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**RISK REGULATION OF BANKING ACTIVITIES WITH DERIVATIVE FINANCIAL INSTRUMENTS: A COMPARATIVE ASPECT**

**Abstract.** The global financial crisis of 2007-2009 demonstrated a new threat source to the global financial system – the rapid expansion of the derivatives market, which volume (80 trillion dollars in 2008) exceeded global GDP. Generating cause for serious concern, derivatives contradicted their economic nature as a tool for hedging and risk avoidance in the financial market. This fact called into question the very necessity of credit derivatives existence, since they have partially claimed responsibility for the bankruptcy of the largest financial institutions.

Lack of control mechanism (from professional organizations or state one) for the issuance and circulation of such financial instruments, an increase in the OTC derivatives market, as well as the absence of effective regulating methods for banking activities related to the bank capital release with the reinvestment purposes – all these factors caused the unrestricted growth of derivatives market. In this regard, our research related to modern methods of banking regulation for risk reduction is one of the most relevant nowadays.

The effective banking system functioning is a prerequisite for the development of market relations in Ukraine that makes banking regulation and supervision important and necessary elements in maintaining stability of the banking system and economy as a whole. This article examines the operating techniques for regulating commercial banks activities in Ukraine and in European practice, following the example of the Czech Republic.

The issues of adaptation and implementation the European experience in order to reduce the level of various banking risks, considering the peculiarities of the Ukrainian economy, is a perspective direction for the research in the field of banking regulation.

**Keywords:** banking regulation, credit derivatives, financial instruments, risk management, Basel recommendations

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**JEL Classification:** D81, G21, E50

**Introduction.** The speculative bubble in the real estate market, the systematic underestimation of market risks, as well as the imbalance of investment and savings have become the global economic causes of the financial crisis. The main problem has arisen because of the numerous unreliable risky mortgages (14 trillion dollars) that were provided to people without jobs, sufficient income, or other assets. Such loans were provided not just as a result of the mistaken belief in the rise of real estate prices, but

also whatever it takes to attract new clients for mortgage companies. However, in addition to obvious reasons, there were implicit financial mechanisms that caused the crisis. First of all, it was a huge market of collateralized debt obligations (CDOs) created through the mortgage assets securitization. Major banks and financial companies have issued credit default swaps (CDS) to insure CDOs against price reduction. The risky policy of CDS has led banks and financial companies to difficult situation, which basically they were unable to cope with.

Complex financial instruments have, in fact, expanded lending opportunities, most often bypassing the requirements for equity, which certainly increased the risks of financial stability not only of the credit institutions themselves, but also of the national financial systems as a whole. Regulators have found themselves unable to assess risks in real terms and have relied on the estimates developed by the financial institutions themselves that create these instruments. The inevitable result was a number of defaults in the US, Europe and Asia, as financial institutions looking for high returns were willing to invest in highly rated but undervalued derivatives: CDOs and CDSs.

It should be noted that the global derivatives market remains practically unregulated. The legislatures of developed countries, including the United States, are establishing a new order of control over the OTC market. The new laws provide for transparency of the derivatives market, as well as for solving the problem of manipulations on it. Documents related to derivatives transactions have also been developed in the European Union. EU countries have introduced into their legislation provisions on OTC derivatives trading, as well as penalties, at least administrative penalties, for those companies and banks whose actions will not comply with the new rules. Despite some efforts, it has not yet been possible to stabilize the world financial system, and, in some ways, its vulnerability has even intensified [Poledna, Molina-Borboa, Martínez-Jaramillo, Van Der Leij, Thurner 2015].

The difficult financial situation of 2007-2009 was exacerbated by the low level of coordination of financial market regulation. Historical experience has shown that, despite the implementation of new regulation, supervision and macroeconomic policies, the financial industry regularly experiences crises. Therefore, the question of the effective state regulation methods of bank activities related to derivatives is becoming more relevant, which led to the choice of the topic for the research.

**Literature review and the problem statement.** Numerous scientific works are devoted to the problem of credit derivatives and banking regulation in terms of credit and investment activities. Many researchers concluded that the crisis potential of financial derivatives manifested itself during 2007-2009 in the following forms [Novak, Osadcha, Petruk 2019]:

- imbalance between the productive manufacturing sector and the financial sector was broken, resulting in a considerable amount of bogus capital, which, in turn, led to the formation of bubbles;
- financial leverage with a high level of speculative component;
- active securitization and the emergence of credit derivatives, including CDOs and CDSs, which have gradually lost their original purpose. Misinterpretation of the nature of these financial instruments has suggested that they help to reduce the financial risk, although in reality it is only transferred from one segment of the financial market to another;
- functioning of economic structures in the form of a financial pyramid.

Credit derivatives create conditions for accumulating systemic risks. The likelihood of systemic adverse events, occurring for exogenous or endogenous reasons and causing financial market volatility, is constantly increasing. Without effective regulation methods bank activities even with the simplest types of credit derivatives can lead to increase in risk level. Owing to this fact, banks need to improve the procedures and standards for operations with credit derivatives, as well as to formulate regulatory rules and methods for managing them. In addition to systemic risk, credit derivatives also have risk connected with counterparty, documentation and the basic one [Gorbunova, Ignatova, Tereshina 2018].

Another type of systemic risk that may arise when using credit derivatives is market risk, which is inherently speculative. It may include the following: a downgrading of a seller's protection and the occurrence of temporary financial problems; currency exchange rates (if the agreement involves the use of different currencies); decrease in security quotes. Although credit derivatives are designed to transfer the credit risk of a particular basic asset to a counterparty, they are themselves exposed to credit risk. If this type of risk occurs, the buyer of the defence will incur double losses. Problems of effective risk management organization inherent in credit derivatives and lack of regulation and supervision of such instruments lead to a weakening of banks' role in the credit market. This, in turn, leads to low requirements for selection and supervision of the reliable borrowers [Fabozzi, Modigliani, Jones 2009].

The study of the complexity and diversity of financial derivatives cannot be considered absolutely complete, since the entire set of financial risks becomes apparent only after the implementation of new financial products into practice. Scientists stress that in order to maintain financial stability and avoid recurrence of financial crises, it is necessary not only to strengthen the requirements for the derivatives market, but, first of all, to consider all possible risks and reform all areas of banking sector. Banking regulators need to pay significant attention to the structure and quality of capital, improve standards for managing liquidity, diversify loan portfolios, and control investment activity. Regulatory approaches and methods vary from country to country, given the level of development and economic characteristics.

Leading organizations that develop international standards for regulating the financial services sector with different goals, objectives and functions include the Basel Committee on Banking Supervision, the International Accounting Standards Board (IASB), the International Organization of Securities Commissions (IOSCO), the Financial Action Task Force (FATF), Financial Stability Forum (FSF), European Systemic Risk Board (ESRB), European Banking Authority (EBA), European Insurance and Occupational Pension Authority (EIOPA), European Securities and Markets Authority (ESMA). New European supervisory authorities have enough powers to directly supervise the bank activities in the European Union, as well as the right to prohibit or restrict the activity on the financial markets of those institutions, whose activities threaten financial stability. However, international practice shows that the most influential banking authority, operating at the supranational level, is the Basel Committee on Banking Supervision (the Basel Committee) [Hlibko, Vnukova, Hontar, Anisimova, Liubchych 2019].

**Research results.** Despite of some differences in the functioning of banking systems, Basel Committee recommendations for regulation and supervision are used even in those countries, where the implementation of these standards is not mandatory.

The 2008 global financial crisis revealed the weaknesses of the pre-agreement International Convergence on the Measurement of Capital and Capital Standards: New Approaches (Basel II) on regulating the stability of banks and banking systems [Konovalova 2018]. That is why Basel II, which has not yet been fully implemented, has been supplemented by new rules, which have become the basis of Basel III and are binding on European Union banks, as well as a benchmark for the Ukrainian banking sector.

Basel Committee standards include increasing of capital and liquidity requirements through the application of appropriate instruments and methods to protect against the recurrence of global financial and economic crises. An effective method of banking regulation to limit high-risk operations and provide the required level of liquidity is the introduction of mandatory standards and limits, considering Basel III requirements [Mejstrik, Pecena, Tepy 2015]. In order to ensure the stable operation of banks and timely fulfil their obligations to depositors, as well as to prevent the misallocation of capital resources and losses due to risks inherent in banking activities, the National Bank of Ukraine establishes economic standards that are mandatory for all commercial banks [National Bank of Ukraine 2015].

Comparison of NBU main standards that operate in Ukraine and the restrictions on EU banking operations in the Czech Republic, as recommended by the Basel Committee, is presented in the Table 1.

**Table 1** - Summary of Macroprudential Instruments

Purpose of application	Requirements and Limits	
	Applied in Ukraine	Applied in Czech Republic
Avoid excessive credit growth	Capital Requirements	
	Capital Adequacy	
	Not less than 10 %	Not less than 8 %
	Capital conservation buffer	
	0,625 % (from 2020) - 2,5 % (2023)	2,5 %
	Countercyclical capital buffer	
	0-2,5 % (from 2020)	1,5 %
	Systemic risk buffer	
	1,00-2,00 % (from 01.01.2020)	1,00-3,00 %
	Leverage ratio	
Potential (from 2020)	3 %	
Mitigate excessive maturity mismatch and illiquidity	Liquidity Requirements	
	Cash liquidity ratio - not less than 20 %	Net stable funding ratio (NSFR) 100 %
	Current liquidity ratio - not less than 40 %	
	Quick liquidity ratio - not less than 60 %	
	Liquidity coverage requirement 100 %	

Limit credit risks	Credit Risk Limits	
	Credit exposure per counterparty	Credit exposures to a client or group of connected clients
	The total amount of large exposures	
	Credit exposures for transactions with bank-related individuals	Where that client or group of connected clients is the parent undertaking or subsidiary of the bank
Limit investment risks	Investment Limits	Large Exposures Limit
	Investing in securities individually for each institution	Limit for the sum of all exposures of a bank to a single counterparty that are equal to or above 10 % of its Tier 1 capital
	Total amount of investment	
Mitigate excessive credit growth	Lending Limits	
	Partly implemented	LTV (loan-to-value) ratio, DTI (debt-to-income) ratio, DSTI (debt service-to-income) ratio

**Source:** author's development based on sources [Czech National Bank 2019; National Bank of Ukraine 2016]

Many requirements and restrictions, applied to banks in Ukraine and the Czech Republic are similar, nevertheless, there still exist significant differences. This is due to the fact that the Czech Republic has one of the most stable banking systems among the EU countries and almost did not experience the negative impact of the financial crisis of 2007-2009 [Sutorova, Těplý 2014].

The implementation of Basel III standards has also been going on for many years, since in the Czech Republic this process is mandatory unlike Ukraine, where the Basel II recommendations were implemented, but transition to Basel III is in progress, considering the country's economic characteristics.

As for the main differences, there are currently three bank liquidity standards in Ukraine: cash liquidity, current liquidity and quick liquidity. These requirements determine what portion of liabilities should be covered by assets of the relevant maturity (20%, 40% and 60%). The logic of all three coefficients implies a comparison of assets and liabilities with a definite maturity. However, they only consider the balance sheet date and are static. This approach does not account for expected outflows and inflows and, as a rule, underestimates the need for bank liquidity in times of stress.

Liquidity Coverage Requirement (LCR) is applied for Czech banks to provide a sufficiently high level of liquidity for the resources required to survive for one month in a stress scenario, as well as Net Stable Funding Ratio (NSFR), designed to increase elasticity at long-term prospects by creating additional incentives for banks to finance their operations from more stable sources on an ongoing structural basis [Czech National Bank 2019]. In 2018, the NBU introduced the mandatory LCR, but only in

test mode, to assess the willingness of commercial banks to comply with the 100 % standard [National Bank of Ukraine 2018]. It more effectively reflects the level of the bank's resilience to short-term liquidity shocks, typical of crisis periods, when there is a significant outflow of clients' funds. The next step is to implement the NSFR standard [National Bank of Ukraine 2018].

Basel III rules require the establishment of capital buffers, which are already in force for Czech banks. Capital buffers are formed in excess of the capital adequacy ratio and are designed to enhance banks' ability to withstand crisis by creating an additional "airbag" and reducing the likelihood of bank failures. In Ukraine, capital buffers are planned for implementation from January 1, 2020.

The capital buffer is accumulated by banks during the economic growth to compensate possible losses that occur in the context of a general economic downturn. The buffer size will increase annually during the years 2020 – 2023 (from 0.625% to 2.5%) [National Bank of Ukraine 2015].

The countercyclical capital buffer aims to protect the banking sector from the accumulation of risks during credit expansion periods. Depending on the phase of the economic cycle, the size of the buffer will range from 0 % to 2.5 %. The introduction of a specific size of countercyclical capital buffer will only take place after careful calculations and in the conditions of sustainable economic growth in the country. Systemic risk buffer for systemically important banks will be set at the level from 1 % to 2 % [National Bank of Ukraine 2015].

A significant difference between the rules of the Czech and Ukrainian regulators is the existence of investment restrictions in Ukraine. In order to ensure control over the direct investments and to limit possible losses, the NBU, within the framework of economic standards for banks, establishes the standards of investing in securities for each institution and the limit for the total investment amount. In the Czech Republic, existed limits that prohibited investing more than 35 % of a bank's equity in one type of asset as well. Nevertheless, since 2017, this limit has been abolished to make the investment market more attractive.

This flexible policy enables banks to regulate and restrict investment operations independently. However, in 2019, a restriction, which also is applied to investment sector, regarding the total amount of large exposures per counterparty, was implemented [Czech National Bank 2019].

Czech National Bank (CNB) applies the household lending limits for banking activities. The first tool, the loan-to-value ratio (LTV), limits the maximum amount of loans given to households, depending on the value of the collateral the bank receives on the loan, and also prevents bubbles in the real estate market and excessive mortgage lending. The CNB may set LTV limit for all new mortgages or only for mortgaged real estate at the highest rate.

The debt-service-to-income ratio (DSTI) and the total debt-to-income ratio (DTI) are also in force. These tools limit the maximum amount of credit a household can receive, depending on its income level; prevent excessive growth in mortgage or consumer lending and household debt.

The application of these coefficients in Ukraine is currently not a mandatory requirement, but are used by domestic banks, as it provides additional guarantee to the creditor. It is worth noting that the mandatory level of these coefficients in Ukraine

is not officially established, and each bank independently determines it, considering the type of loan, the form and purposes of granting it, the application period, availability of collateral, payment method, etc. The mandatory LTV, DTI, DSTI implementation is one of the important elements of the NBU macroprudential policy [Czech National Bank 2019].

Another regulatory tool, which is planned to be used in Ukraine from 2020, is the Leverage ratio [Basel Committee on Banking Supervision 2010]. Keeping the ratio at the required level allows to limit the increase in active operations by banks through borrowed funds. It serves as an additional safeguard for excessive balance sheet growth, provided that the risk weights of the assets do not reflect the actual riskiness of transactions. Its main advantage is simplicity and transparency, since the assets are not allocated according to the risk degree for its calculation.

The next method applied by all countries to manage both individual and aggregate bank risks is provisioning. In order to reduce the loan loss risk, improve the reliability and stability of banks, protect the interests of creditors and depositors, banks create provisions to compensate for possible losses on credit operations.

As a result of the bank activities, assets may lose their usefulness, and if there is objective evidence of its decline, appropriate provisions are formed; the result of a provision formation procedure to reduce the usefulness of an asset is a decrease in the result of the bank activity (an increase in bank expenses) and a decrease in the value of assets. This method allows to adjust the asset value and provides information about the real debt amount.

World practice shows significant differences in methodological approaches to determining the amount of provisions for credit operations. In European countries that focus on the use of general classification guidelines, the size of the provisions created is largely based on estimates of probable losses, sometimes calculated according to internal models and estimates the probability of default. In developing countries, mandatory credit classification rules, specific levels of provisions are set for the formation and control, as well as legal sanctions are enforced.

In the 2018, EU began to apply the International Financial Reporting Standard No. 9 "Financial Instruments" (IFRS 9), under which calculation of loan losses are based on expected losses [Bodnar, Reznikova, Patsuriia, Radzyviliuk, Kravets 2019]. The development of this standard considers the main shortcomings of its predecessor - IAS 39, among which the provision calculations were held only after the depreciation of assets [PWC 2017]. That has consistently led to the delayed and incomplete recognition of asset losses and contributed to the recent financial crisis. After the transition to the new standard, the amount of loan loss provisions will meet real credit risks.

IFRS 9 provides for three stages of measuring an asset:

1. Upon initial recognition of a significant increase in credit risk (ECL is estimated at a 12-month horizon);
2. After a significant increase in credit risk (ECL for the expected life of the asset);
3. Impairment (ECL for the expected life of the asset) [PWC 2017].

The expected credit losses are determined considering the forecast of macroeconomic conditions and phases of the economic cycle. The estimate is made on a point in time (PiT) basis, i.e. it changes depending on macroeconomic expectations: rises during periods of economic downturn and decreases in the recovery phase. In order to properly determine the probability of a PiT non-payment when calculating the ECL,

the bank has to consider all available information that can be collected without undue effort, including macroeconomic conditions [PWC 2017].

Banks should develop possible scenarios and set the probability of each occurrence given the natural uncertainty of future macroeconomic conditions. This is called scenario approach.

IFRS 9 does not offer a clear definition of a significant increase in credit risk. The only clear condition is a delay of more than 30 days, but the bank can refute it if justifies that the loan quality has not changed. A default event also has a single clear feature, defined by the standard – a delay of more than 90 days, but it can also be refuted [PWC 2017]. The full list of possible criteria should be selected by the bank in view of internal risk management standards.

IFRS 9 also identifies new approaches to interest income. For current loans, these are charged at the gross cost of the asset at an effective rate both before and after the significant increase in credit risk. Instead, interest income on impaired assets are accrued to net value after deducting provisions.

The integration strategy of Ukraine into the European community places special responsibility on the adaptation and harmonization of national legislation with the European one. Resolution No. 351 “On the Regulation for Measuring Credit Risk Generated by Banks' Asset Operations”, developed in 2017 with the assistance of IMF experts, the World Bank and USAID, complies with the Basel Committee recommendations and IFRS 9 “Financial Instruments” [Predmestnikov, Gumenyuk 2019].

The tightening of regulatory standards in the new version of the Basel Recommendations and the implementation of IFRS 9 are ambiguously assessed by both national regulators and the regulatory entities themselves.

Tightening of capital adequacy requirements, the establishment of common liquidity standards, additional standards for global, systemically important financial institutions, as well as new approaches to asset valuation, can lead to a slowdown in world economic growth as a result of banks raising interest rates on loans and their reduction in lending. To maintain the previous level of assets, banks need to increase capital. In other words, financial leverage will decrease and the cost of resources will increase, which will negatively affect the efficiency of banking activities.

This will lead to a reduction in dividend payments and a decrease in the attractiveness of bank shares for investors. As a result, competition between banks for borrowed funds will intensify. In order to recover losses, banks will have to increase interest rates on loans and limit risks with the help of tough credit conditions for potential borrowers. As a result, the inflow of financial resources for the real sector of the economy will decrease. This, in turn, will negatively affect the indicators of economic activity.

Nevertheless, national regulators and financial institutions of countries whose banking systems already comply with Basel III standards, and these are, first of all, EU countries, reacted favourably to the proposed changes and support new banking regulation requirements [Novotny-Farkas 2016]. Despite the commonality of the credit loss principle, there are a number of differences between the Resolution No. 351 of NBU and IFRS 9, which are discussed in Table 2.

The NBU has declared a mandatory transition to IFRS 9, but Ukrainian banks will continue to assess credit risk in accordance with Resolution No. 351, which has led banks to overestimate the loan portfolio quality on the basis of expected losses



[National Bank of Ukraine 2016]. Therefore, the transition to IFRS 9 will not significantly impact on the regulatory capital of financial institutions.

**Table 2** - The Main Differences between IFRS 9 and NBU Resolution No. 351

Differences between IFRS 9 and NBU Resolution No. 351 On the Regulation for Measuring Credit Risk Generated by Banks' Asset Operations	
IFRS 9	Resolution No. 351
The probability is calculated on a point-in-time principle (PiT) based on the available information about the phase of the economic cycle.	It uses "through the cycle" (TTC) principle to estimate the probability of default, that is, where the basis for calculation is the average default probability over the economic cycle, regardless of current macroeconomic conditions and expectations.
It envisages the use of two different horizons: for an asset that has not undergone a significant increase in credit risk - losses are determined on a horizon of 12 months, and if such a fact has occurred - for the entire period before its expiry date.	The horizon of forecasting a default event is the next 12 months, regardless of the asset quality
Determines the need for a script approach.	Such scenarios are not developed and evaluated during the credit risk assessment
Assumes that, based on the information available, the bank should determine the amount of expected losses by comparing the present value of contractual and expected payments, without necessarily dividing their magnitude into components such as default probability (PD) and default loss (LGD).	Establishes a single formula for calculating the credit risk level. Credit risk depends on the probability of default (PD) and default loss (LGD).
It clearly defines only the condition for recognizing a default, but provides for the possibility of refuting it if there are good reasons. Therefore, banks have to decide on default based on internal risk management standards.	It sets out a number of unconditional grounds for recognizing a debtor default for more than 90 days.
IFRS 9 provides less sensitivity to the level of provisions to the current phase of the economic cycle compared to IAS 39. However, during crisis the estimated probabilities of default may increase, and the level of provisions may increase, while during the economic recovery everything will happen vice versa.	Rules are not sensitive to the certain stage of the economic cycle.

**Source:** author's development based on sources [PWC 2017; National Bank of Ukraine 2016]

In addition to the active implementation of Basel III and new standards for the formation of loan loss provisions, the EU is paying attention to the development of new requirements for the derivatives market, because the opacity of the OTC derivatives market has been identified as one of the main factors in the global financial crisis. So, 2018 was marked by a new level of legal regulation of European financial markets. This is due, a new legislation on financial instrument markets aimed at improving the transparency of capital markets and financial instruments, in particular derivatives.

The main changes in the legislation occurred in the following areas:

1. The introduction of a disclosure regime before and after trading in order to achieve greater market transparency.
2. Increase in trading volume on regulated sites by creating a new trading platform (organized trading platform (OTF) for trading derivatives.
3. The trading process is regulated with help of special platforms, in particular, with the restrictions on open positions and reporting requirements for commodity derivatives.
4. Facilitating access to capital for small and medium-sized enterprises through the SME Growth Market.
5. Improving investor protection, in particular by banning the receipt of "free" analytics from an investment company, and introducing additional requirements for independence on advisory activities on investment strategy issues.
6. Ensuring non-discriminatory access to trade and post-trade services.
7. Strengthening cooperation among national regulators.

In general, new rules in European financial market will eliminate the regulatory gaps identified during the global financial crisis, protect investors, increase the transparency of financial markets and restore confidence in their participants. The European vector was also decisive for the Ukrainian financial sector. In recent years, Ukraine has been actively working on the implementation of the new European legislation on financial markets, in particular, MiFID II and MIFIR, into its legal field. The imperfection of the Ukrainian legislation on OTC market, the lack of regulation and circulation adversely affect the financial system of Ukraine in general.

**Conclusions.** The global financial crisis, which was caused by both general economic reasons and large speculative pyramids from specific financial instruments, demonstrated the unwillingness of the banking system to withstand significant risks. The search for effective ways to prevent the negative consequences that all countries are experiencing so far has resulted in the following: the development and implementation of new capital adequacy and liquidity requirements for banks in accordance with the Basel III agreement; new methods for asset valuation; new rules for loan loss provisions under IFRS 9; legislation about transparency and control of the OTC derivatives market.

There are significant structural, infrastructural and technical changes in the global derivatives markets in order to increase market transparency and to reduce risks. Significant changes in the national legislation of the largest post-industrial countries in the world are intended to protect markets from crisis phenomena, caused by the misuse of derivatives and the taking of enormous risk. European countries have been adopting new international standards for many years and expect a strong positive effect. Such changes will stimulate the global banking community, in particular, large banks, to strengthen the discipline in the field of OTC derivatives trading and to standardize

trading process. The results will be felt across the entire financial system, including the non-banking sector and capital markets.

Thus, the creation of Ukrainian banking system, which will be able to ensure the sustainable economic development of the country, is impossible without taking over the foreign experience of banks, considering aspects of their successful practice and applying international standards. Successful implementation of EU banking and currency regulation under the Association Agreement will allow Ukraine to apply successful methods for managing the banking sector through efficient reallocation of financial resources in the economy and build a fully-fledged, market-friendly banking environment.

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