Budapest University of Technology and Economics
Faculty of Social and Economic Sciences
PhD School in Business and Management

Regulation and practice of managing bank's operational risk

THESES

Gabriella Lamanda

2011.

Table of contents

1. Research objectives

1.1. Background and relevance of the topic

In the past decades activities of banks have changed significantly. Bank models have been modified: operation and services provided by credit institutions earlier focusing on money collection and credit accommodation have become more complex, their size has increased significantly, their operation expanded internationally, and this was supplemented with the increase of bank risks. The spread of financial conglomerates has led to the establishment of complex organisational structures, in which managers shall direct, supervise institutions with diverse cultures acting in different operational environment – including economic, legal/regulatory and political environment and competition situation. In addition to this the technology requirement and dependence of bank operations and services increased significantly, and at the same time the role of human factor revaluated. Abuses, internal fraud, unauthorised activities resulting in more serious consequences due to the above described processes resulted in putting *operational risk* into focus. These efforts were summed up in the Basel II capital accord approved in 2004, and in the Capital Requirements Directive declared by the EU and its member states in 2006, according to which credit institutions shall allocate capital behind the operational risk they undertake. The institutions may determine their capital requirement – in accordance with their risk assessment and managing profile and level of development – with four different methods[1], among which the *Advanced Measurement Approach* (AMA) provides opportunity for the elaboration of own approaches and defines obligation for the application of own models. In addition to this banks shall determine their so-called internal capital requirements based on their own internal processes, models regarding all relevant risk types, the increment of which – in addition to the more precise definition of capital requirement – is the emergence and spread of more conscious and effective risk managing techniques.

According to the definition generally accepted by professionals „operational risk is loss resulting from inadequate or failed internal processes, people and systems, or from external events".[2] Damages – intentional or not – caused by employees or leaders, such as: unlawful acquisition of

---

[1] The simplest method is *Base Indicator Approach* (BIA) determines capital requirements as 15% of the so-called guiding indicator (gross salary). In *The Standardised Approach* (TSA) the operational risk's capital requirement is the aggregate of weighted figures calculated per business lines. The *Alternative Standardised Approach* (ASA) determines the size of necessary capital in percentage of accommodated loans. The *Advanced Measurement Approach* (AMA) prescribes capital allocation based on the risk exposure of credit institutions calculated upon internal models.

[2] (BCBS, 2006)

information or money, acquisition of bank secret, bribe, error or mistakes due to the lack of expertise. Operational risk also include mistakes of processes and system which cover damaging events related to continuous course of business, bank infrastructure, such as system failure, system breakdown, limited availability, etc. In addition to this external event and danger sources may also be listed here, such as environmental, natural disasters or damages caused by third person: flood, earthquake, burglary, robbery, vandalism, terrorist attack. It is not easy to understand operational risk: many factors belong to this sphere of risks, the emergence of which is ad hoc; some phenomenon does not emerge in some banks, but if an event causing operational risk occurs it may have serious consequences. Barriers imposed by the lack of experiences and data, the shortage of available collection time – partly due to legal regulations – require the implementation of approaches and methods which cannot be considered traditional in risk management. As it is true for new approaches that the number of experiences is relatively low and the used techniques are not detailed and institution specific enough, it may be useful to cooperate with control fields (internal control and compliance): harmonisation of activities, exchange of experiences for the improvement of methods. The collection and analysis of internal loss data and their supplementation with external data provide opportunity for defining operational risk upon the basis of mathematics and statistics. In the literature there are many articles which make attempt to describe operational risk events, losses with cumulative distribution functions. The research of Chavez-Demoulin et al. (2006), Carvalho et al.(2008), Dahen – Dione (2010) or Agostini et al. (2010) may be mentioned, among others. In addition to he already mentioned barriers institutions shall also face data quality problems which affect the applicability of models built on loss data, and at the same time it encourages banks to use different approaches to manage operational risk. For solving data related problems scenarios, risk self-assessments and the risk indicator system touching upon operational environment and internal control environment may offer opportunity. While we may find publications analysing the use of scenarios and the proper use of self-assessments and their integration to a risk management system – like Scandizzo (2006), Watchorn (2007) or some in Hungarian literature, like Hajnal et al. (2007) – the problem of risk indicators may be considered a rather untouched research area.

1.2. Introduction of research objectives

Law prescribes for credit institutions the management of operational risk and risk related capital allocation, to which guidelines, recommendations and handbooks are available. Despite this operational risk is such unmapped area both from theoretical and practical aspect that it does not have established, elaborated methodology for its management or for the determination of capital

requirements. Therefore mentioned documents, supplementary material – and majority of publications in the literature – concentrate on already known techniques and mechanisms, while they rarely touch upon the new, patent and plastic elements of regulation. Advantages and disadvantages of this topic derive from this dissonance. Choosing operational risk as one's area of research is a possibility which – contrary to other fields – due to low literature coverage allows for the use of individual ideas, on the one hand, but, on the other hand, due to the lack of reference points and strong economic foundations the researcher may easily get on the wrong path or receive criticism. All this require the differentiated approach to questions, problems.

In the dissertation I wish to provide a **comprehensive picture** of the **features of operational risk and its regulation, as well as the possible alternatives of its management**. Regarding international literature a wide spectrum of this topic may be found: Van den Brink (2002), Chernobai et al. (2007) or Moosa (2007). However, in Hungarian academic literature we may find low number of analysis rather concentrating on part issues. The review of literature, preliminary expert negotiations and my previous professional experiences helped me to realise and formulate those problems which are now embodied in my dissertation and thesis. I tried to reveal and analyse those problems which provide proper research material from theoretical point of view, but at the same time are significant also from practical aspects.

I approached the topic from the side of regulation. During my examination the starting point was that well structured, relevant and balanced regulations are basic – though not exclusive – conditions of efficient risk management. Banks are profit oriented institutions, in case of which regulations shall find sustainable balance between interests and reliable, prudent operation. If rules do not contain these motivators which would support reliable operation at a high level, we shall calculate its over twisting negative effects and the social costs of emerging losses. **Therefore it is important to examine how much in its present form regulations and supplementing documents (guidelines, principles, handbooks, etc.) contribute to effective risk management.**

Due to the complex, special nature of operational risk effective risk management require the use of qualitative techniques, in addition to quantitative tools. These jointly have several advantages which result not only in the apprehension of operational risk and keeping it within manageable limits, but also have positive extern effects on other fields of banks operation. **Therefore a special objective of my research was to review these positive features and the efficiency and profit increasing possibilities related to them, and to reveal practical relevance.**

A further possible field of research is the determination of the application criteria of non-traditional tools. From these tools in my dissertation I focused on the field of key risk indicators. **As key risk indicators are used in practice both for risk management and capital calculation purposes, it is important to precisely define the criteria of effective and reliable application.** During my research I examined whether these condition are met in risk management practice.

2. Research metodology

The methodology basis of the research were the qualitative processing of literature from the field of economic, banking business and management sciences, the introduction and comparison of different approaches. **I identified and analysed international and domestic literature in this topic and reviewed the legal background of operational risk.** This allowed me to draw relevant conclusions and thesis. For the justification of conclusions and hypothesis I used the results of a survey completed in the domestic bank sector attached to **questionnaire and deep interview**. In addition to this I also use examples and cases from practise and literature.

In the focus of the analysis there are bigger institutions, the so-called large banks, because these are the market players who use more complex, more developed methods for managing their operational risk and determining the related capital requirements, thus their experiences are broader and more diverse regarding non-traditional risk management tools (scenario analysis, risk indicators, integration of expert estimates, consideration of the features of operational environment). In addition to this the quality of the questionnaire motivated me to keep the number of examined institutions below the one-fourth of the bank sector, but at the same time the goal was to focus the survey on banks with relevance regarding the whole sector. This goal has been realised. Six of the eight domestic large banks participated in the survey which formed part of my research, in addition to this **a middle-sized bank and a specialised credit institution** also answered the relevant questions. From bank side I relied on 8 completed surveys and about 16 expert opinions. In case of large banks the results may be considered representative, because – *based on the 2010 operational risk capital requirement – the market share of answer providers exceeds 75%, or 60% regarding the bank sector as a whole*. By taking into account the answers of smaller institutions the coverage of the survey is close to 65%. Among answering institutions there were none presently using the basic indicator method (BIA). In case of smaller credit institutions due to lower sample number my conclusions cannot be considered representative. At the same time, however, the answers of two institution-groups with different profiles and sizes provided some picture about what differences there are between the operational risk management practice of

smaller credit institutions and larger banks with broader scope of activity and clientele. **In order to expand the scope of analysis and confirm my findings I made four experts experienced in the topic and its supervision fill in the questionnaire and then discuss it.** They provided answers for relevant questions by emphasizing their own points of view.

The questionnaire contained closed and open – mainly multiple-choice, sometimes Likert-scale based – questions. The technical structure of the questionnaire (types of questions) was reasoned by the number of those providing answer, the hypothesis and the special nature of the topic. It shall not be forgotten that in the examined scope strict information protection regimes operate. It may be also reasoned with these aspects and features that for the indication of results – in addition to descriptive and evaluative information – I used figures and charts, not the statistical analytical methods used generally for the processing of questionnaires.

3. Hypothesis and scientific results

The doctoral thesis consists of four chapters. At first I summarised the literature background of the topic. Then I examined the balance of regulations, the extra value of risk management and its positive extern effects. Finally I analysed the criteria of applying key risk indicators for risk management and capital calculation purposes.

3.1. Regulation of operational risk management – 1. thesis

Effective regulation is basic requirement of proper risk management. According to Valentiny (2008) the regulation may be considered effective it strives at maximising social well-being (in other words at minimizing social well-being losses), thus benefits provided by it exceed related costs. For this it is basic requirement that regulation shall encourage competition, serve the interests of consumers/clients, shall be transparent and consistent, and shall be established by an independent, professionally laudable and accountable authority/organisation. In theory regulation decreases the possibility of bank panic and through this social well-being costs related to the panic (compensation of losses, losses resulting from unperformed bank functions, effects of economic recession) (Mérő, 2005). By examining laws related to operational risk management and the establishment of related capital[3] as well as documents supporting compliance with legal and

---

[3] Act CXII of 1996 on credit institutions and financial businesses (Hpt.); 200/2007 (VII. 30.) government decree on operational risk management and capital requirements (Mkr)

supervisory requirements[4] I detected their main deficiencies and critical points. Based on these I formulated my first thesis:

Laws and guidelines provided for compliance with the former ones in relation with the reduction and coverage of bank's operational risk cannot effectively serve their function due to their unevenness.[5]

This unevenness has several sources, among which in my dissertation I focused on the following. On the hand in its present form the regulation is too general and narrow, focuses on the application of developed measuring method, despite the fact that majority of bank sector applies simpler methods for determining its capital requirement. On the other hand within developed measuring method it focuses on traditional risk management techniques: defines the application criteria of loss data in details while dos not provide guidelines in relation with non-traditional tools. My statements are confirmed by the survey and the results of deep interviews. All of those answering believed that the regulation of operational risk was not effective because it did not suit the features of risk properly and because it did not provide guidelines for the establishment of a robust risk management system.

3.2. Extern effects of operational risk management – 2. thesis

Based on laws credit institutions shall work out their own methods for calculating all relevant risks surrounding their activities and their coverage with capital. In case of operational risk this assumes the collection of loss data, the use of reference (external) data, the formulation of scenarios and the establishment of key risk indicators. These steps have several advantages. Among them the most important ones are preventing loss, getting to know the critical fields of operation, early identification of problems and the thorough mapping of the organisation. All these not only provide for the effectiveness of operational risk management process, but may also increase efficiency in other – business based and control – fields of the bank. These positive indirect effects, efficiency increasing opportunities may be realised in the rationalisation of activities and related resources, in the reduction of related costs and benefits resulting from the prevention of losses and their early detection. Within my survey I examined the bank consideration and realisation of extra value provided by operational risk management and the potential positive indirect effects. As basic principles and system of tools of the bank's internal control system

---

[4] Hungarian Financial Supervisory Authority (PSZÁF): Validity hand book parts I-III (VKK) 2008, Hungarian Financial Supervisory Authority (PSZÁF): Internal evaluation processes of capital adequacy (ICAAP) guidelines for supervised institutions November 2010
[5] Supported by publication: P2.

harmonise with the objectives and methodology of operational risk management in several points I also touched upon the practical cooperation of these fields. In my opinion, on the one hand challenges related to operational risk (lack and limits of experiences and data) shall provide enough motivation for the realisation of cooperation, and, on the other hand in case of cooperation the mentioned advantages may be exploited even more. Following the review of literature, based on the results of the survey I summarised my conclusions in my second thesis:

The (regulation motivated) operational risk management activity could have positive extern effect on other (control and other business based) fields of bank operation, which is not exploited by domestic banks.[6]

3.3. Application of key risk indicators in risk management and capital allocation – 3. thesis

In case of a developed measuring method factors describing business and internal control shall be part of the capital calculation model elaborated by the bank. In reality institutions fulfil this requirement through the application of key risk indicators (KRI). Risk indicators form part of the best practice of operational risk management. According to Scandizzo (2005) key risk indicators are variables related to operational performance or are financial variables which provide reliable basis for estimating the occurrence probability and seriousness of an operational risk event. In this case these are perfect tools for risk management and for the determination of capital requirement. In order to be suitable and useful tools of these processes risk indicators shall comply with some criteria. Basic requirements are objectivity, commensurability, temporal stability and significant relationship with risk. Utilisation as part of the capital calculation model requires the fulfilment of further conditions. It is important that key indicators shall be able to apprehend the changes of business environment, because in this case it is possible to match them with key factors expected in the developed capital calculation method. In addition to this it is important to prove with statistical and mathematical tools that the change of an indicator is reality connected to the change of risk exposure (validation).

Within the framework of a questionnaire I analysed how much the defined conditions prevail in practice, this whether key indicators are suitable for managing operational risk, for expressing the undertaken risk and for determining related capital requirement. Following the evaluation and summary of answers it may be stated that indicators used by banks fulfil the basic requirements, thus these are suitable tools for risk management. However, I experienced that criteria related to

---

[6] Supported by publication: P1, P7.

capital calculation are not met. The used key risk indicators apprehend the institution's business environment and internal control systems rather poorly, thus in reality their matching would not be possible. In addition to this it is further problematic that correlation between risk exposure and the values of indicators is not measurable. This seriously hampers indicators from becoming integral part of the capital calculation process. I formulated my consequences in the following:

Though key risk indicators are appropriate tools for operational risk management, they are not suitable for determining related capital requirement. [7]

4. Utilization of the results and possibilities for further research

In my dissertation I attempted to review and thoroughly present a topic known by literature and a narrow segment of practising economists, as well as to introduce related actual challenges and their possible solutions. In addition to this the research made in the national bank sector is also unique, which provided opportunity both for interested „civilians" and bankers, risk managers to draw useful conclusions and confirm statements and assumptions.

The results may be applied in the improvement of national regulatory and risk management practice, in professional education and financial higher education.

The research may be carried on in the future in several directions. First of all it would be interesting to examine the risk management practises of smaller institutions, because it may be seen already that for them this new regulatory element is rather problematic than advantageous. Second of all, in possession of internal data – for which I do not see much chance due to the confidential nature of information – the problem of the validity of indicators, the formulation of a solution possibility may also be an interesting and challenging field of research.

---

[7] Supported by publication: P3, P10.

5. Publications

Publication in emphasized journal

P1. <u>Lamanda Gabriella</u> – Zsolnai Alíz: A Moving Target – The First Pillar of Capital Requirements Directive. Pénzügyi Szemle vol. LV. 154-167. p. 2010/1.

P2. Vigvári András – <u>Lamanda Gabriella</u> – Zsolnai Alíz: Banking Regulation. Lessons and Challaneges. Periodica Polytechnica – Social and Management Sciences. 55-62. p. 2008

P3. <u>Lamanda Gabriella</u>: Kulcs kockázati indikátorok és lehetséges alkalmazásuk. (Key Risk Indicators and their Field of Application) Hitelintézeti Szemle. vol. 4. 413-425. p. 2007

Book, bookchapter, notes

P4. <u>Lamanda Gabriella</u>: Bankismeretek (Fundamentals of Banking.) Budapest: Typotex, 2009. 155 p. (ISBN:9789632790473)

P5. <u>Lamanda Gabriella</u>: Bankügyletek. (Banking and Finance.) university note 2008.

P6. Vigvári András – <u>Lamanda Gabriella</u> – Galbács Péter: A pénzügyek alapjai.: Bevezetés a pénzügyek tanulmányozásába. (Fundamentals of Finance. Intruduction to Finance.) Fellegi Miklós (editor) ERVIK Kereskedelmi és Szolgáltató Bt. Miskolc: 2007. 179 p. (ISBN:9630622233)

Published international conference papers

P7. <u>Lamanda Gabriella</u>: Key Components of Operational Risk Management. In: 4th International Conference for Young Researcher of Economics. Gödöllő, Magyarország, 2006.10.02-2006.10.04. (Szent István Egyetem) 2. kötet. 91-97. p.

Other publication

P8. <u>Lamanda Gabriella</u>: Erdős Mihály – Mérő Katalin: Pénzügyi közvetítő intézmények c. 2010-ben megjelent könyvének ismertetése. (review) Pénzügyi Szemle vol. LV. 812-814. p. 2010/4.

P9. <u>Lamanda Gabriella</u>: Út a pánikig. (Way into Panic) BANK & TŐZSDE. 2008. 4. szám.12. p.

P10. <u>Lamanda Gabriella:</u> A kulcskockázati indikátorok szerepe a banki működési kockázat kezelésében. (The Role of Key Risk Indicators in Banks' Operational Risk Management.) XXVIII. OTDK, Közgazdaságtudományi szekció, Doktorandusz konferencia, Miskolc 2007. április 25-27.

P11. <u>Lamanda Gabriella:</u> A működési kockázat bemutatása a formálódó bázeli normák tükrében. Pénzügyi ellenőrzés – egy funkció több szerepben. (Operational Risk Aspect of the New Basel Capital Accord) Vigvári András (editor) 2005. 43-56. p.

6. References

1. Agostini, A. – Talamo, P. – Vecchione, V.: Combining Operational Loss Data with Expert Opinions through Advanced Credibility Theory. *Journal of Operational Risk* vol. 5. 2010. 2-28. p.

2. BCBS: Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework - Comprehensive Version. 2006. June http://www.bis.org/publ/bcbs128.htm (2010. november)

3. Bélyácz Iván: Kockázat, bizonytalanság, valószínűség. *Hitelintézeti Szemle* 2011. 4. szám, 289–313. p.

4. Carvalho, R. S. – Migon, H. S. – Paez, M. S.: Dynamic Bayesian models as an alternative to the estimation of operational risk measures. *Journal of Operational Risk* vol. 3. 2008. 25-49. p.

5. Chavez-Demoulin, V. – Embrechts, P. – Neslehova, J.: Quantitative models for operational risk: Extremes, dependence and aggregation. *Journal of Banking and Finance* vol. 30. 2006. 2635-2658. p.

6. Chernobai, A. S. – Rachev, S. T. – Fabiozzi, F. J.: Operational Risk: A Guide to Basel II Capital Requirements, Models and Analysis. John Wiley & Sons Inc. Oxford 2007.

7. Dahen, H. – Dionne, G.: Scaling models for the severity and frequency of external operational loss data. *Journal of Banking and Finance* vol. 34. 2010. 1484–1496. p.

8. Davies, J. – Finlay, M. – McLenaghen, T. – és Wilson, D.: Key Risk Indicators – Their Role in Operational Risk Management and Measurement. Risk Business International Limited 2006. d.yimg.com/kq/groups/12093474/1290864495/.../McLenaghenTara3.pdf

9. Hajnal Béla – Kállai Zoltán – Nagy Gábor: Működési kockázati önértékelések veszteségeloszlás-alapú modellezése. (Loss Distribution Approach for Modelling Operational Risk) *Hitelintézeti Szemle* vol. 5. 506-519. p. 2007.

10. IOR: Operational Risk Sound Practice Guidance – Key Risk Indicators. The Institute of Operational Risk. 2010. november www.ior-institute.org

11. Medvegyev Péter: Néhány megjegyzés a kockázat, bizonytalanság, valószínűség kérdéséhez. *Hitelintézeti Szemle* 2011. vol. 4. 314–324. p.

12. Mérő Katalin: Miért kell szabályozni a bankokat? In: Pénzügyi ellenőrzés – egy funkció több szerepben. 2005. 25-34. p.

13.   Moosa I. A.: Operational Risk: A Survey. *Financial Markets, Institutions &Instruments* vol. 16.. 2007. november 167-200. p

14.   HFSA 2010.: A tőkemegfelelés belső értékelési folyamata (Internal Capital Adequacy Allocation Process) – Útmutató a felügyelt intézmények részére. 2010. November www.pszaf.hu

15.   Scandizzo, S.: Risk Mapping and Key Risk Indicators in Operational Risk Management. *Economic Notes* vol. 34. 2005. 231-256. p.

16.   Scandizzo, S.: Scenario Analysis in Operational Risk Management. In: The Advanced Measurement Approach to Operational Risk, 2006. http://www.sergioscandizzo.com/papers

17.   Van den Brink, G. J.: Operational risk: the new challenge for banks. Palgrave Macmillan, 2002.

18.   Watchorn, E.: Applying a Structured Approach to Operational Risk Scenario Analysis in Australia. Australian Prudential Regulation Authority (APRA) Working Paper 2007. http://www.apra.gov.au/policy/documents/applying-a-structured-approach-to-operational-risk-scenario-analysis-in-australia-sept-07.pdf