

THE CAPITAL REQUIREMENTS FOR FINANCIAL INSTITUTIONS IN THE CONTEXT OF BASEL II

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ABSTRACT: In this article we analyze and present the steps that banks should take in implementing the proposed regulations by the Basel Committee in order to create the necessary framework for the operational risk management. Therefore the first part is an introduction where we explain the basic effects of the operational risk. Then we continue with the operational risk approaches: basic indicator approach, standardized approach and advanced measurement approach. Also we present a case study for the Romanian market and stated the most important benefits that are derived from quantification of operational risk and how to mitigate it. This last section represents the conclusion remarks of the paper.

Key words: operational risk; operational risk management; basic indicator approach, standardized approach, advanced measurement approach

JEL Code: E42, C02, G32, G33

Introduction

The banking system is a vital segment of the economy as a whole, whose development depends on the degree of the country. Thus every nation is interested in creating a sound and stable banking system that responds to systemic risk and the impact of unforeseen circumstances, being able to generate real incentives and information to all financial market participants.

Over time it was concluded that the risk associated with the activity is a vital component of this. Any entity tries to maximize profits by managing their domain-specific risk, including avoiding or transferring risk that it does not want to take it. In this work is trying a wide exploration of the theory and practice in the field, from the requirements on capital adequacy of financial institutions in the context of Basel II, both by the beneficial effects of its implementation and in light of new solutions.

In many cases operational risks tend to be underestimated, considering that the losses they cause are generally minor, threatening the survival of a bank. As states and Radu Ghetea, president of the Romanian Association of Banks', "operational risk should receive more attention because we have 40 banks". Each tries to capture a market share as possible. In this situation, operational risk has increased dramatically. Such operational risks may materialize in potential financial losses, other than those due to market risk, credit risk or the strategic one. Also they can be due to internal or external events, or because of changes and trends that have been detected and prevented by corporate governance and internal control systems, policies, organization, ethical standards and other controls and standards of the company.

The costs of operational risk, relating decrease, establishing and maintaining a control system, protection insurance, etc., are considered by most financial institutions' cost of work performed that supports the current revenues obtained. Such an institution adopting effective

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operational risk management will reduce the amount of money that will have to take the form of reserves.

The first step in implementing the proposed regulations by the Basel Committee is to create the necessary framework for operational risk management and coordinate the activity of several departments which have established clear roles and responsibilities. This suggests the following operational risk management organizational structure for any financial institution:

a. The Supervisory Board provides support and promotes the culture of operational risk and prioritizes activities down to risk tolerance.

b. The risk management implements strategies approved by the Supervisory Board.

c. Risk Management Department in operational risk management services develops policies and methods of operational risk. Lines of business have as main roles and responsibilities of operational risk management.

d. Internal Audit Department responsible for the adequacy and functioning of operational risk management process.

Stability and profitability of a credit institution depends on how the bank identifies, evaluates, monitors and manages each type of risk, so that the second step sought to implement the regulations by a financial institution is to create an operational risk policy, which should ensure improved operational risk management. It includes the following:

- Low risk tolerance, and operational risk management objectives

- Operational risk management principles

- Identification of operational risk

- Comprehensive evaluation of operational risk control combining four instruments, namely:

a. Self Assessment Questionnaires configured for bank management.

b. Key Risk Indicators - KRI are established at both the overall level of bank and business lines.

c. Set up of a comprehensive database for operational risk events in the bank. The bank uses information from the three assessment tools to complement a set of score-cards.

- Reporting of operational risk by completing the following documents:

- Annual operational risk (including capital allocation) that addresses the Risk Management Committee.

- Quarterly risk analysis for the Risk Management Committee.

- Monthly report on indicators of risk is performed by business lines and the Central Unit for Risk Management (Risk Management Division).

- Monthly report on operational risk management, addressed to the Risk Management Committee

- Biannual reporting of exceptions and establishing a clear way of reporting and tracking their forward Director of Risk Management or Risk Management Committee - is determined by the nature and implications of the issues presented.

To achieve maximum efficiency in managing operational risks of the directors of the Departments, branches must be constantly concerned about the integration of internal control and the supervision is accomplished on the basis of: permanent (activity sensitive and supervision formalized accounting) and specific instructions for operational risk (e.g. collection of operational losses) and a regularly check.

As for completing the implementation of Basel II regulating credit institutions must establish the method of estimating the capital requirements for operational risk. Basel Committee presented three possible approaches for estimating capital requirements in making provisions for operational risk, namely:

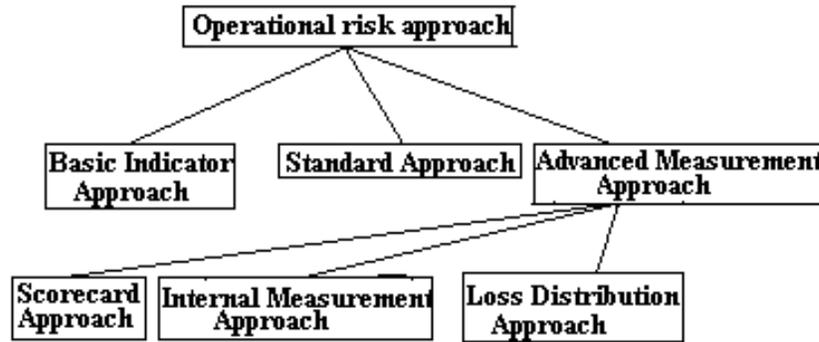


Fig. no. 1 - Methods of quantifying operational risk
Source: Willem Yu (2005)

Operational risk approaches

1. Basic Indicator Approach (BIA-Basic Indicator Approach)

Basic Indicator approach is generally used by financial institutions which are not part of the major economic powers. It is the easiest way to determine the appropriate operational risk capital using a single indicator to replace the bank's overall exposure to operational risk. It is considered the most appropriate method used until the management has appropriate control processes, appropriate monitoring processes of the council, data reporting and audit related operational risk, requiring a minimum volume of work. Thus, the capital requirement is determined by applying a rate of 15% of average gross income of the bank in the last three years. Some analysts believe that this indicator of exposure is incomplete and may be interpreted or implemented divergent.

Recently in Germany was made a study (Zentraler Kreditausschuss, 2001), which took as reference the German banks association ZKA States. This study has recommended that instead of gross income to be used the indicator of general administrative expenses because:

- Is considered an indicator with high sensitivity;
- Reflects the cost components of staff, the risks and processes, with investment business and all high-level business processes;
- Order decrease in expenses, a general part of the bank's strategy;
- Is a clear indication and can be influenced at all levels (organizational units, business lines, segment earnings)
- Record losses that entail a greater need for capital;
- Is an objective indicator that is published in annual accounts (external analysis) and helps to compare national and international values (Commercial Code and IAS);
- Has tended to increase with business expansion (increase operational risk);
- Have a low volatility, is more appropriate than income (the size of a bank's operational risk is as volatile as income).

The main advantage of using "Administrative expenses" as an indicator for determining capital requirements is that all banks can be used for any business lines and it produces distortions in the case of banks organized differently (no branch network). In terms of operational risk control measures, this method is quite restrictive, because operational risk is calculated as a lump sum and the operational risk management is missing almost entirely, because the capital requirement is determined by gross income levels, and no existing operational risks. Method of face is primitive and does not offer any reason to improve bank management and risk analysis.

2. SA - Standardized Approach

This approach involves organizing the financial institution in eight standard business lines, using the common indicator of gross income need be collecting data on operational losses, but should have effective risk management standards. This approach is used primarily by institutions who are in a late stage of implementation of operational risk and until that banks implement appropriate management systems for data on capital, internal procedures for tracking the experiences of the loss are planned. Unlike the Basic Indicator Approach, standardized way is more refined, more suitable due to data collection.

The same German study (Zentraler Kreditausschuss, 2001) considers that the differentiation activity on lines of business can help to increase risk sensitivity, but also entails some problems such as heterogeneous business and organizational structures of the bank that can not be adequately reflected in them. Bank activities are grouped according to standard business lines and thus may manifest a conflict of interest on the one hand due to waste of time and the requirement of a pragmatic approach and on the other hand, supervisors must ensure a uniform implementation of reliable regulatory arbitrage. Experts from the National Bank of Romania, believes that this approach is typical for financial institutions with local or regional market, because the benefits of this models should minimize the costs required, but due to the lack of a database technology they are not very developed. Therefore the lack of incentives for capital leaves the place to arbitrage and profitability of small opportunities, such as financial institutions with a high risk profile. This engages banks in activities whose β is high and for that they chose to use the basic indicator approach instead of those characterized by a low risk profile that chose the standardized approach.

But standardized approach presents certain limitations: results are not directly related to data loss and the operational risk profile varies from one event to another, even there is the same line of business. Capital requirement using this method is more sensitive to risk than the previous approach, because of the division lines of business activity. Therefore the adequacy of risk is limited due to non-use of data on losses. Thus one can not achieve effective control of operational risks, depending on their causes.

The disadvantage is that the methods outlined above may give problems from the econometric point of view also where is used quadratic error minimization procedure, in the sense that a change of regime time series may lead to inconclusive results.

3. AMA - Advanced Measurement Approach

To determine the capital requirements for operational risk using the advanced approach we use one of these methods:

1. Internal Measurement Approach
2. Loss Distribution Approach
3. Scorecard Approach

3.1. Internal Measurement Approach (IMA)

Internal Measurement Approach using information from the standardized approach, providing for each business line exposure indicator (EI), the likelihood of a loss event (PE) and the loss that occurs in the event of such an event (LGE). Expected loss (EL) is the product of these factors.

A study in Germany (Zentraler Kreditausschuss, 2001) provides that capital requirements determined by the Internal Measurement Approach are inadequate in terms of risk management. Determination of expected loss on the basis of EI, PE, LGE involves adopting the system used to measure credit risk, but for operational risk is not achieved a clear separation between the EP and LGD. Besides these factors are interpreted and based on the type of business lines and type of event, we can say that the estimated expected loss is inconsistent. The study recommends a clear definition and consistent determinants of EL and determining for each combination of event the

type and the business line of EP (the event is considered the product) and the LGE (whose components, direct or indirect losses, operational losses are considered). Given the formula proposed by the Basel Committee for determination of the capital, a group of researchers have made a number of shortcomings, among which include: not clear whether specific exposure indicator refers to the frequency or severity; Unexpected loss of two random variables in general, does not add unexpected loss random variable corresponding to the amount their add an unexpected loss can lead to an overstatement of the amount desired; Methodology and nature of the data needed to calculate the formula parameters are not specified; The unexpected loss exposure of different behaviors of scale with respect indicators of frequency and severity of exposure is believed that the greatest accuracy is obtained by distinguishing between the frequency and severity.

In this approach it is assumed that between the expected⁴ and unexpected⁵ loss there is a linear relationship, where the required capital is calculated as a multiplication of the expected loss and a fixed factor, or nonlinear, where the capital is a complex function of expected losses. Then the expected loss of capital needed is determined by multiplying this loss by a factor. Also in this study (Zentralerlkreditausschuss, 2001) it is considered that the correlation is unfunded. It considers that there are no functional correlation between the potential losses (specification quintile distribution) and the expected value, the distribution breadth/ spread is unable to determine the average. Also are ignored the differences between loss distributions by standardizing gamma factors.

3.2. Loss Distribution Approach (LDA)

Loss distribution approach (LDA) determine the likely distribution of operational losses over a period of time, for each business line or risk type, with the fundamental premise that each company's operational loss is a reflection of fundamental exposure to risk operations, considering that data losses are the most objective indicator of true risk. This approach is considered an economic capital allocation framework of bottom-up, which presents the advantage sensitivity of an increased risk. The increased of risk of AMI is different from the methodological point of view and, in terms of risk sensitivity, there are three different aspects:

- It evaluates the expected and unexpected loss without making any assumption about the relationship between them, so it is necessary to determine the gamma factor by the supervisor;
- The institution will determine the single line of business structure and types of events, representing a database that includes the frequency and severity of the unrealized gain or loss;
- Differences are reflected between the institution and the loss distribution industry.

LDA approach has three main components: frequency, severity and aggregate loss distribution. Operational risk assessment using LDA involves attending the following steps:

a. Modeling severity events that give rise to losses, leading to the statistical distribution and form the basis of historical data;

b. Modeling the frequency of events that give rise to losses, leading and shape of the probability distribution on the scale of bank operations and the existing internal control system, which will provide information on the number of losses that occur for a time.

c. Distribution of annual loss is not in the usual form, and therefore used two methods, described below, to estimate objectively the expected and unexpected losses. Expected loss is typically defined as the average distribution loss (Shevchenko Pavel, 2004). It is estimated composite distribution of losses for each risk class, there are two ways namely by solving the analytical formula⁶ by combining distributions, or simulation methods⁷ (such as Monte Carlo simulation), by implementing the computer algorithm and solving by this problem.

⁴ Mean distribution loss

⁵ Tail distribution loss

⁶ Closed form solutions

⁷ Open form solutions

d. Obtaining Capital at Risk (CAR) with composite distribution for each risk class. Under Basel II regulatory capital should be calculated as the sum of expected loss (EL) and unexpected (UL) for a period of one year and a confidence interval of 99.9%. The capital allocated supposes to cover unexpected losses as expected losses are covered by the provisions established.

e. Obtaining ultimately economic capital for the entire bank as the sum of capital reserves for all classes of risk. Loss distribution approach presents certain limitations such as accuracy value obtained from the analysis of economic capital. This capital is significantly affected by assumptions concerning the dependencies between operational losses of different classes of risks.

LDA and IMA models have some shortcomings, such as:

- Events related to operational risk are exogenous, so that operational risk managers have direct control over the risk for business lines and event types and the necessary capital aggregate.

- Direct function between business lines and event types is restricted to a perfect positive dependence (operational risk processes are seen as a parallel system based) that is not appropriate current situation. This will help us to understand the impact of assuming perfect positive dependence as proposed by supervisors

- The objective and purpose of operational risk managers are not clarified.

3.3. Scorecard approach

Scorecard approach determines an initial level of capital for operational risk that changes over time and includes fundamental risk profile of different business lines. This approach applies to pursue a qualitative reasoning, relying less on historical data and is preferred when conducting an operational risk management as identifying the number of risk indicators, which may indicate the cause of fundamental risk.

The Scorecard approach transforms the qualitative risk assessment into a numeric value („Risk score”). Using this method we can analyze the influence of indirect indicators of possible loss of operational risk that represents indirectly the magnitude of operational risk. In this approach the banks seek to improve risk control that can reduce both the frequency and the severity of future operational losses. To identify a number of risk indicators for particular types of risks business lines we draw the fundamental risk profile of different business lines.

For this method takes up to three stages, namely:

1. Comprehensive identification using a systematic procedure.

2. Evaluation through questionnaires (providing opinions on the level of risk and quality control in each business line) for giving scores and establishing's risk rating.

3. Determining the risk profile of the risk score by combining the control module and a system of key indicators of risk.

Scorecard and LDA approaches are based on statistical model VaR. The institution must assess each cell matrix business line / type of event probability distribution and severity of operational losses and capital adequacy and calculate the sum of the operational VaR for each cell.

Advanced approach presents several advantages among which we can mention the following:

- Potential reduction of capital allocated;

- Competitive advantages in assessing price risk;

- Cost savings due to reduction in economic capital allocated;

- Reduction of operational losses through effective monitoring;

- Introduction of prevention mechanisms;

- Focus on the rehabilitation of critical processes;

- Establishment of international standards at potential Sarbanes-Oxley

However under these methods to quantify operational risk has been found and a number of issues, such as:

- Tensions generated because of the identification of the operational losses, such as: obtaining different values for indicators because accounting standards and practices vary from country to country; the absence of regulations regarding the inclusion or exclusion of certain losses components, in the necessary capital base, is difficult.

- Consistency, relevance and bias estimates depend on the frequency and impact of loss events, while quantitative methods are applied on irrelevant data, poor quality or too expensive.

- There are no regulations in the field of VaR applied with difficulty because of the structural dependency, between risks, estimated parameters, tests and procedures used to calculate an increasing number of functions.

Therefore we can say that operational risk quantification methods proposed by the Basel Agreement raises a number of shortcomings which implicitly leads to incorrect measurement of this risk. Establishing an actual optimal level of capitalization of financial institutions of particular importance allowing capital to meet the operational function of protection, while involving the absorption of any loss contingencies that may arise during the conduct of business which allows a reduction of the probability of bankruptcy of the bank concerned with different risks and increase the default level of public confidence in the domestic banking system. Also, the new agreement is likely to set up a financial and economic discrimination between the large banks (which have sufficient funds to design and implement comprehensive and effective internal models for risk assessment) and the smaller ones, which in turn are passed on a structure of a national banking systems with an increasing bank concentration (encouraging mergers and acquisitions in banking and financial plan).

Regarding the case of Romanian banks' preference for models to be used to calculate their capital requirements for operational risk is presented in the following figure:

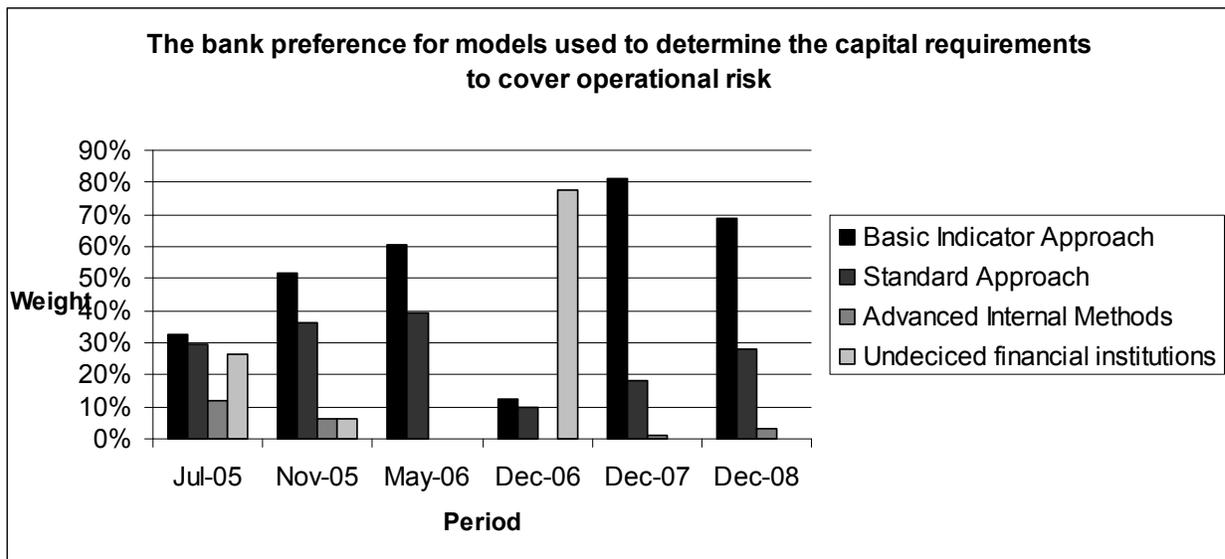


Fig. no. 2

Source: Georgescu Florin (2005)

Addressing operational risk by credit institutions in Romania we have to mention that it is gradual upside. If in the year 2005, 26% of credit institutions were undecided about the models to be used; in 2008 all the credit institutions in Romania were decided on the type of approach used to determine capital requirements.

From the previous table we can see the preference of banks for the simplest approach, for the following reasons:

- equity value is much higher than the minimum regulated and there are incentives to make these institutions to reduce it, by implementing the advanced approaches;

- by the year 2008 approaches allowed minimum capital requirements;
- implementation and use of advanced approaches involves some very high costs;
- in order to obtain relevant results using advanced internal models there should be a statistical database that Romania still miss.

Starting with January 1st, 2008, Romania became effective prudential regarding banking regulations. This requires the application of the principles of Basel II capital adequacy assessment process. Therefore credit institutions have had to calculate the associated operational risk capital requirement, reaching the rate of 8% of the total. Most banks that own a market share greater than 5 percent have used the approach, while the other two banks were based on the standard approach and, respectively, advanced measurement approach. All banks analyzed had an indicator of solvency higher than the minimum limit. The surplus of their own funds was at the end of 2008, 36 percent of the total capital requirements calculated

Conclusions

In conclusion we stated that the most important benefits derived from quantification of operational risk are: identification of operational losses that are exposed and for which no experience necessary, such as: low impact events, the set of events with high frequencies, to foster a framework to model extreme events: analysis of scenarios for low frequency, high impact events, for example, interruption of business, pay-offs potential for banks: help quantify the incorporation of risk mitigation decision making process whether to make a private technology investment, banks manage and measure this risk can significantly reduce costs and are less susceptible to systemic problems.

Because of the importance of the risk events, the financial institutions started to pay high attention to operational risk events and also took measures to mitigate them: the departments involved in activities at the operational risk were provided trainings, normative documents are appropriate under regulations and market conditions, the departments concerned with collecting and reporting operational risk events resulting in loss was instructed to reduce operating errors; development of information systems and strengthening the bank's security systems; methods of risk mitigation were evaluated constantly in terms of costs and benefits; were checked to see if the method of reducing risk is really useful or it is just transferring the impact on other activities of the institution, the methods of reducing risk, such as insurance policies or outsourcing of activities; use correct instruments of operational risk management (risk assessment, scenarios of loss and control, risk indicators and immediate corrective measures, reporting operational risk monitoring information), updating business continuity plans, evaluation and testing them regularly.

Regarding the proposals for the institutions in question could be mentioned: in the departments to identify warning signs (employee turnover, inadequate training of employees etc) to practice a prudent policy in human resources, employment realizing the through competition, to ensure the legal number of days of leave, to follow the material situation of employees, to achieve the migration of staff from one department to another to contain the teaching of all responsibilities, conduct in all activities of the Bank of physical controls (hand the verification of signatures and documents, careful preparation of the sales team, correcting labor standards, etc.), to ensure the safety and security of buildings by well-defined procedures for access, in different locations of buildings, securing jobs involving cash, storage the security and confidentiality of documents; compartment and security guard staff have the necessary training, information system is well protected by password systems that are changing regularly with protection against penetration from outside, and data can be reconstituted in the event of failures, the level of each transaction, activity, product, to achieve a quantitative assessment of operational risk, as a means to mitigate operational risk transfer through insurance to choose, reports are made according to reality, the identified events and their impact on bank to have a correlation, each compartment and territorial unit to deal with operational risk management, ensuring maximum efficiency and decentralization of internal control

in all bank structures, an internal control to be focusing in particular on sensitive sites through spot checks of example of how to recover outstanding debts, mail loro-nostro accounts, the circuit of documents, registration documents etc., the general strategy of the institution consistent with the models to quantify operational risk, in case of emergency operations for recovery strategy should be a back-up IT systems, to be used an advanced method to quantify the operational risk framework should be developed and substantiated, the database contains information on losses, fraud and disputes occurring at least the past 5 years, to determine losses from operational risk, IT system should be tested regularly to be adapted to requirements.

References

1. Basel Committee on Bank Supervision, 2001. Operational Risk. Working Papers Bank for International Settlements, Basel, available online at www.bis.org
2. Basel Committee on Bank Supervision, 2004. Guidelines on Operational Risk Management. National Bank of Austria, available online at www.bis.org
3. Broderick, C., 2001. Capital Allocation for Operational Risk. Securities Firms Operational Risk Conference, Boston
4. Crouhy, M., Galai, D. & Mark, R., 2000. The New Capital Adequacy Framework and the Need for Consistent Risk Measures for Financial Institutions, in L. Jacque (ed.), Financial Innovations and the Welfare of Nations, reprinted in the Journal of Banking and Finance, 2000.
5. Georgescu, F., 2007 „Bilantul evolutiei sistemului bancar la un an de la aderarea la Uniunea Europeana”, available online at www.bnro.ro
6. Georgescu, F., 2005 „Stadiul pregatirii pentru aplicarea reglementarilor Basel II in sistemul bancar romanesc”, available online at www.bnro.ro
7. David Häger D; Andersen L.B.; Aven T; Bø F, 2007. The Basel II Capital Accord and Operational Risk Management; Status and the Way Forward. The Business Review, Cambridge pp. 207 – 214
8. Henie von Greuning, Sanja Brajovic Bratanovic, 2004. Analyzing and Managing Banking Risk. Publishing House Irecson, pp 66-84, 128-137
9. Hoffman Douglas G, 2002. Managing operational risk: 20 firm wide best practice strategies. Wiley, New York
10. Hussain Amanat, 2000. „Managing operational risk in financial markets”, Butterworth-Heinemann, 2000, <http://books.google.com/books?id>
11. Isaic-Maniu, I., 2006 . Caracterizarea statistica a riscului. Publishing house ASE Bucuresti
12. Junji Hiwatashi, 2002. Solutions on Measuring Operational Risk. Capital Markets News
13. Keller James, S., 2001. Request for Comments on the New Basel Capital Accord. The PNC Financial Services Group, Inc. (“PNC”), Pittsburgh, Pennsylvania
14. Raport asupra stabilitatii financiare, 2009. available at www.bnro.ro
15. Regulament BNR nr. 24/29/14.12.2006 privind determinarea cerintelor minime de capital ale institutiilor de credit si ale firmelor de investitii pentru riscul operational, available at www.bnro.ro
16. Shevchenko, P. V., 2004. Valuation and Modeling Operational Risk: Advanced Measurement Approach. CSIRO Mathematical and Information Sciences, Sydney, Australia.
17. Socol, A., 2006. Principalele tipuri de riscuri operationale ce pot afecta activitatea unei societati bancare: identificare, masuri de prevenire si diminuare in perspectiva acordului Basel II. Revista Finante Provocarile viitorului, publishing house Universitaria Craiova, nr. 5, 2006, p. 125-134, available at: stec.central.ucv.ro/finante/arhiva/arhiva_nr5/romana/21_RO.doc

18. Sundmacher, M. 2004. „Operational risk capital charges for banks: consideration and consequences”, available at <http://ssrn.com/abstract=963227>
19. Willem Yu, 2005. New Capital Accord Basle II Using LDA Approach for Measuring Operational Risk?. Amsterdam Vrije Universiteit Faculteit der Exacte Wetenschappen Studierichting Bedrijfswiskunde en Informatica
20. Zentralerkreditausschuss, 2001. Comments of the Zentraler Kreditausschuss on the Basel Committee’s Consultative Document of 16 January 2001 on a New Capital Adequacy Framework for Banks (“Basel II”). Working Papers Bank for International Settlements, Berlin