APPLICATION OF RATING-BASED MODELS FOR CREDIT RISK ESTIMATION BY BANKS: PRACTICE OVERVIEW
Ovseychik S.E. (Russian Federation) Email: Ovseychik224@scientifictext.ru

Ovseychik Sergey Eduardovich – master's degree student,
INTERNATIONAL FINANCE FACULTY,
FINANCIAL UNIVERSITY UNDER THE GOVERNMENT OF THE RUSSIAN FEDRATION, MOSCOW

Abstract*: the author provides an overview of the practice of implementation of models for assessing credit risk as well as an analysis of IFRS and Basel II requirements for expected loss reserves. The article provides a review of the role that the rating-based approach to estimation of key risk parameters plays in the credit process. The research is an in-depth overview of the metrics used in estimation of risk of borrower's default as well as means of optimizing the risk profile of the exposure for banks.*
Keywords*: credit risk, rating, rating models, IFRS, IRB.*

ОБЗОР ПРАКТИКИ ПРИМЕНЕНИЯ БАНКАМИ РЕЙТИНГОВЫХ МОДЕЛЕЙ В КРЕДИТНОМ ПРОЦЕССЕ ДЛЯ ОЦЕНКИ РИСКА
Овсейчик С.Э. (Российская Федерация)

Овсейчик Сергей Эдуардович – студент магистратуры,
международный финансовый факультет,
Финансовый университет при Правительстве Российской Федерации, г. Москва

Аннотация: *в статье приводится обзор практики применения рейтинговых моделей в кредитном процессе, а также проводится анализ требований стандартов МСФО и комитета по банковскому надзору Базеля к формированию резервов на возможные потери. Автор описывает роль, которую рейтинговый подход к оценке риска дефолта заемщика играет в кредитном процессе. В исследовании приведены примеры показателей и их значимость при оценке риска дефолта заемщика, а также способы снижения вероятности дефолта по кредитному портфелю банка.*
Ключевые слова: *кредитный риск, рейтинг, рейтинговые модели, МСФО, IRB.*

Credit risk can be defined as the possibility of losing a financial asset due to the inability of counterparties (borrowers) to fulfill their obligations to pay interest and/or principal in accordance with the terms of the contract. For banks, this results in lost principal and interest, disruption of cash flows and an increase in collection costs.

Loss estimation.

After completing risk assessment, the banks can form reserves, necessary for covering losses, which may occur in case of the borrower's default. These losses can be classified as:

• Expected loss, which is the value of losses that the bank expects to incur according to its estimations which are based upon statistical evidence.

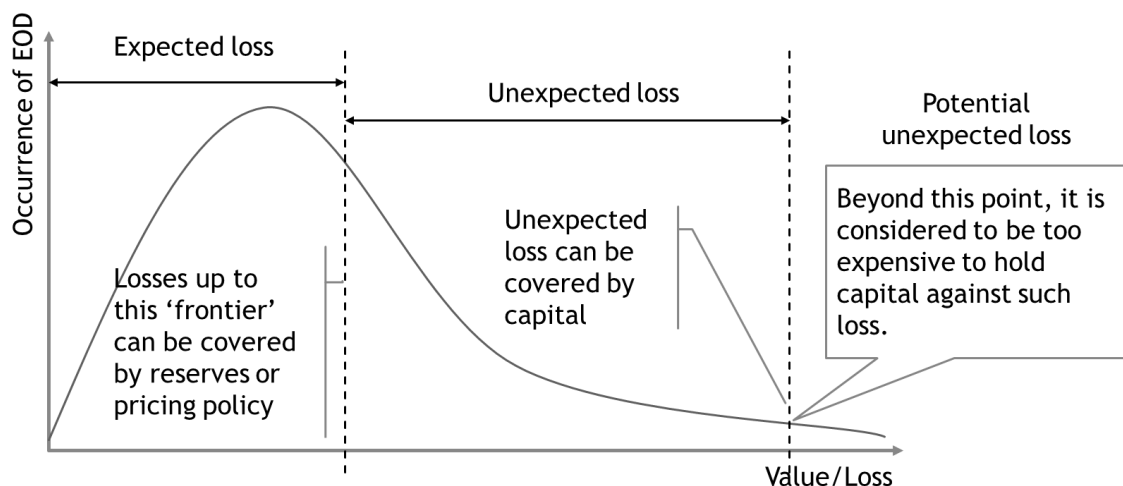• Unexpected loss, which is a variation of expected loss.

Fig. 1. Graph. VaR distribution for banks

To represent the difference graphically, distribution of these risks can be presented in form of Value at Risk (VaR) graph. The graph 1 represents this distribution. As we can see, expected loss (EL) is the loss which happens most often. This loss should be covered by Bank's reserves and/or pricing policy. Unexpected loss (UL) can be covered by bank's capital [2, p. 6].

As it is can be understood from the name, EL is the loss that can be expected. Banks, in order to estimate the amount of potential loss in the event of the borrowers' default, employ the following formula:

$EL = PD \times LGD \times EAD$, where:

PD stands for Probability of default of a borrower, LGD stands for Loss given default - magnitude of likely loss on the exposure, expressed as a percentage of the exposure, and Exposure at default - amount to which the bank was exposed to the borrower at the time of default, measured in currency.

This approach is described in *IFRS 9: Financial Instruments— Phase I: Classification and Measurement*.

To estimate the amount of reserves the bank needs in order to cover EL, we need to find the area, which represents the volume of losses, the bank can expect. In other words, we multiply the volume of borrowers' exposure, which can default as per bank's expectations, by the number of events of default (EOD) we can expect.

Rating approaches.

By the time of the beginning of 2000-s, Banks have already developed sufficient statistical base to form their own capital adequacy requirements. For this purpose Basel II in 2004 has established framework for application of Internal Ratings-based (IRB) approach which would allow banks to use their own estimated risk parameters for the purpose of calculating regulatory capital. In order to provide banks with more freedom, this framework allows to employ IRB approach in two ways:

- Foundation IRB (F-IRB);
- Advanced IRB (A-IRB).

The basic difference between them is presented in the table 1 [1, p. 6].

Table 1. Comparison of differences between Foundation and advanced IRB

Foundation IRB (F-IRB)	Advanced IRB (A-IRB)
banks are allowed to develop their own empirical model to quantify **PD**	banks are allowed to develop their own empirical model to quantify **required capital**
Banks have to use **regulator's prescribed approach** to calculating EAD, LGD and other parameters	banks are supposed to use **their own quantitative models** to estimate PD, EAD, LGD and other parameters.

Banks typically manage their credit-related business in broad business lines or portfolios, each of which may encompass a variety of specific borrower and exposure types. Although the specific business line and portfolio delineation used by individual banks can vary greatly, the key common bonds that define a business line or portfolio may be related to the nature of the customer (e.g. governmental, corporate, households), the nature of the transaction, or a combination of the two.

The design and features of internal rating systems and internal default-loss estimation processes, as key risk management tools, also reflect this broad management approach. At the same time, there can be significant differences across business lines or portfolios in the key risk factors and rating criteria, on the one hand, and the historical loss characteristics or relationships on the other. For example, while political factors are key criteria in the assessment of a sovereign debt, this is hardly the case when considering the ability of an individual to repay a credit card obligation. Similarly, the likely pattern of portfolio losses for a retail portfolio – typically made up of many unrelated borrowers – is very different from that of a portfolio of a much smaller number of corporate exposures, because defaults by individuals tend to be driven more heavily by factors idiosyncratic to the borrower [3, p. 9]. These differences translate into key differences in the distribution of credit loss events for the different portfolios, and thus different relationships between risk characteristics and unexpected loss or required capital. Banks' internal assessments of economic capital reflect these differences, and to be appropriately risk sensitive, the IRB approach also needs to consider them in the construction of capital treatments.

The above motivates the requirement that under the IRB approach, banks must assign banking-book exposures into one of six broad classes of exposures with different underlying credit risk characteristics: corporates, sovereigns, banks, retail, project finance, and equity [4, p. 15]. The Basel Committee is continuing to work on refining the boundaries between these different classes and, in some cases, on the definition of the exposure classes themselves. Generally, all exposures that do not specifically meet one of the definitions for exposure classes set out in this document (e.g. corporate, retail, sovereign) will be categorised as corporate exposures for purposes of the IRB approach. The objective of this proposal is to avoid the potential for regulatory capital arbitrage which may occur through an artificial characterisation of an exposure by a bank for the purpose of reducing regulatory capital requirements.

In January 2000, the Committee issued a paper titled "Range of Practice in Banks' Internal Rating Systems". This paper summarised the key findings from its empirical studies and surveys in respect of the rating systems used in best-practice banks. This focused heavily on banks' rating systems for corporate exposure [5, p. 4]. While this is a free-standing document, it is useful at this stage to revisit some of its key findings, given that these have guided the Committee in its design of the IRB approach for corporate exposures and its thoughts on the minimum requirements which accompany it.

The structure of an individual bank's internal rating system is influenced by a broad range of factors, including the uses to which the rating information is put, and the bank's policy towards the treatment of impaired assets, among which we can identify the following:

1. The number of grades both for performing and non-performing loans
2. The decision whether to focus the rating on the borrower or the facility
3. The means by which ratings are assigned
4. The risk factors considered in the rating assignment process
5. The time horizon over which the rating is considered a valid risk indicator
6. Use of internal ratings

Speaking about points (4) and (5), we can outline the time horizon, during which the information employed for assessment is considered as sufficient to make the rating trust-worthy:

- Financial information, which is presented in the form of financial / annual reports. Outlook horizon – 1 year;

- Quality indicators, which are usually assessed and given to borrowers by banks' due diligence, customer relations or credit risks function. Outlook horizon – from 3 months up to a year. These indicators can include, but are not limited to:
  - Financial disclosure and reliability;
  - Group background (if the borrower belongs to a group of companies);
  - Industry fundamentals and outlook + Market position;
  - Management quality/expertise/succession + business strategy;
  - Product range and quality;
  - CAPEX, R&D expenses

- Behavioral information (e.g., how a given customer services the debt). Outlook horizon – less than 6 months.

Conclusions.

There are many ways that credit risk can be managed or mitigated. The first line of defense is the use of credit scoring, borrower's rating models or credit analysis to avoid provision of exposure to parties that entail excessive credit risk. Credit risk limits are widely used. These generally specify the maximum exposure a bank is willing to take to a counterparty. Industry limits or country limits may also be established to limit the sum of credit exposure a firm is willing to take to counterparties in a particular industry or country. Calculation of exposure under such limits requires credit risk modeling. Transactions may be structured to include collateralization or various credit enhancements. Finally, banks can hold capital against outstanding credit exposures.

References / Список литературы

1. *Gatzert Nadine, Martin Michael*. Quantifying credit and market risk under Solvency II: Standard approach versus internal model // Insurance: Mathematics and Economics, 2012. № 51. P. 649 – 666.
2. *Antão Paula, Lacerda Ana*. Capital requirements under the credit risk-based framework // Journal of Banking & Finance, 2011. № 35. P. 1380 – 1390.
3. *Althoff John*. In depth: IFRS 9 Expected credit losses // pwc. [Electronic resource], 2014. URL: http://www.pwc.com/us/en/cfodirect/publications/in-depth/us2014-06-ifrs-9-expected-credit-losses.html/ (date of access: 10/03/2017).
4. The Internal Ratings-Based Approach: Supporting Document to the New Basel Capital Accord // Bank for International settlements [Electronic resource], January 2001. URL: http://www.bis.org/publ/bcbsca05.pdf/ (date of access: 10/03/2017);
5. Range of Practice inBanks' Internal Ratings Systems. A discussion paper by the Basel Committee on Banking Supervision // Bank for International settlements. [Electronic resource], January 2000. URL: http://www.bis.org/publ/bcbs66.pdf/ (date of access: 10/03/2017).