

Yana M. Kuznichenko¹

ANALYSIS OF APPROACHES TO CALCULATION OF OPERATIONAL RISKS WITHIN BANK CAPITAL ADEQUACY ASSESSMENT

The article analyses the international approaches to operational risks measurement for the purposes of ensuring appropriate coverage by capital. Based on the research conducted, a methodology for operational risks measurement which is the most appropriate one for implementation in Ukrainian banking practice has been offered.

Keywords: capital; operational risk; measurement; assessment; prudential requirements; capital adequacy.

Яна М. Кузніченко

АНАЛІЗ ПІДХОДІВ ДО РОЗРАХУНКУ ОПЕРАЦІЙНОГО РИЗИКУ ЯК ВИМОГИ ДО ДОСТАТНОСТІ КАПІТАЛУ БАНКУ

У статті проаналізовано міжнародні підходи до розрахунку операційного ризику з метою покриття капіталом. З урахуванням проведеного дослідження запропоновано найбільш прийнятний спосіб розрахунку операційного ризику для запровадження в українській банківській практиці.

Ключові слова: капітал, операційний ризик, розрахунок, оцінка, пруденційні вимоги, достатність капіталу.

Форм. 4. Табл. 2. Літ. 11.

Яна Н. Кузніченко

АНАЛИЗ ПОДХОДОВ К РАСЧЕТУ ОПЕРАЦИОННОГО РИСКА КАК ТРЕБОВАНИЯ К ДОСТАТОЧНОСТИ КАПИТАЛА БАНКА

В статье проанализированы международные подходы в части расчета операционного риска с целью покрытия капиталом. С учетом проведенного исследования предложен наиболее оптимальный способ расчета операционного риска для применения в украинской банковской практике.

Ключевые слова: капитал, операционный риск, расчет, оценка, пруденциальные требования, достаточность капитала.

Problem setting. The integration of Ukrainian banking system into the European Union determines the need for further harmonization of capital adequacy assessment methodology with the provisions of the Basel Committee on Banking Supervision, in particular with regard to taking into account operational risks in compliance with Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework.

Latest research and publications analysis. Banks face risks while performing banking transactions to make profits. Thus it is necessary to manage and control the appropriate level of risk. Risks should also be assessed by banks subject to their importance. Such assessment should be ongoing (Risk measurement: Methodological evaluation of inspection of banks # 104). One of the risks faced by the banks in the process of their activity is an operational risk.

The problems in understanding the nature of operational risk, its identification, assessment, management and control have been studied in the works of many Ukrainian scientists, in particular, S.O. Dmytrov, K.H. Honcharov, O.V. Merenkova

¹ Ukrainian Academy of Banking of the National Bank of Ukraine, Sumy, Ukraine.

et al. (2010), A.B. Kaminskyi and A.T. Kyiak (2005), O.V. Vasiurenko and O.M. Sydorenko (2011) and others.

Unresolved issues. Ukrainian scientists mostly focused on the theoretical approaches to understanding the operational risk's nature and specific issues of identification of operational risk within the risk management process in a bank. At the same time, the studies determining the most appropriate methodology for calculation of the operational risk to be applied in order to ensure adequate risk coverage for Ukrainian banks remain insufficiently explored.

The research objective is to explore the international experience in the current approaches to bank operational risks measurement and to identify the most appropriate method to be applied in domestic banking practice of Ukraine.

Key research findings. In compliance with the Core Principles for Effective Banking Supervision (2006) by the Basel Committee on Banking Supervision (BCBS), which became the international standard for sound prudential bank regulation and supervision, supervisors should set reasonable and appropriate minimum requirements for banks with regard to capital adequacy that reflect the risks a bank faces.

In the context of the requirements mentioned above and in order to prevent undue distribution of resources and loss of capital caused by inherent risks, the National Bank of Ukraine (NBU) establishes the rules for determination of economic requirements obligatory for all banks. One of them is the regulatory capital adequacy ratio (H2) (On the order of regulation of banks in Ukraine # 368), which reflects the bank's ability to maintain its liabilities in due time and to the full; it also sets the requirements to minimum regulatory capital of a bank necessary to cover credit and foreign currency risks.

At the same time, it is worth mentioning that the NBU intends to realize the measures aimed at further adjustment of Ukrainian banking practice to the international standards and ensuring compliance with the BCBS Core Principles for Effective Banking Supervision (Letter from the National Bank of Ukraine # 42-412/4010-13749).

Since all banks bear operational risks, let us consider in more detail the possible ways to improve calculations on the regulatory capital adequacy ratio (H2) by covering a bank's operational risks.

An operational risk is defined as the risk of losses due to inadequate or wrong internal processes, actions of staff or systems, influence of exogenous factors (Basel II, 2005). Legal risk is also covered by the definition above.

The Basel II provides for the possibility to choose the most appropriate method for operational risk capital charge measurement based on the nature of banking business and the infrastructure of domestic market in financial services. In particular, it is proposed to choose between 3 possible approaches depending on a bank size, complexity and diversity of its operations, sensitivity to relevant risks. Let us study them to find out the possibility of their application in the national banking practice and to define the most appropriate one.

1. The Basic Indicator Approach. Its application provides calculation of capital requirements as % of the bank's positive gross income over the previous 3 years by the following formula:

$$K_{BIA} = [\sum GI_{1...n} \times \alpha] / n, \quad (1)$$

where K_{BIA} – the operational risk capital charge under the Basic Indicator Approach; GI – annual gross income, if positive, over the previous 3 years; n – number of the previous years for which gross income is positive; $\alpha = 15\%$, as set by the Basel Committee on Banking Supervision, subject to the industry wide level of required capital to the industry wide level of the indicator.

2. The Standardized Approach (general and alternative). The application of it provides calculation of capital requirements as % of the bank's positive gross income over the previous 3 years by business lines as specified below (Table 1).

Table 1. The distribution of the gross income of the bank for business lines

#	Business Line (orientation)	Beta Factors
1	Corporate finance ($\beta 1$)	18%
2	Trading and sales ($\beta 2$)	18%
3	Retail banking ($\beta 3$)	12%
4	Commercial banking ($\beta 4$)	15%
5	Payment and settlement ($\beta 5$)	18%
6	Agency services ($\beta 6$)	15%
7	Asset management ($\beta 7$)	12%
8	Retail brokerage ($\beta 8$)	12%

According to Basel II, 2005 // www.bis.org

The formula for calculation of operational risk capital charge is as follows:

$$K_{TSA} = \langle \sum \text{years} 1 - 3 \max[\sum GI_{1-8} \times \beta_{1-8}, 0] \rangle / 3, \quad (2)$$

where K – the operational risk capital charge under the Standardized Approach; GI – the annual gross income in a given year for each of the business lines; β_{1-8} = a fixed percentage, set by the Basel Committee on Banking Supervision, subject to the level of required capital and the level of the gross income for each of the 8 business lines (Table 1).

The Alternative Standardized Approach provides for almost the same capital charges with the exception of 2 business lines – the retail and commercial banking operations (lines 3 and 4 in Table 1). For these business lines, loans and advances under the relevant business lines multiplied by a fixed factor 'm' replace the gross income as the exposure indicator. The betas for the abovementioned business lines also remain unchanged.

The calculation of the operational risk capital charge for retail and commercial banking can be expressed as:

$$K_{rk} = \beta_{rk} \times m \times La_{rk}, \quad (3)$$

where K_{rk} is the capital charge for the retail/commercial banking operations; β_{rk} is the weighting factor for the retail/commercial banking operations; La_{rk} is the total of retail/commercial banking operations (non-risk weighted and gross of provisions, averaged over the past 3 years); m is a constant equaling to 0.035.

If necessary, the consolidation of retail and commercial banking operations is allowed. In such a case the coefficient $\beta_{rk} = 15\%$ is applied.

Similarly, those banks that are unable to disaggregate their gross income into the remaining business lines can aggregate the total gross income for such business lines using the beta of 18%.

As under the Standardized Approach, the total capital charge for the Alternative Standardized Approach is calculated as the simple summation of the regulatory capital charges across each of the 8 business lines.

3. The Advanced Measurement Approach. The application of it provides for calculation of the operational risk capital charge based on the risk measure generated by the bank's internal operational risk measurement system using quantitative and qualitative criteria.

Qualitative criteria:

- Independent operational risk management function responsible for the design and implementation of the bank's operational risk management framework.
- Integration of the bank's internal operational risk measurement system into the day-to-day risk management processes.
- Regular reporting of operational risk exposures to management.
- Documented set of internal policies, controls and procedures concerning the operational risk management.
- Regular reviews of operational risk management processes and measurement systems by internal and external auditors.

Quantitative criteria:

- The internal system of operational risk assessment must be consistent with the definition of operational risk.
- On the supervisors' request, a bank must calculate its regulatory capital requirement based on expected loss (EL) and unexpected loss (UL). To calculate the minimum requirements based on the UL only, a bank must demonstrate to supervisors that it is adequately capturing the EL in some other way (the provisions are formed).
- The risk measurement system must be sufficiently "granular" to capture the major drivers of operational risk affecting the loss estimates.
- A bank must have an adequate system of correlation of losses for different operational risk assessments.
- Operational risk measurement system must have certain key features to meet the supervisory soundness standard.
- A bank needs to have a credible, transparent, well-documented and verifiable approach for weighting separate elements in its overall operational risk measurement system.

Banks also must take into account internal and external data, scenario analysis, business environment and internal control factors as well as operational risk mitigation.

The formula for calculation of the operational risk is the same as in the standardized approach, the values of beta factors, however, are set by the bank itself (Vasiurenko et al., 2011).

The BCBS, by the way, does not specify the approach or assumption regarding the business lines mapping for calculation of the operational risk capital charge. However, a bank must be able to demonstrate that its approach captures potentially

severe 'tail' loss events, meets a soundness standard, provides significant flexibility in the development of an operational risk measurement and management system. Within the above business lines, the bank performs additional, more detailed, distribution (level 2) and mapping by the types of activity.

The Directive 2006/48/EC of the European Parliament and of the Council of 14 June 2006 provides European banks with the possibility to combine the above methodologies, in particular, the Advance Measurement Approach with any other approach or the Basic Indicator Approach with the Standardized Approach.

In the first case, however, such combination of approaches must be preceded by the fulfilment of a number of conditions regarding documentation of all operational risks, meeting all qualifying criteria and obtaining the supervisory approval. In the second case, the combination is possible only under exceptional circumstances, such as acquisition of a new business type requiring a period of transition to the Standardized Approach.

The only basis for calculation of operational risk under all approaches (except for the Alternative Standardized Approach), as determined by the BCBS, is the bank's gross income, thus the sum of net interest and net non-interest income. We should also take into account that the gross income depends not only on the actions of bank's management and bank's market position. This is the feature of operational risk that distinguishes it from other risks (credit risk, market risk), which allow a bank assess its future capital needs more precisely (Vasiurenko et al., 2011).

Thus, we may conclude, that the Basic Indicator Approach is the simplest one among all the approaches to the calculation of the operational risk capital charge we analyzed. It may be applied by all banks regardless of their size and types of activity. Unlike the Advanced Measurement Approach, it does not require special professional skills of staff, introduction of sophisticated informational systems and development of own internal risk assessment models.

Compared with the Basic Indicator Approach, the Standardized Approach proves to be more complicated for application. It may be used by the banks, which have ensured appropriate distribution of gross income by business lines and obtained the relevant supervisory permit.

As far as the Alternative Standardized Approach is concerned, it is worth mentioning, that the application of it will be reasonable for the banks actively involved into retail and/or commercial segment of banking business (at least 90% of total income (Directive 2006/48/EC, 2006)), or those, where the probability of default (PD) under these business lines is high, or in the cases where the Alternative Standardized Approach allows assessing operational risks more effectively as compared with the Standardized Approach.

Thus, it is only reasonable to consider its application if a bank already has an experience with the Standardized Approach. Taking into account that the calculation of regulatory capital adequacy ratio (H2) in Ukraine today does not include the requirements to the operational risk capital charge, there are no grounds to analyze the advantages of the Alternative Standardized Approach as compared with the Standardized Approach for Ukrainian national banking practice due to the lack of database for reference.

The application of the Advanced Measurement Approach by Ukrainian banks we also consider to be premature at the current stage of development, as it is based on data loss (by each business line) collected by the banks for the period of at least 5 years, internal operational risk measurement systems and their close integration with the everyday risk management processes of the bank. Introduction and implementation of such a technology requires high qualification of relevant staff.

In our opinion, introduction of prudential operational risk capital charges into the Ukrainian national practice will not have an adverse effect on the indicators of Ukrainian banking system activity. In particular, Table 2 shows the strong trend of the previous years towards the considerable excess of actual regulatory capital adequacy ratio (H2) compared with the required level ($H2 \geq 10\%$), as well as the resumption of banks' profitability.

Table 2. Regulatory Capital Adequacy Dynamics

Indicator	01.01. 2007	01.01. 2008	01.01. 2009	01.01. 2010	01.01. 2011	01.01. 2012	01.01. 2013
Bank capital, total, mln UAH	42,566	69,578	119,263	115,175	137,725	155,487	169,320
Regulatory capital adequacy, %	14.19	13.92	14.01	18.08	20.83	18.9	18.06
Bank activity output, mln UAH	4,144	6,620	7,304	-38,450	-13,027	-7,708	4,899

In compliance with the National Bank of Ukraine data <http://www.bank.gov.ua>.

The steady capital growth trend, including the period when the Ukrainian economy was significantly influenced by external adverse factors (due to the global financial crisis of 2007–2008), also reveals the potential of the Ukrainian banking system for accumulation of capital including for the purposes of the operational risk coverage.

Conclusion. Based on the analysis of international approaches to the operational risk measurement, the Basic Indicator Approach and the Standardized Approach (if relevant regulatory requirements are met) are considered to be the most appropriate ones for the purposes of introduction of operational risk measurement and calculation of the bank's operational risk capital charge in the Ukrainian banking practice.

Thus, the formula for calculation of regulatory capital adequacy ratio (H2) can be expressed as:

$$H2 = \frac{RC}{A_r + Of_{xp} + O_{rc}} \times 100\% \geq 10\%, \quad (4)$$

where RC is the regulatory capital of a bank; A_r – the assets and certain off-balance instruments minus total credit risk weighted provisions under active transactions; Of_{xp} – total open foreign exchange position of a bank in all foreign currencies and banking metals (Methods of calculating the economic standards of regulation of banks in Ukraine #315); O_{rc} – operational risk coverage calculated based on the Basic Indicator or Standardized Approach.

The operational risk capital charge calculated is multiplied by 10 to convert it into the equivalent of risk weighted assets (as the required $H2 \geq 10\%$).

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