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SPECIAL ASPECTS OF IFRS 9 APPLICATION BY CREDIT GUARANTEE FUNDS IN DEVELOPING COUNTRIES

Abakirov Malik-Aidar Barktabasovich, Chairman of the Board of OJSC "Guarantee Fund", Bishkek, Kyrgyz Republic <maabakirov@gmail.com>, <abakirov@gf.kg>

Abakirov Syrgak, Expert in "Investment promotion and protection agency of the Kyrgyz Republic" Bishkek, Kyrgyz Republic <syrgak.a@gmail.com>

Avazov Emil Abdivahapovich, Senior consultant <emilavazov@gmail.com>, <avazov@gf.kg>

Baialieva Erkin Sydykovna, Chairman of the Association of Guarantee Funds of the Kyrgyz Republic <association.gf@mail.ru>

Kazieva Mahabat Bakasovna, Chief accountant <kazieva@gf.kg>

Kurmankojoeva Reina Sadyrovna, Risk manager <kurmankojoeva@gf.kg>

Mamytova Elmira Tynaevna, Head of Guarantee Administration Department <mamytova@gf.kg>

Abstract

The article is devoted to the experience of guarantee funds operating in developing countries in implementation and application of IFRS 9 (as in the case of OJSC "Guarantee Fund" in the Kyrgyz Republic), as well as the methods and approaches for assessment of the guarantee risks and loan/guarantee losses under IFRS 9 standard. The key points and important aspects of IFRS 9 are outlined and, in particular, the results of the standard implementation by OJSC "Guarantee Fund" are presented. The article explains the models to estimate the probability of default by borrowers and counterparties of guarantee funds and approaches to calculate expected credit losses on the guarantee portfolio and financial assets, as well as describes approaches developed by OJSC "Guarantee Fund" to assess the probability of default by commercial banks and establish their internal ratings.

Keywords: IFRS 9, financial instrument, expected credit losses, model of expected credit/guarantee losses, probability of default, macroeconomic variables, credit risk, rating.

ӨНҮГҮП КЕЛЕ ЖАТКАН ӨЛКӨЛӨРДӨ ГАРАНТИЯЛЫК ФОНДДОРДО ЭЛ АРАЛЫК ФИНАНСЫЛЫК ОТЧЕТТУУЛУКТУН СТАНДАРТЫ 9ду (МСФО-9) КОЛДОНУУНУН ӨЗГӨЧӨЛҮКТӨРҮ

Абакиров Малик-Айдар Барктабасович, "Гарантиялык Фонд" ААК башкармалыгынын төрагасы, Кыргыз Республикасы председатель правления ОАО «Гарантийный Фонд», Кыргызская Республика <maabakirov@gmail.com, abakirov@gf.kg>

Абакиров Сыргак, Кыргыз Республикасынын инвестицияларды илгерилетүү жана коргоо боюнча агенттигинин эксперти эксперт Агентства по продвижению и защите инвестиций Кыргызской Республики <syrgak.a@gmail.com>

Авазов Эмиль Абдивахапович, башкы консультант старший консультант <emilavazov@gmail.com, avazov@gf.kg>

Баялиева Эркин Сыдыковна, Кыргыз Республикасынын гарантиялык фонддор ассоциациясынын төрайымы председатель Ассоциации гарантийных фондов Кыргызской Республики <association.gf@mail.ru>

Казиева Махабат Бакасовна, башкы бухгалтер главный бухгалтер <kazieva@gf.kg>

Курманкожоева Рейна Садыровна, тобокелдик менеджери риск-менеджер <kurmankojoeva@gf.kg>

Мамытова Эльмира Тынаевна, гарантияларды тескөө бөлүмүнүн башчысы начальник отдела администрирования гарантий <mamytova@gf.kg>

Кыскача мүнөздөмө

Макала өнүгүп жаткан өлкөлөрдүн кепилдик фонддорунда ФОЭС-9 (МСФО-9) стандартын киргизүү жана пайдалануу тажрыйбасына (Кыргыз Республикасындагы «Кепилдик фонд» ААКтын

мисалында) жана ФОЭС-9 стандарттын чегиндеги кепилдик тобокелдиктерди жана кредиттик/кепилдик жоготууларды баалоо методдоруна жана ыкмаларына арналган. Бул макалада ФОЭС-9 стандарттын негизги моменттери жана мааанилүү аспектилери жазылган, тактап айтканда аталган стандарттын «Кепилдик фонд» ААКта киргизүүнүн натыйжасы көрсөтүлгөн. Ошондой эле макалада зайымчылардын жана кепилдик фонддордун контрагенттеринин дефолтко учуроо мүмкүнчүлүгүн баалоонун моделдери сунушталган, кепилдик портфели жана каржылык активдери боюнча күтүлүүчү кредиттик жоготуулардын эсептөө ыкмасы берилген, коммерциялык банктардын дефолтко учуроо мүмкүнчүлүгүн баалоо жана алардын ички рейтингдерин түзүү боюнча «Кепилдик фонд» ААКта иштелип чыккан ыкмалар каралган.

Негизги сөздөр: ФОЭС-9, каржылык инструмент, күтүлүүчү кредиттик жоготуулар, күтүлүүчү кредиттик/кепилдик жоготуулар модели, дефолт ыктымалдуулугу, макроэкономикалык өзгөрмөлөр, кредиттик тобокелдик, рейтинг.

ОСОБЕННОСТИ ПРИМЕНЕНИЯ СТАНДАРТА МСФО-9 В ГАРАНТИЙНЫХ ФОНДАХ РАЗВИВАЮЩИХСЯ СТРАН

Абакиров Малик-Айдар Барктабасович, председатель правления ОАО «Гарантийный Фонд», Кыргызская Республика, г. Бишкек <maabakirov@gmail.com, abakirov@gf.kg>

Абакиров Сыргак, эксперт Агентства по продвижению и защите инвестиций Кыргызской Республики, г. Бишкек <syrgak.a@gmail.com>

Авазов Эмиль Абдивахапович, старший консультант <emilavazov@gmail.com., avazov@gf.kg>

Баялиева Эркин Сыдыковна, председатель Ассоциации гарантийных фондов Кыргызской Республики <association.gf@mail.ru>

Казиева Махабат Бакасовна, главный бухгалтер <kazieva@gf.kg>

Курманкожоева Рейна Садыровна, риск-менеджер <kurmankojoeva@gf.kg>

Мамытова Эльмира Тынаевна, начальник отдела администрирования гарантий <mamytova@gf.kg>

Аннотация

Статья посвящена опыту внедрения и применения стандарта МСФО-9 в гарантийных фондах развивающихся стран (на примере ОАО «Гарантийный Фонд» в Кыргызской Республике), а также методам и подходам к оценке гарантийных рисков и кредитных/гарантийных потерь в рамках стандарта МСФО-9. В статье описаны ключевые моменты и важные аспекты стандарта МСФО-9 и, в частности, результаты внедрения данного стандарта в ОАО «Гарантийный Фонд». Предложены модели оценки вероятности наступления дефолта заёмщиков и контрагентов гарантийных фондов и подходы к расчёту ожидаемых кредитных убытков по гарантийному портфелю и финансовым активам, рассмотрены разработанные в ОАО «Гарантийный Фонд» подходы к оценке вероятности дефолта коммерческих банков и построению их внутренних рейтингов.

Ключевые слова: МСФО-9**,** финансовый инструмент, ожидаемые кредитные убытки, модель ожидаемых кредитных/гарантийных убытков, вероятность дефолта, макроэкономические переменные, кредитный риск, рейтинг.

1. Introduction

Credit guarantee funds (CGFs) were established in order to assist entrepreneurs, who have insufficient collateral, in obtaining necessary loan amounts in banks. Credit guarantee funds help small and medium enterprises (SMEs) to receive expanded access to finances and encourage commercial banks to improve the terms of granting loans to SMEs. For SMEs and banks, guarantee is more simple, inexpensive and usable highly liquid financial instrument for securing a loan than collateral. Successful development of SMEs makes it possible to ensure a competitive environment, solve problems related to employment of the population, increase tax revenues, implement innovations, saturate the own market with locally produced goods and services, as well as create export-oriented production.

Credit guarantee funds are relatively new financial institutions and not all of them use international financial reporting standards (IFRS). The fact of particular importance is that from January 1, 2018, application of IFRS 9 *Financial Instruments* became mandatory to financial institutions, including credit guarantee funds.

IFRS 9 contains a number of fundamental differences compared with the currently applicable IFRS 39 in terms of classification and measurement of financial assets.

This article describes special aspects of IFRS 9 implementation by credit guarantee funds in developing countries, as in the case of Open Joint Stock Company "Guarantee Fund" (OJSC "GF", Kyrgyz Republic).

2.   Conceptual overview of credit guarantee schemes

The system of credit guarantee funds operates in more than 100 countries, and successfully facilitates entrepreneurs, who have insufficient collateral, to obtain a loan. There are more than 2,250 different models of credit guarantee funds development.

SMEs cannot always obtain loans from banks mainly for the following reasons:

- SMEs' activity is risky, especially during periods of market fluctuations and crises;
- insufficiency of collateral to obtain the required loan amount;
- non-favorable or no credit history.

As we can see, one of the main reasons for the banks' loan rejection for SMEs is the insufficiency of collateral required for bank loans and this problem is successfully solved by credit guarantee funds. At the same time, international practice proves the effectiveness of SMEs support due to implementation of credit guarantee funding schemes. Credit guarantee funds, by providing guarantees to SMEs, take the risks associated with the borrowers' failure to pay a part of their obligations under the loan agreement and with the need to recognize losses on the corresponding amount of the primary loan.

In terms of the form of ownership, credit guarantee funds [1] are divided into the following types: 1) public; 2) municipal; 3) private; 4) public-private partnership.

In addition to the direct guarantee support, credit guarantee funds also provide a number of other services, such as: 1) granting loans – in France; 2) leasing operations – in France, Kyrgyz Republic, Indonesia; 3) financial consulting - in Italy, Japan, France, Kyrgyz Republic.

The impact of credit guarantee funds' activity on the economies is growing every year, and this is confirmed by the following results:

- Japan's credit guarantee corporations provided guarantees for 35-37% of entrepreneurs of their total number and the amount of guarantees was equal to 10-14% of the total loan portfolio of financial and credit institutions in Japan;
- Korea Credit Guarantee Fund (KODIT) [2] provided guarantees for 19% of entrepreneurs of their total number, and the guarantee amount was equal to 13% of the total loan portfolio of financial and credit institutions in South Korea.

Capital and multiplier of credit guarantee funds are the important issues of their functioning.

The credit guarantee fund's capital may be formed at the expense of the public, municipal and private funds. In order to increase guarantees to SMEs, they can use a multiplier allowing provision of guarantees for a larger amount than the capital of the credit guarantee fund. For example, the multiplier in Japan is 1:60 [3], and in the Kyrgyz Republic it is 1:2. [4] This shows that in Japan, Credit Guarantee Corporations can issue guarantees being 10 times the amount of their capital, while the credit guarantee funds of the Kyrgyz Republic can issue guarantees being twice the amount of their capital.

The international experience of credit guarantee schemes operation shows that they are designed to ensure provision of comprehensive support to both micro-small and medium

enterprises. Credit guarantee schemes are an integral mechanism to drive forward the development of the major economic sectors.

3. IFRS application in credit guarantee funds
3.1. Summary of IFRS application in the world

IFRS is an important international system of generally accepted principles of accounting, which, despite of their recommendatory nature, are the most recognized and perfected standards used in execution of financial statements by many companies around the world.

The companies' application of IFRS allows them obtaining transparent accounting and financial statements with positive results, which give the possibility to attract investors, obtain loans, and enter the capital markets.

All countries of the world more or less apply IFRS, while the correlation of national standards and IFRS in different countries varies as follows:

• in many developed countries, national standards are mostly brought in line with IFRS (UK, Netherlands, USA, France, Switzerland, Sweden, etc.);

• some countries apply IFRS as national standards (Cyprus, Kuwait, Latvia, Malaysia, Pakistan, etc.);

• some countries use IFRS as a basis for developing their national standards (China, Central European countries, Singapore, Russia and a number of the CIS countries, etc.).

Credit guarantee funds, as a part of the financial system, must keep records and disclose information, as all financial institutions do, while seeking to comply with IFRS.

Due to the fact that credit guarantee schemes of developing countries are at an early stage of their formation compared to similar systems of developed countries, there are some problems with the lack of a supervisory authority, standardized financial reporting and accounting in accordance with IFRS. The value of timely and reliable information for making reasonable decisions increases immeasurably in times of economic instability, which are specific for developing countries. Therefore, implementation of IFRS, in particular IFRS 9, is important for successful operation of credit guarantee funds.

In modern conditions, internal and external users, receiving basic information from financial statements, pay increased attention to information about risks, appreciation of capital and assets, generation of contingency reserve provisions and other indicators.

What opportunities do credit guarantee funds receive when switching to IFRS?

First, IFRS application ensures execution of transparent and reliable reporting, which is highly informative and helpful to users.

Secondly, IFRS provides for comparability of financial statements based on uniform rules of execution, ensures the language and terminology understanding.

Thirdly, IFRS allows investors assessing correctly the investment risks, predicting performance indicators of the credit guarantee fund on the basis of its financial statements.

Fourthly, reporting executed in compliance with IFRS has credibility of foreign investors because of its transparency and openness, and as a result helps to get cheaper and long-term credits, loans, investments, in other words, it provides access to world capital markets.

Fifthly, reporting in compliance with IFRS is the basis for management accounting and an important element of modern corporate governance.

Sixthly, reporting executed in compliance with IFRS provides for a reduction in the cost of preparing consolidated accounting reports of a group of companies.

Seventhly, active application of IFRS forms a basis for enhancement of trust towards credit guarantee schemes.

3.2. Implementation of IFRS 9 and assessment of its impact on the bottom line of expected losses in the credit guarantee fund of the Kyrgyz Republic

3.2.1. Assessment of possibility to implement IFRS 9 in financial institutions

The introduction of IFRS 9 requires the creation of provisions for the impairment of financial assets based on expected credit losses.

Given that IFRS 9 is a new standard that was only planned for implementation, a study was conducted by KPMG [5] on the possibility of implementing IFRS 9 in the banking sector of Belarus. The study showed that bad-debt provisions are expected to increase and, most likely, they will be volatile. At the same time, development of a new model to calculate expected credit losses in accordance with IFRS 9 is a time-consuming and long-term process that requires significant labor and financial resources of financial organizations, as well as changes in business processes.

The study results showed:

• Most Belarusian banks expect provisions to change by more than 15%, while European banks expect an average increase in provisions by 13%;

• Most Belarusian banks expect an impact on capital of no more than 1.5%, while European banks expect an average impact on capital of 0.35%;

• By the end of 2018, banks have to implement IFRS 9.

As to application of the standard by credit guarantee funds of developing countries, there are no data concerning IFRS 9.

However, in the Kyrgyz Republic, the Association of Guarantee Funds and OJSC "Guarantee Fund" developed a methodology and implemented software for application of IFRS 9 in credit guarantee funds, the results and description of which are given below.

3.2.2. Results of IFRS 9 implementation by OJSC "Guarantee Fund"

Since 2011, a new financial system - a system of credit guarantee funds - began to form in the Kyrgyz Republic and at the initial stage six regional credit guarantee funds were established. Adoption of the Law of the Kyrgyz Republic "On guarantee funds in the Kyrgyz Republic" in 2013 created the legal basis for operation of credit guarantee funds.

Successful performance of regional credit guarantee funds allowed providing more extensive support for SMEs through establishment of OJSC "Guarantee Fund" in 2016.

The initial capital was generated at the expense of the republican budget and amounted to KGS 282 million (USD 4 million), including KGS 72 million (USD 1 million) as contribution of the Government of the Kyrgyz Republic and KGS 210 million (USD 3 million) in form of the ADB financial support. In 2018, the authorized capital of OJSC "Guarantee Fund" was increased by KGS 300 million (USD 4.3 million) and totaled to KGS 582 million (USD 8.3 million) at the end of 2018.

For a short time of operation, OJSC "Guarantee Fund" managed to achieve high results in financial and economic activities. Thus, since the start of operations in 2016 and as of the end of 2018, 656 guarantees were issued in the amount of KGS 755 million (USD 10.8 million). Therewith, the amount of loans received by entrepreneurs in the partner banks of OJSC "Guarantee Fund" amounted to KGS 2.7 billion (USD 39.3 million). In 2018, 419 guarantees were issued in the amount of KGS 507 million (USD 7.2 million). The amount of loans issued by partner banks under the guarantees of OJSC "Guarantee Fund" amounted to KGS 1.7 billion (USD 25 million). New jobs for 1,225 people were created in 2018 and 5,887 existing jobs were supported. The payback is 99.9%.

In 2017, net profit amounted to KGS 12.6 million, and in 2018, net profit doubled and amounted to KGS 25.5 million.

The National Bank of the Kyrgyz Republic made a decision on implementation of IFRS 9 by the commercial banks during the period of 2016 – 2018. According to preliminary data, many commercial banks, either through their own efforts or with involvement of external specialists, have implemented IFRS 9.

In this regard, OJSC "Guarantee Fund" also implemented IFRS 9 standards in 2018 and the results of the external audit for 2018 [6] confirmed the correctness of accounting and execution of the financial reporting in accordance with IFRS 9.

As a result of implementation of IFRS 9 by OJSC "Guarantee Fund" in the Kyrgyz Republic, the change in reserve provisions was 13.7%, and the impact on capital was equal to -0.1% compared to the applicable IFRS 39.

The IFRS 9 financial model, implemented by OJSC "Guarantee Fund", is described in the next section.

4. Application of IFRS 9 in the credit guarantee fund of the Kyrgyz Republic
4.1.   IFRS 9: accounting and classification, expected losses model

The purpose of IFRS 9 is to establish principles for reflecting financial assets and financial liabilities (financial instruments) in financial statements to present relevant and useful information to users of financial statements, allowing them estimating the amounts, terms of generation and uncertainty of the organization's future cash flows. [7]

After five years of development, on July 24, 2014, the International Accounting Standards Board (IASB) issued the final version of IFRS 9 *Financial Instruments*. The standard should apply for annual periods beginning on or after 1 January 2018.

The Board divided the work on this standard into three stages:
1. Classification and measurement;
2. Impairment;
3. Hedge accounting

The standard includes a new view of financial assets and financial liabilities reflection in the statements, which will have a significant impact on the financial sector.

The key points of IFRS 9 are:

▪ Classification and measurement of financial assets and liabilities based on the organization's business model and cash flows reflecting it;

▪ Model of expected credit losses, which implies earlier recognition of loan losses and damages;

▪ Model of hedge accounting that reinforces the relationship between risk management and accounting.

Before assessing credit risk, financial instruments are classified and measured according to different categories depending on implementation of: (a) a test for "obtaining contractual cash flows" (SPPI test) (Fig. 1), and (b) a "business model" test.

Financial instruments should be considered consequently:
1) either at amortized cost;
2) either at fair value (with reflection of its changes through profit and loss statement (FVTPL), or as a part of other comprehensive income (FVTOCI)):
– are initially recognized at fair value, including transaction costs (TC). For financial instruments accounted for at FVTPL, all TCs are immediately recognized through the profit and loss statement;
– recognition at fair value through other comprehensive income (FVTOCI) is possible for some types of equity instruments and is required for some debt instruments.

The model of expected credit losses, determination of credit risks and probabilities of default are the most fundamental issues of IFRS 9. The new impairment requirements in IFRS 9 are based on the model of expected credit/guarantee losses and replace the model of incurred losses outlined in IFRS-39.

Many researches in the field of studying financial crises are based on modeling the effect of macroeconomic variables on credit risks. Models are developed in different countries with

consideration of their economic specifics - a set of factors (variables) that affect credit risks to one extent or another.

Fig.1. SPPI-test diagram
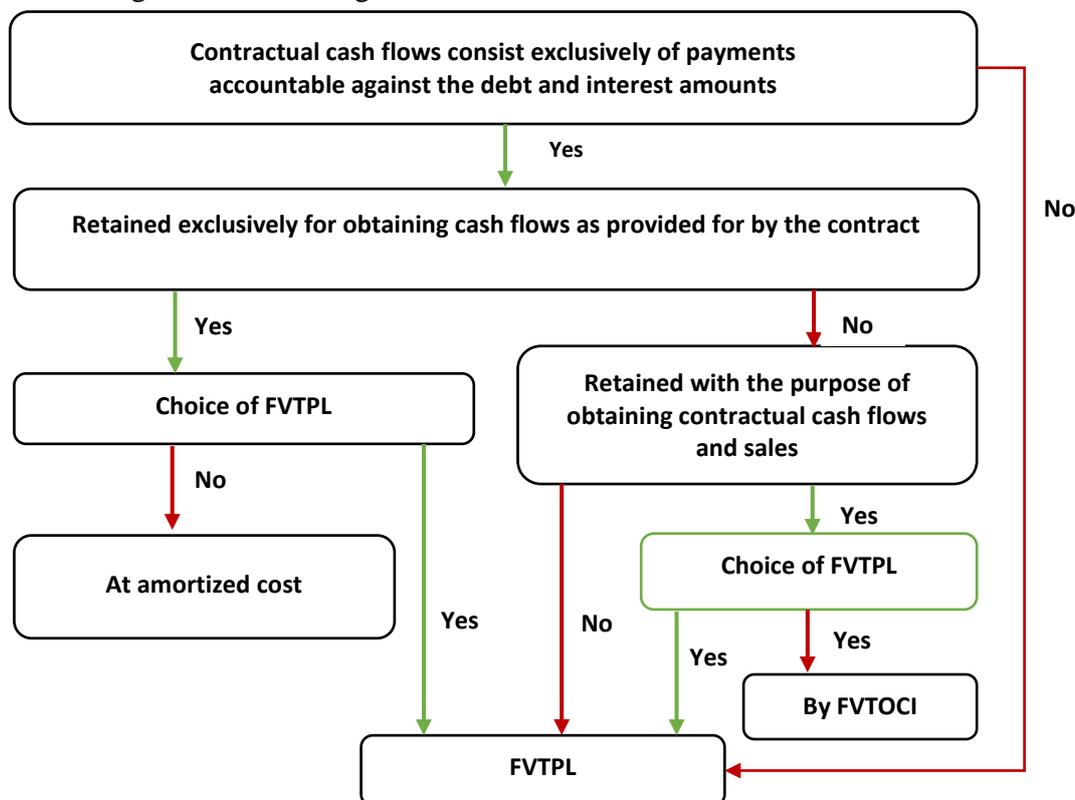
In Kazakhstan, the National Bank uses a multi-factor portfolio model of credit risk [8] in stress testing of the banking sector, which assesses the degree of impact, which macroeconomic parameters have on the credit risk (proportion of non-performing loans (NPL) of banks and other financial and credit institutions (FCIs). Such macroeconomic parameters include the price of oil, nominal exchange rate, real GDP of the country and the main partner states, the rate of production growth in the main sectors of the economy. [9]

In Russia, the Central Bank, banks, and FCIs also use various macroeconomic models to assess loan losses and risks during stress testing of the banking sector. Basically, when building these credit risk models, the macro-parameters used include the rates of real GDP growth, consumer price index (CPI), value of the dual-currency basket (in US dollars and euros), rates of direct investments growth and increase in real incomes of the population. [10]

During the stress testing of the banking sector in Georgia [11] with use of the econometric model developed by the International Monetary Fund (IMF) and the World Bank under the FSAP (Financial Sector Assessment Program), such indicators as the GDP growth and nominal interest rate on long-term loans were applied as significantly affecting the credit risks. This model was built on the basis of endogenous factors, with the assumption of correlation between the size of the economic recession (respectively, the probability of default) and macroeconomic indicators. The model was based on the vector auto regression approach. [12]

The credit risk model developed under a similar FSAP program during the stress testing of the banking sector in Tajikistan [13] allowed finding out that the rate of non-performing loans depends on real GDP growth rates, exchange rate, nominal interest rate on long-term loans, CPI and amounts of incoming remittances into the country.

In the Czech Republic, when assessing the financial stability of the banking sector, the national bank also used the model [14] designed for assessment of the macroeconomic indicators impact on the level of the loan portfolio default. In this model, the important factors affecting the level of probability of the loan portfolio default included: the rate of the real GDP growth, level of interest rates in the interbank market, exchange rate to the euro.

As a result, all the researches described above in the field of assessing the credit risks in the banking sector mainly confirm that the macroeconomic indicators of both the real and banking sectors affect the level of credit risk and can be reasonably used in modeling general and system expected credit losses (ECL) and probabilities of default (PD).

4.2. Credit risk and calculation of expected guarantee losses

One of the main objectives of IFRS 9 is the effective and proper management and assessment of credit/guarantee risk. Any increase in credit/guarantee risk and deterioration in the quality of financial instruments depend on objective events that allow the financial instrument being classified in accordance with different stages.

When determining the expected credit/guarantee losses, portfolio (general) and individual approaches are applied. Provisions for losses and impairment of financial instruments are estimated and created with account of expected credit and guarantee losses. *In the first stage*, estimated loan impairment provisions are determined for a financial instrument as expected credit/guarantee losses within 12 months, and *in the second and third stages* as expected credit/guarantee losses within the whole term of the financial instrument. *The first stage* supposes that the expected credit/guarantee losses are conditioned by default events, which are possible within the next 12 months. In the second and third stages, it is assumed that the loan/guarantee risk has increased significantly after initial recognition (on an individual or portfolio basis) and includes loan/guarantee impairment.

In the first and second stages of the financial instrument, interest income is calculated by multiplying the effective interest rate to the book value of the instrument before deducting impairment provisions, while in the third stage, interest income is determined by multiplying the effective interest rate and amortized cost of the instrument after deducting impairment provisions.

The main indicators in determining and assessing credit/guarantee risk include credit/guarantee loss (CL), expected credit/guarantee losses (ECL) [15], probability of default (PD), loss given default in percent (LGD), exposure at default (EAD).

The formula of expected credit losses [16] is presented as follows:

$$\text{ECL} = \text{PD} \times \text{LGD} \times \text{EAD}, \tag{1}$$
where,
ECL – expected credit/guarantee losses,
PD – probability of a borrower (counterparty) default in future,
LGD – percent of losses of the amount of claims in case of default,
EAD – amount of claims in case of default in future.

Expected credit/guarantee losses are calculated based on the maximum possible value of losses, taking into account the probability of their occurrence within the next 12 months or the entire life of the financial instrument.

The model of expected losses implies continuous recognition of expected credit/guarantee losses and their re-estimation at each reporting date to reflect changes in the credit/guarantee risk of a financial instrument. Estimation of the probability of default should, first of all, be based on historical data of previous periods. Expected credit/guarantee losses are subject to discounting at the date of the financial statements. In turn, assessment of credit/guarantee risks implies an increase in loan/guarantee losses within the term of the financial instrument in the event of a significant increase in credit/guarantee risk from the date of initial recognition. Expected credit/guarantee losses are estimated at each reporting date taking into account new data and changes in predictions

despite the absence of a significant increase in credit/guarantee risk. An illustration of accounting for expected credit/guarantee losses is presented in Fig. 2.

Fig.2. Accounting for expected credit/guarantee losses
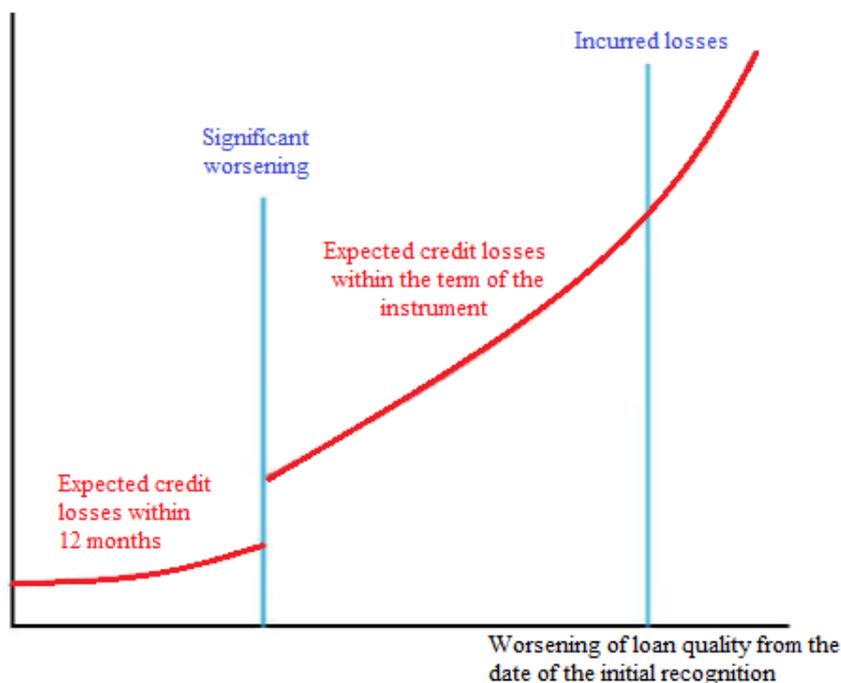
4.3.   Model of expected credit/guarantee losses of the credit guarantee fund

OJSC "Guarantee Fund" has adopted principles for accounting and financial reporting and determined methods for assessing credit/guarantee risks and calculating the probability of default in accordance with IFRS 9.

To assess systemic risks and calculate the probabilities of default, OJSC "Guarantee Fund" applies a regression model, taking into account the influence of macroeconomic factors. It also uses methods based on analysis of accounting and financial statements, and other risk assessment approaches with consideration of historical losses.

In order to ensure reasonability of the assessment and proper recognition of expected credit/guarantee losses, OJSC "Guarantee Fund" uses available tools and information, as well as it will expand its analytical base in the future. In assessing expected credit/guarantee losses and probability of default, it reviews reasonable and supported information about past events, current conditions and predictions of future economic conditions (predicted factors).

Factors that are influencing credit/guarantee risk can be conditionally divided into three groups:
- macroeconomic,
- industry,
- individual for each borrower (counterparty).

Predicted macroeconomic factors are general indicators of the national economy. When estimating expected losses with use of the portfolio method, such factors are key elements in the regression model for determining the systemic probability of default. Analyzing relationships between key macroeconomic factors and the credit quality of financial instruments allows a deeper understanding of sectoral dependencies in the economy, as well as identifying the strengths and vulnerabilities of the financial sector.

Predicted industry factors allow more accurate reflection of the specifics of the borrower industry dynamics, and include a limited amount of information on certain industry indicators.

Predicted individual factors reflect the specificity of a particular borrower, and they are difficult to foresee.

Currently, financial institutions in developed countries have designed and tested many models for assessing the credit risk of borrowers (counterparties), many of which have stood the test of time and now function reliably at the global level. Thus, for assessing credit risk, the Basel Committee on Banking Supervision proposes a standard approach based on assessment made by external rating agencies and an approach based on internal ratings. [15; 16]. In the modern realities of the financial sector, when the major part of the banks' loan portfolio is presented by borrowers that do not have ratings from international agencies, building a flexible system for assessing credit risk with use of a standard approach becomes difficult.

Therefore, taking into consideration special aspects of the banking and credit guarantee systems of the Kyrgyz Republic and countries of the Central Asian region as a whole, the most relevant models are those allowing assessment of credit/guarantee risks based on internal ratings of banks and credit guarantee funds developed with use of econometric and various mathematical methods based on macroeconomic factors.

In compliance with this approach and the principles of IFRS 9, OJSC "Guarantee Fund", commercial banks and other FCIs need to calculate the probability of default, which is one of the key components of the credit/guarantee risk.

The model of default probability is primarily of potential interest to the regulator of the banking system, banks, other financial and credit institutions and OJSC "Guarantee Fund", as well as their counterparties. The model probably brings significant benefits for the regulator, since its actions should be aimed at identifying the most vulnerable banks in order to take timely measures for their financial recovery. The model can have practical value for counterparties to make reasonable decisions and determine risks when investing funds in a particular bank and other financial and credit institutions. OJSC "Guarantee Fund", banks and other FCIs are interested in monitoring of their default probability dynamics in assessing risks associated with financial and investment activities and the policies implemented.

In order to keep accounting and reporting in compliance with the principles of IFRS 9, and to assess reliably and reflect expected credit/guarantee losses, OJSC "Guarantee Fund" has developed and applied *a linear regression model* based on macro-variables. This model is used to identify and account for default losses on the guarantees of OJSC "Guarantee Fund", which are in the first and second stages of the guarantee liability (guarantee portfolio). For the third stage of guarantee liabilities, the *discounting method (effective rate method)* is used. The effective rate method provides for determination of expected losses by discounting future cash flows to repay the loan (guarantee liabilities) to the bank, and calculation of NPV - the reduced (discounted) cost of the loan (guarantee liabilities). The discount rate, in particular, is the weighted average interest rates on alternative financial instruments, the rate of return on highly liquid securities, and in some cases other calculated discount rates that take into account individual and industry risks.

Quarter macroeconomic data for the period from 2008 to 2018 were used to analyze and build the regression. Information base of the analysis are the figures of the National Statistics Committee [18] of the Kyrgyz Republic and the National Bank of the Kyrgyz Republic. [19; 20].

This model supposes the event of default (dependent variable Y) reflecting realization of systemic credit risks of the banking sector to be a change in the trend of the proportion of unprofitable loans (loan losses) in the total loan portfolio of banks from downward to upward (growth rate of loan losses).

Any decrease in proportion of unprofitable loans can be caused not only by the improved creditworthiness of the borrower, but also by writing off bad loans. Therefore, to obtain more accurate estimates, they did not use absolute values, but proportion of unprofitable loans in the total loan portfolio of banks, expressed as a percentage.

The following indicators were applied as explanatory macroeconomic variables:

1. Rate of the real GDP growth - (f_1);
2. Rate of (inward) remittances increase - (f_2);
3. Rate of increase in the exchange rate of the US dollar to KGS - (f_3);
4. Rate of the loan portfolio growth - (f_4);
5. Rate of the consumer price index (CPI) growth - (f_5);
6. Proportion of foreign currency loans in the total loan portfolio - (f_6);
7. Interest rates on loans in national currency (from 1 to 3 years) - (f_7).

With use of the correlation analysis, the first five factors (f1, f2, f3, f4, f5) were selected as having the strongest influence on the dependent variable Y - that is, proportion of loan losses in the loan portfolio of the banking sector.

Review of the scientific literature on determination of the probability of default and loan losses showed that when assessing the impact of macroeconomic factors on credit risk, many experts develop a regression model based on statistical data.

Then, the final model [17] used in assessing and predicting the quality of the loan/guarantee portfolio (credit/ guarantee risk level) looks as follows:

$$Y_t = \beta_0 + \beta_1 \cdot f_{1t} + \beta_2 \cdot f_{2t} + \beta_3 \cdot f_{3t} + \beta_4 \cdot f_{4t} + \beta_5 \cdot f_{5t}, \qquad (2)$$

where,

Y_t – proportion of loan losses in the total amount of the loan portfolio, expressed as a percentage,

β_0 – free constant term, β_n – coefficients with explanatory variables,

f_{1t} – rate of the real GDP growth as a percentage of the previous period of last year,

f_{2t} – rate of remittances increase, as a percentage of the previous period of last year,

f_{3t} – increase of the US dollar exchange rate to KGS, as a percentage of the previous period of last year,

f_{4t} – rate of the loan portfolio growth, as a percentage of the previous period of last year,

f_{5t} – rate of the consumer price index (CPI) growth, as a percentage of December last year,

t – period (quarter).

Further, to determine the probability of guarantee losses (PD_{GP}) [17], the value of the indicator Y_t (the proportion of credit losses) is multiplied by the proportion of the guarantee liability (R_{GL}):

$$PD_{GP} = Y_t \times R_{GL}, \qquad (3)$$

In turn, R_{GL} indicator is determined with use of the formula [17]:

$$R_{GL} = GP / L, \qquad (4)$$

where, GP is the guarantee portfolio, L is the loan portfolio secured by guarantees of the credit guarantee fund.

This model is applicable for the portfolio approach, and for guarantees/loans in the first and second stages in accordance with IFRS 9, and can be used for various lending segments (industries) with the necessary conversion of incoming statistical data. Thus, it is advisable to differentiate the relevant statistical data in terms of various sectors of the economy, in order to make a more accurate calculation of the predicted values of PD and expected credit/guarantee losses.

5. Determination of the provision amount for financial assets of the credit guarantee fund
5.1.   Calculation of the provision for financial assets of credit guarantee funds

IFRS 9 requires application of the expected credit loss model, which takes into account prediction of future conditions and events, including macroeconomic ones, when assessing impairment of financial assets. That is, it will not be necessary to wait for events confirming a high credit risk in order to recognize the impairment.

Deposits placed by credit guarantee funds in partner banks are financial assets, therefore, in accordance with IFRS 9, credit guarantee funds must recognize the estimated reserve provision as expected credit losses on financial instruments to which the impairment requirements apply.

For financial assets (deposits, securities, etc.), provisions are calculated in accordance with the counterparty rating and the probability of default using the formula [16]:

$$\text{LLP}_{FA} = \text{PD} \times \text{LGD} \times \text{EAD}, \tag{5}$$

where,

LLP_{FA} (loan loss provision) – provisions to cover potential losses on financial assets,

PD (probability of default) – probability of default of a counterparty bank defined in dependence on the bank's rating,

LGD (loss given default) – losses in case of default, i.e. a part of assets exposed to risks, which will not be returned at default, being equal to 100%,

EAD (exposure at default) – financial asset amount.

5.2. Rating construction and determination of a bank default

The construction of a bank solvency rating, which is a generally accepted tool for a comprehensive assessment of banks, is based on public reporting data.

Bank reliability is a complex indicator that should take into account all major aspects of the bank's work, therefore the rating should comprise the most important parameters of the bank's activities.

In order to set up a comprehensive rating, the assessment system should include the indicators, characterizing those aspects of a bank's business, which are the most important ones from the analyst's point of view. Only in this case we can consider the final rating as a truly comprehensive assessment. The authors of this article propose to use the index method in the rating procedure. It consists in determining the weight factor of each indicator in the scorecard. For this, it is assumed that a table is created in which data on the size of assets, authorized capital, loan portfolio, profit, proportion of loans in assets, return on assets and capital, liquidity, deposit base, operating performance and other indicators are given for each of the banks being assessed. Moreover, all indicators are divided into two groups: six absolute indicators and eight relative indicators.

Based on international experience and economic considerations, this model uses 8 indicators as explanatory variables (Table 1).

For each of the indicators, they calculate a score being equal to the ratio of the indicator value for the bank to the average value of all indicators of the banks in question. Then, the values of relative indicators are assigned half the weight, calculated on the basis of the correlation analysis of the factors (indicated in Table 1) and estimated dependent value – financial soundness indicator (FSI). Weight of influence of each factor on the dependent value (FSI) is empirically determined by means of correlation analysis. Weights of influence in percentage form are calculated as the ratio of the correlation coefficients of particular indicators - factors (ROA, ROE, etc.) to the total value of correlation coefficients (Table 2).

Table 1. Key financial variables (factors)

	Index	Calculation	Determination
1	ROA	Profit / Assets	Asset profitability
2	ROE	Profit / Authorized capital	Capital profitability
3	NW/A	Net worth / Assets	Capital adequacy
4	LA/LIA	Liquid assets/Liabilities	Liquidity
5	PA/A	Performing assets /Assets	Performing assets level
6	LLP/LP	Loan loss provision / Loan portfolio	Portfolio quality
7	OI/OE	Operating income / Operating expenses	Operating performance
8	GR/A	Gross return /Assets	Return on assets

Table 2. Calculation of the factor weights of influence on the FSI.

		ROA	ROE	NW / A	LA / LIA	LLP / LP	PA / A	GR / A	OI / OE
Weight of influence (rounded)		**5,0%**	**5,0%**	**30,0%**	**15,0%**	**10,0%**	**10,0%**	**15,0%**	**10,0%**
Weight of influence (est.)		5,0%	6,0%	30,0%	15,0%	10,0%	11,0%	14,0%	9,0%
		0,13	**0,15**	**0,77**	**0,39**	**0,27**	**0,30**	**0,37**	**0,24**
	FSI	Index 1	Index 2	Index 3	Index 4	Index 5	Index 6	Index 7	Index 8
FSI		0,13	0,15	0,77	0,39	0,27	- 0,30	0,37	0,24
Index 1			0,99	0,25	0,24	- 0,46	0,00	- 0,04	- 0,04
Index 2				0,21	0,21	- 0,50	0,04	- 0,06	- 0,05
Index 3					0,72	0,21	- 0,67	0,41	0,19
Index 4						0,04	- 0,90	0,32	0,21
Index 5							- 0,28	0,32	0,46
Index 6								- 0,39	- 0,34
Index 7									0,27
Index 8									

In the second group, 50% of the weight is distributed in proportion to the number of indicators in the sampling. Further, by summing all the values for the selected indicators of the bank, we obtain the cumulative criterion. The use of a conservative approach is recommended, that is, all fractional estimates should be rounded to the smallest. The final ranking of banks is based on the results of the cumulative criterion calculation in the rating scale, which has eight categories, seven of which are for banks that are not in default and one category intends for banks that are in default. Each category has its own integral criterion of the bank. Depending on the received criterion, the rating is assigned. It should be noted that Table 3 is conditional and is used only to represent the functioning of the rating system.

Table 3. Rating scale

Cumulative criterion	Rating	Comments
2 and higher	A1	Normal
	A2	
1.7–2.0	A3	Satisfactory
	B1	
1.5–1.7	B2	Claims attention
1-1.5	B3	At risk of default
1 and lower	C	Default

Based on the available statistical information on the banking system and using the available methods for estimating the probability of default, we can determine the maximum probability of default, at which bank failure is considered to be the most expectable, by the following formula [17]:

$$PD = X_1 \times X_2 \times X_3, \tag{6}$$

where,

X_1 – proportion of the number of the banks, that have defaulted, in the average value of the number of banks in the system for a specified period

X_2 – proportion of the number of default periods in the total number of specified periods,

X_3 – proportion of assets of the banks, that have defaulted, in the average value of assets of the banking system for a specified period.

Then, for each category of the rating scale, the probability of default is assigned and a default matrix is compiled (Table 4).

As new information on bank defaults is received, estimates of the probability of default on banks are reviewed at least once a year.

Table 4. Default Matrix

Rating	Probability of default (PD) in %
A1	0.00%
A2	
A3	0.01%
B1	
B2	0.02%
B3	0.03%
C	0.04%

Thus, the approaches proposed by this methodology are based on the assessment of a set of criteria for the banks stability and are aimed at determining the probability of default of a particular bank and creating adequate reserve provisions in accordance with the requirements of IFRS 9.

6.   Conclusion

As a result of IFRS 9 implementation by OJSC "Guarantee Fund" in the Kyrgyz Republic, the change in reserve provisions was 13.7%, the impact on capital was equal to -0.1% compared to the applicable IFRS-39. The conclusion of the external audit of OJSC "Guarantee Fund" for 2018 confirmed correctness of the methodology and the results of the IFRS 9 implementation.

Methodologies and approaches developed and used at OJSC "Guarantee Fund" can be implemented in credit guarantee funds in both developing and developed countries. It should be taken into account that the results of IFRS 9 implementation will be affected by macroeconomic indicators, the state of the banking system, the quality of the loan portfolio, sectoral development of the economy and other indicators of the country of the credit guarantee fund's stay.

In this case, the behavioral model of reserve provisions will depend on the risk assessment models adopted by the credit guarantee funds, as well as on the procedure for using all available reliable information about past events, current conditions and predicted future economic conditions.

Bibliography

1. Abakirov, M., Abakirov, S. Access of small and medium enterprises to finances. – Bishkek: Guarantee fund, 2019.

2. Astana Economic Forum, 2017.

3. Credit Guarantee Corporations Law of Japan.

4. Resolution of the national Bank of the Kyrgyz Republic, 2018.

5. KPMG. Implementation of IFRS 9 in the banking sector of the Republic of Belarus. 2018.

6. BAI Audit Company. Report on audit of Guarantee Fund OJSC for 2018. 2019.

7. International Financial Reporting Standard (IFRS) 9 *Financial Instruments*.

8. Podlich, N., Illyasov, D., Tsoy, E., Shaikh, Sh. Methodology of stress test for the Kazakh banking system", IFO Working Papers #85, Institute for Economic Research at the University of Munich, 2010.

9. Reports on financial stability of Kazakhstan for 2012-2014 and 2015-2017, NBRK.

10. Review of financial stability for 2012 - 2018(QI-II), CBRF.

11. Kazarian, E., Ferrari, A., et al. Stress Testing the Banking Sector of Georgia - Technical Note". IMF-WB FSAP, 2015.

12. Totmyanina, K.M. Analytical methods in risk management: Review of default probability models // Financial risk management. – 2011. – № 01(25).

13. Grigorain, D., Melecky, M., et al. Stress Testing the Banking Sector of Tajikistan: Technical Note". IMF-WB FSAP, 2016.

14. Jakubik, P., Gersl, A., Konecny, T., Seidler, J. Dynamic Stress Testing: The Framework for Assessing the Resilience of the Banking Sector used by the Czech National Bank // Czech Journal of Economics and Finance. – 2013. – № 6, 63.

15. Basel Committee on Banking Supervision – International Convergence of Capital Measurement and Capital Standards: Specific framework, June 2004, Bank for international settlements. – Mode of access: https://web.archive.org/web/20120617075545/http://www.cbr.ru/today/ms/bn/Basel.pdf.

16. Basel Committee on Banking Supervision – "An Explanatory Note on the Basel II IRB Risk Weight Functions", July 2005. Bank for international settlements. – Mode of access: https://www.bis.org/bcbs/irbriskweight.pdf.

17. Methods of creating provisions on financial assets according to IFRS in Guarantee Fund OJSC, Bishkek, 2018.

18. Social and economic situation in the Kyrgyz Republic for 2014-2018, NSC KR.

19. Bulletin of the National Bank of the Kyrgyz Republic for 2008-2018, NBKR.

20. Report on the financial sector stability of the Kyrgyz Republic for 2013-2018, NBKR.