished to find that the political risk was not *statistically significant*.

**Table 7 Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3915,575	638,731		-6,130	0,000
	Poli Risk	20,069	14,980	,170	1,340	0,195
	Fin Risk	96,924	15,778	,780	6,143	0,000

From table 7 : We concluded the regression equation as follow :  

$$FDI = 3915.57 + 96.92 \text{ fin risk}$$

## 7. Conclusion

The purpose of this paper was to analysis the linkage between the political risk, financial risk and foreign direct investment .Our main results can be summarized as fellow. First, the results show that the political risk doesn't have a real impact on the foreign direct investments since the government in Algeria give political guarantees to the petroleum firms and the coefficients is positive but not statistically significant at the 5 to the 10 percent level. The findings regarding the financial risk was in the line with King and Levine(1993)and

Beck, T., & Levine, R. (2002) who found a statistical relationship between financial risk and FDI .

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## Comparative Research on Romanian SMEs Crediting

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**Abstract:** In an efficient market economy, economic growth and welfare is based on the existence of a powerful SME sector. As proven in the context of the nowadays crisis, a powerful and well-developed SME sector can successfully cope with economic challenges and can adapt more easily to a negative economic context, insuring, in the same time, the premises for the economic recovery and the population welfare. Therefore, one of the most important concerns for the developing countries is the development of the SME segment, which obviously supposes the accumulation of capital. Considering the post-revolutionary economic history of Romania, the shift from a centrally planned economy to the market economy, and afterwards the financial crisis that has started in 2008, at present the SME segment is being developed especially through loans granted by the commercial banks, taken into account the low absorption rate of European funds and the insignificant and incoherent governmental financing programs.

Therefore, this paper is important and actual as it synthetically and relatively simply presents the way in which Romanian commercial banks determine which SMEs may be financed, after performing a quantitative / financial analysis of the applicants in order to correctly determine the credit risk as a result of assessing and interpreting the main economic and financial indexes. We will also present the actual macro-economical stage (crediting terms, credit risk, credit demand, etc), as well as the main similarities and differences occurring in the SMEs crediting process at the Romanian commercial banks.

**Keywords:** credit, financial analysis, financial indexes, risk.

**JEL codes:** E51, G21, G32, G33

### 1. Introduction

Generally, SMEs financing has been generating numerous debates starting from the general economic background, the stability of the legislation and of the NBR regulations, the lack of credit demand in Romania, and ending with tough eligibility conditions of the Romania-based commercial bank.

Considering all these aspects, according to the data provided by NBR (NBR, Poll on crediting non-financial companies and population, February 2014), but also starting from the data provided by the representatives of the main commercial banks, we may notice the following aspects concerning the context and the stability of crediting conditions in our country:

- crediting standards were relatively constant in the last part of 2013 and they even marked the end of the continuous tightening of the crediting process. This is more clearly seen starting with 2014, when the commercial banks' strategy has become, for the first time since the beginning of the crisis, much more aggressive on



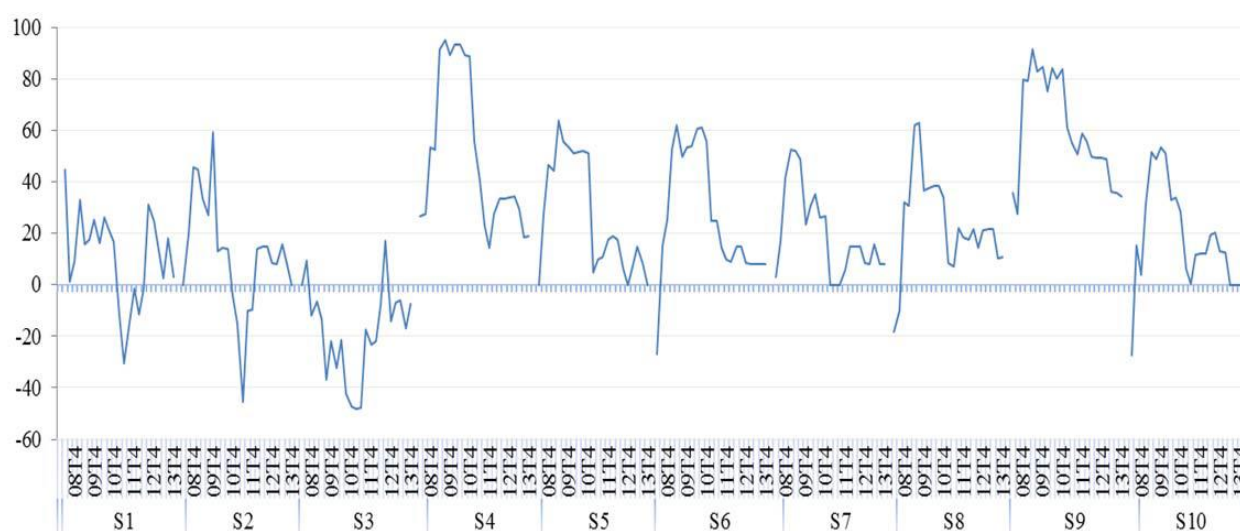
this segment, in order to determine an increase both in the market share as well as in incomes;

- most of the crediting terms remained unchanged at the end of 2013, but starting with 2014 they have slightly relaxed, especially due to the decrease of ROBOR, as well as due to the fact that a minimum level of the interest rate for main refinancing operations of NBR has been set, in order to stimulate crediting by lowering interest rates; cost reduction is also due to lowering reserve requirements that has led to an increase of liquidities on the market;

- after a slight increase at the end of 2013, and except for the first term of this year, credit demand seems to have truly recovered for the first time since 2008, and the increase forecasts for this year are only menaced by a possible instable political and military background;

- business risks (Figure 1), which contribute to the crediting decision, slightly increased at the end of 2013, however, in 2014, the crediting increase pace shall be maintained due to the other conditions that evolved positively.

**Figure 1.** Credit risk evolution according to activity domains (net percent (%))



S1 Agriculture, aquaculture

S2 Industry

S3 Energy

S4 Constructions

S5 Trade

S6 Tourism

S7 Transport, Communications

S8 Financial Brokerage

S9 Real Estate transactions

S10 Other services

**Source:** [www.bnr.ro](http://www.bnr.ro)

Irrespectively of the more or less important modification of the standards, terms and credit-associated risks, in our opinion the commercial banks take the crediting decision by observing the same principles.

## 2. Theoretical approaches on the crediting process of the (Romania-based foreign and Romanian) banks

After studying the crediting process of several top Romania-based commercial banks, both Romanian as well as foreign banks, we are going to present the main similarities and differences occurring in the SMEs crediting process, as well as the financial indexes on which the crediting decision is made.

*The similarities of the Romanian SMEs crediting processes are:*

- company credit applications start with and comprise information included in the yearly financial statements as well as in the customer balance sheets. Usually, the bank requests the last two yearly financial statements<sup>3</sup> based on the data taken from the balance sheet for December, as well as the last balance sheet;

- the banks input the data in their own Scoring Application in order to obtain and synthetically calculate various indexes and sets of indexes. Indexes can be easily interpreted and they are decisively contributing to the company crediting decision (together with the qualitative analysis and the proposed guarantee structure. There are various algorithms on which the analysis is based, and, within the quantitative analysis, they usually represent about 60% of the total score (the qualitative analysis concerning especially the quality, the management experience and the company history and previous conduct in relation with the banks, the previously accessed financing represent about 40%).

- generally, the bank adds up the performances of the main financial / quantitative indexes (Table 1), and each index receives a mark (from 1 to 5, where 1 stands for the maximum and 5 for the minimum) depending on the internal regulations of the crediting bank.

- company financial performance assessing models consist of the qualitative part as well as of the quantitative part. In the credit report (credit application) one assesses the credit risk according to the above description. By multiplying the marks of a predefined set of criteria with certain risk ratios, the Scoring Application calculates a weighted result, which determines the inclusion in one of the five financial performance categories of a company, according to the NBR regulations. The marks for the analyzed criteria are based on a 1 to 5 scale. The marks are granted depending on the inclusion in the preset values / ranges, and thus the financial performance is automatically calculated and determined.

Liquidity indicators show the company's capacity to meet its short-term debts generally higher liquidity meaning a lower probability of default. Solvency indicators shows the company's ability to meet its long-term debt, generally the more leveraged hedge is higher the greater the likelihood of default of the company. Profitability indicators shows the company's ability to generate profit, and the more the capacity is higher the PD is less. Activity indicators shows the efficiency with which the company uses various font inputs having different effects on PD like in Table 1

*The main differences in the SMEs bank crediting process consist in:*

- use and approach of an analysis more or less complex, starting with differentiated customer segmentation (corporate or retail);

- approving authority, which in case of the Romanian majority shareholder banks is a local one, at the Subsidiary level (Transilvania Bank, CEC), while in case of multinational banks, it is centralized, which means that there is no local authority;

- response time, as an effect of the length and speed of the analysis and decision making process (Transilvania Bank is considered one of the most rapid banks, as compared to multinational banks where flows are longer and the response time is also longer);

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<sup>3</sup> Financial statements of companies are regulated by the Order of the Minister of Public Finances no. 1752/2005 on the approval of the accounting regulations in accordance with the European Directives, published in the Official Journal of Romania no. 1080/2005.

- approving rates, as an effect of the appetite and flexibility showed by each bank entity (usually, Romanian majority shareholder banks are much more flexible than the multinational ones).

Irrespective of the similarities and differences of the financing process, the standard flow of the company crediting activity may be synthetically presented in Figure 2.

**Table 1** – The main Financial Indexes introduced in Scoring Application and their impact on the Probability of Default (PD)

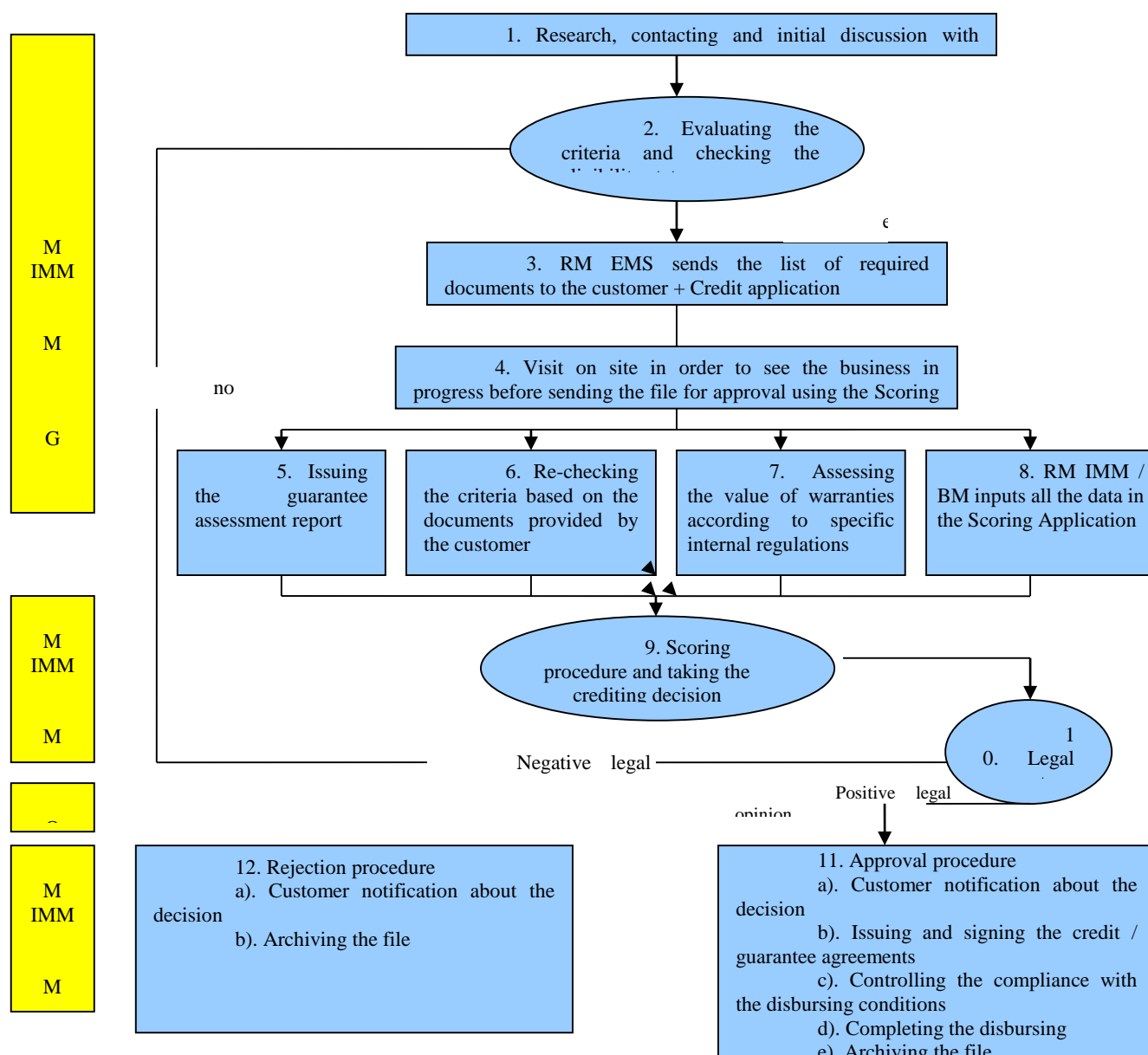
Ratio	Definition	Notation	Expected impact
<b>Liquidity ratios</b>			
Current ratio	$\frac{\text{current assets}}{\text{current liabilities}}$	r1	-
Quick ratio	$\frac{\text{cash} + \text{ST}^{\text{a}} \text{ receivables}}{\text{current liabilities}}$	r2	-
Cash ratio	$\frac{\text{working capital}}{\text{assets}}$	r19	-
Working capital	$\frac{\text{financial assets}}{\text{current liabilities}}$	r15	-
Capitalisation ratio	$\frac{\text{fixed assets}}{\text{long-term liabilities}}$	r10	-
<b>Solvency ratios</b>			
Leverage I	$\frac{\text{debt}}{\text{equity}}$	r3	+
Leverage II	$\frac{\text{LT}^{\text{a}} \text{ debt} + \text{LT}^{\text{a}} \text{ bonds}}{\text{equity}}$	r4	+
Leverage III	$\frac{\text{debt}}{\text{assets}}$	r14	+

**Source:** author's compilation

Ratio	Definition	Notation	Expected impact
<b>Solvency ratios</b>			
Debt payback period	$\frac{\text{LT}^{\text{II}} \text{ debt} + \text{ST}^{\text{I}} \text{ debt}}{\text{operating profit} + \text{interest expenses} + \text{depreciation}}$	r9	+
Interest coverage	$\frac{\text{operating profit} + \text{interest expenses}}{\text{interest expenses}}$	r5	-
Cash-flow I	$\frac{\text{net profit} + \text{depreciation}}{(\text{debt} - \text{reserves})/365}$	r6	-
Cash-flow II	$\frac{\text{net profit} + \text{depreciation}}{\text{debt}/365}$	r13	-
No credit interval	$\frac{\text{money} + \text{ST}^{\text{I}} \text{ payables} + \text{LT}^{\text{II}} \text{ payables}}{\text{operating expenses}}$	r16	-
Retained earnings	$\frac{\text{retained earnings}}{\text{assets}}$	r17	-
<b>Profitability ratios</b>			
Gross profit margin	$\frac{\text{operating profit}}{\text{sales}}$	r7	-
Return on assets	$\frac{\text{operating profit}}{\text{assets}}$	r8	-
Return on equity	$\frac{\text{net profit}}{\text{equity}}$	r20	-
Net profit margin	$\frac{\text{net profit}}{\text{sales}}$	r21	-
<b>Activity ratios</b>			
Average receivable collection period	$\frac{\text{receivables}}{\text{sales}/365}$	r11	+
Inventory ratio	$\frac{\text{inventories}}{\text{sales}/365}$	r12	+
Sales turnover	$\frac{\text{sales}}{\text{assets}}$	r18	-
Payables ratio	$\frac{\text{ST}^{\text{I}} \text{ payables}}{\text{sales}/365}$	r22	+

**Source:** Petr Jakubik and Patr Teplý, Scoring as an indicator of Financial Stability, 2007

**Figure 2 - Standard flow of company crediting activity.**



Note: RM PJ = Relationship Manager Medium and Micro Enterprises

BM = Branch Manager

OAC = Credit Approval Officer

LO = Legal Officer

**Source:** author's compilation

### **3. Practical approach, case study regarding crediting a SME by two important banks in Romania: a foreign capital European bank and a Romanian bank**

The research and correct interpretation of the financial statements is the most important stage for a bank in order to clearly understand the financial status of a company. Also, the financial analysis provides valuable information based on which a correct and informed crediting decision can be taken.

One can find below an example of our research concerning the complex crediting process performed by two important banks in Romania: a subsidiary of a foreign multinational banking group and one of the biggest private Romanian banks.

For this case study we selected a company having a RON 10.7 m turnover as of December 2010 (EUR 2.4 m), generically called "X" ltd. The main premises of the analysis process are the turnover and the group exposure. According to the amount of turnover, the "X" ltd company is considered to be:

- a medium SME, by the international bank, therefore it requires a more complex analysis, identical with the one performed in case of corporate companies;
- a corporate company, by the Romanian bank, thus requiring an analysis specific to this category, using the specific application of this bank.

The approvals / rejections concerning the credit facilities required by "X" ltd company are the results of a complex process based on the concise analysis and interpretation of the following indexes (Figures 3,4 and5):

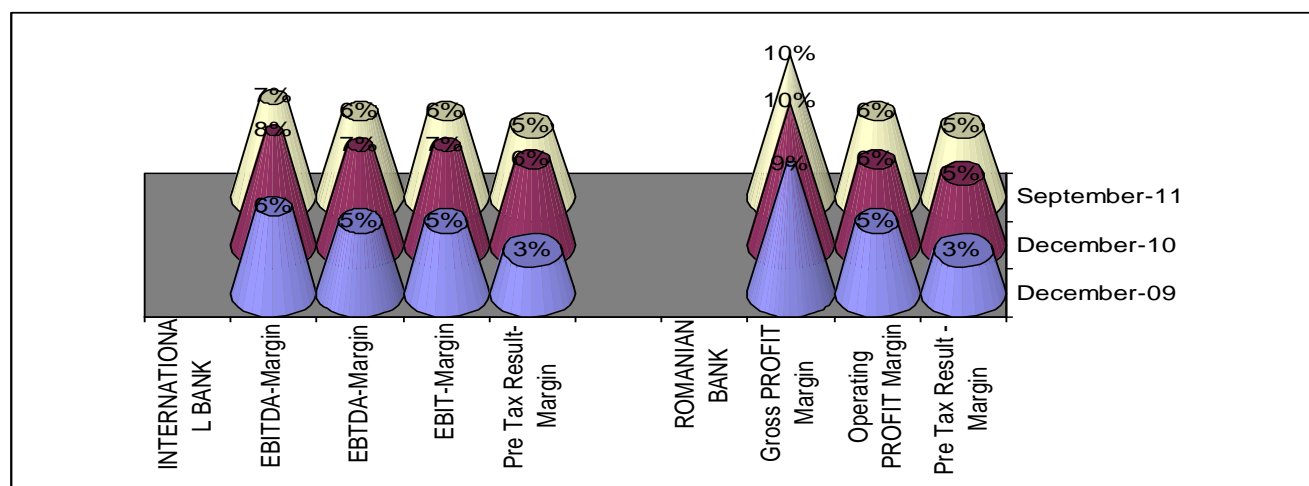
- profitability ratios (for the international bank: EBITDA and EBIT Margin, Pre-Tax Margin; for the Romanian bank: Gross Profit Margin, Operating Profit Margin, Pre Tax Profit Margin) resulting from the analysis of profit and loss account;
- efficiency ratios: operating cycle, deficit to be financed (financial gap – for the international bank, and working capital requirement – for the Romanian Bank)
- Liquidity ratios & Working capital;
- cash flow analysis – operating activities / investment activities

Remark: - besides the quantitative indexes, which are the most important, the qualitative indexes are also used, but they are more subjective and quite different between the two banks;

- calculation of quantitative indicators can be found above in Table 1.

Figures 3, 4 and 5 present the results of the financial analysis of the "X" ltd company using the analysis models specific for each of the two banks.

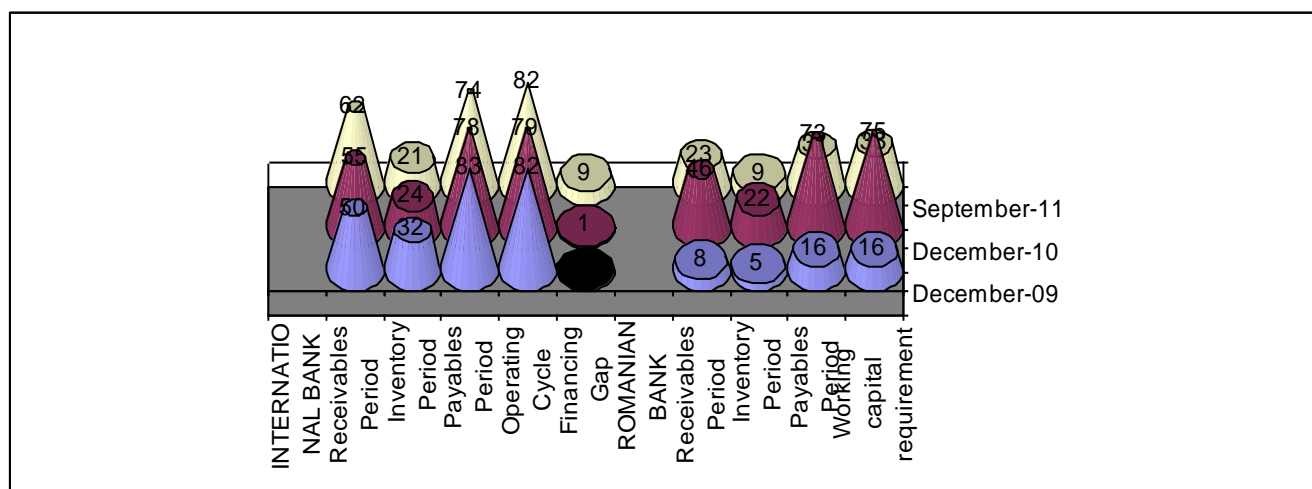
**Figure 3 – The results obtained from an international bank and Romanian bank for profitability indicators of the "X" ltd**



Source: author's compilation

Indicators calculated from the two banks show good profitability and PD is small, so the company can be credited (recorded results from the two banks are identical for the same indicators)

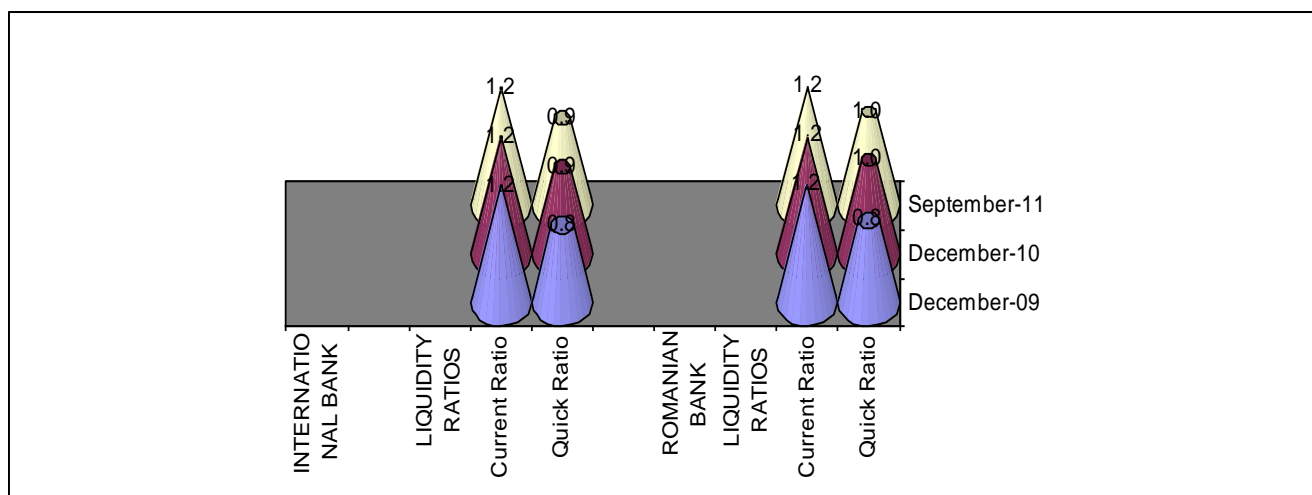
**Figure 4 – The results obtained from an international bank and Romanian bank for activity indicators of the "X" ltd**



Source: author's compilation

Activity indicators of the "X" indicates an efficient ltd company can be financed because PD is low (though we note that the results are different in the two banks are not identical because of its scoring program applied - for example the international bank it takes into account the scope of the company adjusting the results accordingly, while Romanian bank that does not happen)

**Figure 5 – The results obtained from an international bank and Romanian bank for liquidity ratios of the "X" ltd**



Source: author's compilation

Liquidity ratios indicate the firm on both banks very good liquidity, greater than one, the firm can thus honor Payable smoothly and therefore be credited (recorded results are the same on both banks)

#### 4. Conclusions

Financing the economic units has become a real test in nowadays economic conditions, so that the commercial banks continuously addapt the crediting policy and

the types of credits in order to cope with the current economic challenges, aiming both at decreasing the provisions and make profitable investments with warranties as safe as possible.

The entire crediting process is governed by caution, beginning with the selection of customers (the economic areas with the lowest degree of risk are, consequently, the most desirable ones), continuing with the qualitative and quantitative analysis of debtors in order to calculate the rating, the concern for structures of warranties adequate to the established risk degree, as well as the debtors' monitoring (regular financial analyses, customers analytics charts, inventories, etc., re-assessment of the real estate warranties).

He who shall find the most successful solution shall gain an important market share, both from the general Romanian banking market, but also from the SME banking market, considering that the decreasing pace of natural persons crediting also seems to come to an end.

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## Early Warning Indicators for a Financial Crises. The Case of Romania

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**Abstract:** This paper analyses the early signs in the economy that has the ability to predict that a financial crisis is due to happen because of the macroeconomic indicators deterioration and how other economic indicator signals the distress in the state of the economy. We specify the macroeconomic indicators we follow and we identify the symptoms associated with the associated disorder, as it is described by the economic literature as indicators that use to predict some of the internal crisis (currency, banking, balance of payment, all crisis at once). We see the dynamics of this indicators and we compare them with the the dynamics of the best leading indicators for a crisis, that were able to predict a crisis nationally, regionally or globally. We choose 7 early warning indicators that provided in-time valid signals about a crises in Romania, and we define a composite indicator for showing the distress of the economy (as each indicator can give a particular signal of distress, while the composite indicator shows the imminence of the Romanian Financial Crises of 2008-2010).

**Keyword:** Exchange Rate, financial crisis, currency crisis, balance of payment Crisis.

**JEL Classification:** E52, E58, G01

### 1. Conceptual and theoretical context

The models of balance of payment crisis were studying the Latin American currency crisis of the late of 1970s. The currency crash in this cases was triggered by unsustainable money financed fiscal deficits that lead to a persistent loss of international reserves.

Obstfeld (1996)<sup>4</sup> develops a model of a currency crisis that focused on government officials (and central banks) concern on contradictory targets: for example reducing inflation and keeping economic activities close to a given target. Fixed exchange rate may help in achieving the growth target, but the cost is a loss of a competitiveness and a recession.

With fixed prices (generated by peg or managed floating of the exchange rate), a devaluation may restore competitiveness and help in the limitation of unemployment.

Diaz Alejandro (1985)<sup>5</sup> and Velasco (1987)<sup>6</sup> - for the case of Chile - model difficulties in the banking sectors as giving rise to a balance of payment crisis<sup>7</sup> arguing that if central banks finance the bail out of troubled financial institutions by printing money, we have the case of a currency crash prompted by excessive money creation.

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<sup>4</sup> Obstfeld, M. (1996) - "Models of currency crisis with self-fulfilling features", European Economic Review 40, 1996, p. 1037-1047

<sup>5</sup> Diaz Alejandro, C.F. (1985) - „Good-bye Financial Repression, Hello Financial Crash”, Journal of Development Economics 19, p. 1 - 24

<sup>6</sup> Velasco, A. (1987) - "Financial crisis and balance of payments crisis: a simple model of the southern cone experience", Journal of Development Economics, Volume 27, Issues 1-2, October 1987, p. 263-283

<sup>7</sup> Kaminski, G. (1998) - "Currency and banking crisis. The early warning of distress", International Finance Discussion Paper, 629, Board of Governors of the Federal Reserve System, Number 629, October 1998), p. 4

The literature on capital inflows and capital inflow problems (for example Montiel and Reinhart (1997) also suggests that a liquidity crisis is triggered by the sudden stop or the reversal in capital flows (becoming capital outflows)<sup>8</sup>.

Capital flight can cause serious economic difficulties for developing countries by causing an erosion of the tax base and a reduction in domestic investment. Also, as it leads to a buildup of foreign debt, it can fuel a currency crisis as foreign investors become doubtful about the ability and the will of the emerging economy to pay back (Kahn and Haque (1985)<sup>9</sup>)

Calomiris and Gorton (1991) pointed that crisis and panics are preceded by recessions<sup>10</sup> and are most likely to occur when a recession follows a period of substantial credit increase, which fuels a prolonged expansion in economic activity.

Kaminsky, Reinhart, Lizondo, Diebold (1999)<sup>11</sup> are studying the 1997 Asian Crisis that have led many to claim that there crisis are of a new generation unpredictable. They contradict this theory by examining 102 crisis in 20 countries and concluding that the Asian Crisis are not of a new variety. They show that as well as previous crisis elsewhere, they occur when the economies are in distress, making the fragility of the economy a useful indicator of future crisis. Based on this idea, Kaminsky (1999) proposes different composite leading indicators of crisis.

Kaminsky (1998)<sup>12</sup> summarizes the symptoms of an upcoming crisis. They range from recessions to exaggerated cycles in credit markets and they describe the whether it is a positive or a negative shock to that particular indicator that indicates that the economy might be prone to bank runs and speculative attacks.

## **2. The early warning indicators for the Romanian Financial Crisis**

Financial crises can arise as a result of an isolated shock (for instance an expansionary monetary policy can clash with the commitment to maintain a stable (even managed float) exchange rate. Investors will try to anticipate the collapse and they might generate speculative attacks (that eventually will lead to a devaluation of the currency). Banking crisis may arise as a result of a credit crunch (illiquidity that will lead to a high demand for money and a price increase).

In the case Romania it was mainly a problem of pro-cyclical fiscal policy (even if the unbalanced budget was showing sign of weaknesses in terms of structural deficit, not accrual deficit). The fiscal policy was expansionary and the crisis was preceded by an explosion of international lending at very low interest rates (historically). When the credit crunch arrived in the advanced economies, the money become much more needed and expensive. To avoid a depreciation of the national currency, and to compensate the pro-cyclical conduit of the fiscal policy, the National Bank of Romania switched to a contractionary monetary policy (from August 2007 to June 2008, the NBR increased the monetary policy rate from 7% to 10.25%) but this had as an effect an increase in the vulnerability of the banking sector (the lending in

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<sup>8</sup> Kaminski, G. (1998) - "Currency and banking crisis. The early warning of distress", International Finance Discussion Paper, 629, Board of Governors of the Federal Reserve System, Number 629, October 1998), p. 4

<sup>9</sup> Kahn, M. and Haque, N., „Foreign Borrowing and Capital Flight: A formal analysis”, 1985, IMF Staff Paper, Palgrave Macmillan, vol 32 (4), p. 606-628

<sup>10</sup> Kaminski, G. (1998) - "Currency and banking crisis. The early warning of distress", International Finance Discussion Paper, 629, Board of Governors of the Federal Reserve System, Number 629, October 1998), p. 5

<sup>11</sup> Kaminski, C. Reinhart, Lizondo, Diebold (1999) - "Currency and Banking Crisis - The Early Warning of Distress", Washington DC, Working Paper 178, p.1-9

<sup>12</sup> Kaminski, G. (1998) - "Currency and banking crisis. The early warning of distress", International Finance Discussion Paper, 629, Board of Governors of the Federal Reserve System, Number 629, October 1998), Appendix, Table 2 - Symptoms and leading indicators

foreign currency became more attractive and as a result, the exposure of the banks increased). When world interests increased and the capital inflows turned into outflows, the vulnerability of the banking sector surged, so did the non performing loans. The crisis scenario was aggravated by the real appreciation of the domestic currency and the deterioration of the current account, that was caused also by the pro-cyclical fiscal policy which caused a surged in consumption. The state of euroization of a still high-inflationary economy contributed to the severity of the collapse. As RON devaluated, the low-interest environment for foreign exchange lending magnified the deterioration of the bank balance sheets (as the debts were paid by people and companies that had revenues in the national currency) and this lead to a credit crunch. A miss match of maturities (with great exposure on the short term debt) added pressures from the Romanian State to the credit market, as the treasury crowded out.

So, an early warning system for the Romanian Economy cannot limit itself to point a problem or a set of problems, but we have to incorporate the state of distress of the economy as leading indicators to the crises. For the particular case of Romania we will see the indicators that cumulative warned about the financial distress that was developing

a) The economic, financial or currency crisis were preceded by rapid credit growth that were amplified by the financial system liberalization and the elimination of the capital account restrictions.

In the particular case of Romania, joining the NATO and the EU have additionally increased this tendency. As a result an over-borrowing cycle is forming - that is shown by the  $M2^{13}$  multiplier and the growth of the internal credit to GDP ratio.

b) A relaxing monetary policy can fulfill a currency crisis. Once Romania joined the EU and the capital inflows grew rapidly, the central bank confronted also speculative capital inflows looking for carry-trade<sup>14</sup>. This conduit might be training a currency devaluation with significant effects on the banking system (overexposed in a double manner: excessive lending and internal lending in a different currency - the so called "euroization"). We follow M1 indicator.<sup>15</sup>

c) The real exchange rate. The RON appreciated by 50% between 2004 and mid 2007. The overvaluation of the RON and a weak external sector are premises for a financial crisis. They come over the weaknesses of the banking system (overexposure, not toxic assets).

The lose of competitiveness (by overvaluation) and the external market can lead to recession, bankruptcy and a depreciation of the quality of the loans - by increasing the non performing loans. As a consequence, any major shock regarding the exports (decrease as a consequence of a lower competitiveness), regarding the imports (increase as the exchange rate appreciates) as well as a strengthening of the real exchange rate is a system of the financial crisis associated with teh current account deficit. We follow export, imports, and the real exchange rate<sup>16</sup>.

d) Higher international interest rates might anticipate a currency crisis that lead to a reversal of the capital inflows. The capital account problems tend to be more severe when

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<sup>13</sup> M2 is the intermediate money supply and includes M1 plus deposits shorter than 2 years

<sup>14</sup> Carry-trade defines a strategy by which an investor borrows money for a low interest rate in order to invest in an assets that is going to generate a higher yield (that the cost of money). The currency carry trade is made by borrowing a low-interest rate currency and invest the money (by currency conversion) in a different currency, for a higher yield.

<sup>15</sup> M1 is covering the cash and the current accounts

<sup>16</sup> The real exchange rate is the nominal exchange rate (a measure of the value of the currency comparing with a basket of currencies) divided by a price deflator or a cost index

the external debt is high and it amplifies the capital outflows rising concerns regarding the sustainability of the public debt.

As a fact, Romania entered the crisis with a very low public debt (13.6% of GDP) and an external debt of 48.2% of GDP (2008). That's why this vulnerability was not major, but the short term financing of the public debt put additional pressure on costs and dynamics.

As indicators, we follow the interest rate differential (international versus domestic), public debt, capital flows, short term external debt - that are part of the troubles in the capital account.

e) Higher interest rate might be a symptom for a liquidity crisis, that lead to a decrease of the economic activity and to fragility in the banking sector (pressure on future NPLs). An increase of the loans/deposits ratio might show a decline of the quality of the loans. We follow GDP, real interest rates, loans/deposits ratio and the price of stocks

The indicators:

1. M2 multiplier: The ratio of M2 (IFS lines 34+35) to base money (IFS line 14) - 12 month percentage change
2. Domestic credit/GDP: IFS line 52 divided by IFS line 64 to obtain domestic credit in real terms, which was then divided by IFS line 99b.p. (interpolated) to obtain domestic credit/GDP ratio. Monthly real GDP was interpolated from annual data.
3. Excess M1 balances: M1 (IFS line 34) deflated by consumer prices (IFS line 64) less an estimated demand for money. The demand for real balances is determined by real GDP (interpolated IFS line 99b.p.), domestic consumer price inflation and a time trend. Domestic inflation was used in lieu of nominal interest rate, as marked determined interest rate were not available during the entire sample for a number of countries. The time trend (which can enter log-linearity, linearly or exponentially) it is motivated by its role as a proxy for financial innovation and/or currency substitution;
4. Current account deficit (data from the National Bank of Romania);
5. Real exchange rate: The real exchange rate index is derived from a nominal exchange index, adjusted for relative consumer price (IFS line 64). This measure is defined as the relative price of foreign goods (in domestic currency) to the price of domestic goods. The nominal exchange rate index is a weighted average
6. Real interest rate differential. The interest rate differential is constructed as the difference between real rates for the domestic and foreign countries. Real rates are deposit rates (IFS line 60) deflated using consumer prices (IFS line 64)
7. Capital flight. We use the consolidated foreign claims to GDP (as reported by the Bank Of International Settlement);
8. Short-term foreign debt: Liabilities of domestic residents to BIS reporting banks with maturities up to 1 year divided by total liabilities of domestic banks to BIS reporting banks, interpolated from semi-annual data. The Maturity, Sectorial and Nationality Distribution of International Bank Lending, Bank for International Settlement
9. Lending-Deposit rate Ratio: IFS line 60p divided by IFS line 60 was used in lieu of differential to ameliorate the distortions caused by large percentage points spreads observed during high inflation. Both rates are for domestic economy.

The symptoms:

The above described indicators are part of the symptoms that Kaminsky (1999)<sup>17</sup> identified for banking and currencies crisis.

**Table 1:** Symptoms and indicators on the economy identified by Kaminsky (1999) for banking and currencies crisis.

a. Symptoms	b. Indicator	c. Critical Shock Sign	d. Comments
Overborrowing Cycles	M2 Multiplier	Positive	Both banking and currency crises have been linked to rapid growth in credit fueled by liberalization of the domestic financial system and by the elimination of capital account restrictions
	Domestic credit/GDP	Positive	
	Loans in foreign currency	Positive	
Monetary Policy	‘Excess M1 Balances’	Positive	Loose monetary policy can fuel a currency crisis. The the extent that the devaluation worsens the health of the banking sector it can also trigger a banking crisis (by an increase in NPL)
Problems Current Account	Current account deficit	Positive	Real exchange rate overvaluations and a weak external sector are part of a currency crisis. They add to the vulnerability of the banking sector since a loss in competitiveness and external markets could lead to a recession, business failure and a decline in the quality of loans. Thus large negative shocks to exports and the real exchange rate and positive shocks to imports (both covered by the current account deficit) are interpreted as symptoms of the financial crisis
	Real Exchange rate	Negative	
Problems Capital Account	Real Interest Rate Differential	Positive	High world interest rates may anticipate currency crisis as the lead to capital

<sup>17</sup> Kaminski, G. (1999) - “Currency and banking crisis. The early warning of distress”, International Finance Discussion Paper, 629, Board of Governors of the Federal Reserve System, Number 629, October 1998), Appendix, Table 2 - Symptoms and leading indicators

a. Symptoms	b. Indicator	c. Critical Shock Sign	d. Comments
	Short term Foreign Debt	Positive	out-flows. Capital account problems become more severe when the country's foreign debt on short term increases since it may rise issues of sustainability . Kaminsky and Reinhart (1996) argue that a currency crisis may in turn deepen the banking crisis
	Capital flight	Positive	
Growth slowdown	Domestic real interest rate	Positive	Recessions and the burst of asset price bubbles precede financial crisis (Calomiris and Gorton 1991). High real interest rates could be a sign of a liquidity crunch leading to a slowdown and banking fragility. An increase in the lending/deposit ratio in the domestic economy can capture a decline in loan quality
	Lending/Deposit Ratio	Positive	
	Stock Prices	Negative	

### 3. Which indicators worked best for the Romanian crises

The current model is based on the assumption that the Romanian economy had a sustainable economic growth in 2000-2004 so we presume that the indicators from this period can be used as references for a sustainable economic growth (even if the economy had a large growth between 2000-2004, we have not seen a deterioration of the macroeconomic indicators).

The model:

For each indicator we calculated the average value, the variance and the standard deviation between 2000-2004. We consider that each annual indicator for 2005 - 2007 (pre-crises) will issue a signal if the difference between the yearly indicator and the average value of that indicator for 2005-2008 is higher than the standard deviation for a sustainable period of economic growth (2000-2004), or in the case of macroeconomic indicators if the difference between the annual indicator and the average for sustainable times (2000-2004), defined as DELTA, is higher than the standard deviation for tranquil times. So we have a maximum of 4 consecutive signals (for 2005, 2006, 2007, 2008) which lead us to an Intensity of the signals of (0, 0.25, 0.5, 1). Any value above 0.5 shows us that a crises is highly probable, while a value of 1 shows us that the crises is imminent. To refine the signals we define the following algorithm:

If we have consecutive signals, the signal for an year will be multiplied by a factor which will show a repetitive factor (2 for the second year in a row, 3 for the third year in a row). So, we will have a maximum of 6 points signals (one signal in 2005 added with two signals in 2006 added with three signals in 2007 added with 4 signals in 2008) and we will

define by adding signals for each year the intensity of the signal ( $IS = \text{number of signal} / 6$  possible signals)

Because the purpose of the model is to see if we can have early warning of distress, we will consider the values for 2005-2007 in terms of predicting the crises, while the values of 2008 ( $x = \text{annual indicator} - x_m$  - the average indicator for 2005-2007 might can show us if the crisis is going to further develop in the future).

Where we have percentage change (year on year) indicators - we use as reference the DELTA (which is the value of the indicator - the average level of indicators for tranquil times (2000-2004 or fractions of 2000-2004)). Each time the Delta is higher than 2 standard deviations we have a signal issued.

Where we have the actual value of the indicator - we use as reference the  $(x - x_m)$ , where  $X$  is the value of the annual indicator and  $x_m$  is the average value for 2005-2007 (prior to the crises). Each time the  $x - x_m$  is higher than the standard deviation for tranquil times (2000-2004 or fractions of it), we have a signal issued).

a) loans to deposit ratio (year on year)

Average value 2000-2004: 18.14

Variance 2000-2004: 85.41

Standard deviation 2000-2004: 9.24

For loans to deposit ratio we have:

Table 2: Dynamics of loans to deposit ratio (2005-2008)

Dynamics loans to deposit ratio	2005	2006	2007	2008
X	20.96	55.92	18.62	41.73
$X_m$ (2005-2007)	31.83	31.83	31.83	31.83
$X - X_m$	-10.87	24.09	-13.21	9.90
Standard deviation (2000-2004)	9.24	9.24	9.24	9.24
$(x - x_m) / \text{standard deviation}$	-1.18	2.61	-1.43	1.07
Signals	1.00	1.00	1.00	1.00
Noise to signal	1.00	2.00	3.00	4.00

Source: National Bank of Romania, own calculations.

According to these calculations we have 3 consecutive signals between 2005-2007 and another signal in 2008 (showing that the indicator is going to further adjust in the future). Having in mind that the crises occurred in 2008, the 3 consecutive signals conduct to an intensity factor of 1 (maximum for 2004-2007). The highest signal was sent in 2006 where the  $(x - x_m)$  was 2.6 times higher than the standard deviation.

The signals are considered to be valid in tranquil times (non-crises), so we do not consider as valid the signal sent in 2008 (when the crises already manifested, since we want to predict the crises, not to validate it).

**So, the IS for loans to deposit ratio equals 1, fully signaling a crises.**

If we want to verify this indicator for 2009-2013, we have the following results (and we compare with the standard deviation for tranquil and sustainable times (2000-2004), which had a value of 9.24):

Table 3: Dynamics loans to reposit ratio (2009-2013)

Dynamics loans to deposit ratio	2009	2010	2011	2012	2013
X	-73.06	-16.14	35.57	21.11	8.97
Xm	12.37	<b>12.37</b>	<b>12.37</b>	<b>12.37</b>	<b>12.37</b>
X-Xm	-85.43	-28.51	23.20	8.74	-3.40
Standard deviation (2000-2004)	9.24	9.24	9.24	9.24	9.24
(x-xm)/standard deviation	-9.25	-3.08	2.51	0.95	-0.37
Signals	1.00	<b>1.00</b>	<b>1.00</b>	<b>0.00</b>	<b>0.00</b>
Noise to signal	0.00	<b>0.00</b>	<b>1.00</b>	<b>0.00</b>	<b>0.00</b>

Source: National Bank of Romania, own calculations.

Since the crises was already manifesting in 2009 and 2010, we do not consider as valid the signals in 2009 and 2010 (even if they show as an adjustment of the indicator), but just the signals in 2011, 2012, 2013. According to this estimate, we have an IS of  $1/6 = 0,16$  in 2011-2013, mainly because of the signal in 2011, which is not enough for signaling a crises since the 2012 and 2013 (valid signals) where not indicating any crises.

#### b) M2/M1 % change (annual)

We have an average value (xm) of 2.47% between 2002-2004 (we exclude the 2001 factor as being irrelevant since the ratio, as absolut level, was five time higher than the average, and a standard deviation of 5.47 (2002-2004). For each year the difference between yearly indicator (x) and the average value for the indicator (2005-2007) (xm) is higher than the standard deviation (2000-2004) we have a signal (and this signal is multiplied by the repetitive factor).

For 2002-2004 we have

\* average value: 2.78

\* variance 29.93

\* standard deviation: 5.47

For M2/M1 % change we have the following calculated data (2005-2008):

Table 4: M2/M1 % change (2005-2008)

M2/M1 % change	2005	2006	2007	2008
X	-9.81	-15.73	-17.39	0.15
Xm (2005-2007)	-14.31	-14.31	-14.31	-14.31
X-Xm	4.50	-1.42	-3.08	14.46
Delta (x-Xm(2002;2004)	-12.59	-18.51	-20.17	-2.63
<b>Delta/standard deviation</b>	<b>-2.30</b>	<b>-3.38</b>	<b>-3.69</b>	<b>-0.48</b>
Signals	1.00	1.00	1.00	0.00
Noise to signal	1.00	2.00	3.00	0.00

Source: World Bank Database, National Bank of Romania, own calculations

According to this calculation, we have 3 consecutive signals (2005, 2006, 2007) which conduct to an Intensity Signal of 6/6 (1). Since the IS is higher than 50%, we consider that M2/M1 % change is a relevant factor for signaling a crises (especially that the ratio Delta/standard deviation was higher than 2 standard deviation for each of the three years. So, the M2/M1 % change fully signaled a crises.



If we want to verify this indicator for 2009-2013, we have the following results (and we compare with the standard deviation for tranquil and sustainable times (2002-2004), which had a value of 5.47):

Table 5: M2/M1 % change (2009-2013)

M2/M1 % change	2009	2010	2011	2012	2013
X	27.23	3.91	1.20	-0.84	3.617
Xm	1.97	1.97	1.97	1.97	1.97
X-Xm	25.26	1.94	-0.77	-2.81	1.65
Delta (x-xm (2002-2004))	24.45	1.13	-1.58	-3.62	0.84
Delta/standard deviation	4.47	0.21	-0.29	-0.66	0.15
Signals	1.00	0.00	0.00	0.00	0.00
Noise to signal	0.00	0.00	0.00	0.00	0.00

Source: World Bank Database, National Bank of Romania, own calculations

In 2009-2013 we had a single shock signal (in 2009, but we do not consider this as valid since 2009 was already a crises time) so the IS value is zero for 2010-2013, which shows no crises foreseen. As a result, we consider as relevant the M2/M1 % change indicator for signaling a crises.

#### c) Current account deficit signals:

We have an average value (xm) of -4.575% between 2000-2004 and a standard deviation of 1.97 (for 2000-2004), resulted from our calculations. For each year the difference between yearly indicator (x) and the average value for the indicator (2005-2007) (xm) is higher than the standard deviation (2000-2004) we have a signal (and this signal is multiplied by the repetitive factor).

For 2000-2004 we have:

\* xm = -4.575

\* variance: 3.88

\* standard deviation: 1.97

For current account deficit between 2005-2008, we have the following situation:

Table 6: Current account deficit (% of GDP) 2005-2008

Current account deficit (% of GDP)	2005	2006	2007	2008
X	-8.6	-10.4	-13.4	-11.6
Xm	-11	-11	-11	-11
X-Xm	2.40	0.60	-2.40	-0.60
Delta (x - xm(2000;2004) = 4.575)	-4.03	-5.83	-8.83	-7.03
Signals (1 if Delta > Standard deviation (1.97))	1.00	1.00	1.00	1.00
Noise to signal	1.00	2.00	3.00	4.00

Source: National Bank of Romania, own calculations

We have this situation: For each year (2005, 2006, 2007, 2008) the difference between the yearly current account deficit and the average value (2000-2004) - considered as sustainable is much higher than the standard deviation for 2000-2004 (1.97) - from double

(2005) to quadruple (2007). Since the current account crisis already started to manifest in 2008 (the shrinking of the current account deficit) we consider as valid signals those from the period 2005-2007. So we have a total of 6 signals (from 6 possible), which give us the maximum value for  $IS = 1$ . This signaling approach considers that an average current account deficit of 4.575 (the average for 2000-2004) is considered as sustainable, at macroeconomic level. So, the dynamics of the current account deficit fully signaled a crisis.

If we want to verify this indicator for 2009-2013, we have the following results (and we compare with the standard deviation for tranquil and sustainable times (2000-2004), which had a value of 1.97):

Table 7: current account deficit (% of GDP) - 2009-2013

Current account deficit (% of GDP)	2009	2010	2011	2012	2013
X	-4.2	-4.4	-4.5	-4.4	-1.1
Xm	-3.72	-3.72	-3.72	-3.72	-3.72
X-Xm	-0.48	-0.68	-0.78	-0.68	2.62
Delta (x - xm(2000;2004) = 4.575)	0.38	0.18	0.08	0.18	3.48
Signals (1 if Delta > Standard deviation (1.97))	0.00	0.00	0.00	0.00	1.00
Noise to signal	0.00	0.00	0.00	0.00	1.00

Source: National Bank of Romania, own calculations

So we have just 1/15 possibility to have a crises predicted by the series of current account deficits (0.06) for 2014, which is not relevant enough for predicting a crises.

#### d) Real exchange rate signals:

We have an average value (xm) of 83.35 (Real Exchange Rate, BIS data, 2005=100\_between 2000-2004 and a standard deviation of 3.717 (for 2000-2004), resulted from our calculations. For each year the difference between yearly indicator (x) and the average value for the indicator (2005-2007) (xm) is higher than the standard deviation (2000-2004) we have a signal (and this signal is multiplied by the repetitive factor).

For 2007, we take into consideration, for the average, the value of real exchange rate, end of period (108.83), but since we have monthly data for the real exchange rate we look at the July 2007 rate (when the RON started to depreciate against the Eur). In July 2007, the RER (Real Exchange Rate) was 119.58, while in December, the rate was 108.83

For 2000-2004, from our calculations, we have:

- \* The average (Xm) = 83.35
- \* The variance: 13.82
- \* The standard deviation: 3.717.

So, for 2005-2008 we have the following data:

Table 8: Real Exchange Rate (2005-2008) (Ron/Eur)

Real Exchange Rate	2005	2006	July 2007	2008
X	97.9	109.56	119.58	103.41
Xm	105.43	105.43	105.43	105.43

X-Xm	-7.53	4.13	14.15	-2.02
Standard deviation (2000-2004)	3.72	3.72	3.72	3.72
(x-xm)/standard deviation	-2.03	1.11	3.81	-0.54
Signals	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>0.00</b>
Noise to signal	<b>1.00</b>	<b>2.00</b>	<b>3.00</b>	<b>0.00</b>

Source: World Bank Database, National Bank of Romania, own calculations

Following the results, we see that that in each year (2005, 2006, 2007) before the crisis, the deviation from the average value of the real exchange rate was much higher than the standard deviation observed in 2000-2004 (3.72). The critical shock sign was in July 2007, when the deviation was almost 4 times higher than the standard deviation. So we have 3 consecutive signals which conduct to an IS of 6 of maximum 6 points, showing a full probability for a crisis.

So, the evolution of the real exchange rate is one of the best indicator as an early warning for the crisis, and we identify as critical shock a deviation 3 times higher than the standard deviation in tranquil times.

To verify this indicator we will watch the signals between 2009-2013:

Table 9: Real Exchange Rate (2009-2013) (Ron/Eur)

Real Exchange Rate	2009	2010	2011	2012	2013
X	100.1	99.45	100.13	97.32	100.82
Xm	99.56	99.56	99.56	99.56	99.56
X-Xm	0.54	-0.11	0.57	-2.24	1.26
Standard deviation (2000-2004)	3.72	3.72	3.72	3.72	3.72
(x-xm)/standard deviation	0.15	-0.03	0.15	-0.60	0.34
Signals	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
Noise to signal	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

Source: World Bank Database, National Bank of Romania, own calculations

As we see, there was not any signal between 2009-2013 (the deviation from the mean was each year under the standard deviation in tranquil times. So the IS between 2009-2013 is zero, showing zero probability for a crisis to occur in the future, on the exchange rate channel.

#### e) Real interest rate signal differential

We define the value of the real interest rate differential between -Real interest rate adjusted with the GDP deflator - data from World Bank (Romania) and the short term interest rate for the Eurozone (OECD data).

We have an average interest rate differential (xm) of 3.282 (2000-2004) and a standard deviation of 4.53 (for 2000-2004), resulted from our calculations. For each year the difference between yearly indicator (x) and the average value for the indicator (2005-2007) (xm) is higher than the standard deviation (2000-2004) we have a signal (and this signal is multiplied by the repetitive factor).

For 2000-2004, from our calculations, we have:

- \* The average ( $X_m$ ) = 2.275
- \* The variance: 9.54
- \* The standard deviation: 3.09

So, for 2005-2008, we have the following data and we calculate the average value for 2005-2007 (as we want to see if the model predicts the crisis of 2008)

Table 10: Real Interest Rate Differential (RIRD): 2005-2008

Real Interest Rate Differential (RIRD)	2005	2006	2007	2008
X	4.62	0.82	-4.48	-4.43
$X_m$	3.5	3.5	3.5	3.5
$X - X_m$	1.12	-2.68	-7.98	-7.93
Standard deviation (2000-2004)	3.09	3.09	3.09	3.09
$(x - x_m)/\text{standard deviation}$	0.36	-0.87	-2.58	-2.57
Delta (2004: RIRD= 7.29)	<b>-2.67</b>	<b>-3.80</b>	<b>-5.30</b>	<b>0.05</b>
Signals	<b>0.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>
Noise to signal	<b>0.00</b>	<b>1.00</b>	<b>2.00</b>	<b>0.00</b>
Real interest rate (Interest rate adj by GDP Deflator) -ROM	6.8	3.9	-0.2	0.2
Euro Zone short term interest rate	2.18	3.08	4.28	4.63
Interest rate differential	<b>4.62</b>	<b>0.82</b>	<b>-4.48</b>	<b>-4.43</b>

Source: World Bank Database, National Bank of Romania, own calculations

We identify as signals when the Delta (which is RIRD current year - RIRD previous year) is higher in absolute terms than standard deviation in tranquil times, and we identify as critical shock sign for the real interest rate perspective when the RIRD turns negative (2007).

In this case Delta is important since the capital investors always look at the past for comparing the yields.

According to this we have 2 consecutive signals in 2006 and 2007 which leads towards a noise to signal of 3. So, the IS is  $3/6 = 0.5$ , showing a high probability for a crisis (when the RIRD turns negative, the capital flows reverses from inflows to outflows).

As we defined an IS higher or equal to 0.5, we conclude that we have a valid early warning indicator in the real interest rate differential, with a critical shock sign when the deviation from the mean is higher than 2 standard deviations (in tranquil times) and the RIRD turns negative.

For verifying the model in a post-crisis period (2009-2013), we have:

Table 11: Real Interest Rate Differential (RIRD) 2009-2013

Real Interest Rate Differential (RIRD)	2009	2010	2011	2012	2013
X	11.07	7.29	6.51	5.33	6.28
$X_m$	7.3	7.3	7.3	7.3	7.3
$X - X_m$	3.77	-0.01	-0.79	-1.97	-1.02
Standard deviation (2000-2004)	3.09	3.09	3.09	3.09	3.09
$(x - x_m)/\text{standard deviation}$	1.22	-0.00	-0.26	-0.64	-0.33
Delta (2008: RIRD= -4.43)	<b>15.50</b>	<b>-3.78</b>	<b>-0.78</b>	<b>-1.18</b>	<b>0.95</b>
Signals	<b>1.00</b>	<b>1.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
Noise to signal	<b>1.00</b>	<b>2.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

Real interest rate (IR adj by GDP Deflator) -ROM	12.3	8.1	7.9	5.9	6.5
Euro Zone short term interest rate	1.23	0.81	1.39	0.57	0.22
Interest rate differential	<b>11.07</b>	<b>7.29</b>	<b>6.51</b>	<b>5.33</b>	<b>6.28</b>

Source: World Bank Database, National Bank of Romania, own calculations

We have 2 consecutive signals in 2009 and 2010 in terms of Delta and zero signals in 2011. 2012. 2013, which leads to a noise to signal of 3 and an IS of 3/15 (0.2). That shows a probability less than 0.5 for a crisis to occur, so we reject the null hypothesis that we'll have a crisis after 2013 signaled by the RIRD, and we accept the alternative hypothesis that no crisis will occur.

About the signal in 2012 (when the real interest rate was 12.03 and the real interest rate differential was 11.07) shows a sign of distress (in fact the liquidity crunch). Since this was given by the miss-match in terms of financing and the global liquidity crunch, this cannot be identified as a signal for a crisis but as a signal that the crisis was already developing.

#### f) "Excess M1 balances" signal

We use M1 (data from World Bank Database - <http://data.worldbank.org/indicator/FM.LBL.MONY.CN?page=2>) and the consumer price index for deflating the M1 to CPI and we calculate the time trend for M1/CPI (dynamics) from 2001 to 2004.

We also use the Real GDP (nominal terms - line 790 World Bank Database) and deflate it by CPI. We also determine a time trend for Real GDP/CPI.

For determining the M1 excess we do the ratio (M1/CPI)- (GDP/CPI). We calculate the average value, the variance and the standard deviation for 2002-2004, and we have the following results:

We exclude the data for 2001 from this calculation since the M1/IPC (2001/2000) is out of the normal range of the distribution (158.56), as the M1 in 2001 was distorted by the issuance of 4 new banknotes ( 500.000 lei - October 23rd 2000, 10.000 lei - September 18th 2000 and 50.000 lei and 100.000 lei in the fall of 2001). So we calculate restrict the range of each indicator for 2002-2004 corresponding to the evolution in tranquil times and extend the period to 2005, to for annual indicators

According to our calculations, we have the following data for 2002-2005, and we calculate the indicators for 2005-2007 in order to see that if the excess M1 balance predicts a crisis for 2008.

\*  $x_m = 9.52$

\* variance: 443.58

\* standard deviation: 21.06

Table 12: Excess M1 balances, 2005-2008

Excess M1 balances	2005	2006	2007	2008
X	16.35	16.75	40.65	-6.42
$X_m$	24.58	24.58	24.58	24.58
$X - X_m$	-8.23	-7.83	16.07	-31.00
Standard deviation (2002-2005)	21.06	21.06	21.06	21.06
Delta (x current year - x previous year), 2004 = 22.15	-5.80	0.40	23.90	-47.07

Delta/standard deviation	-0.28	0.02	1.13	-2.24
Signals	<b>0.00</b>	<b>1.00</b>	<b>1.00</b>	<b>0.00</b>
Noise to signal	<b>0.00</b>	<b>1.00</b>	<b>2.00</b>	<b>0.00</b>

Source: World Bank Database, National Bank of Romania, own calculations

In order to validate a signal, we will consider a valid signal if the Delta (x current year - x previous year is positive, in other words the excess is growing on a yearly basis), and this critical shock sign amplifies if the Delta is higher than one standard deviation (for tranquil times).

So, we have the Delta higher than the standard deviation in 2007 (signaling a loose monetary policy). The noise to signal for 2005-2007 is 3, that means that the  $IS = 3/6 = 0.5$ , signaling a crisis.

If we calculate according to Kaminsky (when a critical shock sign is showed when the excess M1 balance is positive), we see three consecutive shock (2005, 2006, 2007) that were signaling a crisis when the excess of the „excess M1 balances” (yearly evolution) pass through the standard deviation for the tranquil times (the sustainable growth evolution), which is alternate way in which the excess M1 balance signals a crisis.

In order to verify the conclusions for 2009-2013, we assume the following null hypothesis:

H0: there will be a crisis in Romania after 2012 (based on data 2009-2012) signaled by the excess M1 balance

Table 13: Excess M1 balances (2009-2012)

<b>Excess M1 balances</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>
X	-11.84	-1.65	-1.16	-1.79
Xm	-4.11	-4.11	-4.11	-4.11
X-Xm	-7.73	2.46	2.95	2.32
Standard deviation (2002-2005)	21.06	21.06	21.06	21.06
Delta (x current year - x previous year), 2008 = -6.42	-5.42	10.19	0.49	-0.63
Delta/standard deviation	-0.26	0.48	0.02	-0.03
Signals	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
Noise to signal	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

Source: World Bank Database, National Bank of Romania, own calculations

According to Kaminsky, we see a critical shock sign if the X value turns positive, but each year the X is negative, so we reject the null hypothesis (that will be a crisis) and we go to the conclusions that there is no excess of M1 balance, so there won't be any crisis signaled by this.

According to our Delta calculations, in all years the absolute value of Delta/Standard Deviation in sustainable times is less than one standard deviation, so we also reject the null hypothesis. So, we do not have any crisis signaled by the M1 excess balance.

#### g) Short term debt signal

We have an average value (xm) of 9.62% of GDP between 2000-2004 and a standard deviation of 2.94 (for 2000-2004), resulted from our calculations. For each year the difference between yearly indicator (x) and the average value for the indicator (2005-2007) (xm) is

higher than the standard deviation (2000-2004) we have a signal (and this signal is multiplied by the repetitive factor).

For 2000-2004 we have:

\*  $x_m = 9.62$

\* variance: 8.64

\* standard deviation: 2.94

For the short term debt (2005-2007), we have the following situation, in order to see the effect on predicting the crisis of 2008.

Table 14: Short term debt (% of GDP), 2005-2008

Short term debt (% GDP)	2005	2006	2007	2008
X	19.06	30.69	34.75	27.95
$X_m$ (2005-2007), 2008 (2005-2008)	28.17	28.17	28.17	28.11
$X - X_m$	-9.11	2.52	6.58	-0.16
%change (2004=14.75% of GDP)	29.24	60.99	13.24	-19.58
Standard deviation (2000-2004)	2.94	2.94	2.94	2.94
Delta ( $x_{\text{current}} - x_{\text{previous}}$ ) ; $x_{2004}=14.75$	4.31	11.63	4.06	-6.80
Delta/standard deviation	1.47	3.95	1.38	-2.31
Signals (1 if Delta > Standard deviation (2.94))	1.00	1.00	1.00	0.00
Noise to signal	1.00	2.00	3.00	

Source: World Bank Database, National Bank of Romania, own calculations

According to Kaminsky, and increase in the short term debt (positive evolution) shows a critical shock sign as a problem for the capital account. We have positive evolution in 2005, 2006, 2007 which leads to 3 signals or a noise to signal of 6. That leads as to an IS of  $6/6 = 1$ , showing a full probability for a crisis (that might turn into a banking crisis).

As an alternate, in our model, we follow delta (the difference between Short term debt in the current year - Short term debt in the previous year, as GDP percentage). We find out that we have 3 consecutive positive signals, that conduct to an IS = 1, showing a full probability of the crisis (and the future seeds of a banking crisis). As a critical shock sign we define if Delta is higher than 2 standard deviations (in tranquil sustainable times). For 2007 we see a delta which is more than 3 standard deviations higher, showing a critical trigger for the short term debt crisis that manifested in 2008.

To verify this scenario after the crisis (2009-2012) we have the null hypothesis

$H_0$  = There was a crisis in 2009-2013 triggered by the short term debt

We find the following results:

Table 15: Short term debt (% GDP) 2009-2012

Short term debt (% GDP)	2009	2010	2011	2012
X	18.70	21.01	22.92	20.48
$X_m$ (2009-2012)	20.78	20.78	20.78	20.78

X-Xm	-2.08	0.23	2.14	-0.30
%change (2008=27.95% of GDP)	-33.09	12.32	9.10	-10.65
Standard deviation (2000-2004)	2.94	2.94	2.94	2.94
Delta (xcurrent - xprevious) ; x2008=27.95	-9.25	2.30	1.91	-2.44
Delta/standard deviation	-3.15	0.78	0.65	-0.83
Signals (1 if Delta > Standard deviation (2.94))	1.00	0.00	0.00	0.00
Noise to signal	1.00	0.00	0.00	0.00

Source: World Bank Database, National Bank of Romania, own calculations

According to Kaminsky, we have 2 positive evolutions in 2010 and 2011, which leads us to 2 consecutive signals (for 4 possible years) or a noise to signal of 3. So, the IS is 3/10, or 0.3, which is lower than 0.5 that we defined as a highly probable crisis scenario. So we reject the null hypothesis (that we are going to have a short term debt crisis) and we accept the alternate scenario - no short term debt crisis is seen for 2013 and beyond (which is supported by the reality - the deleveraging process having as an effect the reduction of the short term debt).

According to our model, we find out that the Delta in absolute value was higher than a standard deviation just in 2009. That leads to a noise to signal of 1, so we have an IS of  $1/10=0.1$  which is much lower than the level of 0.5 accepted as a signal for a future crises. Also, the negative value of the delta shows as that the adjustment started to produce, actually the crisis was in full development. So, we reject the null hypothesis and with a  $IS = 0.1 < 0.5$ , we accept the alternate hypothesis - there is no crisis signaled by the short term debt evolution.

#### 4. A Composite Early Warning Indicator (C-EWI).

As each economic/macroeconomic indicator studied in this paper by itself may have provided clues that a financial problem was developing in Romania, we will try to define a composite leading indicator will show that the Romanian crisis was signaled by multiple indicators in the same time.

Table 16: Indicators of shocks, critical cut-offs and symptoms for financial crisis

e. Symptoms	f. Indicator	g. Critical Shock Sign	h. Comments
Over borrowing Cycles	M2 Multiplier	Positive, $IS \geq 0.5$	Both banking and currency crises have been linked to rapid growth in credit fueled by liberalization of the domestic financial system and by the elimination of capital account restrictions



e. Symptoms	f. Indicator	g. Critical Shock Sign	h. Comments
Monetary Policy	'Excess M1 Balances'	Positive, $IS \geq 0.5$	Loose monetary policy can fuel a currency crisis. The the extent that the devaluation worsens the health of the banking sector it can also trigger a banking crisis (by an increase in NPL)
Problems Current Account	Current account deficit	Positive, $IS \geq 0.5$	Real exchange rate overvaluations and a weak external sector are part of a currency crisis. They add to the vulnerability of the banking sector since a loss in competitiveness and external markets could lead to a recession, business failure and a decline in the quality of loans. Thus large negative shocks to exports and the real exchange rate and positive shocks to imports (both covered by the current account deficit) are interpreted as symptoms of the financial crisis
	Real Exchange rate	Negative, $IS \geq 0.5$	
Problems Capital Account	Real Interest Rate Differential	Positive, $IS \geq 0.5$	High world interest rates may anticipate currency crisis as the lead to capital out-flows. Capital account problems become more severe when the country's foreign debt on short term increases since it may rise issues of sustainability . Kaminsky and Reinhart (1996) argue that a currency crisis may in turn deepen the banking crisis
	Short term Foreign Debt	Positive, $IS \geq 0.5$	

e. Symptoms	f. Indicator	g. Critical Shock Sign	h. Comments
Growth slowdown	Lending/Deposit Ratio	Positive, $IS \geq 0.5$	Recessions and the burst of asset price bubbles precede financial crisis (Calomiris and Gorton 1991). High real interest rates could be a sign of a liquidity crunch leading to a slowdown and banking fragility. An increase in the lending/deposit ratio in the domestic economy can capture a decline in loan quality

The composite indicator is the average of the IS for the 7 indicators identified by us as signaling the Romanian crises. So, we have:

Table 17: Early Warning Indicators for Romania that compound the composite index C-EWI

i. N o.	j. Indicator	k. IS (2005-2008)	l. IS (2009-2013)
1	Loans to deposit ratio	1	0.16
2	M2/M1 % change (annual)	1	0
3	Current account deficit	1	0.06
4	Real exchange rate	1	0
5	Real interest rate Differential	0.5	0.2
6	Excess M1 balances	0.5	0
7	Short term debt	1	0.1

According to our calculation, we have a C-EWI value of 0.86. As our model estimates a value higher or equal of 0.5 for signaling a crises, the value of the C-EWI (0.86) shows a high probability for a crises.

After the crisis (2009-2013), the value of C-EWI is 0,074, significant less than the reference value of 0.5. The, the C-EWI for post-crisis is signaling a very low probability for a crises.

### 5. Conclusions on early warning indicators

a) The analysis shows that the financial crisis in Romania was developed by a set of multiple economic problems, confirming the fact that crisis do not occur by a single bad shock;

b) As each macroeconomic indicator studied in this paper by itself may have provided clues that a financial problem was developing in Romania, the composite leading indicator shows that the Romanian crisis was signaled by multiple indicators in the same time, and the signal was very strong.

c) In the contrast to the view that the Romanian crisis could not have been anticipated, the results show that the Romanian economy was far from healthy, with clear signs of distress surfacing as early as 2005 (more than 36 months) before the crisis unfolded and strong signals 12 months before the crises developed.

d) The best individual indicators for signaling the crisis were loans to deposit ratio, M2/M1 % change, current account deficit, real exchange rate, short term debt, and we also find useful the signals sent by real interest rate differential and excess M1 balances.

e) Much of this indicators could have been adjusted before the crises unfolded, by a coherent policy mix (monetary policy and fiscal policy). By itself, the monetary policy strengthens (counter-cyclical) was not enough to compensate the lax fiscal policy (pro-cyclical).

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## New Elements in Corporate Governance of the Credit Institutions from the Perspective of National Bank of Romania Regulation no. 5/2013

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**Abstract:** The global economic crisis has stretched its harmful effects including banking activity, this being one of the severely affected economic domains where the greatest efforts of resuscitation were done, sometimes with serious consequences over public money. In this context, restoring the credit institutions' activity on actual basis, through a more efficient organizational system and re-editing the attributions of the management organs, so that to be able to guarantee for an effective and fast risk management framework, represented a globally assumed goal. Romanian law cannot remain outside this framework especially considering the obligation to join the model imposed by the European legislator by taking over the domestic law of the European directive CRD IV. This paper proposes a comparative study between the current and the previous legislation in order to highlight the main elements of novelty brought by Basel III, CRD IV and GL Guide 44/2011 on the internal governance of credit institutions elaborated by the European Banking Authority.

**Keywords:** economic crisis, credit institutions, CRD IV, Basel III, European Banking Authority, internal governance

### 1. Introduction

Corporate governance in the case of credit institutions, representing the of sum rules, principles and norms that regulate the organizational and management framework of the credit institutions' activity, traditionally found its regulatory premises into the Government Emergency Ordinance No. 99/2006 on credit institutions and capital adequacy<sup>18</sup>, its provisions being complemented by National Bank of Romania Regulation No. 18/2009 concerning the administration of the activity of credit institutions, the internal assessment of capital adequacy to risks and conditions of outsourcing their activities.

The amendment of GEO 99/2006 operated by GEO 113/2014 on some budget measures and for amending and supplementing the Government Emergency Ordinance No. 99/2006 on credit institutions and capital adequacy<sup>19</sup>, as well as the partial repeal of Regulation No. 18/2009 by NBR regulation No. 5/2013<sup>20</sup>, represents the alignment of national legislation in the field of credit institutions to the new regulations adopted by the Council of Europe and the European Parliament, respectively the Regulation<sup>21</sup> and the Directive<sup>22</sup>

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<sup>18</sup> GEO 99/2006 on credit institutions and capital adequacy, published in the Official Journal of Romania No.1027 from 27.12.2006, approved by Law No. 227/2007 for the approval of the Government Emergency Ordinance No. 99/2006 on credit institutions and capital adequacy (OJ No. 480 from 18.07.2007), subsequently amended and supplemented

<sup>19</sup>Published in the Official Journal of Romania No. 830 from December 23, 2013

<sup>20</sup> published in the Official Journal of Romania No. 841 from December 30, 2013

<sup>21</sup> EU Regulation Nr. 575/2013 of the European Parliament and of the Council of Europe from June 26, 2013 concerning the prudential requirements for credit institutions and investment companies, amending (EU) Regulation No. 648/2012, published in the Official Journal of the European Union L 176, volume 56, from June 27, 2013.

concerning the prudential requirements in credit institutions' activity, generically called CRD/CRR IV<sup>23</sup> Package.

### *1.1 The European context for the regulation on the framework of the credit institutions' management*

The CRD/CRR IV Package adopted by the European Parliament and the Council of Europe represents the European legislator's solution for strengthening of the banking system, by increasing the potential of anticipation, surveillance and counter the specific risks occurring in the banking activity, the adoption of the legislative package being mainly a response to the effects of prolonged economic crisis on the financial sector.

Global financial crisis has revealed the existence of gaps in the previous regulation at European level, generically called *Capital Requirements Directive* - CRD (European Directive on the capital adequacy), the legislative package comprising Directives 2006/48/EC and 2006/49/EC, that reflected the proposals of the Basel Committee for Banking Surveillance<sup>24</sup> included in Basel II agreement.

Although Basel II proposed an efficient strategy of risk management in banking activity, founded on three pillars: minimum capital requirements, capital adequacy surveillance and internal surveillance of the Bank as well as market discipline – its regulations were not sufficient to ensure the absorption of the economic shock represented by the financial crisis.

This conclusion became obvious especially at the moment of awareness of the effects of cross-border financial groups collapse, insurmountable harmful effects for national Governments that were forced, in the absence of effective and appropriate tools, to appeal to the public money to give to the banks already disagreeable "*bail-out option*". So, the insufficient or weak development of risk management instruments has led to the undesirable effect of profit's privatization, but also conferring a social character to the losses (*privatizes profit, socialize losses*).

Specifically, the gaps in the regulatory framework based on Basel II consisted mainly in: (i) the basic capital of credit institutions did not have the quality and rank required to properly absorb losses; (ii) the deficient liquidity management; (i) the lack of an efficient and effective corporate and internal governing.

Starting from these issues, by the Declaration on the occasion of the G20 Summit of 2 April 2009, world leaders have assumed the obligation of international cooperation and concentration of efforts in order to recover the effects of the economic crisis by improving the quantity and quality of capital in the banking system, through the introduction of additional instruments to stabilize and measure the risk in banking activity, as well as through the development of a new regulatory framework.

The objectives undertaken by the leaders of the G-20 had been achieved through the development by the Basel Committee, on the basis of rules approved by the leaders of the G-20 and the Financial Stability Board at the Pittsburgh Summit from September 24-25 2009, of

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<sup>22</sup> Directive 2013/36/EU of the European Parliament and of the Council of Europe from June 26, 2013, on access to the credit institutions' activity and prudential supervision of credit institutions and investment companies, amending Directive 2002/87/EC and repealing directives 2006/48/EC and 2006/49/EC, published in JOUE, L 176, volume 56, from June 27, 2013.

<sup>23</sup> Acronyms CRD/CRR come from "Capital requirements directive/regulation"

<sup>24</sup> The Basel Committee is composed of representatives of the supervisory authorities of Belgium, Canada, Switzerland, France, Germany, Italy, Japan, Luxembourg, Netherlands, Sweden, United Kingdom and United States. Typically, they meet at the BIS headquarters (Bank of International Settlements) from Basel, where the permanent secretariat is located.

the new global standards for regulating banking activity, known as Basel III, taken in the European space through the legislative package CRD IV.

We may note that, in terms of European settlement CRD IV, progress towards the previous legislative package refers not only to the content of specific measures of risk management but also to a legislative technique feature – the current legislative package is composed of a regulation and a directive (unlike the previous package consisting of two directives), which ensures speeding up the implementation of the adopted measures, considering that regulation is to go to apply directly to national jurisdictions, without having to be taken over by domestic law.

### *1.2 The internal regulation*

Regarding the national regulatory framework, European Regulation No. 575/2013 concerning the prudential requirements for credit institutions and investment companies apply directly in domestic law, and European Directive 2013/36/EU on access to the credit institutions' activity and prudential surveillance of credit institutions and investment companies was transposed to a double level in domestic law:

- At the level of primary legislation – modifying the GEO 99/2006 by the GEO 113/2013, normative act specifically aimed at strengthening the regulatory framework for credit institutions in the areas of corporate governance, prudential surveillance and sanctions regime;
- At the level of secondary legislation – by issuing the NBR Regulation No. 5/2013 on prudential requests for the credit institutions, including provisions of Directive CRD IV missed by the primary legislation, provisions about Romanian legislator's option in areas where the European Directive gives only a principled regulation, provisions of the guidelines issued by the European Banking Authority (EBA) in 2011 in the fields covered by regulation as well as principles in the Basel Committee documents.

So, we may note that the domestic regulation on corporate governance of the Romanian credit institutions is the result of combining Basel III agreement, the European Directive CRD IV, with those issued by the European Banking Authority (EBA), respectively EBA Guidelines on Internal Governance GL 44/2011.

The reason for this legislative synthesis process is the purpose unity of the Directive CRD IV and of EBA Guidelines 2011 regarding the improvement of corporate governance.

Thus, the reasons for the appearance of EBA Guidelines 2011 on internal governance are represented, on the one hand, by the results of the evaluation carried out by CEBS (Committee of European Banking Supervisors) at the end of 2009, which has led to a number of difficulties in implementing the corporate governance Guidelines 2006 Edition, related to the organizational structure and organization, the surveillance exercised by the supervisory bodies, risk management and internal control, and on the other hand, the motivation lies in the work of other bodies (European and international) on the corporate governance (especially Principles for enhancing corporate governance, issued by Basel Committee in October 2010).

In order to give the possibility of credit institutions for effective implementation of the new legal provisions, Romanian legislator has made a difference in terms of the entry into force of the NBR Regulation No. 5/2013, following that its provisions which ensure implementation of Directive CRD IV to enter into force on January 1, 2014, and those provisions that take over into the Romanian legislation of the EBA Guidelines to enter into force on July 1, 2014.

## 2. Corporative governance as risk management tool

The Basel III agreement, as well as the adopted European legislation, follows essentially the idea to cover, anticipate and counter the various risk types that may appear in banking activity by proposing risk management tools.

In corporative governance domain, deficiencies in the functioning of the administrative framework of the credit institution, determined by the regulatory failure under previous legislation, have led to excessive and unwise risk-taking and through it to the bankruptcy of some credit institutions and systemic problems. The direct consequence of these issues was a need for strengthening corporate governance regulation for the purpose of preventing excessive and unwise risks<sup>25</sup>.

So, the CRD IV Directive transforms the effective and efficient corporate governance into a real risk management instrument, considering that the main elements of novelty introduced by the European legislator refers to the clarification and standardization of structures and mechanisms for corporate governance in credit institutions, imposing a set of defining and detailed rules on the composition of the governing bodies, the functioning of the various governing structures and their role in terms of risk surveillance activity and development of risk management strategies. It is also a strengthening of the status and independence of the risk management function and is defined the role of supervisory bodies regarding monitoring of the specific risks of credit institution.

The main elements of novelty brought about by Regulation 5/2013, and the transposing of EU legislation ensured by it and by EBA Guidelines 2011 on internal/domestic governance (GL 44/2011), compared to the previous regulation (Regulation No. 18/2009), are presented as follows:

The new regulations imposed by GL 44/2011:

- GL 44/2011 defines the management structure in the sense of Regulation 18/2009 and contains in addition the stating that the persons who effectively direct the activity of credit institutions are also included.
- The management framework (internal governance) is a crucial component of corporate governance and includes at least the following aspects:
  - a) organizational structure and organization of the credit institution;
  - b) the responsibilities of credit institution's governing structure, its function and composition, the general framework for this purpose;
  - c) risks management;
  - d) internal control;
  - e) information systems and the continuation of the activity;
  - f) transparency requirements.

Compared to the previous activity management framework component (Article 3 paragraph 1 of Regulation 18/2009), GL 44/2011 introduces two new components: risks management and information systems and the continuation of the activity.

- The provisions on organizational structure and organization of the credit institution are not much different of those of the Regulation No. 18/2009, being structured/delimited differently:
  - organizational framework;
  - examining and balancing the group structure;

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• <sup>25</sup> Robu R. (2014), “ International governance in the context of applying the CRD IV”, the Colloquium “ Challenges for legal work in the context of the new prudential regime for credit institutions”, National Bank of Romania, March 19, 2014, published by <http://www.bnr.ro/Colocviile-juridice-ale-BNR-10754.aspx>

- structure knowledge (operational) – is a task for the management structure – non-standard activities / routinely performed or not transparent.

➤ Compared to existing provisions on the management structure's responsibilities from Regulation No. 18/2009, GL 44 structures the management as following:

- duties and responsibilities of the management structure of credit institutions – as a novelty, regroups under one paragraph the main responsibilities of the governing structure, making the distinction between the general business strategy and general risk policies and strategies of credit institutions;

- composition and functioning of the management structure – on one hand, introduces a number of novelty items regarding the management structure, its hiring, management of conflicts of interest within the leadership structure and qualification of members of the management structure, and on the other hand establish a series of remarks on the functioning of the governing structure, including from the perspective of its specialized committees (committees that might include an audit committee, a risk Committee, a remuneration Committee, a Nominating or human resources Committee and/or a governance Committee or ethics or compliance);

- the general framework for the purpose (*business conduct*) involve the following aspects: corporate values and code of conduct, conflicts of interest at the level of the credit institution and internal alert procedures.

➤ From the perspective of GL 44/2011 risk management involves:

- the existence of a culture regarding risk;
- remuneration alignment to the risk profile;
- risk management framework;
- the existence of a policy on new products.

Unlike risk management in the framework of regulation No. 18/2009 (chapter 3), GL 44 regulates the risk management framework that involves policies, procedures, boundaries and controls, in order to ensure the identification, measurement or evaluation, monitoring, mitigation and reporting risks related to activities both at the level of the lines of activity, as well as the overall level of credit institution.

➤ In the perspective of GL 44/2011, internal control means, as in the case of Regulation 18/2009, the existence of a framework for internal control. This is the equivalent of the internal control system governed by Regulation No. 18/2009, because as for the internal control system ensures the fulfillment of the objectives of internal control (as defined in art. 2 (2). 5 letter. (d) of Regulation No. 18/2009) and the related internal control framework ensures effective and efficient operations, risk control, carrying out the activity, the credibility of financial and non-financial information and compliance with the legal and regulatory framework, the surveillance requirements and the credit institution's internal rules and decisions.

A proper framework for internal control involves checking the policies and internal control procedures by the control functions / independent functions of the internal control system. These are: the risk control function, the compliance function and the function of internal audit. At the credit institutions with a less complex or smaller size, risk control function and the function of compliance can be combined.

➤ The risk control function is the main control function of the internal control system. Unlike the previous view of the risk control function, provided by regulation 18/2009 (this is mainly to ensure the compliance with the policies in the field of risks, usually being organized on business lines), GL 44 develop this function, assuming the risk management function characteristics of Regulation 18/2009. Thus, the risk control function in GL44 acceptance has the following features:



- the function must ensure that each significant risk faced by credit institution is identified and managed according to the relevant structures within the credit institution and as an overview (*holistic view*) of all the risks is sent to the management structure;

- the function should be organized centrally within the credit institution and must be structured so they can implement risk policies and can control the administration framework of the activity. Although large institutions with sophisticated activity may consider establishing a risk management function on each line of activity, there must be a centralized function (including, if necessary, a risk control function at group level within the group's mother credit institution) to provide an overview of all risks;

- the function's role is complex. It has to be actively involved from the initial phase of the development risk strategies and in all management decisions of significant risks. It also needs to have a fundamental role in ensuring the existence of an effective risk management process;

- the credit institution must appoint a person, CRO (Chief Risk Officer), with an exclusive responsibility for risk control function and for monitoring the risk management framework, except when the size, organization and nature of activities do not justify such responsibilities to a person specially designated for this purpose.

➤ In terms of business continuity (component of the management framework activity), there are the following issues:

- credit institutions must establish a solid process in terms of management in order to ensure the ability to operate on the principle of sustainability/continuity and to limit casualties in case of a severe business interruption;

- in order to establish a solid business continuity management, credit institutions need to consider exposure to severe disruptions of the activity and to analyze the potential impact of these, using internal and external data and scenario analysis;

- based on the analysis, credit institutions must dispose of:

- plans for unpredictable situations and for activity's continuation – in order to ensure a proper response to emergency situations and the ability to maintain the most important activities in case there is an interruption of normal business procedures;
- recovery plans for critical resources – to allow them to return to normal business procedures in an appropriate time frame.

➤ GL 44/2011 defines the tolerance or appetite for risk to describe on both the absolute risks a credit institution is willing to undertake (this is called appetite for risk), as well as the actual limits within the risk appetite of a credit institution (this is called tolerance to the risk).

B. The new rules imposed by the CRD IV – Directive 2013/36/EU

➤ Defines the management body for the purposes of Regulation No. 18/2009 and the GL 44. Includes in addition a number of issues related to the two functions of the management structure.

➤ Unlike the GL 44 and of Regulation No. 18/2009, also defines the governing body in its surveillance function and superior leadership.

➤ As in the system of Regulation No. 18/2009 (article 12, paragraph 1), the management structure must approve and periodically revise the strategies and policies on risk-taking, administering, monitoring and mitigation of risks to which the credit institution is or might be exposed, including those due to the macroeconomic environment in which it operates in conjunction with the stage in the business cycle (article 76, paragraph 1). There is not such a requirement in GL 44, but there's a provision according to which the management structure must establish and revise the general business strategy, as well as the general policies and strategies of risk for the credit institutions (B.1.8. points 2 and 3).

Also, GL 44 contains the provision according to which, in the decision-making process for risk management framework trends and relevant data of the macroeconomic environment must be addressed in order to identify their potential impact on the exposures and portfolios.

- Unlike the Regulation No. 18/2009 where there's a brief request that members of management structure must devote sufficient time to fulfill their obligations and responsibilities (article 18 paragraph 5 e), CRD IV requires that the management structure to allocate sufficient time to analyze/to consider the issues related to risk, in order to be actively involved in managing all risks, as well as in the valuation of assets, use of external ratings and internal models related to those risks (article 76 paragraph. 2). GL 44 tackles these provisions in general and not in strict reference to risk. So, the members of the management structure should have only a limited number of mandates or other occupational activities which require long time dedication; as President or leader has more responsibilities and powers, it must devote more time to resolve them, etc. (B. 2.12 points 2, 3 and 4). GL 44 mentioned that every person in a credit institution (not only the leadership as CRD IV) has to be fully aware of his attributions on risk management.
- The provision, found in the Regulation No. 18/2009 (article 8 paragraphs 1 and 2), according to a credit institution must establish reporting lines to the management structure which will cover all significant risks and risk-management policies and their modifications (article 76 paragraph 2) is also found in GL 44 – the organizational structure does not need to affect the ability of the management structure to oversee and effectively manage the risks faced by the credit institution or group of which it forms part (A. 4. 1 and 3). Plus, credit institutions must establish mechanisms for the regular and transparent reporting, so the leadership structure and all the relevant structures of a credit institution to be provided timely reports, and these mechanisms lead to identifying, measuring or assessing and monitoring risks.
- While the Regulation No. 18/2009 indicated only the possibility of the establishment of the risk management committee, whose duties and composition are to remain at the discretion of credit institutions (article 12 paragraph 2 and article 851 paragraphs 1 and 2), CRD IV indicates the obligation of establishing a risk Committee for credit institutions which are significant from the point of view of size, internal organizing, the nature, extent and complexity of their business (also indicating its structure and functions), or the permission of combining risk with the audit Committee, if the credit institution is not significant (article 76 paragraph 3). GL 44 also speaks of a risk committee, but the same as the Regulation No. 18/2009 this is also an optional committee (B.2. 14 points 6-8 and 12).
- As GL 44 (B.2.14 point 12), CRD IV also indicates access of the management structure or of the risk Committee to information concerning risks and, if necessary and appropriate, to the risk management function and to the expert advice from outside the credit institution (external expert advice) (article 76 paragraph 4. 1). Such information emerged indirectly from the Regulation No. 18/2009 (article 84 paragraph 3 and art. 90 paragraph 4).
- A provision that has no counterpart in Regulation No. 18/2009 and in GL 44 is that relating to the functions of the management structure or of the risk Committee, if any, to determine the nature, value, format and frequency of the risks' information it receives. Also, an additional provision is also about the role of the Committee in providing risk policies and practices on remuneration, without interfering with the remuneration Committee (article 76 paragraph 4. 2).
- Risk management function provided by the CRD IV (article 76 paragraph 5. 1, 2 and 3) is also regulated by Regulation No. 18/2009 (article 78 paragraph 2, article 80 paragraph 2, article 81 paragraph 1 and article 92), and by GL 44.

- A specific provision of CRD IV (article 76 paragraph 5. 3) not found in the Regulation No. 18/2009 and in GL 44 (C.22 points 7 and 8) is the one according to the risk management function must be able to report directly to governing bodies in their supervisory function (*management body in its supervisory function*) any concerns regarding specific risk issues or developments affecting or likely to affect the credit institution.
- Provisions correspondent to the Regulation 18/2009 (article 90) regarding the existence of a coordinator of risk management function - *chief risk officer* – (or of any other person with superior function (senior person), when the nature, size and complexity of the activities of a credit institution does not justify the appointment of a CRO) (article 76 paragraph 5. 4 and 5 of CRD IV) are detailed on the GL 44 (D.27. points 1-5). Also, the revocation of the CRO, provided by CRD IV (article 76, paragraph 5.5) is detailed by GL 44 (D.27. 6).
- The provisions found to some extent on the Regulation No. 18/2009 (article 4 paragraph 1, article 14 paragraph 5, article 17, article 18 paragraph 5) concerning the definition, supervision and responsibility of the management structure for the implementation of a governance framework of the activity that ensures an effective and prudent management of a credit institution (article 88, paragraph 1. 1 CRD) are also detailed by GL 44 (II. 3, B.1. 8. 1, B.1. 8. 2, B.1.9. 1, B.2.12. 6, B.3.16.1 and 4).
- The provision according to which the management structure must have general responsibility for the credit institution to approve and revise its strategies (business and risk) and the activity's administration framework (article 88, paragraph 1. 2. a) is also found on GL 44 (B.1.8. 1 and B.1. 8. 2. a, b and g ). It is also found in some measure on the GL 44 (B.1.8. 2.h and B.1. 8. 3) the provision according to which the management structure must ensure the integrity of accounting systems and financial reporting (article 88, paragraph 1. 2. b), as well as the provision according to which the management structure has to oversee the process of publication and communication of the information (article 88, paragraph 1. 2. c).
- The provision according to which the governing body should oversee superior leadership (article 88, paragraph 1. 2. d) has correspondent, being even detailed by GL 44 (B.1.10. 1 and 2).
- The provision according to which the governing body has to monitor and periodically evaluate the effectiveness of the management framework of the activity (Article 88, paragraph 1. 3) is detailed by GL44 (B.1. 9). Thus, the assessment will be made at least annually and will take account of any changes in the internal and external factors affecting the credit institution.
- The establishment of a Nominating Committee, including its composition and functions (article 88, paragraph 2. 1-5), is partially treated by GL 44 (B.2.14. 6 and 7), as long as such a Committee is not mandatory.
- The reporting requirement of the key indicators such as the rate of return on assets (*return on assets*) in the management framework of the activity (article 90) can be found in the general sense on GL 44. Thus, a credit institution must disclose significant information concerning the financial and operational results (F.33. 2 and 3).
- The requirement for training of the management structure's members (article 91, paragraph 9) is detailed on GL 44 (B.2.13. 1 and 6). So, according to GL 44, the leading structure members must have access to training programs tailored to their specifics, which take into account any gaps in the profile of knowledge needed by the credit institution and the actual knowledge of the members of the management structure.

- Detailed requirements concerning the existence of a broad set of qualities and skills in recruiting members of the leadership structure, including the existence of a policy to promote diversity within the leadership structure (article 91, paragraph 10).

### 3. Conclusions

At the end of this study, that cannot be exhaustive concerning the comparison between the previous legislation in the area of corporate governance of credit institutions and the new rules proposed by the European legislator and European Banking Authority, we can summarize the main elements of novelty brought about by the law-making progress in this domain as:

- the introduction of provisions relating to an effective corporate governance within credit institutions, meant to help prevent excessive risk and that allows the National Bank of Romania to monitor the degree of adequacy of mechanisms relating to the management of a credit institution;
- introduction of principles and standards that must be applied taking into account the nature, extent and complexity of the credit institutions' activities;
- redefinition of the management organ, of the leading organ and the supervisory function of the senior management, ensuring a better understanding of the role, duties and relationships, vertically and horizontally, between the structures of the credit institution;
- restoring the elements of a framework of rigorously designed activities, among which are found, in addition to the governing body and the organizational structure and risk management, internal control, information systems and business continuity, as well as transparency requirements;
- the necessity of promoting diversity in the composition of the management organ
- in accordance with the principle of proportionality regulates the functions of the risk management committee and nomination Committee
- the reissuing of the risk management framework at the credit institution's level, with the redefinition of its component operations, key functions for this activity, subordination and reporting relationships on risk management.

The conclusions to be made on the novelty brought by the new regulation refer in particular to the following aspects:

- in response to the global economic crisis and its devastating effects on the activity of credit institutions, the new regulation is focused in particular on the risk management for the credit institution and on the role, duties and responsibility of the management structure;
- it prefigures models of organizational structures / of management structures, stable, balanced, with clearly defined responsibilities and the real possibility of exercising their control, so as to be diminished the excessive risk taking by the credit institution as a result of any decision-making system flaws;
- the new regulation also focuses on the methods and mechanisms for rescue, resuscitation of the credit institution's activity after a possible economic shock, as well as on damage mitigation systems.

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## Debates on Intellectual Property Rights

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**Abstract:** This paper supports the understanding of the definition of intellectual property rights and strong connection with intangible assets and, on the other hand, provides a brief presentation of the organizations supporting the protection of such rights.

The essential aim of this article is represented by the detailed information obtained as a result of research carried out in order to define, identify and study the application of IPR in general and especially in our country.

At the end of the paper I mentioned what involves protecting intellectual property rights and brought little concerned how our country is perceived to protect such rights.

Most often, intellectual property is defined as a formal document of title, like a lease, which means that the property is a legal concept distinct from real property that are actually good without concrete material form. Constitute a special category of assets being perceived as an original creation, derived from creative ideas; has or may have a commercial value due to its contribution to earnings for its owner.

The need for protection of intellectual property rights has emerged because of the changes in the contemporary society. The aim and purpose of which is to protect human intelligence product and, at the same time, ensuring that consumers benefit from the use of the attributes of this product.

Always remember that the violation of intellectual property rights, causes injury to major economic, signifying a strong threat to the consumers health and safety.

**Keywords :** *Intangible assets, protection, organizations, intellectual property rights.*

**JEL Codes:** *M4, K10, A19, O34.*

### 1. Introduction

Intangible assets are the most important resources of an enterprise because they can show us the technical - material and financial results from the progressive and continuous development.

Intellectual capital and intangible assets constitute the foundations successful companies on the market. In such a competition, knowledge assets provide a sustainable competitive advantage.

These economic factors have always been the subject of various researches conducted in order to identify the many methods and techniques for measuring the advantages they have in doing business, which has given rise to multiple controversies.

Because of these issues I have deepened and presented the research, trying to link the existence of intangible assets and intellectual capital so that I could refer to the protection of intellectual property rights.

## 2. The present state of knowledge

Intangible assets can be presented and evaluated in terms of both international accounting standards, financial reporting standards and in accordance with international standards.

In accordance with IAS 38 "*Intangible assets*", an intangible asset is a good nonmonetary, identifiable, without physical substance-intangible assets, intangible assets.

An intangible asset is an identifiable asset, nonmonetary, without support material and used for use in the production or supply of goods or services, to be rented out to third parties or for use for administrative purposes (OMFP 3055/2009 No., Section 8.2, paragraph 72). It forms an integral part of the fixed assets, represented as formation expenses, expenses for research and development, concessions, patents, licences, trademarks, computer software etc.

Future economic benefits from an intangible asset created reveals the ability to contribute, directly or indirectly, cash flows or cash equivalent to the entity (Treasury assets) and may take the form of cost savings or income derived from the sale of goods or services.

According to the latest studies and research, it has been observed and was aware of the importance of economic growth, information technology, human capital, economic processes, capabilities and skills of the Organization as organic factors related to knowledge. Each of them individually approach reveals very valuable items, with great practical implications. But the common denominator is the knowledge that actually means and how to individualize their operationalization.

Knowledge is "a base of data and information" stored in people's minds, but also skills arising from their use by the receiver. These abilities depend on intellectual capacities (perception, judgment) of the receiver, and the essential feature of knowledge (which differs fundamentally from the data and information) is their ability to generate added value through their appropriate use.

Intangible resource as intellectual capital along with the tangible resources of an organization include the market value of a business.

The intellectual capital of an organization is made up of human capital (know-how of its employees) and its structural capital (organizational and intellectual property). In other words, its main ingredients are human capital (what is the potential value of the company assets), intangible assets and intellectual property.

Good management of human capital could create intangible value to the company.

## 3. Intellectual Property: The definition and specific issues

The notion of intellectual property it is associated with the intangible assets .

Generally, intellectual property is defined as a formal document title, like a lease, which means that the property is a legal concept distinct from real property that are actually good without concrete material form. As their owner are unique and protected by law for unauthorized or counterfeit operation, intellectual property is a special category of assets. It includes all the knowledge that can give rise to property rights; result of human activities even during the creative process using different devices, such as computer if the person conducting a computer program.

Even if the outside is a visible manifestation or expressed material, intellectual property remains intangible. For example, a painting is a tangible object, and the creativity of the author is the subject of intellectual property.

Intellectual property is an original creation, derived from creative ideas; has or may have a commercial value due to the contribution from obtaining legal gains for its owner.

We can associate the following attributes: possession, use and disposal.

Examples of intellectual property rights: the right to exploit an idea, the right to have a claim, patents (patent), copyright (copyright) and product trademarks, trade secrets or know-how (knowledge powers, etc.).

These include the following rights: to use, to hold, to sell, to rent, to test (bequeath) to donate, to vote or to exercise any or none of them.

Copyright protects the form of an original expressive works (literary, artistic or technical). The patent protects the solutions and original ideas and trademark protects the identification of a manufacturer or other reputable sources.

*Observation!*

In the idea of highlighting the sources of the rights of separation intangible, intellectual property rights is purely theoretical. Intellectual property rights are contained within copyright and related rights and industrial property rights.

According to the Organization for Economic Cooperation and Development - OECD highlighting intangible ownership structure of a company, we highlight two types of intellectual property rights, set out as follows in the table below.

**Tabel no.1:** The structure of a company's intangible property <sup>26</sup>

		<b>TECHNOLOGICAL INTANGIBLE ASSETS</b>	<b>MARKETING INTANGIBLE ASSETS</b>
<b>UNDERLYING ASSET</b>		<ul style="list-style-type: none"> <li>• tehnology</li> <li>• product knowledge</li> <li>• the ability of employees</li> <li>• management ability</li> <li>• the management system</li> <li>• information system</li> <li>• computer programs</li> </ul>	<ul style="list-style-type: none"> <li>• reputation</li> <li>• credibility</li> <li>• bank standing</li> <li>• customer lists</li> <li>• distribution network</li> <li>• contracts</li> <li>• relations - partnership</li> </ul>
<b>INTELLECTUAL PROPERTY RIGHTS</b>	<b>Registered</b>	<ul style="list-style-type: none"> <li>• patents</li> <li>• models, drawings</li> <li>• copyright</li> </ul>	<ul style="list-style-type: none"> <li>• brands</li> <li>• trade name</li> <li>• franchise</li> </ul>
	<b>Unregistered</b>	<ul style="list-style-type: none"> <li>• know – how informations</li> <li>• manufacturing secrets</li> <li>• improvement projects</li> </ul>	<ul style="list-style-type: none"> <li>• market informations</li> <li>• informations about clients</li> <li>• comercial strategies</li> </ul>

**Source:** Ion Anghel, 1998

The table shows that intellectual property rights are considered to be a special category of intangible assets. Those recorded are protected legally from being marketable, market potential and the unregistered can bring profit, but companies are not directly marketable on the market.

Technological intangible assets are based on the ability of an entity to produce goods or provide services, and the marketing is based on the company's relationship with the potential commercial market.

Industrial property rights are grouped into three categories:

<sup>26</sup> Presented from the intellectual property rights point of view - Ion Anghel și Sorin Stan, *Evaluation of intangible assets*, Editura Iroval, București, 1998, page 43.



a) the rights arising in connection with the rights of inventors, creators and designs, technical designs patented as inventions, protection of new plant varieties and animal breeds, protection of topographies of integrated circuits, industrial secret;

b) distinguishing marks, trademarks, geographical indications, trade names and companies;

c) aimed at unfair competition with direct reference to new creations, the hallmarks.

Intellectual property rights have a limited or unlimited in time: inventions, copyrights have a limited time, when an artist's moral right to stop the destruction of his work is unlimited in time.

Intellectual property rights are present and included in all subsequent achievements protected. Is a monopoly right.

Ownership of intellectual property elements offer the following advantages:

- cost reduction materials;
- increasing labour productivity;
- reduction of transport costs, handling, storage;
- eliminate or reduce scrap, loss;
- increasing recyclability postutilizare;
- reduction of fuel consumption and energy;
- eliminate or reduce environmental risks and impacts negatively on nature;
- achieving a competitive advantage;
- improve and maintain a good market image, and the list goes on.

#### **4. Organizations supporting the protection of intellectual property rights**

##### *4.1. The State Office for Inventions and trademarks-OSIM<sup>27</sup>*

It is a specialized body of the central public administration in Romania sole authority in the protection of industrial property, in accordance with national legislation and the provisions of international conventions and treaties to which Romania is a party.

OSIM has responsibilities in the protection of industrial property rights, as defined in art. 1 of the Paris Convention for the Protection of Industrial Property. Bonds issued by granting protection that gives holders exclusive rights in Romania and National Registers of applications depository and National Registers of protection titles granted for inventions, utility models, trademarks, geographical indications, designs, additional certificates protection of topographies of semiconductor products and new plant varieties.

In the legislative regulations, the institution shall develop draft industrial property laws including the National Strategy in the field of industrial property.

OSIM represents Romania in decision-making structures of bodies and specialized international organizations and applications for securities depository industrial property protection.

##### *4.2. Chamber of Commerce and Industry - CCIR<sup>28</sup>*

Chamber of Commerce and Industry of Romania (CCIR) is the most powerful business association in Romania, bringing its ranks the whole system of chambers of commerce and industry, county, bilateral chambers of commerce and professional associations.

CCIR is a non-profit organization, with independent nature, which supports the interests of the business community and, in particular, those of its members in dialogue with State institutions and international organizations. Work to create a stable business environment, coherent and

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<sup>27</sup> [www.osim.ro](http://www.osim.ro)

<sup>28</sup> [www.ccir.ro](http://www.ccir.ro)

conducive to the development of the private sector, a real market economy, sustainable and open outward.

#### *4.3.The Romanian Office for copyright-O.R.D.A.<sup>29</sup>*

Is a specialized body of the central public administration, subordinated to the Government, with legal personality, being the single regulatory authority, evidenced by the national registries, surveillance, authorisation, arbitration and technical-scientific findings in the field of copyright and neighbouring rights. O.R.D.A. has duties in promotion of projects of normative acts in the field of its activity and to contribute to the participation, development and updating of the national strategy in the field of intellectual property.

Organizes and administers the registration or enrolment in national registers and other specific national records of copyright and related rights; released for use in the field of holographic markings of copyright and neighbouring rights.

By the law of ORDA running tasks on collective management are:

- ✓ keeps track of repertoires submitted by collecting societies;
- ✓ advises and supervises the operation of the establishment of collecting societies;
- ✓ give consent to proposed changes to the statutes of the collecting bodies and the establishment of joint bodies, the collection for several fields;
- ✓ give consent to registration in the register of associations and foundations in the field of copyright and neighbouring rights at the registry of the courts, as well as to associations for combating piracy;
- ✓ controls the functioning of collective management bodies and establishes measures for entry into legality, sanction.

ORDA self representation in dealing with similar professional organizations, including the European Union institutions and bodies and international organizations to the Romanian State is a party, in the field of copyright and related rights.

OSIM and ORDA works with the National Customs Authority to combat counterfeiting and piracy of intellectual property rights.

#### *4.4.World Intellectual Property Organization – OMPI (WIPO)<sup>30</sup>*

Under the original name in English, the World Intellectual Property Organization, or WIPO was established by the Convention establishing the world intellectual property organization, signed at Stockholm on 14 July 1967 and confirmed on September 28, 1979. In accordance with article 3 of this Convention, WIPO promotes the protection of intellectual property throughout the world (according to the original playback-"It seeks to promote the protection of intellectual property throughout the world"). Later, in 1974, WIPO became a specialized agency of the United Nations.

Romania is a founding member of WIPO and cooperate with it on the basis of the cooperation Program between the Romanian Government and WIPO.

WIPO currently has 183 Member States, administers 23 international treaties, headquartered in Geneva.

#### *4.5.Office for harmonization in the internal market - OAPI<sup>31</sup>*

Is the public authority responsible for the procedures relating to the registration of Community trade marks since 1996 and designs 2003 community. These intellectual property rights are valid in all EU Member States.

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<sup>29</sup> [www.orda.ro](http://www.orda.ro)

<sup>30</sup> [www.wipo.int](http://www.wipo.int)

<sup>31</sup> [www.oami.europa.eu](http://www.oami.europa.eu)

Under the name of The Office of Harmonization for the Internal Market (OHIM), L ' Office de l ' dans le marché intérieur harmonisation (ohm) to Oficina de Armonización del Mercado Interior (OAMI), Das Harmonisierungsamt für den Binnenmarkt (HABM), L ' Ufficio per l ' nel Mercato Interno Armonizzazione (UAMI), the seat of the institution is in Alicante, Spain.

The first applications for Community trade marks were filed in 1996, and for Community designs in 2003. Community trade mark and community design are essential for the single market, which is the European Union, which are valid throughout the Union. OHIM examines, registers and manages marks and Community designs and their protection at european level. OHIM also maintains registers of trademarks and registered Community designs, and with the courts of the Member States of the European Union decides on applications for annulment of Community trade marks.

Being an independent public institution legally, administratively and financially, it has legal personality and is governed by Community law.

The legality of its decisions is supervised by two Community Courts: the Court of first instance and the Court of Justice of the European Communities (European Court of Justice).

#### *4.6.The European Patent Organization and the European Patent Office - OEB<sup>32</sup>*

European Patent Organisation (EPO) was established with the adoption of the Munich Convention of 5 October 1973 (revised November 29, 2000) European Patent. Organization whose main mission European Patent task being performed by the European Patent Office under the control of the Board. The office has tasks that relate to information and publication of inventions aimed at the European Patent Register is managed and published European Patent Bulletin and Official Journal of the EPO.

It also gives technical advice at the request of national courts asked for an action for infringement or invalidity concerning European patents and, with the support of the Contracting States, provide technical assistance to developing states.

#### *4.7.Organization for Economic Cooperation and Development – OCDE<sup>33</sup>*

The Organization for Economic Cooperation and Development is an international forum for debate through which 33 governments, including the Romanian government is working to solve the economic, social globalization.

This international organization's mission is to build a strong economy in the Member States, improve efficiency, improve and strengthen the market, expanding free trade, increased contribution in economic development.

It was originally called the European Economic Cooperation Organization (OECE).

OECD helps governments in increasing prosperity and fight poverty through economic growth and stability, trade and investment, technology, innovation, entrepreneurship and Development Cooperation. Must be to ensure that economic growth, social development and environmental protection are achieved together. Other goals include creating jobs for all, social justice, clean and effective governance.

It makes efforts to understand and to help governments respond to new developments and concerns. These include trade and structural adjustment, online security and the challenges of poverty reduction in the developing world.

For more than 40 years, the organization is one of the largest and most reliable sources of comparable statistical, economic statistics and social data. Its databases contain a wide range and diverse as national accounts, economic indicators, labor, trade, occupation, migration, education,

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<sup>32</sup> [www.epo.org](http://www.epo.org)

<sup>33</sup> [www.oecd.org](http://www.oecd.org)

energy, health, industry, taxes, and the environment; most of the studies and analyzes are published periodically.

Over the last decade by the OECD have solved a number of social, economic, environmental, and developing connections in the business, trade unions and other civil society representatives.

OECD member countries are: Australia, Austria, Belgium, Canada, Czech Republic, Chile, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Israel, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States, Romania.

OECD headquarters is located in Paris.

In May 2005 the Romanian Centre was officially inaugurated OECD Information and Documentation (CRID) of the Institute of National Economy, Romanian Academy, supplemented by an information and documentation OECD, which operates within the Ministry of Foreign Affairs. CRID Centre aims to provide access to documents and publications developed by the OECD and become the primary interface between the Romanian and OECD experts.

OECD is also concerned with the analysis of new trends such as sustainable development, e-commerce, biotechnology, food safety. Today is an important framework for guiding policy development and economic convergence or, as it defines itself, an organization that, above all, provides a framework for governments to review, develop and adopt economic and social policies. This supports intangibles optimizing scientific research, experimental development, innovation, representing the main activities that provide knowledge and generate economic and social progress.

In Romania the research and development activity is a national priority and has a role in sustainable economic development strategy.

Also meet other bodies, treaties, agreements, associations or agencies etc. on the protection of intellectual property rights to present and analyze them in the next stage of research. These are:

- ✓ Trade agreement against counterfeiting-ACTA;
- ✓ The State Agency for intellectual property-AGEPI;
- ✓ The Agency for innovation and Technology Transfer-AITT;
- ✓ The African Regional Industrial Property Office-ARIPO;
- ✓ The Association "of copyright and related rights"-AsDAC;
- ✓ The Benelux Organization for Intellectual Property BOIP;
- ✓ The official industrial property Bulletin-BOPI;
- ✓ The International Confederation of societies of authors and Composers-CISAC, the Eurasian Patent Office invention-EAPO;
- ✓ The European Convention of patents-CEB;
- ✓ The European patents-EPO;
- ✓ The European Grouping of societies of authors and composers-GESAC;
- ✓ The International Confederation of Music Publishers (ICMP)-;
- ✓ The African Intellectual Property Organisation — OAPI;
- ✓ The Treaty on cooperation in the field of Invention Patent-PCT;
- ✓ The Standing Committee in the field of copyright and related rights SCCR;-
- ✓ The Treaty on the law of trademarks WIPO-TLT;
- ✓ The intellectual property rights relating to trade-TRIPS;
- ✓ The Copyright Treaty WIPO-WCT.

## **5. Protection of intellectual property rights**

The scientific and technological research, education, labor, sophisticated software, advanced telecommunication and electronic finances have become key sources of labor tomorrow and not least the organization of self-knowledge must always be protected.

Movies, music recordings, books, computer software and online services are bought and sold because of information and creativity contained.

Therefore, we can say that the intangible assets of the firm and its intellectual capital are the advantages of obtaining a sustainable competitive advantage or disadvantage tangible technology alone.

The need to protect intellectual property rights arose because of changes that are permanent contemporary society. Because the so-called era of digitization or technologization, we face many changes, priorities and modifying them in turn. Thus the old ideas are instantly replaced with new ones; evolution is very fast that day may appear chance that everything was true until now to have a different value.

Whenever the value creation can occur through innovation, research and development, brand building, brand or through networking, networking, partnerships; in other words, value creation can occur through all the intangibles.

Intellectual property, with its two components, industrial property on the one hand and copyright and related rights on the other hand, is one of the basic levers of economic, social and cultural nation. In this context we can say that the protection of intellectual property rights is of great importance. The goal and purpose is to protect the product of human intelligence and at the same time, ensuring consumer benefits of using the attributes of this product.

Violation of intellectual property rights causing major economic damage. A significant number of infringing products at the moment represents a real threat in terms of consumer health and safety.

#### **6. Romania and the protection of intellectual property rights<sup>34</sup>**

In Romania, the protection of intellectual property rights (in all its forms) is implemented in accordance with the *Industrial Property Rights Strategy for Europe*. It outlines actions to achieve a system of industrial property rights of high quality, able to allow Europe to benefit from its potential in addressing the challenges of economic globalization.

According to this strategy, such a system must:

- ✓ to have a top quality, characterized by strict standards of review;
- ✓ to be approachable, offsetting the costs through quality and legal certainty;
- ✓ to be coherent, with a common interpretation of laws;
- ✓ to be able to ensure a balance between rewarding valuable intellectual creation and ensuring good circulation of ideas and innovations.

The Romanian government has adopted the strategy period 2003-2007. During the same period have been promoted the principles of active companies, encouraging for high-performance, based on work values, social cohesion, solidarity and responsibility and contributed to the establishment of a balance between the interests of authors and public interest, ensuring an environment of creativity in order to create benefits for all parties involved.<sup>35</sup>

In 2010, they took steps for the continued existence of strategies, extending until 2015.'s New Strategy proposes specific targets for increasing creativity and innovation and develop strategic objectives underlying the 2003-2007 National Strategy on intellectual property, and introducing new objectives.

This strategy becomes the initiator of creativity, innovation, ie the link between entities in the field: designers, creative industries, public, users and institutions involved in the field.

The purpose of the Strategy is to coagulate institutions responsible efforts and involvement in the intellectual property system in Romania, so as to ensure protection of rights. Equally

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<sup>34</sup> Information processed by the author along with the studies and research carried out and provided by „Lucian Blaga” University from Sibiu.

<sup>35</sup> Dumitrescu, M., Burghilea, C., Burghilea, O., *European Policies by 2020*, Hyperion International Journal of Econophysics & New Economy, Bucharest, ISSN: 2069-3508, Volume 6, Issue 2, 2013

compatibility and harmonization strategy seeks permanent intellectual property system in our country to the community.

This has led to a program of action that was structured with the following objectives<sup>36</sup>:

✓ The development of methodologies, methods and institutional coordination: improving coordination and the flow of work between the institutions dealing with the protection of intellectual property rights (IPRs) in Romania, the revision of the legal framework and procedures for the protection of IPRS in Romania, development and approval of a methodology for estimating the rate of piracy and counterfeiting;

✓ The human resources training and Development: elaboration of training plans for the medium and long term for all institutions involved in the protection of IPRS, the training of trainers within key personnel in beneficiary institutions, training courses for the staff of the institutions;

✓ The creation of a common database for all institutions involved in the protection of IPRS and the development of a campaign of public awareness about the risks involved in violation of such rights.

In developing this strategy has taken into account the National Strategy for research, development and innovation (RDI) for the period 2007-2013. This vision is based on Romanian society regarding the role of science, technology and innovation in the development of the knowledge society in Romania for economic and social progress.

We conclude by the fact that the vision of the Strategy has three objectives: creation of knowledge for the achievement of scientific and technological results, increasing the competitiveness of the Romanian economy and, not least, increased quality of life.

In case of copyright protection of computer programs, the protection afforded by the Romanian law operates both the works and rights holders Romanian and the foreigners and works created by them. According to the law, "aliens who hold the copyright or neighboring rights, benefit from the protection provided by the Conventions, international treaties and agreements to which Romania is a party, and in their absence, are treated equal to the Romanian citizens who will avail themselves of national treatment in that State. *"The same protection is recognized by the law regulating the relations of private international law which states that "copyright (...) of foreign legal persons are protected in Romania, according to Romanian law and international conventions to which Romania is a party".*

Romanian State is a signatory to the Agreement on trade relations between Romania and the United States of America ratified by Parliament by Law. 50 of 1992. According to Article 8 of this Agreement, each Party shall ensure copyright protection belonging to holders of the other Contracting State under paragraph 2 letter. a) section and the letter attached to this Agreement. As mentioned text sets, enjoy the protection of both software and copyright holders. Holder is expressly recognized the exclusive right to prevent the existence and distribution in Romania of unauthorized copies of computer programs belong<sup>37</sup>.

Also, to protect intellectual property rights, menus piracy and anti-counterfeiting programs belonging to some of the leading companies producing software in the world.

IDC (International Data Corporation) is one of the largest market research and consulting in information technology, telecommunications and consumer technology markets worldwide. (Provide global research with local content). Is helping IT professionals, business executives, and investors so they can make informed decisions on technology purchases and business strategy. More than 900 analysts in 90 countries provide global expertise, local and regional markets on opportunities and trends in technology. For over 43 years, IDC has provided strategic insights to

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<sup>36</sup> <http://ppi.ulbsibiu.ro/ro/proprietate/index.php> - Universitatea „Lucian Blaga” din Sibiu

<sup>37</sup> [www.microsoft.com](http://www.microsoft.com)

help our clients achieve their key business objectives. It is a division of IDG, the world leader in providing media, research, conferences and events<sup>38</sup>.

Established in 1993 as a representative of IDG Inc., Headquartered in Boston, U.S., IDG Romania - is the market leader in web publishing and events, with extensive work on the line and with a diverse portfolio of projects Special IT & C market in Romania. The mission aims to redefine their core business in relation to new digital era and fulfill this mission through all means available<sup>39</sup>.

After IDC studies, if the current software piracy in Romania would be reduced by 10% over the next four years, this would create 3,711 jobs, would add 573 million dollars to GDP and generate revenues of 498 million dollars for the local IT industry and 87 million dollars in tax revenue for the government.

To my further research I will present a small case study on the protection of intellectual property rights in Romanian software industry offered by Attorney Magda Popescu, representing the Business Software Alliance in Romania<sup>40</sup>. It is the most important organization dedicated to promoting a safe online world, according to the laws in force. Constitute spokesman sectors software, hardware and Internet world the governments and consumers in the international market.

BSA educates computer users in the field of copyright for software and information security universe supports public policy that encourages innovative spirit, expand opportunities for trade, the fight against software piracy.

The concept of software patent is not in Romania and the EU. In Europe software is protected by copyright. This results in many consequences, but first I'd like to clarify is the fact that if copyright protection is not required to register to obtain exclusive rights suffice creation and marketing. A second problem is the duration of protection. Copyright it lasts 75 years, the patent for 20 years. If you do register, you are not subject to any charge, while a patent can cost a lot. Regarding the Romanian software manufacturers do not have separate statistics for people worldwide. Piracy rate of 64% in Romania and Bitdefender affecting him, give an example, as it affects Microsoft (Bitdefender is more vulnerable).

This aspect was also joined BSA's. The same problems, internet piracy, the unauthorized distribution and use, but more reforms are envisaged by the Romanian Copyright Office (ORDA) and the Ministry of Culture. In addition, the ROC has agreed to officially introduce its draft legislation amending copyright for software vendors obligation to inform consumers about the risks of software piracy<sup>41</sup>.

Do not think that we are protected by copyright than patents. In both cases the violation constitutes an offense.

From the point of view of Lady Lawyer, legislative and organizational influence made by software producers and holders of copyright industries protected by copyright, was much stronger and therefore the penalties are more severe in the copyright than in the industrial property, including patents. For this reason it seems that things are placed and if you forget how many checks are made annually for patent infringement, you will discover that there are far fewer than the attention paid to the copyright in computer programs. Not seen or heard of any instance of a press conference or any protocol to any manufacturer protected by patent.

Recently, together with the General Inspectorate of Romanian Police signed a protocol to prevent and combat piracy. This partnership involves the initiation of joint projects, campaigns and outreach to consumers and businesses, to reduce the risk of breaches of legislation.

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<sup>38</sup> <http://www.comunicatedepresa.ro/idc-romania/>

<sup>39</sup> [www.idg.ro](http://www.idg.ro)

<sup>40</sup> [www.marketwatch.ro](http://www.marketwatch.ro)

<sup>41</sup> <http://w3.bsa.org/romania/>

Thus comes the role of the BSA where you can call if you are a member. In terms of educational and public relations benefit the entire market, because when you promote a message of legality and respect for intellectual property and non-member advantage BSA.

There are instances of software theft when someone makes a program that is similar to yours, but this does not affect the market. In Romania, the loss of 195 million euros for the software industry come from ordinary breach of copyright in computer programs from unauthorized use, the use of unlicensed software from unauthorized distribution.

Our big problem and one of the reasons why our country still has a high piracy is public perception. Ownership of a visible object is more respected than ownership of a software that is immaterial. *"If you get someone to steal a glass is considered offended that you did the thief, if you put you to download pirated software from the internet and install it will not be offended,"* said lawyer Magda Popescu, representing the Business Software Alliance in Romania.

## 7. Conclusions

Nowadays due to the development and continuous resizing technologies become more and more a reality inconceivable without concern for performance, success and success. Therefore any company trying to go beyond trying to adopt new requirements and requirements relating to the economy of the knowledge society.

In Romania the research and development is a national priority and has a role in sustainable economic development strategy.

From the analysis, according to the topic under research, we emphasize the idea that intellectual capital can be considered a heritage item, a hidden fortune, which was not reflected in any of the financial statements known. Is of particular importance in developing companies.

In the new economy, learning and knowledge have become key success factors internationally and intangible resources have gained importance. Thus existing struggle between competing companies moved directly from the "front" of such tangible capital resources, raw materials, land, machinery or equipment and so on, in the intangible resources, where items such knowledge - know - how - and the ability to use them - knowledge management has a decisive role.

From the intellectual capital perspective we note that the content in the knowledge society and the role of work has undergone important changes. As a result, the work machine is associated with intelligent or active-productive information<sup>42</sup>.

Always remember: try to be one step ahead of technology.

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<sup>42</sup> According to Niță Dobrotă, Andreea Stan, *Work and its role in the knowledge society*, Tribuna Economică, nr. 8/2005, page 13 - 15.



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