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DOCTORAL DISSERTATION

Abstract

THE PERFORMANCE OF THE ROMANIAN BANKING SYSTEM. THE IMPACT OF THE EUROPEAN INTEGRATION

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CLUJ – NAPOCA, 2011

The content of the doctoral dissertation abstract

Key words: banking performance, banking system, European integration, banking institution, credit portfolio, commissions, scoring, risk management, The International Treaty of Capital Convergence and Adequacy (Basel II Treaty), credit risk, non-reimbursement probability.

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2. The motivation and importance of the scientific research

Globalization is an objective reality for Romania, a process to which our country must align since the globalization tendency through integration is a real one. Adhering to the European Union represents a fundamental strategic step, while the problem of the institutional regulation and financial surveillance reform, both at the level of the European Union and at the level of our country as integrant part of the European Union, is one of great actuality.

When speaking about performance, as an ensemble of actions, re-active or pro-active, towards reaching some aims or limiting some dysfunctionalities, I shall use the term *performing*. Thus, performing is analysed from the point of view of falling under a critical alarming threshold, according to which a loss or a negative evolution can be embodied for the smooth evolution of the bank or the whole banking system. Performing can be understood from two perspectives:

- an individual, singular perspective, referring to pre-established indicators;
- a second, collective, much more complex perspective, which represents a pluralism of structural, legislative actions which contribute to the smooth evolution of the whole system.

In order to succeed in creating a healthy macro-prudential analysis, one must start from understanding "the basis cell", the micro-prudential analysis as an integrant part of the methodological frame of monitoring the banking risk, in other words, the risk inherent to the crediting activity. Credit risk remains the major preoccupation from the perspective of the banking stability, considering the complex way in which this is engendered, including the transfer from the credit institutions to their counterparties (legal persons) of the risk inherent to the exchange rate (in the case of currency credits, by the devaluation of the national currency) and of the risk associated with the interest rate (in the case of lei credits, with growing interest). The transfer of the two mentioned risks has significant negative implications upon the performances of clients and, consequently, upon their ability to reimburse the credits, considering the present economic conditions.

As an integrant part of the banking system, any bank, taken individually, and any banking system, taken collectively, takes risks when allowing credits and, certainly, all banks mark losses at the level of the client portfolio when some debtors don't honour their obligations. Indifferent of the level of the assumed risks, the losses of the client portfolio can be minimized if the crediting operations are professionally organized and managed. There must permanently exist an equilibrium between the non-reimbursement risk and the profit associated with the credit portfolio (performance-risk relation), which certifies the existence of a healthy bank management in the domain of crediting clients and a corresponding development of the bank on the national and international banking market.

The changes at the financial-institutional level, among which there can be mentioned: the liberalization of the capital fluxes, strengthening competition between the financial-banking institutions and the growth of the volume of transactions, especially of the speculated ones, have contributed to an increase of instability at the financial level. This instability generated consequences on two different levels: firstly, it led to a development of the credit risk and, secondly, it encompassed preoccupations within the area of the management of this type of risk by the appearance, extension and even generalization of some advanced evaluation and protection techniques for the crediting risk.

Although there emerged a diversification of the risks present in the activity of a bank in our country, such as operational, juridical risk, systemic risk, there has mainly persisted the risk associated with the crediting activities, this being a primary risk for the developing banks. Consequently, the performing of a bank can be judged from the perspective of the identification, assumption and management of this type of risk.

All these operation systems increased the vulnerability of banks to successive negative shocks and led to the worldwide growth of the number of banking bankruptcies. In order to survive and thrive, banks have assimilated new instruments and techniques for risk management.

The current doctoral dissertation intends to present both sides of the understanding of the banking system in Romania, on the one hand, at a macro level, by the analysis of the evolution of the banking system in the context of European integration, from the point of view of the legislation and crediting evolution and, on the other hand, having been given the great majority of the crediting practice, the performing of the banking institutions and, more precisely, the improvement of the default risk monitoring.

The scientific approach intends to emphasize the improvement of the present monitoring methods of the default probability, at the level of the banking institutions, using, on the one hand, data emerging from the banking institutions and, on the other hand, data emerging at an aggregated level from standardized reporting. I also intend to cast light upon the importance of including in the micro analysis of the macro-economical elements items with a defining role in choosing the future business strategy for each bank.

Understanding performance as a complex long-term process when it refers to a banking system (performing) also represents one of the aims of the research.

3. The methodology of the scientific research

Stressing upon the necessity of broadening the view when it comes to the need to understand the present events, but with strong references to the past, throughout this paper there shall be used both theoretical and practical aspects, quantitative and qualitative aspects, the sole declared purpose being that of a minimum real plus towards the improvement of the performing methods for banks as an integrant part of the banking system which long ago stopped being Romanian, but which is the banking system from Romania.

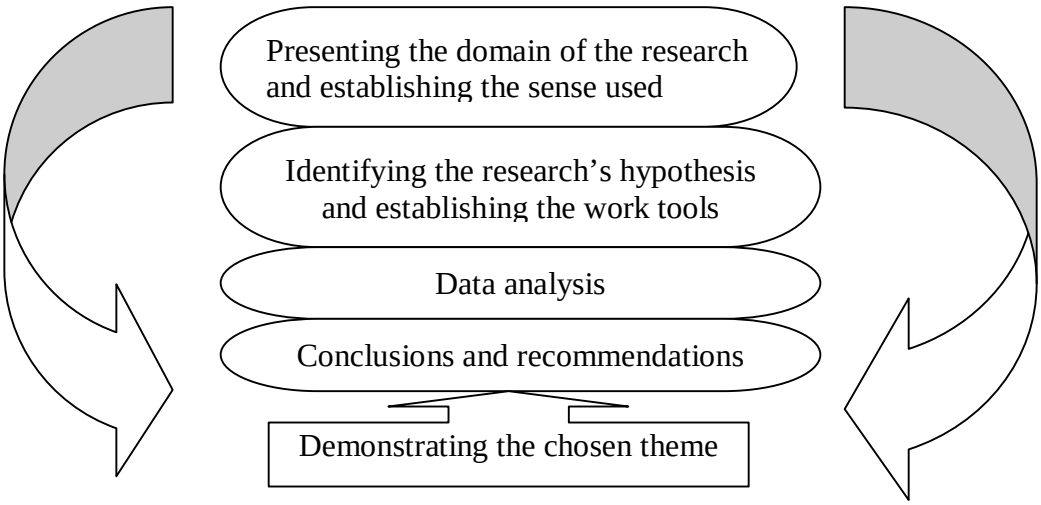
As already stated, the main element is represented by the improvement of the evaluation tools for the risk generated by the activity of the credit institutions, according to the present status of European Union member, but also by the requests of the Basel II treaty, on the basis of which the competent authorities can select the optimal measures in order to prevent the appearance of a possible banking crisis in Romania. For that purpose, I have used relevant elements from outside the micro-prudential analysis sphere and in the end I tried to carry this micro-prudential analysis further in the context of the micro-prudential analysis by using the FINREP and COREP reporting instruments.

The selection, development and improvement process of the specific tools started from the present and anticipated necessities and vulnerabilities of the Romanian banking system, forming the *hypothesis* from which the scientific research emerged. What intends to be proved is the fact that, starting with the development of the banking system, the complexity of the risk management tools must be compliant with the supervened changes. It is also intended that the term of *performance* be understood in the sense of *performing*, a permanent process which must be dynamically and not statically studied. In order to demonstrate the stated formula, the present work contains, on the one hand, a case study with micro-type data representing a banking institution and, on the other hand, a case study with aggregated data.

An originality mark of the present work is the attempt to comprise in the logistic analysis, besides the idiosyncratic financial performance of companies, also the negative

aggregated shocks at the level of economic domains. Considering the high complexity of most of these undertakings there have been used different tools and also the statistic availability of the necessary data as an additional criterion in choosing the technical solution appropriate for the previously described process.

Thus, there has been used a logit model, the attractiveness of such regressions-type being given by the fact that estimating some discreet values (0-1 type, healthy company-default company) leads to a permanent and limited measure-type (for example within (0,1) interval) which can be interpreted as the probability that a company belongs to one category or another on the basis of some Xi explicative variable which characterizes it. The logit and probit models are non-linear models recommended to be used when the dependent variable is binary (or generally discreet). A linear model, although easier to estimate and interpret from the point of view of coefficients, has the disadvantage that the estimated variables for the dependent variable are not necessarily within the [0,1] interval, which makes the general interpretation of the results very difficult. It is not the case of the logit and probit models which natively give estimated values for the dependent variable within the [0,1] interval, these having a clear probability interpretation. Since we are interested in the PD estimation, the logit model appears as an appropriate candidate to be used. Between the results of the logit and probit models there are only small quantitative differences, in no way qualitative.
A schematic representation of the research's analysis can be found below:



After the observed undertakings, *we have demonstrated* that there is a series of risk factors of a macro-economic level which can have a great impact upon the performance of a banking institution, with direct implications upon the quality of a credit portfolio of a bank, upon its profitability and capitalization and, why not, upon the whole banking system. There has also been shown that the analysis of the aggregated data resulted from standardized reporting at a European level, so that a banking group can prevent a systemic risk. Also, the quantitative and qualitative measures demonstrated that, at the level of the banking system, performing becomes obvious during several years, this being a dynamic process connected to the past, but influenced by future requirements and necessities.

4. The synthesis of the doctoral dissertation chapters

Chapter I synthesis

PERFORMANCE AND RISK IN THE BANKING ACTIVITY. THEORETICAL-METHODOLOGICAL APPROACHES

This chapter remarks itself by a rapid and actual presentation of the theoretical-methodological approaches regarding performance and risk within the commercial banks. After presenting these approaches, there has been established the directing line from whose perspective there shall be sustained the thesis regarding the performance-performing of the banking system[1] in Romania.

Today the *performance* concept represents a picture of the general, economic-social interests which society uses towards improving the individual or collective situation. Depending on the periods to which one refers, the performance concept takes different shapes such as productivity, adaptability, efficacy etc. (Jianu, I.2006; Wagner, J. 2009; Mironiu, M. 2009).

The *performance* concept is being more and more utilized for a large activity scale and, depending on this, it is being associated with success, growth, effort etc. (Jianu, J., 2007). As regards the banking activity, performance is associated with the creation of an added value, an optimal report between cost and advantages. Being imposed by the capitalization of investments in new technologies, this implicitly led to the growth of risks and, thus, the relationship between performance and risk has become indestructibly connected.

[1] According to the 99/2006 G.U.R. regarding credit institutions and the adequation of capital and connected rules associated with the 39/1996 G.U.R. regarding the foundation and activity of the Guarantee Fund of the deposits in the banking system, by "banking system" one can understand the totality of the credit institutions from Romania, co-operative credit organizations, saving banks and crediting for the locative domain, ipotecary credit instituions, instituions which issue electronic currency. In the present work there shall be used the term "banking system" when referring to the credit institutions (commercial banks).

According to the explicative dictionary of the Romanian language, "performance" is defined as an especially good result obtained by somebody or something (engine, machine, person etc.).

The performance of the banking system reflects the efficiency of mobilizing and allocating capital generally and also particularly and, in this respect, banks must mobilize the internal savings, allocate investment funds which contribute to the structural changes from economy and the growth of productivity, they must facilitate payments so that the market can operate at reduced costs and find correlations as just as possible between efforts and effects, in other words efficiency and efficacy.[2]

From my point of view, performance, at the level of the banking system, represents that actuality characterized by decisional, legislative stability, prudential monitoring and coordination of the "players".

The term "performance" is of Latin origin (performo, -are, -atum) and it generally represents the accomplishment level of the aims (Marinescu, I. 2004). Although I consider that the most appropriate meaning of the term performance within this work is the one given by the Latin term "performare", to give a thing a full shape, by the means of some actions, strategies which serve the established aims, the semantic mix between the English "to perform"[3] and the French "performance"[4] represents the whole process undertaken for reaching the established aims. Thus, performance is strictly the result of an action and it largely represents an assembly of logical stages for reaching the established aim. Quantifying performance must not be limited to an indicator, a result, but to the whole assembly of actions undertaken for reaching the set objectives.

[2] In the existing competitive medium the *centre de profit* of the banking institution is being more and more stressed, in other words a profitability of the territorial units of the bank
[3] Achieving a thing with regularity, method and application.
[4] The way in which aims are reached.

Economic literature defines risk as the probability of the future real profitability being smaller than the expected profitability (Halpern, P. et al. 1994). Another definition of risk is that of difference between the expected and the achieved result (Pastre, O. et al. 2007).

According to Dimitris N. Corafas, risk represents the chance of prejudice, damage, loss, hazard (Dimitris, N. 2004, 2007). Within banks, risk is the quantitative expression of producing a loss-generator event. The loss probability is not a purely mathematical element, as it can be determined by statistical and analytical methods, its probability, intensity and size being given by:

- the way of covering loss;
- market conditions;
- the complexity of the tools behind loss.

Economic literature defines risk as the probability that the future real profitability be less than the expected profitability (Halpern, P. et al. 1994). Another definition of risk is that of difference between the expected result and the achieved result (Pastre, O. et al. 2007). But modern financial theory brings new meaning to this definition, considering that probability and risk must not be equated, *"probability actually represents the measurement unit for risk and a quantifying method of this one"*.

The definition which thoroughly illustrates risk belongs to the work "Banks – Small Encyclopaedia" published by the Expert Publishing House in 1998, in which the authors (Acad. Costin C. Kirițescu and Dr. Emilian M. Dobrescu) define risk in business as *"future and probable event whose appearance could lead to certain losses"* (Costin C. Chirițescu & Emilian M. Dobrescu, 1998).

Trying to define and explain banking risk in general, Dennis G. Uyemura and Donald R. Deventa, in their work "*Financial Risk Management in Banking*" published in USA and Great Britain in 1993, begin from the idea that "risk represents the volatility of net cash flow of a business unit" Dennis G. Uyemura & Donald R. Deventa, 1993). By business

unit, in the case of banks, we can understand a department, a branch, a product, the whole bank.

Mathematically speaking, the above definition can be formulated as below:

$$\text{Standard deviation} = \frac{\sqrt{\sum_{i=1}^{n}(CFi - CFavg)^2}}{n-1}$$

where: CFi = cash flow at i period

CFavg = medium cash flow

- cash flow – expresses "cash" and "cash equivalent" entrances and exits;
- cash – contains cash and visible deposits;

cash equivalent – contains short-term placements, investments with a high degree of transformation into cash and which are not exposed to devaluation.

From my point of view, performing in today's banking is influenced not only by the internal factors of the institution, but also by the economic context within which it operates. A high competition on a market where massive crediting imposes an excessive capitalization can be a non-performing reason in the future for the small banks which make a considerable effort to "follow the fashion", especially when the potential losses are not taken into consideration.

An important question arises: When can we speak about non-performing within a banking system? If, for each institution individually, risk intervals with maximum and minimum thresholds are established, taking into consideration the assumed risks, as a result of a well-established strategy, this is hard to quantify at system-level. Performing at this level is represented by finding equilibrium between different action categories, risk generators, not by strictly limited intervals.

During this dissertation, there are studied aspects of the performing of the banking system in Romania in the context of the European integration, both looking at the crediting aspect and at the evolution of the structure of the banking system.

Chapter II synthesis

PERFORMANCE AND RISK MANAGEMENT IN BANKS. THE IMPACT OF GLOBALISATION AND THE EUROPEAN INTEGRATION UPON BANKING

If the first chapter represents an introduction and survey of the main theoretical-methodological aspects regarding performance, the second chapter pictures the impact of the European integration upon the banking system in Romania in general and thus, the perspectives of the research re-position from the theoretical ground to the concrete, practical one.

Any society, any economic-social system tends to develop and face the continuous challenges arisen from the medium in which it exists and which is under continuous transformation. For the banking system in Romania, a country in full transition process, adapting to the requests of the market of the European Union is a challenge, but especially a necessity to maintain itself at an excellent professional development standard in order to be able to face competition. Entering a free market, where the "game" is that of competition, banks must analyse very well the relation between the profits they want to attain and the assumed risks, this relation underlying the efficiency of each bank as a singular entity or of the whole banking system as a complex entity.

The analysis of performance, of the efficiency of the banking system in Romania is of vital importance both macro-economically and micro-economically (Berger & Mester, 1997). Form the micro perspective, that of the bank, the aspect of efficiency is crucial considering the market competition, the growth of performance being somehow "imposed" by the existence of foreign banks in a country of the European Union, a country in transition, leading to improvements in domains such as regulations and prudential surveillance. From the macro perspective, the efficiency of the banking system influences the financial intermediation and the stability of the whole financial system, as long as banks constitute the "backbone" of the financial markets from the European Union (Rossi et al., 2005). Thus, it can be understood that improving the banking

performances indicates a better granting of the financial resources and consequently a growth of investments fosters the growth of institutional performances.

Elaborating some risk management politics represents the continuous preoccupation of the management of a banking institution and these politics must be found at the level of each structure in a bank by the use of some specific tools.

Table 1 **Risk management politics according to decision levels**

Decision level	Directions	Quantification
The centre of the bank	Profitability	ROE, RAROC
	Rating	Rating agencies
	Liquidity	Liquidity rates
	Market value	Stock course, VaR
	Credit portfolio	Benchmark, IRB
Profit centres	Credit portfolio	Credits' equivalent
	The evolution of the interest's rate	Volatility, spread
	Country risk	Country rating
Debtor	Debtor's solvability	Credit scoring
	Guarantees	Mortgage, guarantee

Source: author's adaptations

A consequence, but also a necessity, determined by the development of the banking system in Romania and its entrance on a much bigger and perilous competitive market is represented by the implementation of the Basel II Treaty. In the case of Romania, the implementation of Basel II presupposes a series of important challenges, both for the credit institutions (adjusting risk management and the informational system, preparing the personnel, obtaining the databases etc.) and for the National Bank of Romania (adapting the surveillance system, elaborating the new implementation frame, preparing the personnel etc.).

Considering the set objectives of the research, there has been stressed upon the quantification and management techniques correspondent to credit risk proposed by the Basel II Treaty. Thus, the Treaty amply deals with credit risk and offers banks a wide range

of options for calculating the capital requests according to the typologies of the representations. There can be used three methods for this purpose: the standard approach, the basis approach and the advanced approach using internal rating models.

The novelty elements introduced are as follows:

- promoting a higher sensibility to risk (by refining the respective categories);
- the use of external ratings, the surveillance authority being responsible for recognising the external rating agencies based on some qualitative criteria ;
- widening the sphere of the accepted tools and operations for reducing credit risk.

Approaches based on internal rating models represent the highest novelty element, this being based on the theories for the evaluation of assets. Capital requests are calculated according to the following risk parameters: non-reimbursement probability (*probability of default-PD*), loss in case of non-reimbursement (*loss given default-LCD*), the exposure to the debtor (*exposure at default-EAD*) and the maturity of the exposure (*maturity-M*), the debtor's size (S). Banks that want to implement this approach must obtain the approval and validation of the internal models form the supervisor institution.

In the present context, performance management imposes managers to weigh very well the compromises they must take when it comes to economic growth, efficiency and risk. During the last years, banks have started to adopt more and more innovating performance calculating methods, such as: adjustment according to the risk capital efficiency (RAROC) or the economic added value (EVA).

The final objective of the RAROC indicator is to offer a unitary frame for measuring banking performances. Also, this can also be useful for capital budgeting, as well as for establishing the bonuses for managers (rewarding the managers).

Evaluating risk by the RAROC method presupposes considering the medium cost of risk and determining efficiency upon own funds, following the below relation:

$$RAROC = \frac{Exploitation\ income - risk\ bonus}{total\ capital}$$ [5]

The main limit of this method is considering only own regulated funds for measuring the solidity of a bank.

The **VAR** method is presently being utilised by all big banks in order to evaluate the market risk which can have several causes, out of which there can be mentioned: changing the interest's rate as a result of the central banks' interventions in the activity of other banks. The VAR[6] method allows determining the level of losses on a set period and it makes possible the capital's evaluation, consequently own funds necessary to cover the risk of potential losses.

EVA (Economic Added Evaluate) is a modern instrument which determines whether a business won more than the real cost of capital. EVA is an instrument which concentrates on maximising the shareholders' fortunes, developed by Stern Stewart & Co. Application in banks is relatively new as this began to be applied in the USA in 1994.

As a conclusion to this chapter we can state that the worldwide actual situation can and must be a clear message for any country which desires to enter the European Union, alongside the great powers of Europe, with all the social, economic and financial implications. For the candidates, as is the case of Romania, the "lessons" taught by the economic-financial crisis are eliminatory for occupying a place in EU. These lessons must be understood and assumed so that in the future these situations can be avoided as much as possible.

[5] Financial result can be determined on the basis of the profit and loss account, the calculation of the expected losses using advanced statistic methods. An indicator that can be used as proxy for the expected losses is the level of the constituted commissions (commissions for the credit risk and other commissions).

[6] The economic capital is determined by the volatility of the economic value of banks. Unfortunately, this represents a vairable hard to quantify. Instead, the financial result of the bank can be used. Thus, the volatility of the economic value of the bank is approximated by the volatilty of the financial result.

Chapter III synthesis

PERFORMANCE AND RISK IN BANKS – FUNDAMENTAL OBJECTIVE OF THE BANKING PRUDENCE SURVEILLANCE

Chapter three concentrates on the major mutations which took place as regards performance and risk in banks from the perspective of the banking prudence surveillance.

In the context of implementing in Romania the prudentiality principles of The New Capital Treaty (Basel II), with regards to calculating the capital requests for the credit institutions, of adopting The International Financial Reporting Standards (IFRS) at a consolidated level, as well as assuring the convergence of the prudential reporting (COREP) requirements with those of financial reporting for surveillance purposes (FINREP), there has been imposed the introduction in the national legislation of the standardized financial reporting frame on a consolidated basis (FINREP), issued by The Committee of European Banking Supervisors (CEBS). This is directed towards credit institutions which utilise IFRS-type accounting standards for generating the consolidated financial reports. Harmonising the internal regulation frame with the CEBS suggestions has been done by publishing the 2007 NBR Decree nr. 6.

The National Bank of Romania and the Banking Institutions have made and are making efforts for the safe and healthy development of the whole crediting mechanism from Romania, and I refer to the present and the future but with strong references to the past, thus showing maturity when it comes to understanding the crediting mechanisms and the management risk inherent to this activity. There has been agreed upon the need to change the principles of banking surveillance as a result of the development and diversification of the crediting process in Romania, more precisely, passing from the *traditional*, accounting banking surveillance, of verifying the conformity of the credit institutions with the requirements imposed by the banking prudence norms[7], to a superior, qualitative

[7] Compliance supervision

stage of the banking surveillance, oriented towards the evaluation of the risks to which the credit institutions can be exposed by their peculiarity, by their risk appetite[8].

Thus, as an imperative *request*, due to the accentuated development and diversification of the banking system in Romania, there has surfaced the need to form some databases as support for the participants in the banking market and not only.

The European Central Bank defines financial stability as a "state in which the financial system – which encompasses financial intermediaries, the markets and their infrastructures – is capable of facing financial shocks and disequilibriums in the process of financial intermediation, which are sufficiently severe to affect the allocations of savings for profitability" (Crockett & Ferguson, 2003).

There certainly is an impressive number of models for the management of credit risk generated by the structure of the credit portfolio, but this is not what we further want to present, but some compulsory minimum elements which must be followed in creating a model by the banking institution according to Basel II.

There are some principles which must be taken into consideration when elaborating the models[9] (according to the recommendations of the Basel Committee, but also of the National Bank):

a.) credit institutions must not forget that the primary responsibility in the formation process belongs to them;

b.) the model must have real predictive abilities for the risk estimations of a bank and the examination of the way in which these are utilised in the relevant activities of the credit institution;

c.) there is no universal method for their elaboration, only minimum elements to be introduced in the model;

[8] Risk based supervision
[9] www.bis.org and The National Bank of Romania

d.) it must include both qualitative and quantitative elements;

e.) the process and the results must be independently revised.

Thus, during a first stage, credit institutions will validate the internal models after which the surveillance authority will evaluate the way in which validation has been made by the banks.

In order to manage a credit portfolio there are several models[10], each stressing different aspects (entrances). Thus, on the one hand, there are being emphasised historical data referring to the counterparty (SD, debtor's rating, non-reimbursement incidents, frequency etc.), among which there can be mentioned the CreditRisk+ model or the CreditMetrics model and, on the other hand, the management models for the credits' portfolio which also take into consideration macro-economic indicators (CreditPortofolioView or PortofolioManager), thus placing the counterparties in a more realistic context regarding the non-reimbursement probability.

It is recommended, for each credit institution, that the whole credit risk exposure be monitored by limits and a reporting system.

In the best known scoring methodologies (Dobson, 2001), the value of the credit risk is calculated by the method of the scoring equation:

$$Y = w_o + w_1 X_1 + w_2 X_2 + \ldots + w_n X_n,$$

where:

- $X_1, X_2, \ldots, X_n$ – entrance variables of the model (in the case of scoring destined to measure the credit risk of a company, these variables usually represent financial reports calculated from financial account extracts)

[10] A description of the creation of the scoring models based on the linear regression is presented by R. A. Johnson, D. W. Wichern, *Applied Multivariante Statistical Analysis*, 2002, Prentice-Hall or by L. C. Thomas, D. B. Edelman, J. N. Cook, *Credit Scoring and Its Applications*, 2002, SIAM

- w_o, w_1, w_2, …, w_n – interception coefficient and constants which describe the weight of the particular variables of the model, the so-called *weights*
- Y – the number which describes the stability/the status of the credit of the entity to be verified, this depending on mentioning the bigger Y model, that is a weaker evaluation of the credit; nevertheless, this relation can be the other way round.

In the case in which a credit institution opts for a *logit model*, there are the independent explicative variables X_1, X_2, …, X_n, by which the status of the Y entity shall be shaped, the so-called dependent variables. In scoring based on logistic regression, the status of the Y entity has the following interpretation:

$$Y = P\,(\,\text{default} \mid X_1, X_2, \ldots, X_n,\,),$$

and thus Y denotes the probability of non-accomplishment during a prolonged period, starting with the reporting date when the variables X_1, X_2, …, X_n, were calculated. By such an interpretation Y through X_1, X_2, …, X_n, on the basis of the linear regression and, consequently, the attempt to build the regression of the formula $Y = w_o + w_1X_1 + w_2X_2 + \ldots + w_nX_n$ encounters problems of a fundamental nature: Y probably belongs to the row [0,1], and the linear combination $Y = w_o + w_1X_1 + w_2X_2 + \ldots + w_nX_n$ can take any values (- ∞, ∞). In order to overcome this problem, the non-linear transformation of the Y variable is composed by the function method.

$y \mapsto 1n\left[\frac{y}{1-y}\right]$ called the connection function. Thus applying the change we form an equation formula:

$$1n\left[\frac{y}{1-y}\right] = w_0 + w_1X_1 + w_2X_2 + \ldots\ldots + w_nX_n$$

or the equivalent

$$y = \frac{\exp\left(w_0 + w_1X_1 + w_2X_2 + \ldots\ldots + w_nX_n\right)}{1 + \exp\left(w_0 + w_1X_1 + w_2X_2 + \ldots\ldots + w_nX_n\right)}$$

The expression $\frac{\exp(a)}{1+\exp(a)}$ always belongs to the (0,1) interval and the mentioned problem for the linear regression disappears.

In the case in which the credit institution chooses *the probit model*, this is based on the transformation of the function method $x \mapsto N_{\mu,\sigma}(\text{wo} + \text{w1X1} + \ldots + \text{wnXn})$ where $N_{\mu,\sigma}$ is the function of normal cumulative density.

If the evaluation procedure of the coefficients w_o, w_1, w_2, …w_n of the scoring equation moves, we presuppose that we have *k* observations of a vector of an independent variable (financial reports, variables calculated on the basis of the history of the competitors' credit) and which correspond to the values of the dependent variables which can take only values from 1 or 0 (there has been there a non-accomplishment or not). We introduce the following symbols:

- $\Rightarrow$ x_{ij} – the value of the X_j variable in the *i* observation,
- $\Rightarrow$ x_i – (x_{1i}, …, x_{ni}) – the vector of the value of the X_2, …, X_n variable in the *i* observation,
- $\Rightarrow$ y_i – the value of the dependent variable in the *i* observation,
- $\Rightarrow$ w = (w_o w_1, …,w_n) – the vector of the coefficients from the scoring equation

The parameters of the scoring equation are evaluated by maximising the probability function

$$l(w) = \prod_{i=1}^{k} \pi(x_i)^{yi} (1 - \pi(x_i))^{1-yi}$$

or equivalently by the log maximising of the probability function

$$L(w) = 1n(l(w)) = \sum_{i=1}^{k} \{y_i 1n[\pi(x_i)] + (1 - y_i) 1n[1 - \pi(x_i)]\}$$

As a conclusion of the above, we can say that it is sufficiently clear that defining the financial stability cannot be made by the help of an indicator or a mathematical/econometric tool, since this presupposes the analysis of a set of indicators during a reasonable span of time, always considering the economic context within which the entities action. Thus, we can state that financial stability must be defined not as reaching some safety thresholds, but more likely as surpassing some critical thresholds, systemic risk generators.

Chapter IV synthesis

CREDIT RISK MANAGEMENT IN THE BANKING INSTITUTION. QUANTITATIVE AND QUALITATIVE EVALUATIONS FROM THE PERSPECTIVE OF THE BANKING PRUDENCE SURVEILLANCE

This chapter represents the central part of the practical undertaking of this research. Structured on two dimensions, one referring to micro aspects and the other one describing macro analysis, this is the stage where the hypothesis of the research is being demonstrated.

As a methodology, this stage is developed on two dimensions. It firstly presupposes multi-factorial analyses, specific to the scoring credit-type models and, from the point of view of the econometric technique, it is being used the estimation of a logit model[11] (to consult Hosmer and Lemeshow (2000) for details concerning the applications of the logistic regression) and, secondly, the methodology presupposes an analysis of the calculation ways of the commissions of the debtors of a credit institution.

The data used in the case study belong to a random sample of the clients' portfolio of a credit institution for whom the balance data were available in December 2008. There were also available the balance data after December 2008 referring to the behaviour of the company as a client of the credit institution (ex. debt service), together with a set of standard financial indicators in December 2008 (solvability, debt degree, current rate,

[11] The attractiveness of this type of regressions is given by the fact that the estimation of some discreet values (0-1 type, healthy company-default company), this resulting in a continuous and limited measure (for example in the (0,1) interval) which can be interpreted as the probability that a company belongs to one category or another based on some Xi explicative variables which characterise it. The logit and probit models are non-linear models recommended to be used when the dependent variable is binary (or generally discreet). A linear model, although easier to estimate and interpret from the point of view of the coefficients, has the disadvantage that the estimated levels for the dependent variable are not necessarily within the [0,1] interval, which makes more difficult the general interpretation of the results. It is not the case of the logit and probit models which by definition give estimated levels for the dependent variable in the [0,1] interval, these having a clear interpretation probability. Since we are interested in the PD estimation, the logit model appears as a natural candidate to be used. Between the results of the logit and probit models there are only small quantitative differences, in no case qualitative.

economic profitability), which are calculated by the crediting institution for each client, compulsorily according to the law. The descriptive statistics of these indicators are presented in the annex.

The econometric model of the logit type, on the basis of which we estimate the non-reimbursement probability of the companies from the existing sample, has the following general shape:

$$\log \frac{p}{1-p} = ct + \sum_i \beta_i \cdot Micro - financial\_Indicator_i + \sum_j \beta_j \cdot Macro - economic\_Aspect_j$$

It can be noticed that the result of the logit regression of the "dummy" variable, which indicates the non-reimbursement status upon the financial indicators, the debt degree and the current rate (the last variable is an indicator of liquidity) don't have a significant statistical impact upon the non-reimbursement probability. On the other hand, the influence of solvability and market quality is statistically significant to 1%, as it can be seen in the below table.

Table 2 **The logit regression without eliminating the variables whose effect is insignificant from a statistical point of view**

Debt service indicator > 90 days – dependent variable		
Regressors	**Coefficients**	**p – value**
Constancy***	-1.2394	0.000
Solvability***	-0.0029	0.002
Debt degree	-0.0005	0.477
Current rate	-2.03E-06	0.831
Market quality***	-0.2029	0.007
Services area indicator*	0.2858	0.091
Obs. no.=975	**Statistical LR (5 df)=21.023**	**AIC=0.352**
McFadden R-squared=0.059	**Probability(LR stat)=0.000**	**SIC=0.382**

Remark: *** - significant at 1%, ** - significant at 5%, * - significant at 10%.

The values commissioned by the logistic regression represent the non-reimbursement probabilities which I associate to any company from the portfolio. To be observed that the "rating" of the debtor companies (established by the credit institution) is not in a bi-

univocal relationship with the estimated non-reimbursement probabilities. Indeed, the intervals of the non-reimbursement probabilities, estimated for each "rating" class, are not disjointed. Nevertheless, the estimated medium probability for each credit class grows simultaneously with the worsening of the "rating" represented by that class. Moreover, order is kept both by the inferior limits as well as by the superior ones of the intervals. This shows that the credit institution has a "scoring"/"rating" which stresses some financial indicators believed as being significant also by the logistic regression of the present work.

It can be noticed that a company from the services area has 6,5 more percentage points of non-reimbursement probability than a company in any other area, provided both companies are characterised by the same solvability and market quality. This result does not seem surprising at all for the analysis of a clients' portfolio at the end of 2008, considering the high macro-economic risk of the services area compared to all the other areas. Practically, the logistic regression catches the beginning of a phenomenon later confirmed by the macro-economic evidences.

Table 3 **The marginal effects of the variables whose effect is significant from a statistical point of view**

Variables	Marginal effect (percentage points)
Solvability	-0,046
Market Quality	-0,498
Services area indicator	6,531

Source: author's adaptations

Table 4 **The distribution of the non-reimbursement probability within classifying classes**

Classifying category	Medium probabilities	Probabilities interval	
Standard	3,90%	1,10%	16,70%
Under observation	4,68%	1,15%	45,10%
Sub-standard	5,64%	1,33%	51,80%
Doubtful	6,80%	1,45%	77,40%

Source: author's adaptations

The estimated non-reimbursement probabilities for the "standard" class, corrected by the "loss given default", determine positive commissioning coefficients. The practice of the credit institutions many times presupposes not forming commissions for the companies described as being "standard".[12] This can constitute an under-estimation of the non-payment risk, risk existent even for the clients in the "standard" class. It can be observed in our sample how the medium non-reimbursement probability for the "standard" class is around 4%, with extremes that can reach up to 17%. As regards the "sub-standard" and "doubtful" credit classes, the logistic regression associates medium rising values of the non-reimbursement probability, but much below the values presupposed by the practice of the credit institutions[13]. For the credit class "under observation", the non-reimbursement probability predicted by the logistic regression implies, at a maximum "loss given default", a value of the commissioning coefficient close to the one imposed by practice, 5%.

We can conclude that a commissioning based on the non-reimbursement probabilities predicted by the logistic function presupposes a more accentuated risk aversion for the credit classes of high financial reliability, respectively leading to an under-estimation of risk for the company classes from the lower levels from the perspective of the same reliability. This observation does not mainly depend on a sample or particularly on a portfolio, given the fact that the logistic regression overrates the real reduced probabilities and underestimates the real big ones. The implications of the above results and observations are discussed in the next section.

After analysing the possibility of improving the identification and management methods of the credit risk, with direct impact upon the performance of the banking institution, we shall continue by analysing the possibility of creating a scoring model which utilizes

[12] The N.B.R. proposes a 0% commission coefficient for the debtors legal persons quoted as standard (to consult Regulation 3 from 19/03/2009 of The N.B.R., published in the Official Monitory, Part I, nr. 200 from 30/03/2009).
[13] Regulation 3 from 19/03/2009 of The N.B.R. proposes commissioning coefficients of 20%, respectively 50% for the two classes, which means that the implied non-reimbursement probabilities are even bigger than these values.

financial and prudential report at the level of the whole banking system. This scoring model targets a different performance type, one of financial stability and prudential surveillance.

In order to appreciate the credit risk of a bank, there are being utilised a number of indicators obtained from FINREP, COREP, Credits' Classification, Liquidity Report, etc.

I have next proposed a scoring model which can identify and monitor the evolution of banks as regards credit risk. The used indicators are the ones communicated by the financial reports, transmitted by the banking institutions according to the requests of the Basel Treaty. For this analysis, there have been used the quarterly reports of 28 banking institutions, during one year, thus resulting a number of three scores, for each quarter, for each banking institution.

The value of each indicator registered by a bank is marked according to the weakest and strongest values from the banking system. Thus, the weakest indicator (marked by H from high risk) will be marked by 0 points, and the best (marked by R from reduced risk) by 100 points. The value of the indicator will be obtained by applying the below formulas according to its risk content (see ANNEX 7):

(1) score I = (The value of I – The value of R)*100/(The value of R – The value of H)
or
(2) score I = (The value of R - The value of I)*100/(The value of H – The value of R)

The results obtained by each indicator are totalised, thus obtaining the final score. On the basis of the final score, each bank enters one of the 9 risk classes accordingly:

- reduced risk – class 1
- medium reduced risk – classes 2a, 2b
- medium risk – classes 3a, 3b, 3c
- high medium risk – classes 4a, 4b
- high risk – class 5

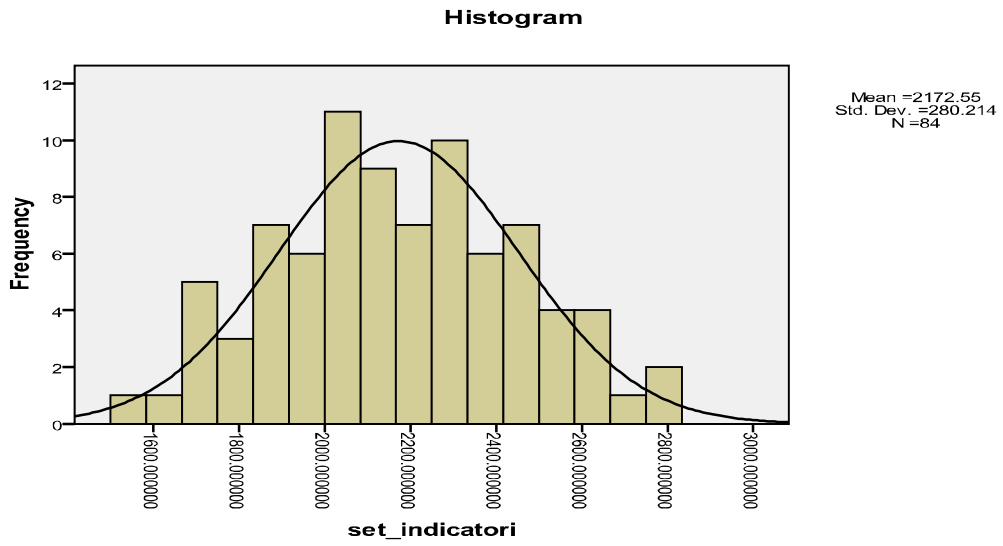
The categorisation scores of the classes result from the statistic analysis of the normal distribution of the scores obtained during the three quarters.

Table 5 **Descriptive Statistics**

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
indicators_set	84	2.17255081E3	2.802142645E2	1538.145600	2819.870570	1.96167183E3	2.16508958E3	2.35118043E3

Source: author's adaptations

Graphic 2 **The scores' distribution**



Source: author's adaptation

In this sense, in order to understand whether the scores' distribution is a normal one, I have used a Kolmogorov–Smirnov test, observing that the p-value is greater than 5%, thus being accepted that the distribution of the indicators is not significantly different from a normal one.

The result of these analyses emphasized the fact that at the beginning of the year, during the first three quarters, there supervened a significant deterioration of risk from the crediting activity, which led to the growth of commissioning and implicitly of own capitals (either Level 1 or Level 2), with a migration of grouping banks from the point of view of the credit risk towards (M, MR).

Chapter V synthesis

PERFORMANCE AND RISK MANAGEMENT FROM THE PERSPECTIVE OF THE REQUESTS OF ADHERING TO THE EURO ZONE

This chapter concentrates on the importance of risk and performance management in the banking area from the perspective of the growth of the operational safety of the banking transactions, especially when the dynamic of capital has grown, once with the European integration, the risk of transactions being more and more heightened.

Restructuring the infrastructure of markets during the period of pre-adherence to the European Union had as a purpose ensuring the development of economy by the growth of the safety and efficiency of inter-banking settlements, for approaching a society in which payments without cash are predominant, in order to strengthen the ability of the National Bank of Romania to implement the monetary politics and, taking into consideration the need to adequately sustain the development of the national financial market under the conditions of improving the management of the systemic risk, there has been decided to create a safe, efficient and automatic payment system which ensures a service of processing lei payments in real time and by the end of the day for all the credit institutions operating in Romania, but also for the State Treasury and the National Bank of Romania.

By starting the PHARE RO 0005.02 project, there has been realized the first step towards implementing in Romania a national electronic payment system formed out of 3 automatic, independent and interconnected components:

1. ReGIS - settlement system based on a brute basis in real time
2. SENT – automatic compensation register
3. SaFIR – depositing and settlement system of the financial instruments.

Another necessary evolution, towards the integration in the Euro zone, is represented by the implementation of SEPA, thorough which the extension of process of European

integration and in the domain of payments of small euro value is targeted, by the formation of a unique market at a European level for the euro payment tools.

SEPA covers a geographic spaced formed from the 27 member states of the European Union and also Iceland, Liechtenstein, Norway and Switzerland, representing an area in which all payments denominated in euro, including the cross-border ones, are treated as national payment (without the present differentiation between the national and the trans-national payments).

By implementing SEPA, it is intended to assure a corresponding efficiency and market competition level which stimulates important scale economies and ensures that the European economy has a high level of competitiveness.
With the purpose of ensuring transparency during the migration process of the deliverers of payment infrastructures towards the new SEPA standards, the Euro system published a set of compatibility criteria under the shape of some reference terms.

SEPA is being realized by:

1. adopting a single set of payment instruments for euro payments (credit transfer, direct debiting and card payments);
2. implementing some efficient processing infrastructures for euro payments (generally called compensation and settlement mechanisms);
3. adopting some common technical standards, unique at the level of the zone;
4. adopting some common commercial practices.

In order to integrate the financial-banking system from Romania, there have been initiated adaptation actions of the legal frame applicable to the payment domain from a rigid approach, characteristic of the past regime, to a more flexible one, adequate for the settlement of payment obligations specific to the diversity of transactions of a free market.

Harmonising the national legal frame with the communitarian acquis solicited elaborating the primary legislation aiming at:

1. modifying the status of the National Bank of Romania;
2. modifying the juridical norms applicable to the credit institutions;
3. transposing the previsions of the directive of the European Parliament and of the European Board nr. 97/5/EC regarding the cross-border credit transfers;
4. transposing the previsions of the directive of the European Parliament and of the European Board nr. 97/5/EC regarding the finality of the settlement;
5. transposing the previsions of the directive of the European Parliament and of the European Board nr. 97/5/EC regarding some financial guarantee contracts.

From the point of view of banks, there would be some changes in the bank–client relationship, as follows:

- introducing the euro currency would reduce the costs the Romanian companies pay as a result of exchanges. These costs, according to some estimations made by the CEB represent approximately 1-2% of the value of the transaction;
- there would be spared precious time in the management activity, disappearing the necessity to analyse risk and the profit-expenses relation for each transaction made by the company;
- the evaluation of the commercial results done from the company's point of view would be simplified, no longer being necessary to take into account the volatility of the currency;
- much easier access of the exporters to the markets of any of the member countries is another advantage which could be focused upon after eliminating the monetary boundaries from the European Union. In this case, there shall be reduced the number of intermediaries so that companies can increase their incomes as a result of the direct exports and which, at the same time, will become more competitive from the point of view of the offered prices; the transparency of prices. This means that expressing all prices in euro will help the Romanian companies to choose the providers who offer the least expenses and export their products to those countries where one can obtain the greatest incomes.

5. Conclusions and suggestions

Once again the economic situation through which the great majority of the world's countries is passing emphasized the fact that there is a need for warning instruments as regards the macro-economic disequilibriums, both at the level of one country and at a regional level, the contagion risk being high.

Regarding the warning systems, this is one of the basis components of the economic governance frame which is to be implemented at the level of the Economic and Monetary Union during 2011. The legislative proposals of the European Commission in this direction intend to introduce an identification procedure of the macro-economic disequilibriums with the purpose of preventing and correcting them. Within the preventive component, there shall most probably exist an alert mechanism which presupposes monitoring a set of indicators as opposed to signal limits ex-ante established.

In the name of developing a macro-prudential frame and promoting a financial stability, the implementation of the Basel III proposals regarding capital requests (buffer capital) is pursued, which would complete the actual frame of debt monitoring. These instruments of macro-prudential politics are to be established as opposed to the *Credit/IBP* report deviation from the long-term evolution ("*credit gap*[14]"). Additionally to the Credit/IBP indicator, it is also necessary to initiate a more detailed analysis of the crediting level. By this measure, it is intended to assure the resilience of the financial system and to protect real economy from the systemic risks associated with the periods of excessive credit growth.

In the context of the international financial crisis and as a result of the research made, the Romanian banking system can be characterised by a comfortable level of solvability and liquidity, under the conditions of noticing a deterioration of the quality of assets and registering a modest profit, as a result of the stagnation of the crediting activity.

[14] "Countercyclical capital buffer proposal" – Consultative document BIS, 2007.

Nevertheless, a series of measures for improving the risks' identification and monitoring has been imposed by the central bank:

- improving the risk management frame and establishing thresholds from which risks are considered significant;
- revising the politics for the liquidity risk management, improving the strategies for the liquidity crisis management; re-analysing the liquidity indicators defined in the risk profile of the bank; signing new treaties for alternative financing in order to ensure the liquidity necessary during crisis conditions;
- revising the crediting politics, establishing concentration limits for types of credit facilities, interrupting the approval of unguaranteed consumption credits, improving the monitoring and realisation of the re-evaluation of guarantees, elaborating and improving the norms regarding the sale of debts, evaluations of credit risk based on some alternative scenarios for crisis conditions, complying with the maximum accepted limits for great exposures;
- improving the evaluation tools of exposure to operational risk, completing the system of operational risk indicators;
- elaborating, completing and revising the norms, the politics and the internal procedures regarding the internal audit, knowing the clientage, the internal and external frauds;
- modifying the informational systems by developing and implementing some automatic applications.

Also, for improving the "health", the stability of the banking system, there still is a need for structural reforms, both at a micro and at a macro level. Thus, the central bank proposed a series of reforms in this respect:

- macro-prudential surveillance by the formation of the European Systemic Risk Board – ESRB;
- micro-prudential surveillance by the formation of three European authorities for the surveillance of the individual financial institutions (*European Supervisory Authorities* – ESA) and the formation of the European System of Financial Supervisors – ESFS.

As regards the *macro-prudential surveillance*, the European Systemic Risk Board shall have as an objective monitoring and evaluating risks which can menace the financial system as a whole. Also, in case of need, it shall also send to the member states and to the European surveillance authorities warnings regarding the systemic risks susceptible to accumulate, as well as recommendations for their management. Part of this board will be the president and vice-president of the Central European Bank, the governors of the national central banks, the leaders of the European surveillance authorities, one representative of the EC, as well as representatives of the national surveillance authorities.

As I have analysed during this paper, this method of working regarding warnings in the case of a systemic risk can be realized as a result of finding a unitary system of financial reporting. Using the data from the FINREP and COREP reports, we have managed to suggest a scoring model for the whole banking system, also using the reporting system common at a European level. The nine risk classes have been identified according to the requests of the treaty, so that at the time of reporting at a consolidated level, the data is unitary. This classification way roots from encountering the need of the banking system in Romania to grow up as a result of the European integration and of the economic-financial realities from our country. Improving this undertaking is obvious, this can develop by introducing some perturbing factors of a macro level so that the migration of exposures from one risk class to another can be followed, the actions of the central authority could thus be pro-active.

As regards the *micro-prudential surveillance* at the level of EU, this shall be made by the three new European authorities of domain surveillance, respectively a European banking authority (*European Banking Authority* – EBA), a European authority in the domain of insurance and occupational pensions (*European Insurance and Occupational Pensions Authority* – EIOPA) and a European authority in the domain of real estate values (*European Securities and Markets Authority* – ESMA). The new European surveillance authorities shall replace and overtake all the tasks of the present committees of level 3 (*Committee of European Banking Supervisors* – CEBS, *Committee of European*

Insurance and Occupational Pension Supervisors – CEIOPS and *Committee of European Securities Regulators* – CESR), but they will also have additional responsibilities, well-defined prerogatives and a greater authority. The three European surveillance authorities– EBA, EIOPA and ESMA – shall form together the European System of the Financial Supervisors and they will contribute to the harmonising of standards and regulations at the level of EU, the main set objective being a "Book of common rules" for the surveillance authorities in EU. The main tasks of these authorities are: forming a common surveillance culture, providing some coherent surveillance practices, introducing new uniform and consistent surveillance procedures at the level of the surveillance colleges, editing a unique manual of procedures and ensuring their unitary interpretation, editing guides regarding the practical aspects of surveillance.

Because crediting represents a significant percentage in the crediting activity of a bank, the preoccupation for the management of this activity must be sustained. By analysing the credit portfolio of a banking institution, there has been brought to light the fact that the evolution of the quality of a credit portfolio represents a major risk as regards the financial performance of a bank and implicitly of a banking system. That is why we have demonstrated that it is necessary to analyse in a personalized way each credit portfolio after first identifying its particularities. In the end, there resulted that belonging to an activity domain, besides the financial results, represents at a certain point a supplementary commissioning necessity with direct impact upon the profit of the bank.

In this sense, as a development direction, there can be analysed the opportunity and impact of such an analysis in the bank's strategy of later crediting, so that the input amends the output. For this, it is necessary to monitor the evolution of exposure on a certain activity segment on as wide a time span as possible, according to the requests of Basel II Treaty, so that the correction can be made step by step and with maximum efficiency and efficacy.

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