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CREDIT RISK OF SMALL AND MEDIUM-SIZED ENTERPRISES IN THE CONDITIONS OF THE COVID-19 CRISIS

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Abstract: *The subject of the paper is assessment of the credit risk of small and medium-sized enterprises (SMEs) in the conditions of the COVID-19 crisis. The paper gives the overview of the theoretical and professional literature on the existing accounting standards related to the assessment of expected loss and banking regulations in terms of capital adequacy, as well as their applicability in the current crisis. Bearing in mind the share of SMEs in total gross domestic product and employment in emerging and developing markets, and dependence of these companies on bank funding, special attention is paid to the researches dealing with the impact of stress tests and an increase in capital requirements on credit supply. Since the paper was written at a time when the COVID-19 crisis was well under way, and the final effects could not be fully analysed, except for only certain projections, future researches will focus on the effectiveness of the existing credit risk assessment models in crisis conditions.*

Key words: *small and medium-sized enterprises, the COVID-19 crisis, credit risk, expected and unexpected losses, stress test*

1. INTRODUCTION

In the paper, we are going to deal with the problems related to credit risk assessment of small and medium-sized enterprises (SMEs) in the condition of the COVID-19 crisis.

The main feature of the crisis is the specific business condition caused by lockdown measures enforced by governments in most countries worldwide.

The global economy, which has not fully recovered from the previous financial crisis, in these business conditions continues to weaken, causing disruptions in supply chains, domestic consumption, export, etc. Consequently, this negatively affects the ability of SMEs to meet contractual obligations concerning loan agreements approved by banks, which can lead to a significant accumulation of non-performing loans and further deepening of the crisis. Accordingly, it is very important to continuously monitor the creditworthiness of SMEs and ensure adequate quantification of credit risk.

Therefore, after defining the business environment and exposure to credit risk of these companies in the COVID-19 crisis, we decided to focus on quantifying expected credit losses in compliance with IFRS 9 and unexpected credit losses, i.e. capital requirement in accordance with Basel II. The last part of the paper analyses credit risk stress testing, as one of the main elements of the Basel II framework.

2. BUSINESS CHARACTERISTICS OF SMALL AND MEDIUM-SIZED ENTERPRISES IN THE CONDITIONS OF THE COVID-19 CRISIS

In almost all countries, small and medium-sized enterprises (hereinafter SMEs) represent the most efficient economic segment, and they are especially important in developing countries that are facing the problems of high unemployment, low level of economic activity, insufficient competitiveness, and lack of investment. The latest data indicate that in OECD countries, 50% of the total number of workers are employed in SMEs. In emerging and developing countries, SMEs account for more than one third of GDP with 34%, and 52% respectively of formally employed (OECD, 2020). In 2019, there were 35,077 companies operating in Bosnia and Herzegovina, of which 34,693 or 98.9% were small and medium-sized enterprises (BHAS, 2021). For this reason, the business of SMEs is a popular area for both theoretical and practical researches.

The most important source of external financing for SMEs are bank loans. The availability of bank financing to SMEs is important in order to enable SMEs to establish, finance and increase their investments; therefore, it is not surprising that this topic that has been covered by a large number of authors. Armstrong et al. (2013) addressed the impact of changes in the availability of bank loans to British SMEs in the period 2001-2012 and concluded that the existence of permanent constraints on SME financing could have short-term and long-term negative effects on economic performance. Beck (2013) also considered the impact of constraints on SME financing, noting that easing the constraints would have a direct and indirect impact on small and medium-sized enterprises and lead to poverty reduction and the creation of high-quality jobs. When creating such a policy, one should be aware that credit expansion can result in financial instability in a poor institutional and regulatory environment.

The biggest problems when granting bank loans to SMEs concern the assessment that there may be difficulties in repaying loans due to insufficient financial capacity and lack of adequate collateral, lack of adequate accounting records and quality business plans, as well as the fact that unfavourable credit ratings can increase the credit risks of these companies. Additional problems have been further deepened by the COVID-19 crisis, which is affecting a number of SMEs, mainly through potential disruptions in supply chains, domestic consumption, export, diminishing earnings prospects and, consequently, the ability of SMEs to perform their *bank-related contractual obligations* pertain to *lending* agreements which leads to the accumulation of non-performing loans (NPL).

According to the results of business activities so far, the COVID-19 crisis has affected SMEs more than large companies, and the experts hired by the OECD (2021) outline the following reasons:

- Firstly, SMEs belong to the number of sectors mostly affected by the crisis (wholesale and retail trade, air transport, accommodation and food services, real estate, professional services, and other personal services). In the OECD countries, the share of employees in SMEs employed in these sectors is on average 75%.
- Secondly, Bartik et al. (2020) point out that small businesses are usually financially vulnerable and have smaller cash stocks compared to larger businesses. Furthermore, it is more difficult for small companies to take advantage of various sources of financing, including the market, so they very often rely on retained earnings and traditional bank loans.
- Thirdly, small businesses generally have smaller stocks and supplier networks making them more vulnerable to supply chain disruptions and rising prices. In addition, they have less bargaining power to provide attractive payment terms.
- Finally, small businesses face more limitations in adapting their business to emerging conditions compared to large companies and start-ups.

Between March 28th and April 4th, 2020, Bartik et al. (2020) surveyed more than 5,800 small businesses that are members of Alignable, a network of 4.6 million small businesses. Three-quarters of the respondents had enough cash at their disposal to last for 2 months or less, so they pointed out that the duration of the crisis played a central role. In addition, there are significant differences in the degree of sensitivity of companies to the business conditions in times of crisis, largely depending on the need of a business to take place through personal contacts. Al-Fadly (2020) analysed the impact of the pandemic on small businesses in the United States based on the data from April 2020 and highlighted the impact of the recorded decline on the revenue as well as the number of small businesses on future economic inequality.

In order to mitigate the immediate impact of the sudden freeze of economic activities and support new borrowings, a number of countries, including both Bosnia and Herzegovina entities, have implemented some economic measures, including moratorium on loan obligations.

The exposure of banks to the loans granted under the EU moratorium on loan repayment required joint prudential treatment, as provided in the Guidelines on legislative and non-legislative moratoria on loan repayment applied in the light of the COVID-19 crisis. According to a report by the European Banking Authority from June 2020, the nominal volume of loans worth 871 billion euros was approved in accordance with these guidelines, making up about 6% of the total bank loans. The segment of SMEs had the largest share in suspension on loan repayment (approximately 60%). However, it should be borne in mind that many of these measures are only temporary, and 50% of the moratorium on payments is supposed to expire before September 2020, while 85% of loans is supposed to expire before December 2020. Some countries have announced an automatic extension of the moratorium in 2021. (European Banking Authority, 2020a).

It can be expected that the termination of the relief measures for companies will lead to an increase in the risk of business failures, which would further lead to an increase in unemployment rates. Given the level of uncertainty in SMEs business operations, it is very important to monitor the creditworthiness of these companies and ensure adequate quantification of credit risk, which will be the subject of the next part of the paper.

3. QUANTIFYING EXPECTED CREDIT LOSSES

Credit risk, i.e. the risk that borrowers will not be able to fulfil their obligations under the loan agreement in a timely manner, is one of the biggest risks that banks face. This risk has been a major driver of most systemic banking crises in advanced economies in recent decades (Mayer, Pence and Sherlund (2008), Demyanyk and Hemert (2011), Goodstein, Hanouna, Ramirez and Stahel (2017)).

Accounting standards require banks to recognize impairment of credit assets. In accordance with IFRS 9, if credit risk has increased significantly since the initial recognition at each reporting date, a bank should measure a provision for the losses equal to the expected credit losses over their lifetime; and if at the reporting date, credit risk relating to a particular financial instrument has not increased significantly since the initial recognition, a bank should measure the provision for losses for that financial instrument in an amount equal to twelve months of the expected credit losses (IASB, 2021). These credit losses reduce a bank's profitability, thus affecting the capital, and in extreme cases credit losses may be large enough to reduce the bank's capital below regulatory requirements for capital adequacy and solvency and lead to a bank failure. Due to potentially large exposures concentrated in loan portfolios, financial institutions need to quantify credit risk at a portfolio level.

Although it is never possible to know in advance the losses that a bank will experience in a certain year, it can predict the average loss in value of a loan portfolio over a period of time or expected credit losses. Expected Credit Losses (ECLs) can be measured as follows:

$$ECL = \sum_{i=1}^{N} PD_i \cdot LGD_i \cdot EAD_i \quad (1)$$

PD - probability of default.

$LGD = 1 - RR$ - loss given default.

EAD - exposure at default.

RR- recovery rate.

It should be noted that IFRS 9 establishes a framework for determining the amount of expected credit losses and allows the determination approach to be adapted according to different circumstances. Banks should use the flexibility inherent within this framework to take into account the effect of emergency COVID-related support measures, as well as the expectations related to economic trends (BIS, 2020).

One of the functions of bank capital is the absorption of unexpected losses, which occur occasionally; nevertheless, it is not possible to know in advance when and how serious they will be. The interest rates at which loans are granted can absorb a certain level of unexpected losses, but the market does not support sufficient interest rate supplements to cover all unexpected losses. (Basel Committee on Banking Supervision, 2005). The method of determining unexpected losses is the subject of the following part of the paper.

4. QUANTIFYING UNEXPECTED CREDIT LOSSES

Unlike expected losses, unexpected losses (UL) are not the sum of individual losses, but they depend on the correlation between credit losses of all loans in the portfolio (Chatterjee, 2015).

$$UL = \sum_{i=1}^{N} \sigma_i \cdot \rho_i \cdot \quad (2)$$

σ_i - denotes the standard deviation of credit losses in *i* homogeneous group and

ρ_i - denotes the correlation/diversification effects of *i* homogeneous group with other instruments in a bank's loan portfolio.

To calculate capital requirements for credit risk, Basel II defines a standardized approach and an internal ratings-based approach (IRB), and banks are left with the option to choose the one that is most applicable to them.

There are two variants of an internal ratings-based approach:

- Within the foundation internal ratings-based approach (IRB-FIRB), banks use their own estimates of probability of default (PD), while the estimates of other parameters - risk components (LGD, EAD and effective maturity - M) are determined by the supervisor.
- Within the advanced IRB approach (AIRB), banks use their own estimates for all risk components, as well as conversion factors.

The asymptotic single risk factor (ASRF) model is used to calculate unexpected credit losses within the IRB approach. The model is based on Merton-Vasicek model of the firm (Merton (1974), Vasicek (2002)) and additional assumptions, such as that a loan portfolio consists of a large number of infinite granularity loans, normal distribution of risk factors, and time horizon of one year.

Unexpected loss is denoted as the difference between Value-at-Risk (VaR) with a confidence level of 99.9% as a measure of potential portfolio loss in a certain period, and expected loss (EL) (Hlawatsch and Reichling, 2010):

$$UL = \left[\Phi\left(\frac{\Phi^{-1}(PD) + \sqrt{R} \cdot \Phi^{-1}(0{,}999)}{\sqrt{1-R}} \right) \cdot LGD - PD \cdot LGD \right] \cdot EAD \quad (3)$$

R denotes the correlation coefficient *PD* with a systemic risk factor. Basel II specified the correlation values for different asset classes (Basel Committee on Banking Supervision, 2006).

According to the Basel Committee on Banking Supervision, the benchmark for determining a confidence level are companies whose rating is BBB+ and whose average probability of default amounts to 0.1%. The choice of confidence level, in addition to regulatory capital requirements, is influenced by the target credit rating.

The capital requirement for credit risk of SMEs differs depending on whether SME is classified in the category of exposure to legal entities or in the category of exposure to individuals (more in Mitrašević and Bardarova, 2020).

The study conducted by the European Banking Authority (2020b) states that there is a risk that the effects of COVID-19 will lead to higher levels of losses and downgrades in industries particularly affected by the crisis and, consequently, to an increase in required capital levels.

Growing capital demands in the previous crisis caused fears that banks will be reluctant to lend to SMEs, and that they will shift their activities to less risky segments. Therefore, during the implementation of the Basel III standard into EU legislation in 2014, the Supporting Factor was introduced, so that for the banks that use a standardized approach for calculating capital requirements, there could be a reduction in capital requirements related to granted loans to SME sector. The aim of the measure was to provide an incentive for banks to lend to eligible SMEs.

In the next part of the paper, we are going to deal with stress testing whose purpose is to warn the bank's management and supervisory authorities of negative unexpected outcomes associated with various risks, as well as to determine the level of capital that could be needed to absorb losses in case of major shocks.

5. STRESS TESTING

As unprecedented business conditions have proved to have a significant impact on the global economy and financial markets, parallels with the previous global financial crisis are beginning to be drawn. An important feature of the financial crisis that began in the summer of 2007 is the growing delay in the payment of overdue mortgage loans. The initial shock of the increase in delays in the payment of overdue mortgage loans due to falling housing prices in the USA and some European countries was a trigger for a liquidity crisis that eventually turned into the global financial crisis. The previous financial crisis spilled over to small and medium-sized enterprises from the financial sector, whereas this crisis has a direct impact on SMEs and also affects emerging markets which largely escaped the recession after 2007-2008.

In order to ensure that banks are able to meet their capital and liquidity needs under stressful conditions, such as the previous financial crisis, the Basel Committee on Banking Supervision published the Guidelines on Stress Testing in 2009 (Basel Committee on Banking Supervision, 2009). The guidelines addressed the key weaknesses in a stress testing practice highlighted by the global financial crisis; however, as a stress testing evolved rapidly and became increasingly important these principles were updated in 2018 (Basel Committee on Banking Supervision, 2018).

Foglia (2009) provides the overview of quantitative methods developed by individual supervisors for a credit risk stress testing, with a particular focus on the methods used to link macroeconomic drivers of stress with bank-specific credit risk measures.

The European Banking Authority (EBA) is expecting that the stress test assessment of the European banking sector in which the adverse scenario is based on the assumption of a prolonged COVID-19 scenario and that a long period of low interest rates will be completed in July 2021. It is assumed that the worsening economic outlook, in addition to the fall of risk-free long-term rates from the already recorded low level, will result in a fall in GDP, an increase in unemployment, a fall in residential and commercial real estate prices, and a fall in corporate earnings.

Given the numerous studies on the impact of stress testing on the reduction of SME loan offers, including the studies of Cortés et al. (2019), Cetorelli and Goldberg (2012) and Covas (2018), it is clear that the availability of the funds for SMEs will have a crucial impact on poverty rate primarily in developing countries.

CONCLUSION

Thanks to their flexibility, small and medium-sized enterprises in almost all countries represent a rather efficient segment of the economy. The OECD data show that in emerging and developing countries, SMEs account for more than one third of GDP. The specificity of SME business is reflected in the fact that the most important source of external financing are bank loans, and the availability of this source for financing investments is crucial for the growth, and, in situations such as the new crisis, for the survival of these companies. The research presented in the paper outlines the negative effects of restrictions related to bank loans on the economic performance of SMEs.

As the COVID-19 pandemic is spreading and the global economy continues to weaken, the credit risk of many borrowers is expected to increase. Therefore, as in the previous financial crisis, the importance of stress testing is crucial in order to enable the assessment of the impact of a hypothetically unfavourable scenario on banks' balance sheets. The stress testing of the European banking sector, based on the assumption of a prolonged COVID-19 scenario and a long period of low interest rates, is planned to be completed in July 2021 and will have important implications for making a loan policy for SMEs.

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SUMMARY

In the paper, we analysed the issue of bank financing of small and medium-sized enterprises in the COVID-19 crisis. The paper presents an analysis of the current situation and presents potential negative scenarios whose effects on SMEs will largely depend on the duration of the crisis. As opposed to the previous crisis, which affected SMEs in the financial sector, the current crisis has a direct impact on SMEs and also affects developing markets, which largely avoided post-2007 recession. Since SMEs represent a significant segment of the economy in all countries, especially developing ones, the research into the problem of their financing requires special attention. Furthermore, the analyses related to the assessment of the effectiveness of the existing models of credit risk assessment in the conditions of the modern crisis, which will be the subject of our further research, are of immense importance.