ROLE OF THE BASEL ACCORDS IN PRESERVING FINANCIAL STABILITY

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Role of the Basel Accords in preserving financial stability

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Abstract: International convergence and standardisation of general banking terms and conditions are primarily associated with the Basel Committee's activities, which resulted in the adoption of the Capital Adequacy Accords (Basel I, Basel II and Basel III) for the purpose of limiting potentially growing risks in the international banking operations by means of appropriate capitalisation. The purpose of this paper is to point out the importance of the Basel Accords and/or their impact on banking operations and financial stability based on available scientific literature, international standards, the EU acquis, national legislation and other statistical data. Starting from a defined subject matter and a set goal, the paper will first analyse the core principles of Basel I and the transition to the new Basel II Accord. After identifying the shortcomings of Basel II, which were manifested during the global financial crisis, the attention will be focused on the development and implementation of Basel III. Taking into consideration the preservation of financial stability, the National Bank of Serbia pays special attention to improving and harmonising the legislation governing banking operations in accordance with international standards and the EU acquis, while observing distinctive features of the local legal framework and the national market.

Keywords: Basel Committee on Banking Supervision, capital adequacy ratio, financial stability, Basel I, Basel II, Basel III, capital buffers
[JEL Code]: G01, G21, G38, O11

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Non-technical summary

Financial stability gained importance over the last few decades of the 20th century due to frequent crises in the banking sector. Pursuant to the Law on the National Bank of Serbia (RS Official Gazette, Nos 72/2003, 55/2004, 85/2005 – other law, 44/2010, 76/2012, 106/2012, 14/2015, 40/2015 – Decision of the Constitutional Court and 44/2018), the National Bank of Serbia defines and undertakes, within its jurisdiction, measures and actions in order to preserve and strengthen the stability of the financial system. Achieving and preserving financial stability is by no means a simple task and it requires developing an appropriate regulatory framework that includes various institutions, rules and procedures.

The Basel Accords (Basel I, Basel II and Basel III) are a series of guidelines drawn up by the Basel Committee on Banking Supervision, which was established by the governors of the central banks of the G-10 Group in order to limit risks in banking operations by means of adequate capitalisation.

Bank capital symbolises its ability to expand credit and cover losses resulting from deterioration in the asset quality. Due to the importance of capital adequacy, as well as the creation of conditions for equal competition among internationally active banks, the Basel Committee on Banking Supervision has stipulated a minimum capital adequacy ratio, allowing national regulatory bodies and supervisors to impose stricter capital adequacy requirements.

It is extremely important for each bank to maintain a certain level of liquidity, which provides a bank with the ability to respond to sudden needs for liquid assets when performing financial operations, to preserve financial health during financial crises, and take advantage of any opportunity to earn profit by investing liquid assets in above-average profit potential investments.

Contents:

1 Introduction

Modern banking development resulted in a higher exposure to various types of operational risks, which in turn requires their identification and appropriate protection measures as a prerequisite for efficient banking operations. Bank capital symbolises a source of funds – it enables bank's growth, provides security in terms of risk management, protects interests of creditors and bank's depositors, and makes it possible to gain trust in the bank and the banking sector in general.

The Basel Accords provide regulatory and incentive measures for more secure banking operations. They are adopted by the Basel Committee on Banking Supervision headquartered in Basel, which, at first, used to issue recommendations and guidelines that were not binding at a global level. These included recommendations on how to properly carry out certain banking activities, how to approach risk management, etc. The role of the Basel Committee is to define general supervision standards and guidelines to be implemented by legislative bodies subject to specific conditions in a specific country. This way common supervision standards are ensured in different countries.

The subject matter of this paper is an analysis of the roles of the Basel Accords in ensuring financial system stability. Since banks' assets are exposed to higher risks than assets of companies, and due to the fact that the banking system can jeopardise the financial stability both at national and international levels, the need for international banking standards arose. An institution that is highly important globally for creating international banking supervision standards is the Basel Committee on Banking Supervision. The years of Committee's work resulted in the adoption of the Basel Accords (Basel I, Basel II and Basel III) aimed at limiting growing risks in international banking operations by means of adequate capitalisation.

Basel Accord I was adopted by the Basel Committee in 1988 with the aim of managing and monitoring credit risk. A set of rules of this accord came into force in January 1993, when uniform capital rates were set against risk-weighted assets for all banks operating internationally.

The Basel Committee responded to Basel I weaknesses by adopting a new accord – Basel II, which primarily concerned international banking. It contributed to better risk management and accordingly to the preservation of financial stability and better financing conditions. The Basel II standard is based on three interrelated sets of rules for governing financial sector operations, i.e. the so-called Basel II pillars, which will be separately described in more detail hereunder. In addition, the weaknesses and limitations of this standard that led to the adoption of Basel II will also be covered.

The global financial crisis only prompted the improvement of the Basel II standard, whose modification resulted in a new Basel III Capital Accord adopted to mitigate the effects of the crisis by striking a balance between the requirements for developing and maintaining stable financial systems, on the one hand, and achieving a necessary credit level, on the other hand, as well as minimising the employment of government and taxpayers' money for covering losses and recovery of private financial institutions. If the aforementioned goals were to be implemented, the Basel III Accord should contribute to long-term financial stability and

prosperity. A major novelty of Basel III is the introduction of capital buffers, liquidity coverage ratios and leverage ratios.

2 Establishment, role and objectives of the Basel Committee

A bank is one the most important entities in the financial market and the overall system of economy financing. For this reason, banks need to be constantly monitored by central monetary authorities that undertake preventive supervision. Such an approach enables timely protection against the collapse of the banking sector and its severe consequences for the stability of the financial system.[1]

The development of financial markets and their interconnectedness at a global level added an additional dimension to efforts invested to preserve the banking system stability. Risk growth on global financial markets is always accompanied by an increase in exposure of globally active and particularly of large banks, and the deterioration of the capital adequacy ratio. One of those severe disturbances on banking foreign exchange markets that occurred at the beginning of the 1970s and resulted in the bankruptcy of some major banking institutions drew attention to the need to establish an international body that would deal with issues and modalities of cooperation in terms of improving the international monitoring network and overcoming its shortcomings.[2]

The Basel Committee on Banking Supervision was founded in 1974 by the central bank governors of the G-10 Group, and is headquartered at the Bank for International Settlements in Basel. Its main objective was to enhance financial stability by improving the quality of banking supervision worldwide, and to serve as a forum for regular cooperation between its member countries on banking supervision matters.[3]

The first meeting of the Committee was held in February 1975 and since then meetings have been regularly held three or four times a year. The Basel Committee members have been expanded since the establishment from G-10 to 45 institutions and 28 jurisdictions. At first, the Committee's primary objective was to bridge the gaps in the international banking supervision, so that no banking institution would escape supervision and that supervision would be adequate and consistent across member jurisdictions. Starting with the Basel Concordat, which was first issued in 1975 and has been revised a few times since then, the Committee introduced a number of international banking standards, most notably its landmark publication of capital adequacy accords commonly known as Basel I, Basel II and Basel III.[4]

Decisions made by the Basel Committee are the result of consultations with financial experts and representatives of regulatory and supervisory bodies from the most developed countries. It should be noted that the Basel Committee does not have controlling powers and its conclusions have no legal force. Its recommendations and adopted documents only become

[1] Matić, V. (2009). Prudential supervision, *Banking*, vol. 38, no. 3-4, Association of Serbian Banks, 108.

[2] *Ibid.*

[3] *History of the Basel Committee*, https://www.bis.org/bcbs/history.htm

[4] *Ibid.*

binding when they are adopted as a law or a by-law by competent authorities. Those are recommendations and advice on how to appropriately implement certain activities in banks, how to approach risk management, etc. Each national regulator should adapt the given recommendations to specific circumstances in a specific country.[5]

One of the main issues of preventive supervision since the end of the 1980s is the capital adequacy issue. In 1988 the Basel Committee decided to introduce a common capital adequacy measurement system named the Basel Capital Accord (Basel I Accord).[6] Its main objectives were to ensure an adequate capital level in the international banking system in order to strengthen financial stability, so that no bank is able to operate if it has not met the necessary capital requirements.[7]

3 Basel I

The response to the global debt crisis during the 1980s was the adoption of the Basel Capital Accord in July 1988, better known as the International Convergence of Capital Measurement and Capital Standards. The standard was signed by the representatives of the USA and leading industrial countries (Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, Switzerland, Great Britain and Luxembourg) as an accord on banking standards for capital adequacy measurement and minimum standards that supervisory bodies need to implement in their countries. In order to ensure the uniformity of conditions for banking operations on the global financial market, the Basel Committee on Banking Supervision published a set of rules for calculating capital adequacy and minimum standards that supervisory bodies need to implement in their countries.[8]

Basel I achieved particular success after prudential regulations were accepted in more than 100 countries, to a greater or lesser extent, thus becoming the global standard for bank solvency measurement and risk management in banking. The Basel Committee's report from 1993 indicates that all banks from the G10 Group members operating internationally met minimum capital requirements listed in the Basel I Accord.[9]

Basel I sets out components of bank capital – core and supplementary (Tier 2) capital, credit risk assessment weights per balance sheet assets and credit conversion factors for credit risk assessment per balance sheet assets, as well as a relation between equity capital and total

[5] Božović, J. Božović, I. (2009). The role of Basel principles in banking operations and financial stability, *Ekonomika,* Niš, no. 5, 248.

[6] Matić, V. *op. cit.* 112.

[7] Stojković, M. Jeremijev, V. (2017). The importance of implementing the Basel Standards in the banking sector of the Republic of Serbia, *European legislation*, no. 61-62, 240.

[8] Božović, J. (2009). *Main principles of the banking management process,* first edition, Faculty of Economics in Priština, Kosovska Mitrovica, 66.

[9] Jocić Radenković, D. Stanković, J. Pešić Anđelković, M. (2012). Harmonisation of the risk management legislation in the Serbian banking sector, *Faculty of Economics of the University of Niš*, Niš, vol. 36, no. 3, 1196.

credit risk weighted assets in order to assess the capital adequacy ratio.[10] The Accord also specifies bank capital tiers:

Primary (core) capital has a key role in calculating the profit rate and assessing bank's risk absorption capacity and ability to maintain competitive relationships. It comprises ordinary shares, a surplus above the nominal value of shares paid by shareholders, non-cumulative preference shares and retained earnings.[11]

Tier II includes convertible preference shares, cumulative preferred stocks, loan loss reserves, convertible loans and other debt instruments. These components are included in the bank capital base in order to assess capital adequacy even though they do not have the stability characteristics of core capital.[12]

Tier III is a term introduced by the Basel Committee on Banking Supervision by adopting an amendment in 1996, with market risk as an additional risk that banks were exposed to when dealing with financial derivatives, for which they are supposed to ensure supplementary capital. This type of capital may be used only to cover market risks arising from shares and interest-sensitive instruments of trade portfolios, foreign exchange risk and commodity risk. Additionally, tier III has to have maturity of at least two years and has to be subject to the provisions stipulating that neither interest nor principal may be paid if such payment means that the bank falls below or remains below its minimum capital requirement.

Basel I stipulated the following minimum capital requirements: a minimum 4% ratio of tier I capital to the total risk-weighted assets and a minimum 8% ratio of tier I and tier II and tier III to the total risk-weighted assets, whereby the sum of tier II and tier III is limited to a 10% of the tier I.

The main focus of Basel I is the obligation to assess banks' capital adequacy using the proposed standards, the introduction of minimum capital adequacy of 8% and the highest coverage for banks within jurisdictions, i.e. the obligation to apply these standards if they implement them at national level.

$$\text{CAPITAL ADEQUACY RATIO} = \frac{\text{TOTAL EQUITY CAPITAL}}{\text{TOTAL RISK} - \text{WEIGHTED ASSETS}}$$

i.e.

$$\text{CAR} = \frac{\text{AVAILABLE CAPITAL}}{\text{RISK} - \text{WEIGHTED ASSETS}} * 100$$

This ratio denotes a proportion between net capital and net risk-weighted assets, and it constitutes the main component for reaching a conclusion on whether capital may support a bank's risk profile, i.e. whether a bank's operations are acceptably secure for depositors and creditors and whether they are a threat to the overall stability.[13]

[10] Bozovic J. *op. cit.* 66.

[11] Nikic D. (2012). Interest rate risk performances and Basel procedures, *Ekonomika, Niš,* no. 4, 165.

[12] Bozovic J. *op. cit.* 66.

[13] Božović J. *op. cit.* 67.

One of the shortcomings of Basel I was that it related to credit risk, whereas market risk was taken into consideration to a lesser extent. In addition, when applied to all banks in a certain jurisdiction (not only to internationally active banks, but to local ones as well), its weakness was that the same standard, i.e. a minimum capital adequacy ratio of 8%, was used for all types of banks. This percentage has to be higher for local banks in countries with higher risk exposure. National supervisory bodies are the ones that decide on prescribing a higher amount of regulatory capital for local banks.[14] Having taken country risk into consideration, the National Bank of Serbia (hereinafter: the NBS) stipulated a minimum regulatory capital requirement of 12% by adopting a Decision on Capital Adequacy of Banks in 2007.[15]

Basel I helped increase the stability of global banking systems. The number of banks on larger financial markets was considerably reduced through liquidation and bankruptcy or acquisitions and mergers with larger banks that did not have any difficulties in adjusting their operations to changed business conditions thanks to capital, their risk management approach or market position. The implementation of this standard was overcome by further developing banking products, connecting markets and strengthening competitiveness.[16]

3.1 Weaknesses of Basel I

Numerous weaknesses of Basel I were identified due to the development of banking systems over time. Risk management practice and technology advanced and thus the assumptions contained in the applicable accord became too simplified for banking business practice. Therefore, it could no longer provide a reliable basis for assessing an adequate capital amount against total risks as it only covered credit risk and partly market risks, while excluding other risks. Being divided into OECD (Organisation for Economic Co-operation and Development) members and non-member countries (for credit risk exposure assessment purposes), it is evident that Basel I did not properly identify and assess country risk, which means it unjustifiably favoured OECD member countries. Moreover, the method of applying risk weights according to Basel I may have encouraged banks to allocate or securitize assets. In this way, banks could present a nominally high capital adequacy ratio, which is realistically insufficient to cover assumed risks.[17]

As mentioned earlier, the main weakness of Basel I is the fact that it was almost exclusively related to credit risk. Banks, particularly large ones, were displeased with the fact that it applied the same standard to all loan types and sizes – a minimum capital adequacy ratio

[14] Jocić Radenković, D. Stanković, J. Pešić Anđelković, M. *op.cit*. 1197.

[15] Section 2 of the Decision on Capital Adequacy of Banks (RS Official Gazette, Nos 129/2007, 63/2008);

[16] Božović, J. *op. cit.,* 68.

[17] Todorović, V. Tomić, N. (2020). The Basel Accords and the stability of the banking system, *Current Macroeconomic and Microeconomic Aspects of European Integrations of the Republic of Serbia,* Faculty of Economics in Kragujevac, Kragujevac, 369.

of 8% (in the EU and USA), while it was higher in countries with higher risk exposures (e.g. it was 10% in Croatia and 12% in Serbia).[18]

In order to eliminate this weakness, the Basel Committee formulated a set of non-binding market risk principles after adopting the main document. The next important step in the evolution resulting in the adoption of the Basel II Standard were principles that were published as proposals in 1993. This approach was based on the stand that, in addition to credit risk, the bank's portfolio is also exposed to other risks: interest rate risk, foreign exchange risk, commodity and price risks. This model was incorporated into Basel II and named the Standard Model. In 1995 the Basel Committee expanded the concept of market risk and permitted the use of market risk models, allowing banks to set their capital requirements on their own using these models, and developed sophisticated risk assessment models. This risk is recognised in Basel II as the internal risk assessment model. A few years later, as of 1998, banks have been required to have regulatory capital as a hedge against market risks.[19]

4 Basel Capital Accord (Basel II)

A draft of a new accord was drawn up at the beginning of 1999, and its final version published in June 2004, titled *International Convergence of Capital Measurement and Capital Standards,* or generally accepted as the Basel II Standard *(Basel Committee on Banking Supervision, 2006, International Convergence of Capital Measurement and Capital Standards).* The document came into force in December 2006, whereby its implementation by EU member states began in January 2007.*[20]*

The objectives of the new Basel Capital Accord are:[21]

1) creating a better correlation between regulatory capital rules and risks that banks are faced with, which contribute to strengthening financial stability;
2) creating conditions to ensure competitive equality of banks;
3) an integrated risk exposure approach (credit, market and operational risks);
4) developing own and appropriate approaches to determining capital adequacy, which reflect risk level sensitivity.

The Basel Capital Accord (Basel II) is a new measurement concept of banks' capital adequacy, which offers new rules for managing and assessing risks that banks are faced with in their ordinary course of business. Since capital is the basis of each bank's growth and a hedge against unexpected losses, this accord set the equity amount that is sufficient to cover those losses. Equity is a bank's primary hedge against the insolvency risk. Hence, its value has to be adjusted to the bank's risk exposure. As such, capital has an important role in preserving

[18] Basel Committee on Banking Supervision, (2007). Basel II – International Convergence of Capital Measurement, *Yugoslav Survey,* Belgrade, 10.

[19] *Ibid.*

[20] Jocić Radenković, D. Stanković, J. Pešić Anđelković, M. *op.cit*. 1199.

[21] Nikić, D. *op. cit.* 167.

the stability of any bank. A low capital value would result in incapacity to absorb risks. However, a high capital value would jeopardise business profitability.[22]

The Basel II standard is based on three interrelated sets of rules for governing financial sector operations, i.e. the so-called Basel II pillars.

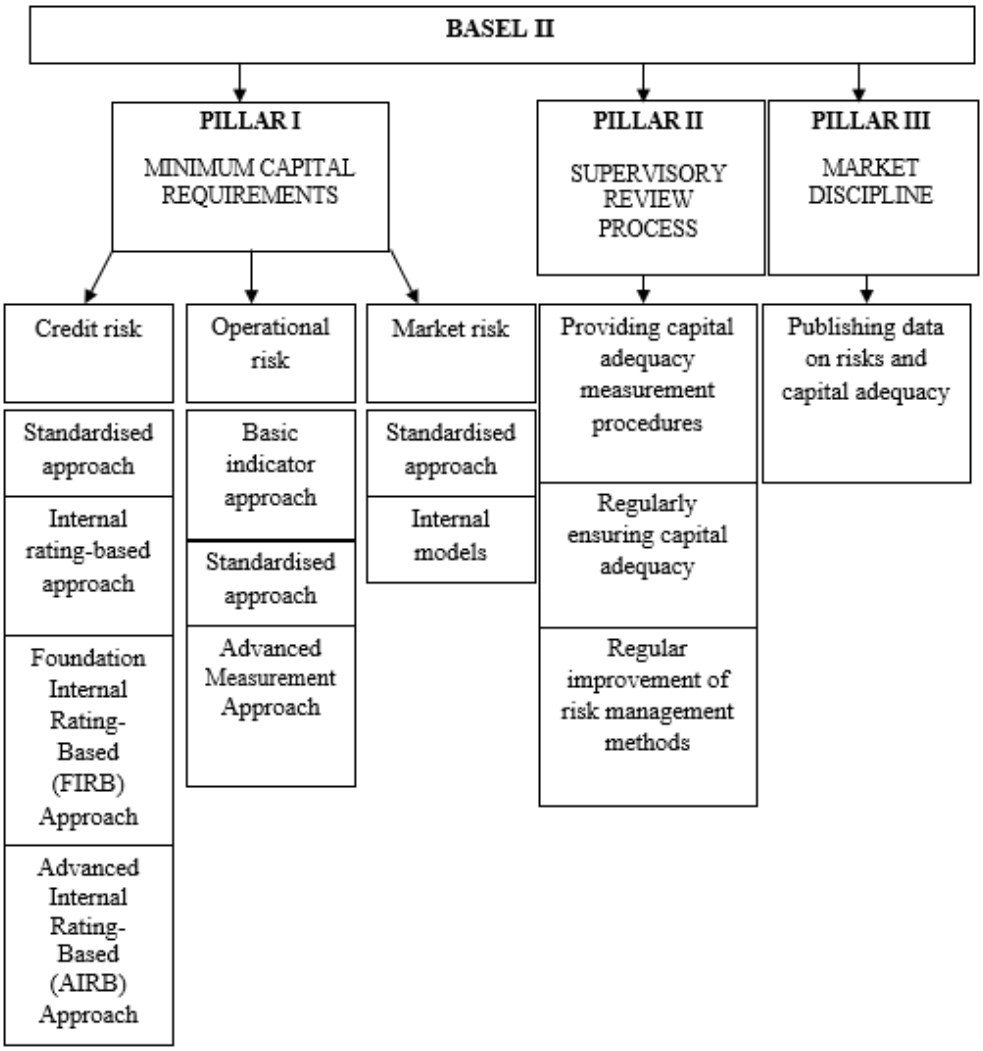

Figure 1 **Three pillars of Basel II**

Source: Milojević, N. (2008). Basel II and forecasts of the effects of its implementation, Industry, No 1, 54.

[22] *Ibid.*

4.1 The first pillar – minimum capital requirements

A minimum capital requirement is used to define capital adequacy ratio measurement and it represents a ratio between equity and a risk level that a bank is exposed to and/or risk-weighted assets.[23]

$$\frac{\text{Core capital} + \text{supplementary capital}}{\text{Weighted assets}} = \text{Minimum equity quota of } 8\%$$
$$(\text{Credit risk} + \text{Market risk} + \text{Operational risk})$$

The upper part of the fraction is the same as in the Basel I Standard, whereas operational risk was introduced into the calculation in the bottom part of the fraction, and the following credit risk measurement models are available to banks:[24]

1) Standardised approach;
2) Internal ratings-based approach – IRB;
    1) Foundation internal ratings-based approach – FIRB;
    2) Advanced internal ratings-based approach – AIRB.

4.1.1 Credit risk

Risk is an inseparable component of every average or "normal" credit transaction, which is why a bank, as a credit institution, has to perform a due diligence review of a borrower in order to protect itself from any credit risks, both preventively and consequently.[25] Credit risk is a risk of potential occurrence of adverse effects on a bank's financial result and capital due to a debtor's default on their obligations to the bank.[26]

Credit risk measurement is one of the credit risk management functions. Credit risk measurement is in fact used to determine the credit quality of each bank's transaction and overall portfolio, as well as the probability and amount of losses that might occur due to other contractual party's default.[27]

The standard approach to credit risk measurement is similar to the credit risk measurement according to Basel I. Banks assign prescribed risk weights to their accounts receivable depending on the characteristics of receivables (corporate, retail or banks). Weights are assigned depending on a rating assigned to a debtor by a credit rating agency. If a debtor has

[23] Milojević, N. (2008). Basel II and forecasts of the effects of its implementation, Industry, No 1, 54.

[24] Neogradi, S. (2014). "Credit risk assessment and management models", *Hypo-Alpe-Adria a.d. Belgrade*, 22 - 23.

[25] Vunjak, N. Antonijević, T. (2008). "Bank Portfolio Management Strategy", *Montenegrin Journal of Economics, No. 7,* 52.

[26] Risk management, https://nbs.rs/sr/finansijske-institucije/banke/upravljanje-rizicima/

[27] Stojanovski, Đ. (2007). *Internal models for credit risk measurement*, *value-at-risk model,* First Edition, *Centre for Publishing Activities* of the Faculty of Economics, Belgrade, 8.

not been assigned a credit rating by a recognised rating agency, a receivable is assigned a weight of 100%.[28]

There are still no credit rating agencies in Serbia, therefore, the implementation of this standard may encounter certain difficulties. Corporate risk weights are given as rating examples according to Basel II.

Table 1 **Corporate risk weights**

Credit rating	AAA to AA-	A+ to A-	BBB+ to BB	Below BB	No rating
Risk weight	20%	50%	100%	150%	100%

Source: Milojević, N. (2008). Basel II and forecasts of the effects of its implementation, Industry, No 1, 55.

Basel II enables banks that have available funds for more accurate risk measurement to measure credit risk using their internal models. IRB approaches enable banks to use their internal ratings for borrowers' creditworthiness in order to assess credit risk in their portfolios. Risk weights assigned to each bank's exposure are based on the rating. Therefore, those exposures that are more favourably rated have lower risk weights and consequently lower capital requirements.[29]

The use of IRB approaches is approved by a supervisor based on stipulated eligibility standards. In order to obtain permission to use an IRB approach, a bank has to prove that it has in place reliable risk measurement and management processes. IRB approaches cannot be used without the prior supervisor's approval, whereas the Basel Committee points out that supervisor's monitoring of the application of any IRB approach is crucial in order for the risk supervision results to be credible. There have to be separate systems for measuring risk parameters, strict formal control and appropriate documentation on using models and data.[30]

When using IRB models, receivables have to be divided into at least eight different groups, while risk components are as follows:[31]

1) Probability of Default (PD);
2) Loss Given Default (LGD);
3) Exposure at Default (EAD);
4) Maturity (M).

As already mentioned, banks can use the foundation approach or FIRB and the advanced approach or AIRB. The difference between these two approaches is that FIRB is based on supervisor's assessments of risk components, whereby LGD, EAD and M (PD) are calculated by banks themselves, while all four risk components in the AIRB approach are calculated by

[28] Milojević, N. *op. cit.* 55.

[29] Janković, M. (2018). *Credit risk parameters*, Master thesis, University of Niš, Faculty of Sciences, Department for Mathematics, Niš, 14-15.

[30] *Ibid.*

[31] Stojanovski, Đ. *op.cit*. 159.

the bank alone. The AIRB approach is much more flexible, but also more demanding, and it can be used only by large banks that have developed software and trained staff.[32]

4.1.2 Operational risk

Operational risk is a specific type of financial risk. It refers to potential losses due to inadequate organisation, mismanagement, incorrect control, fraud, theft and human error. Operational risk often entails deliberate fraud when, for instance, a seller or another authorised employee intentionally falsifies or understates transaction values.[33]

As regards the occurrence of operational risk as "a risk that will cause a loss event", banks do not differentiate between companies from the industry and companies from other industries. It can be:[34]

1) human factor;
2) technical factor
3) process actions;
4) information technology.

Basel II introduced operational risk as a part of capital requirements. Little was known about this risk and its measurement method, which is why its management was poor and banks were faced with big losses. Therefore, the Basel Committee paid special attention to this risk using Basel II and offered three methods for its measurement:[35]

1) The *basic indicator approach* is the most simplified method for calculating a minimum capital requirement. A three-year average of net operating income is multiplied by a 15-fixed-alpha percentage. However, this method is not accurate and is therefore not recommended for large international banks.
2) The *standardised approach* implies that operational risk is measured by dividing overall bank activity by eight business segments, and then net operating income of each business segment is multiplied by the beta factor prescribed for each business segment. The total capital requirement is obtained by adding eight capital requirements.
3) The *advanced measurement approach* is the most complex method, which implies that a bank alone develops internal models for monitoring operational risk provided that it meets all qualitative and quantitative requirements prescribed by a supervisor.

[32] Milojević, N. *op. cit.* 56.

[33] Janković, M. *op. cit*. 7.

[34] Đukić, Đ. (2018). *Risk and capital management in banks,* Expanded fourth edition, Faculty of Economics, Belgrade, 45.

[35] Milojević, N. *op. cit.* 57.

4.1.3 Market risk

Market risk is defined as the risk of losses in on- and off-balance sheet items arising from movements in market prices.[36]

Market risk is associated with the variability of financial products and services on a market, and it exists independently of financial capabilities of the debtor and the nature of a separately concluded agreement. Market risk means facing a decline in a share price and associated losses and all losses caused by systemic factors. It is determined by factors that are common for all companies, e.g. changes in the gross domestic product.[37]

Since banks now trade on the financial market more frequently and use increasingly complex instruments, such as futures, swaps and shares, the Basel Committee increased the importance of credit risk management.[38]

We are familiar with two models for measuring this risk: the standardised approach, prescribed by a supervisor, and the internal model, approved by a supervisor. Emphasis is placed on trading control, mark to market models, VaR (Value at Risk), scenario and stress-test models.[39]

Stress tests are an important tool used by banks to manage risks under Basel II. Apart from the risk management process, stress test principles require that banks envisage an economic shock (scenario), test the internal model and assessment procedures, whereas they require that supervisors consider how banks assess unexpected events when calculating the amount of capital. In order for a bank to conduct a stress test, it has to project and apply some of the following scenarios: economy functioning in difficult situations, market risks, banks should use their own data for a rating assessment and conduct a stress test in a potentially deteriorated credit environment.[40]

4.2 The second pillar –– supervisory review process

The second pillar is an addition to the first one and it is supposed to cover the control and provision of capital adequacy and risk management, which were not included in the first pillar. It introduced assessments performed by supervisors, who have a high level of authority when setting a bank's capital requirement.[41] Namely, it requires that supervisors ensure that each

[36] Basel Committee on Banking Supervision, Basel II – International Convergence of Capital Measurement, *op. cit.* 157.

[37] Todorović, T. (2009). Credit risk management in banks, *Economic Horizons*, 11 (2), 90.

[38] Milojević, N. *op. cit.* 58.

[39] *Ibid.*

[40] Englelmann, B. Rauchmeier, R. (2011). *The Basel II: risk parameters, estimation, validation and stress testing,* expanded second edition: part XVI Gundlach V., Development of Stress Tests for Credit Portfolios, 352.

[41] Milojević, N. *op. cit.* 59.

bank has in place acceptable capital adequacy assessments, which are based on their own, thorough assessment of the risks they are exposed to.[42]

Four main principles of supervisor's oversight are the following:[43]

1) Banks should have a process for assessing their overall capital adequacy in relation to their risk profileand a strategy for maintaining their capital levels;
2) Supervisors should encourage risk modelling and control by means of internal models, and they should monitor their usage;
3) Supervisors should expect banks to operate above the minimum capital ratios;
4) The supervisor's role has to be preventative and performed at an early stage to prevent bank capital from falling below the minimum levels required for riskhedging.

These principles are based on the belief that there is a strong connection between the amount of capital held by a bank and its risk exposure, on the one hand, and quality of risk management and internal control processes, on the other. The importance of supervision comes to the fore in terms of business activities of large international banking groups, which operate in different jurisdictions and use different organisational principles.[44]

4.3 The third pillar – market discipline

The third pillar combines the first two, contributing to stronger market discipline through better disclosure of information. Market discipline may produce considerable benefits by helping banks and supervisory bodies to manage risks and improve stability. The bottom line is that banks are supposed to publish sufficient and quality information on their operations, and market entities can then make decisions based on the principle of sound business practice and selection. If a market is sufficiently developed, it will be able to reward banks that operate well and maintain their capital adequacy in line with the risks assumed, and vice versa.[45]

Basel II contributed to a reduction in the minimum regulatory capital requirement of largest banks, which depended on their ability to efficiently exploit the IRB approach. Banks were exposed to the costs of introducing and developing internal models over the short run, but in the long run they made profit.[46]

Basel II strongly promoted the use of internal models for capital adequacy measurement as a tool for covering credit, market and operational risks that a bank is exposed to, since banks developed sophisticated risk measurement models during the 1990s, enabling them to assess

[42] Zelenović, V. Vunjak, N. (2014). Capital adequacy of the banking sector, *Annals of the Faculty of Economics in Subotica,* Vol. 50. no. 31, 8.

[43] Jocić Radenković, D. Stanković, J. Pešić Anđelković, M. *op.cit*. 1200.

[44] Barjaktarović, L. (2010). Harmonisation of the Serbian banking sector with EU legislation, *Singidunum Journal,* 6 (2), 146.

[45] Božović J. *op. cit.* 69.

[46] Todorović, V. Tomić, N. *op. cit.* 372.

risks and determine the required capital level much better than simply weighting assets using standard risk weights defined by Basel I.[47]

Basel II allows banks to improve their risk and capital adequacy measurement systems and hence determine an optimal capital level, which simultaneously protects them from the assumed risks and ensures high profitability.[48]

4.4 Weaknesses and limits of Basel II

The application of Basel II encouraged banks to assess credit and market risks more carefully. However, an issue arose in terms of operational risk measurement due to a lack of comparative data on default rates. Basel categories of operational risk are formulated in a descriptive manner, without using tests to determine differences among them, which gives national regulatory bodies great freedom in making decisions when applying the given guidelines. Even insurance undertakings that cooperate with the largest banks used to adapt their policies to Basel II requirements.[49]

Those banks that assumed high risks in relation to the capital they owned were faced with the necessity to increase the amount of capital, while on the other hand, they faced an increase in total costs.[50] While it was still in its adoption stage in 2004, institutions tried to estimate the actual costs of implementing this standard, which entail the costs of introducing information technologies, developing and introducing a rating system, educational costs and the costs of developing a reporting system.[51] Estimates of actual costs varied, and were higher in countries with many banks (Germany) or countries with large and internationally active banks (England). Based on the aforesaid, it can be concluded that the costs of implementing Basel II differed between countries, depending on the development of a country's banking system, risk management level and the current method of capital adequacy measurement.[52]

Moreover, one of the weaknesses and limitations of Basel II is indirect costs (Figure 2) associated with the procyclical effects that this standard can produce at the macroeconomic level. Basel II increases the cyclicity of minimum capital requirements by increasing the sensitivity to credit risks.[53] For this reason, banks are faced with a big problem in managing capital. However, the procyclical effects on macroeconomic fluctuations vary between

[47] Stojanovski, Đ. *op. cit.* 164 - 165.

[48] *Ibid,* 165.

[49] Todorović, V. Tomić, N. *op. cit.* 373.

[50] Milojević, N. *op. cit.* 61.

[51] *Ibid,* 61.

[52] Todorović, V. (2015). *Managing banking crises,* Faculty of Economics of the University of Kragujevac, 146.

[53] So-called capital buffers, which are held by banks above the required minimum and which will be discussed in more detail in the fifth chapter, play a key role in reducing cyclical effects and mitigating the volatility impact of capital requirements.

countries, and different factors may impact the procyclical effects of this standard: inflows of foreign capital, company size, bank sectoral specialisation, banking competition, etc.[54]

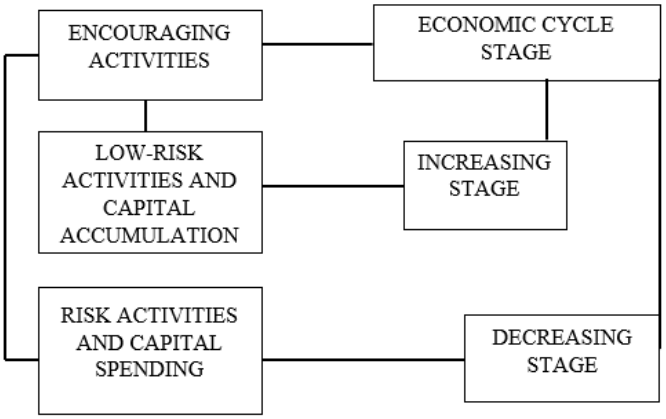

Figure 2 **The procyclical effects of Basel II**

Source: Todorović, V. Tomić, N. (2020). The Basel Accords and banking system stability, *Current Macroeconomic and Microeconomic Aspects of the European Integrations of the Republic of Serbia*, Faculty of Economics, Kragujevac, 374.

The problem of cyclicality of the Basel II capital requirements was the subject of discussions in both financial and regulatory circles. Requests to reduce the minimum capital requirement from 8% to 6% in recession periods, in order to ensure credit expansion, were taken into consideration. However, the Basel Committee stood its ground, indicating that the minimum capital rate needs to be uniform and fixed. If a more flexible capital rate was introduced, the main idea of the Basel Committee underlying the creation of a strong capital requirement regime in the context of higher risks and uncertainty of banking operations might be rendered meaningless. The question is who would decide on a capital rate reduction – the Basel Committee or a supervisor? Finally, the third argument against a lower capital rate was that there were no sufficient macroeconomic reasons to reduce the capital requirement rate.[55]

The global financial crisis showed that there was a discrepancy between the Basel II regulatory framework and its primary objective to preserve financial stability, due to the neglect of systemic risk dimensions and the ease of its transmission. The crisis revealed an obvious omission in the Basel regulation, which consisted of inadequate establishment of dynamic connections between monetary and prudential policies. Central banks were tasked with ensuring macro stability and providing lending services, while supervisors were in charge of prudential regulation and preservation of financial stability. However, the regulation did not oblige them to cooperate closely, which is one of the main causes of the aforesaid crisis.[56]

[54] Heid, F. (2007). The cyclical effects of the Basel II capital requirements, *Journal of Banking & Finance*, 31 (2), 3898.

[55] Todorović, V. Jakšić, M. Tomić, N. (2017). Bank regulations in modern financial environment, *Facta Universitatis, Series, Economics and Organization,* 14 (3), 226.

[56] Todorović, V. Tomić, N. *op. cit.* 375.

5 Development and implementation of Basel III

The global financial crisis that originated in the US began with the collapse of the housing market and credit difficulties. Banks offered favourable mortgage loans to real estate buyers, which resulted in a surge in real estate prices and high profit in the real estate industry. Mortgage loans were granted to customers with low creditworthiness, which increased the number of those who could not pay their mortgage liabilities on time. With mortgages being activated, a large number of real estate was suddenly on offer, but due to reduced credit potential of banks as a consequence of payment delays in outstanding loan instalments, real estate prices dropped drastically. Due to the fact that the estimated mortgage value was higher than the market value of real estate, banks were forced into solvency, which became a mass phenomenon and turned into a financial crisis.[57]

The global financial crisis revealed that the application of rules and measures defined under the Basel II Accord failed to meet the expectations of eliminating adverse effects on the stability of the banking system. In order to improve the ability of the banking system to cushion the adverse effects of the financial and economic crisis and prevent the crisis spillover from the financial sector into the real sector, the Basel Committee on Banking Supervision introduced a new Basel III accord.[58]

Basel III is a key regulatory response to the global financial crisis. It comprises a set of reform measures adopted by the Basel Committee on Banking Supervision for the purpose of strengthening the banking system resilience to a systemic crisis and improving the transparency of banking operations.[59]

The Basel III standard was adopted in EU countries in July 2012 based on the Capital Requirements Directive (CRD IV)[60] and the Capital Requirements Regulation (CRR),[61] while its implementation was planned to begin on 1 January 2013, with gradual application and a transitional period by 2019 inclusive, when the standard was expected to have been fully implemented.

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[57] Stevanović, V. S. Đorđević, T. M. Milanović, R. M. (2010). "Global financial crisis and its effects on the Serbian economy", *Agricultural Economics*, vol. 57, no. 3, 353 – 368.

[58] Đerić, S. (2014). "The role of Basel III Accord in strengthening the stability of the global banking system", *Proceedings of the Faculty of Economics in East Sarajevo*, 8, 296.

[59] Annual Financial Sstability Report, NBS, 2011, 75.

https://www.nbs.rs/export/sites/NBS_site/documents-eng/publikacije/fs/fsr_2011.pdf

[60] Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32013L0036

[61] Capital Requirements Regulation (CRR): Regulation (EU) No. 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No. 648/2012, https://www.eba.europa.eu/regulation-and-policy/single-rulebook/interactive-single-rulebook/504

5.1 The purpose of introducing Basel III

As already mentioned, the climax of the global financial crisis resulted in a lack of liquidity on financial markets, slowed down lending to the real sector and a decline in the global economic activity. However, an effective and prompt response of fiscal authorities of major global economies managed to stabilise the market and fully normalise the funding of the real sector. The Basel Committee developed a comprehensive plan, based on which measures for improving the deposit insurance scheme were adopted, which in turn resulted in capital strengthening and preservation of financial system stability. Basel III is a document on capital strengthening and the regulation of the banking sector liquidity.[62]

The objective of the adopted Basel III rules is to improve the ability of the banking sector to absorb shocks arising from both financial and economic stress, and consequently reduce the risk of the crisis spillover from the financial sector onto the real economy.[63]

The purpose of introducing Basel III is as follows:[64]

1) increasing the ability of the banking sector to respond to the shocks arising from financial and economic stress regardless of its cause;
2) risk management monitoring;
3) increasing the transparency of banking operations.

At a micro level, the goal is to increase the resilience of financial institutions in stress periods, and at a macro level, the goal is to identify and monitor risks that can cause disruptions to the overall economic system through the banking sector.[65]

The Basel III standards are more demanding. Their adoption contributes to a higher and better banking base, more adequate risk management, introduction of a new parameter that represents the ratio between capital and total exposure (leverage ratio), and determining its maximum level, defining measures based on which banks will have to set aside more funds to be used in crisis periods and introducing liquidity requirements.[66]

5.2 The first pillar – capital requirements

As already mentioned, the main objective of Basel III is to ensure that banks have more layers of capital that can absorb losses. That is why it introduced higher minimum standards for quantity, quality and risk coverage of capital requirements.[67]

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[62] Ivančević, J. Radaković, M. (2014). "Distinctiveness of the Basel Accords in terms of competitiveness and economic efficiency", *Annals of the Faculty of Economics in Subotica,* Vol. 50. no. 31, 182.

[63] Ljubić, M. (2015). "The implementation of the Basel III capital standards and challenges of the global economic crisis", *Megatrend Journal,* Vol. 12, No. 1, 74.

[64] Jocić Radenković D. Stanković, J. Pešić Anđelković, M. *op. cit.* 1203.

[65] *Ibid.*

[66] Ljubić, M. *op. cit.* 74.

[67] Ingves, S. "Finalising Basel III"", speech, *Sveriges Riksbank*, 2017, 3-4.

5.2.1 Capital buffers

A macroprudential policy is a policy aimed at limiting risks that the overall financial system is exposed to (the so-called system risks) for the purpose of preserving financial stability. A systemic risk is most often defined as a risk of disruption in the provision of financial services, caused by a failure in the overall financial system or one of its components, which might result in severe adverse effects on the real sector.[68]

One of the crucial Basel III novelties is capital buffers, i.e. instruments of the macroprudential policy, which have been applied by the NBS since 30 June 2017.

Capital buffers are additional common equity Tier 1 capital that banks have to maintain above the prescribed regulatory minimum. The advantages of their introduction are reflected in the fact that they increase bank's resilience to losses, reduce excessive or understated exposures and limit capital distribution.[69] These macroprudential instruments should limit systemic risks in the financial system that may be cyclical (capital conservation buffer and countercyclical capital buffer) or structural (capital buffer for systemically important banks and capital buffer for a structural systemic risk).

5.2.2 Capital conservation buffer (CCB)

Capital conservation buffer is a macroprudential instrument stipulating the obligation of banks to maintain additional common equity Tier 1 capital in the amount of 2.5% of their risk-weighted assets.[70]

Banks have to maintain the capital conservation buffer on both individual and consolidated bases in the amount of 2.5% of their risk-weighted assets, calculated in accordance with the Decision on Capital Adequacy of Banks.[71]

Capital conservation buffer may only include the components of common equity Tier 1 capital and cannot be used to maintain capital adequacy ratios,[72] i.e. bank's increased capital adequacy ratio.[73]

Those banks that do not maintain a capital conservation buffer cannot distribute common equity Tier 1 capital in the amount that would reduce common equity Tier 1 capital to the level

[68] Macroprudential framework, NBS, 2015, 3-4. https://nbs.rs/en/ciljevi-i-funkcije/finansijska-stabilnost/finansijska-stabilnost/

[69] Capital buffers, https://nbs.rs/en/ciljevi-i-funkcije/finansijska-stabilnost/zastitni_slojevi_kapitala/index.html

[70] Capital conservation buffer, https://nbs.rs/en/ciljevi-i-funkcije/finansijska-stabilnost/zastitni_slojevi_kapitala/index.html

[71] Section 3, paragraph 2, of the Decision on Capital Adequacy of Banks (RS Official Gazette, Nos 103/2016, 103/2018, 88/2019, 67/2020, 98/2020, 137/2020, 59/2021 and 67/2022);

[72] Section 3, paragraph 3, of the Decision on Capital Adequacy of Banks

[73] Section 5 of the Decision on Capital Adequacy of Banks

indicating that the bank can no longer meet the combined buffer requirement. In fact, banks have to calculate the maximum distributable amount and inform the NBS about it.[74]

In addition, banks that do not meet the combined buffer requirement have to develop a capital conservation plan and deliver it to the NBS not later than five business days after they discovered they did not meet the said requirement.[75]

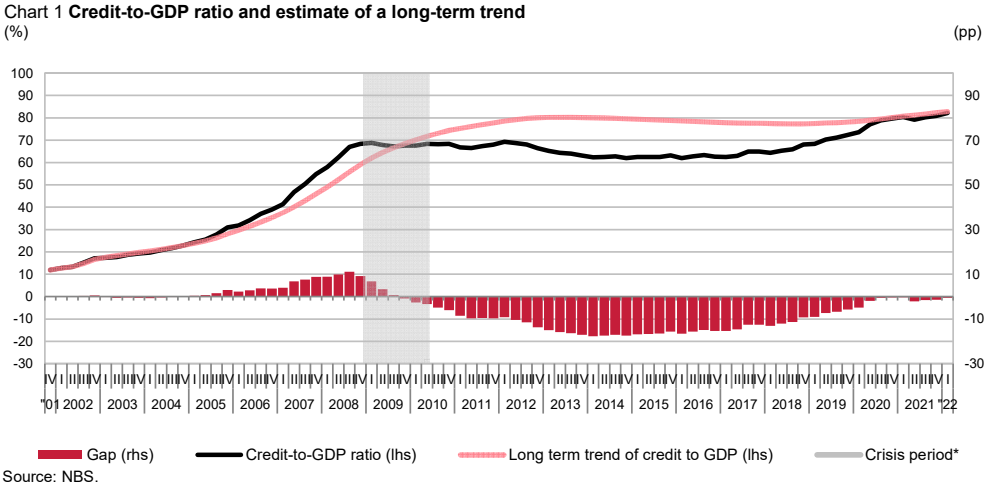
This instrument has also been used to boost economic growth and prevent potential adverse effects of the coronavirus pandemic. Banks are allowed to exclude certain exposures from their risk-weighted assets when calculating the CCB in the period from August 2020 until end-2022.[76] The objective of this measure is to facilitate citizens' access to housing loans and thus provide support to the real sector, namely the construction industry.

5.2.3 Countercyclical capital buffer (CCyB)

Countercyclical capital buffer (CCyB) is additional common equity Tier 1 capital that banks have to maintain above the prescribed regulatory minimum in the amount equal to the result of their risk-weighted assets and a specific countercyclical capital buffer rate. Additional common equity Tier 1 capital is created during a period of pronounced credit growth when this instrument is applied, which increases the resilience of the banking sector and reduces the possibility of a financial crisis.[77]

The NBS sets a CCyB rate for the Republic of Serbia on a quarterly basis taking into consideration the reference guide, applicable guidelines and recommendations of the European Systemic Risk Board (ESRB) and other variables it considers relevant for monitoring the

Chart 1 **Credit-to-GDP ratio and estimate of a long-term trend**



Source: NBS.
*Based on SSI.

[74] Section 455 of the Decision on Capital Adequacy of Banks

[75] Section 458 of the Decision on Capital Adequacy of Banks

[76] Section 2 of the Decision on Temporary Measures for Banks to Facilitate the Access to Financing for Natural Persons (RS Official Gazette, Nos 108/2020 and 119/2021);

[77] Explanation for the countercyclical capital buffer rate for the Republic of Serbia, NBS, June 2022 https://www.nbs.rs/export/sites/NBS_site/documents-eng/finansijska-stabilnost/Explanation_CCB_20220609.pdf

cyclical dimension of systemic risk. Pursuant to the Decision on Capital Adequacy,[78] the basis for determining the reference guide for setting the CCyB rate is a deviation of the credit-to-GDP ratio from its long-term trend.[79]

Chart 1 shows the total non-government sector credit-to-GDP ratio, a long-term trend and the estimated credit-to-GDP deviation from its long-term trend in Serbia. After a period of credit expansion from 2000 to 2008, the credit-to-GDP gap entered a negative territory at the end of 2009. Credit activity has been on the rise since 2014 and, as a result, the share of total loans in GDP came closer to its long-term trend. According to data from March 2022, the ratio of real credit activity to real GDP was below its long-term trend (the gap is -0.6 pp). At the end of Q1 of 2022, the gap increased by 16.9 pp compared to end-2014, and by 0.8 pp relative to the previous quarter. Taking into consideration that the estimated ratio of real credit activity to real GDP was below its long-term trend, accompanied by global uncertainty, intensified geopolitical tensions and the outbreak of the Ukraine conflict, setting the CCyB rate above 0% might result in potentially lower growth in credit activity.[80]

Basel II envisages that the CCyB should be introduced (or increased) as a macroprudential policy instrument during a period of pronounced credit growth, which would contribute to creating an additional capital buffer that can be released if systemic risk materialises, and enable sustainable lending.[81]

5.2.4 Capital buffer for systemically important banks

Capital buffer for systemically important banks is a macroprudential instrument stipulating that banks identified as systemically important for the local economy need to maintain additional common equity Tier 1 capital. Disruption in operations or a collapse of a systemically important financial institution may result in considerable disruptions in the functioning of the overall financial system, thereby jeopardising economic activity. This instrument reduces the probability of such an event occurring. The use of this instrument neutralises comparative advantages that such institutions have due to the "too big to fail" status (moral hazard). Systemically important banks in Serbia have been identified on the basis of the same criteria and mandatory indicators prescribed by the European Banking Agency Guidelines. The NBS reviews the capital buffer for systemically important banks and the methodology for identifying systemically important banks at least once a year, and a list of systemically important banks is published on the NBS web page.

According to the Decision on Compiling a List of Systemically Important Banks in the Republic of Serbia and Their Capital Buffer Rates, dated 16 June 2022, the following

[78] Section 436, paragraphs 2 and 3 of the Decision on Capital Adequacy of Banks

[79] Explanation for the countercyclical capital buffer rate for the Republic of Serbia, NBS, June 2022 https://www.nbs.rs/export/sites/NBS_site/documents-eng/finansijska-stabilnost/Explanation_CCB_20220609.pdf

[80] *Ibid.*

[81] Basel Committee, (2010). "Guidance for national authorities operating the countercyclical capital buffer", *Bank for International Settlements,* Basel, Switzerland, 6 – 7, https://www.bis.org/publ/bcbs187.pdf

systemically important banks have been identified, as well as their capital buffer rates that they have to maintain as of 30 June 2022.[82]

Table 2 **List of systemically important banks in Serbia with capital buffer rates for systemically important banks**

Bank	Capital buffer rate for systemically important banks
BANCA INTESA AKCIONARSKO DRUŠTVO (NOVI BEOGRAD)	2%
OTP BANKA SRBIJA AKCIONARSKO DRUŠTVO NOVI SAD	2%
RAIFFEISEN BANKA AD BELGRADE	2%
NLB KOMERCIJALNA BANKA AD BELGRADE	2%
AGROINDUSTRIJSKO KOMERCIJALNA BANKA AIK BANKA AKCIONARSKO DRUŠTVO, BELGRADE	2%
UNICREDIT BANK SRBIJA A.D. BELGRADE (STARI GRAD)	1%
BANKA POŠTANSKA ŠTEDIONICA AKCIONARSKO DRUŠTVO, BELGRADE (PALILULA)	1%
ERSTE BANK AKCIONARSKO DRUŠTVO, NOVI SAD	1%
EUROBANK DIREKTNA AKCIONARSKO DRUŠTVO BELGRADE	1%

Source: NBS

5.2.5 Systemic risk buffer (SRB)

Systemic risk buffer (SRB) is additional capital expressed as a percentage of risk-weighted assets. It is introduced to limit the euroisation risk as one of crucial structural and non-cyclical systemic risks to the stability of the Serbian financial system.

The systemic risk buffer rate is set at 3% of total daily and foreign currency indexed receivables that banks approve to corporates and households in Serbia.[83]

The Serbian banking sector is still highly euroised[84] and characterised by a high level of deposit euroisation (in June 2022, 63.5% of total corporate and retail deposits were FX and

[82] Capital buffers, https://nbs.rs/en/ciljevi-i-funkcije/finansijska-stabilnost/zastitni_slojevi_kapitala/index.html

[83] Section 3 of the Decision on the Rate and Manner of Maintaining the Systemic Risk Buffer (RS Official Gazette, Nos 58/2017 and 3/2018).

[84] According to the ECB working paper: *Windischbauer U. Strengthening the role of local currencies in EU candidate and potential candidate countries,* http://www.ecb.europa.eu/pub/pdf/scpops/ecbop170.en.pdf?8ca594f1a1391f72a33d05aca6a0405c and the working paper published on the BIS web page: *Alvarez-Plata P.* and *García-Herrero A. To dollarize or de-dollarize, Consequences for Monetary Policy*, http://www.bis.org/repofficepubl/arpresearch200709.1.pdf, countries with a euroization level above 40% are classified as highly euroized countries. Additionally, according to the latter working paper, a level of euroisation between 10% and 40% is considered moderate, whereas it is deemed to be low if it is below 10%.

FX-indexed deposits) and credit euroisation (FX and FX-indexed receivables accounted for 62.8% of total corporate and household receivables in June 2022).[85]

5.3 The second pillar – liquidity standard

Liquidity entails a bank's ability to increase its liquid assets and settle outstanding liabilities when they fall due, without incurring considerable losses. A bank is a financial institution that mediates between parties that have a surplus of funds and parties that have a deficit of funds (i.e. household segment). Liquidity risk management is one of bank's functions that is crucial to its efficient and successful performance.[86]

The global financial crisis revealed that a large number of well-capitalised banks had liquidity problems during the crisis. A problem arises when banks allocate capital in order to have a higher level of capital adequacy without paying attention to possible consequences to their liquidity. In 2008 the Basel Committee on Banking Supervision issued a document titled *The principles for sound liquidity risk management and supervision*. Its purpose was to point to the need to improve the approach to the liquidity risk management process.[87]

In order to improve the stability and resilience of financial systems to unexpected and unforeseeable events, the Basel III legislation entails the application of new liquidity measures, such as the liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR).

An additional macroprudential liquidity requirement (liquidity coverage ratio – LCR) implies that banks maintain an adequate level of unencumbered and highly liquid assets that can be converted into cash within a month if unforeseeable market events occur. The primary objective of LCR is to regulate short-term liquidity and banks' increased resilience to stress situations during a one-month period. According to the LCR, the amount of bank's unencumbered and highly liquid assets during a 30-day period should be higher than the forecast net cash outflows. The LCR is obtained as follows:[88]

$$LCR = \frac{Total\ highly\ liquid\ assets}{\begin{matrix} Total\ net\ cash\ outflow \\ in\ a\ 30-day\ period \end{matrix}} \geq 1$$

Highly liquid assets are classified under two categories:[89]

Level 1 liquid assets that include cash and cash equivalents, a surplus above the minimum reserve requirement with the central bank, government securities with a risk weight of 0% according to the Basel II legislation;

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[85] Report on Dinarization of the Serbian Financial System, First Quarter 2022, NBS, July 2022. https://www.nbs.rs/export/sites/NBS_site/documents-eng/publikacije/dinarizacija/izvestaji/din_I_22.pdf

[86] Mirković, V. "The application of liquidity ratios in risk management in banks", *Finance management in modern business circumstances, Finiz 2015 - Invited papers,* 13.

[87] S. Đerić, *op. cit.* 299.

[88] V. Mirković, *op. cit.* 14 – 15.

[89] *Ibid.*

Level 2 liquid assets that comprise government securities with a risk weight of 20% according to the Basel II legislation, covered and non-financial corporate bonds with an investment grade (of at least AA-);

The total net cash outflow contained in the LCR denominator represents a difference between total expected cash outflows and total expected cash inflows in the next 30 days.[90]

The net stable funding ratio (NSFR) requires a minimum amount of bank's stable funding sources in relation to the liquid profile of assets, as well as the potential for a set of liquid needs arising from off-balance sheet liabilities in a period longer than one year. This ratio is modelled in order to ensure a sustainable maturity structure of assets and liabilities in the bank's balance sheet.[91]

The main objective of introducing the NSFR is to reduce a maturity mismatch between the items of assets and liabilities, whose residual maturity is at least one year. The idea is that the NSFR should be higher than 1, i.e. 100%, since the amount of available stable funding needs to exceed the required funding assets in the observed period. The NSFR is obtained as follows:[92]

$$NSFR = \frac{Available\ stable\ funding}{Required\ stable\ funding} \geq 1$$

Available stable funding includes total bank capital, total preference shares with maturities of one or more years, liabilities with an effective maturity longer than one year, demand deposits and/or term deposits with maturities of up to one year and economy sector funding with a maturity of up to one year. Required stable funding is defined as a weighted sum of assets multiplied by a specific factor of required stable funding assets assigned to each balance sheet item separately.[93]

5.4 The third pillar – leverage ratio

The leverage ratio is a general measure of risk. It was introduced under Basel III as an addition to a risk measure that is based on capital adequacy. Namely, the global financial crisis of 2007/2008 revealed a deficiency in the use of the capital adequacy ratio as a bank's general risk ratio. For this reason, it was concluded that a simple relationship between a bank's capital and exposure, without applying weights, may considerably contribute to understanding assumed risks. Its application is particularly evident during economic and financial crises, which produce high financial risk rates at a macro level, as was the case during the most recent crisis which was the subject matter of an analysis conducted by the Basel Committee. The leverage ratio was introduced under Basel III as a solvency indicator, which should be an obstacle to uncontrolled distortion of the relationship between the capital requirement and its

[90] *Ibid.*

[91] Matić, V. (2011). "Banking risk 22: Basel III – introducing liquidity standard", *Banking,* 3-4, 160.

[92] Mirković, V. *op. cit.* 15

[93] *Ibid.*

exposure to risk, whose ratio serves as an additional measure for determining the capital requirement.[94]

The leverage ratio is also defined as a ratio between the capital measure (capital definition) and bank's exposure measure (total bank's exposure), which is calculated as an average monthly leverage ratio during one quarter.[95]

The Basel Committee proposed that the minimum level 1 of the leverage ratio should be 3%, with the Basel Committee monitoring it on a semi-annual basis.[96]

A capital measure for the leverage ratio is Tier 1 capital, as defined under Basel III. Deductible items from Tier 1 capital, as defined by Basel III provisions, are deductible items when determining bank's total exposure and other components for calculating the leverage ratio. Such an approach is necessary in order to consistently measure capital and exposure, and avoid double calculation. Banks' investments in the capital of financial institutions (banks, insurance undertakings and other financial institutions) that are outside the regulatory consolidation framework are treated as deductible capital items for the purpose of estimating a leverage ratio to the extent to which these investments exceed certain thresholds.[97]

The exposure measure, as well as the other leverage ratio component, usually accompany the accounting exposure measure, which implies the following:[98]

1) balance-sheet, non-derivative exposures do not have specific reserves or value settings;
2) the amount of exposure per balance sheet item is taken into account before using risk mitigation instruments (guarantees, physical and financial collaterals, etc.)
3) the impact of the balance sheet netting of loans and deposits on the amount of exposure for the purpose of estimating this ratio is not allowed.

Apart from common requirements, some specific ones are also prescribed for the purpose of estimating the exposure measure as a component of the leverage ratio.

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[94] Đeric. S. *op. cit.* 300.

[95] Matić, V. "Banking risk 27: Basel III – Leverage Ratio", Banking, 1/2012, 132.

[96] Ivanova, P. B. Barjaktarović, L. Ivanov, Đ. I. "Leverage ratio as a Basel standard in the financial management of the petroleum industry", *Vojno delo,* 7/2018, 346.

[97] Matić, V. Basel III – Leverage Ratio, *op. cit.* 132.

[98] *Ibid.*

6 Conclusion

Modern banking trends take place in complex conditions and are exposed to a wide range of risks, which disrupt financial stability to a lesser or a greater extent. Hence, a need for more thorough supervision of banks and international convergence of national legislation arose. An appropriate regulatory framework needs to be in place in order to make informed decisions, although it cannot completely eliminate risks.

International convergence and standardisation of general banking terms and conditions are associated with the Basel Committee's activities, which resulted in the adoption of the Capital Adequacy Accords (Basel I, Basel II and Basel III). Basel I managed to introduce discipline in global banking sectors and make a positive impact on the amount of bank capital. However, its main weakness lies in the fact that it only dealt with credit risk. Another weakness was that the same standard, i.e. a minimum capital adequacy ratio of 8%, applied to all types of banks. The shortcomings of the Basel I Accord were the reason for adopting Basel II, which addressed operational risk in addition to credit and market risks. It was based on the increased sensitivity of banks and other financial institutions to risks. However, it neglected the liquidity issue as a key factor of banking system instability, which only came to light thanks to Basel III.

The global financial crisis revealed some major weaknesses of the Basel Accords and the inability to prevent the collapse of the banking and financial systems. Afterwards, reforms were initiated to harmonise monetary and prudential policies, which resulted in the adoption of the Basel III Accord. Its main purpose is to ensure the stability of the financial system and capital adequacy and liquidity of banks, and to reduce systemic risk. A major novelty of Basel III is the introduction of capital buffers, liquidity coverage ratios and the leverage ratio.

To conclude, we can say that it is necessary for legislation to keep up with new risks as, even though financial novelties do bring some advantages, they can certainly jeopardise financial stability if they are not adequately managed. Additionally, the role of supervisors is crucial since they ensure rules that have to be applied, while their cooperation with banks and banking associations, supervisors from other countries and other institutions for the purpose of properly managing banking risks is also highly significant. Taking into consideration the aforesaid, it is necessary to regularly upgrade banking regulations and ensure professional development of employees who will be able to adequately respond to challenges ahead.

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