# **OPPORTUNITY COSTS OF BANKING SUPERVISION**

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**Abstract:** This paper focuses on the definition of banking supervision and indicators of effort and effect of banking supervision. The idea of the importance of measuring the effectiveness of supervision through cost-benefit analysis has been profiled and the categories of costs of supervision have been categorized according to several authors. In addition to direct costs related to personnel, remuneration, technical sources, supervision entails many indirect costs, including compliance and opportunity costs. According to some authors, the ratio of indirect to direct costs is 4:1. This is also why the task of quantifying the effectiveness of banking supervision is so difficult. In the article we tried to penalize overliquidity and overcapitalization as an opportunity cost of supervision in Rep. The period 2008-2024 was analyzed. During this period many events occurred that destabilized the banking system, ranging from international financial crisis, bank failures, pandemics, war that brought strong inflationary pressures. Therefore, a broader analysis of the reasons behind the banks' decision to go far beyond the minimum requirements regulated by the National Bank is needed.

**Key words**: banking supervision, costs of supervision, regulation, supervisory authority, supervisory effectiveness, costbenefit analysis

### **JEL: G21**

## 1. Introduction

Banking supervision is a concept that has been around for over a century. In recent decades, against the backdrop of the crises of the 21st century, countries around the world have realized how important banking supervision is in the financial sector and the economy in general.

Banking supervision must contain an arsenal of strategies and regulations through which the state, including the supervisory authorities, can guarantee the viability of the banking system and the stability of the financial system. Banking supervision must be able to develop, implement and monitor supervisory policies effectively under both normal and critical economic and financial conditions.

Efficiency takes into account not only impact or outcome, but also effort. There are such situations where the costs of supervisory resources are greater than the benefits in terms of compliance or societal benefits, the solution for market failure may be worse than the failure itself (supervisory failure). It is therefore considered appropriate to identify the costs of banking supervision and analyze their effect, including from the perspective of missed opportunities.

In recent years, the academic literature has focused more on research on banking regulation, and banking supervision still remains a little-researched field of study. This is also due to the limited access to information about supervisory activities, which is considered as confidential information of supervisory authorities. Therefore, the article aims to investigate the theory defining different categories of banking supervision costs according to different authors, to analyze the practice of the European Central Bank's supervisory cost assessment and to evaluate through a mathematical model a potential opportunity cost of banking supervision applied in Rep. Moldova through prudential indicators related to capital and liquidity.

## 2. Definition and classification of bank supervision costs

## 2.1. Definition of banking supervision

"Banking supervision refers to the activity of monitoring the financial situation of banking institutions and checking how **banking regulations** are complied with and enforced". This is the micro view. From a macro perspective, banking supervision must contain an arsenal of strategies and regulations

# through which the state, and hence the **supervisory authorities**, can guarantee the **viability of the banking system and the stability of the financial system**.

Thus, the idea has emerged that banking supervision aims not only to ensure compliance with certain standards and legislation, but also to influence the macroeconomic environment by achieving societal objectives.

Societal objectives	Compliance objectives
• bank viability	compliance with legislation
<ul> <li>protecting the rights of consumers of banking services</li> <li>protecting investors</li> <li>stability of the financial system</li> <li>contribution to sustainable economic growth</li> </ul>	<ul> <li>solvency requirements</li> <li>liquidity requirements</li> <li>business model assessment</li> <li>reviewing corporate strategy and governance</li> </ul>

# Figure 1. Objectives of banking supervision

Source: by author

In other words, supervisory authorities must be able to demonstrate the causal relationship between their activities (cause) and outcome (effect) and to assess the effectiveness of the set of regulations, decisions and tools they have applied.

Both monitoring and supervisory intervention is costly for the supervisory authority. The supervisory strategy should therefore be chosen as optimally as possible to balance the benefits and costs of supervision. More intensive supervision may be considered a better option considering its benefits alone. However, there is a need for optimal supervision, the intensity of which is limited by the level at which marginal costs are higher than marginal benefits.

The Basel Committee proposes the following indicators for calculating the performance of financial supervision, which in fact correspond to different stages of the supervisory process:

• Supervisory resources - indicators in this category determine the extent and intensity of banking supervision. These indicators include: supervisory staff, supervisory budget, quality of reported data.

• Supervisory activities - indicators in this category refer to the tools by which supervisors identify and mitigate risks. These indicators include: time spent on supervisory activities, number of reports and on-site visits, number of supervisory meetings with banks.

• Impact of supervisory activities - indicators in this category relate to how institutions respond to the identified findings. Supervisors monitor banks' migration from one risk category score to another to identify the impact of supervisory activities. Risk scores are used to help plan future supervisory activities. These indicators include: the number of entities at heightened risk, the impact of supervisory adjustments and recommendations, the index of repeated infringements after a legal proceeding, stakeholder surveys, internal audit and the national audit office

• The outcome of surveillance activities, depending on the ultimate objective of the surveillance. This is the most relevant but also the most difficult way to measure the effectiveness of supervision. Supervisors have different measures to monitor the financial condition of the institutions they supervise. (BIS, 2024)

In order to summarize the indicators proposed by the Basel Committee, we have created Table 1, where we have delineated effort indicators from effect indicators. Thus, **effort indicators** show how much time and resources are required to achieve the supervisory objectives, while **effect indicators** measure the performance of supervision and show the outcome, intermediate and final impact of the intervention.

Effort indicatorsImpact indicators• time and resources to achieve the objectives of supervision• result - direct consequence of the supervisory intervention • intermediate impact - actions of the supervised bank • final impact - results achieved as a result of the actions• cost-benefit (effort-result) analysis avoid surveillance failure (cost > benefit)	Tuble 1. Indicators for calculating the effectiveness of banking supervision			
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surveillance activities     intermediate impact - actions of the supervised bank     intermediate impact - actions of the supervised bank     intermediate impact - results achieved as a result of the actions     - cost-benefit (effort-result) analysis     avoid surveillance failure (cost > benefit)	• time and resources to achieve the objectives of	• result - direct consequence of the supervisory intervention		
surveillance activities <ul> <li>final impact - results achieved as a result of the actions</li> <li>cost-benefit (effort-result) analysis</li> <li>avoid surveillance failure (cost &gt; benefit)</li> </ul>	supervision	• intermediate impact - actions of the supervised bank		
<ul> <li>cost-benefit (effort-result) analysis</li> <li>avoid surveillance failure (cost &gt; benefit)</li> </ul>	<ul> <li>surveillance activities</li> </ul>	<ul> <li>final impact - results achieved as a result of the actions</li> </ul>		
<ul> <li>avoid surveillance failure (cost &gt; benefit)</li> </ul>	- cost-benefit (effort-result) analysis			
	- avoid surveillance failure (cost > benefit)			

## Table 1. Indicators for calculating the effectiveness of banking supervision

Source: by author

On the basis of the effort and effect indicators, we can proceed to a more detailed analysis of the costs of banking supervision and their structure.

# 2.2. Classification of the costs of banking supervision

In the literature, several approaches to the classification of supervisory costs can be found. Some of them refer only to the act of supervision, others - only to bank regulation, in some sources regulatory and supervisory costs are addressed in unison.

Goodhart et al. (1998), Alfon and Andrews (1999) divide the costs of financial supervision into three categories:

1. *Institutional costs* - are costs arising from the work of supervisory and regulatory authorities. These are considered as direct supervisory costs.

2. *Compliance costs* - are costs imposed on regulated entities through regulatory requirements. Compliance costs comprise operational costs and opportunity costs (Elliehausen, 1998). Operational costs refer to all costs necessary to comply with regulatory requirements.

3. *Structural costs* - refers to a possible impairment of market competition and innovation in financial intermediation. This type of cost is quite difficult to quantify, but is very much responsible for the sector's performance.

Schüler and Heinemann (2005) have a similar classification of supervisory costs: institutional costs (direct costs), compliance costs and structural costs. According to their research, institutional costs are passed on to the financial (banking) sector and thus can be seen not only as direct costs but also as an important component of compliance costs.

Economist Briault (2003) categorizes the costs of bank regulation and supervision into:

1. *Direct costs* - costs that are borne by the authorities, the financial industry and the state or society as a whole and that enable regulatory and supervisory activities to be carried out in various forms, from rule creation to enforcement;

2. *Indirect costs* - are costs incurred by supervised entities in order to comply with regulated requirements. This category includes compliance costs, as well as costs of reporting to the authorities. One of the most essential compliance costs is the profit forgone by banks due to the use of cash to comply with regulatory requirements. Another cost relates to the high capital requirements imposed on the banking sector to ensure micro and macroeconomic stability on the one hand, but which can negatively influence lending conditions for bank customers on the other hand. And in practice it is very difficult to measure this impact and find a consensus. At the same time, indirect costs should not be ignored. According to the economist Franks et al. (1997), there is a 4:1 ratio between indirect and direct costs.

3. *Distortion costs* - these costs derive from the potential distortions that a particular legislative requirement may bring. Normally, if a legislative initiative is well thought through, the distortionary costs it may bring should be clearly outweighed by the benefits it brings.

In response to the global financial crisis, many microprudential regulations (notably capital and liquidity requirements) have been tightened in many countries to enhance supervision and the resilience of the banking system.

Jakob de Haan et al. (2019) analyzed how liquidity and capital regulations influence individual and systemic risk. Following a computational model by these authors, they find that liquidity regulations can have a positive impact on banks' individual risk. However, in order to reduce banks' risk appetite, liquidity regulations need to be combined with other policies to improve the quality of banks' assets and market liquidity. At the same time, liquidity regulation has an insignificant impact on systemic risk, as do other categories of regulation, including capital regulation.

Rochet (1992) shows that the relationship between bank capital and bank risk can be ambiguous, especially if the risk weights used in prudential capital regulations deviate from actual market risks. Also, Perotti et al. (2011) argue that higher equity capital may also imply higher risk appetite, implying that stricter capital requirements do not necessarily imply lower individual bank risk.

Supervision is designed to address the ambiguous relationship between regulation and banking risks. Thus, strict supervision can prevent risky decisions by banks and improve their stability. (Barth et al., 2004a). Thus, stronger bank supervision could mean lower individual bank risk.

Supervisory controls can also mitigate the risk of contagion risk in the system, due to the role of the supervisor as lender of last resort or resolution and winding-up supervisor to intervene at an early stage and block the risk of systemic crisis spreading.

BIS General Manager Agustín Carstens told a summit of the European Banking Federation that "welldefined capital and liquidity requirements - as proposed by the Basel III standards - are intended to equip banks with a buffer to withstand sudden interest rate fluctuations and give them time to address several structural weaknesses. At the same time, we must recognize that the current regulatory framework may not fully capture all risks."

So the theory goes that supervision is meant to reduce banking risks that regulation either has not yet covered or is not yet able to manage. "Minimum regulatory requirements are very narrow and not tailored to the risk profile of each bank. And there is no level of capital or liquidity that would make a bank viable if it has an unsustainable business model and weak governance." (Dahlgren et al., 2023) This is why supervision is so important. However, considering that supervisory resources are limited, the high costs of carrying out supervisory activities may ultimately lead to inadequately supervised banks and poor performance and stability. Banking supervision fulfils its role as a stabilizer of the system, but up to a certain level of effort, which is considered optimal. Banking supervision therefore needs to be calibrated. (Barth et al., 2004a).

# 2.3. Assessing the opportunity costs of banking supervision - the case of Rep. Moldova

Since there are no public data on the costs that the National Bank of Moldova incurs in the act of supervision, in terms of staff, technical resources and other supervisory efforts, I will try to assess the costs of banking supervision from the perspective of opportunity costs. Specifically, I will assess the potential effects of overliquidity and overcapitalization on the performance of the system, as expressed by profitability indicators.

Dynamic analysis of the values recorded by liquidity indicators shows that banks in Rep. Moldova respecting the regulated limits (Principle I and Principle II of liquidity) including in the crisis years (2008-2009 and 2020), being liquid and over-liquid.

Thus, over the period 2008-2024, long-term liquidity varies around the coefficient of 0.7. The exception is 2014, when the maximum regulated level of 1 was exceeded due to the liquidity indicators reported by BEM, Banca Socială and Unibank.

Regarding current liquidity, it ranged between 20-40% between 2008-2013. In 2014, due to the three problem banks, the current liquidity ratio decreased to 22.5%, and from 2015 onwards it exceeded 40%, reaching a maximum of 55.5% in 2017 and maintaining a ratio close to 50% until 2021. Starting from January 2022, the liquidity principle II was replaced by the liquidity coverage ratio (LCR)  $\geq$  100%, which amounted to 235.47% in 2022 - 235.47%, 282.12% in 2023 and 274.13% in 2024, well above the minimum regulatory limit.



## Figure 2. Liquidity Principle I and Principle II, evolution of indicators by banking system a.y. 2008-2024 (%)

Source: prepared by author based on National Bank of Moldova data [online] [cited March 22, 2017]. Available: <a href="http://bnm.md>"></a>.

In order to harmonize the legislation of the Republic of Moldova with the European one, since 2016, Principle III - Liquidity by maturity bands (>1) was also implemented. Thus, until 2016, there were some gaps in the NBM's regulatory acts in terms of liquidity indicators, because liquidity needs were not calculated in the period from 1 month to 2 years. Because banking operations have different maturities and often uncertain, the task of matching bank liabilities to bank assets is difficult so that liquidity risk is minimized. Principle III has come to fill these regulatory gaps.

According to the information on the economic and financial activity of banks in Rep. Moldova for the year 2016-2022, the liquidity principle III exceeds the threshold of 1 in all maturity bands, being well above this regulatory minimum.

	2016	2017	2018	2019	2020	2021	2022	2023	2024
up to and including one month	2,91	2,72	2,94	2,67	2,28	1,89	2,17	2,19	1,79
1-3 months inclusive	14,85	18,40	19,09	18,14	19,86	19,64	20,42	16,07	12,69
3-6 months inclusive	4,75	2,74	3,12	12,90	14,74	14,43	12,10	12,55	12,29
6-12 months inclusive	4,22	3,06	2,37	8,83	9,97	9,92	7,48	9,47	8,33
over 12 months	5,32	4,74	4,34	8,74	7,97	8,35	7,25	8,36	8,14

 Table 2. Principle III - Liquidity by maturity bands (>1)

Source: author based on data from the National Bank of Moldova [online] [cited March 22, 2025]. Available: <http://bnm.md>.

Thus, the banking sector of the Republic of Moldova does not have problems in terms of liquidity indicators, which means that it has adequate sources to support bond payments and increased resilience to possible external shocks. However, banks are far exceeding the regulated requirements, which makes for a superliquid banking system, and this entails certain risks or opportunity costs. By hoarding liquidity, they miss the opportunity to transform these assets into long-term bank loans, i.e. to generate profits.

At the same time, excess liquidity hampers the transmission of monetary policy decisions taken by the central bank as it tries to adjust monetary policy instruments to its inflationary expectations and crisis forecasts. Also, theoretically, the build-up of liquidity in the system could undermine the financial intermediation function of banks and their role in supporting economic growth.



Figure 3. System-wide evolution of risk-weighted capital adequacy between 2008-2017 and total own funds ratio between 2018 and 2024 (%)

Source: author based on data from the National Bank of Moldova [online] [cited January 22, 2025]. Available: <a href="http://bnm.md>"></a>.

The average risk-weighted capital adequacy of the banking system in the period 2008-2017, shown graphically in Fig.2.3., shows that the capital adequacy ratio was above the regulatory level of  $\geq 12\%$  - in the period 2008-2010 and  $\geq 16\%$  - in the period 2011-2017. The exception is the year 2014, when this indicator amounted to 13.92%, below the minimum regulated level. The situation in 2014 was not a systemic problem, but was generated by Banca de Economii and Banca Socială - banks that in 2014 recorded a risk-weighted capital adequacy ratio slightly above 3%.

The evolution of the own funds ratio in the period 2018-2024 shows that banks in Rep. Moldova continue to be sufficiently capitalized in relation to their risk profile. As mentioned above, according to the new calculation methodology, the total own funds ratio takes into account not only credit risk, but also market and operational risk. Thus, it is natural that this indicator is lower than the indicator calculated until 2018. In the period since the total own funds ratio has been applied, this indicator has shown an upward trend, from 26.55% in 2018 to 26.32% in 2024.

Return on Assets (ROA) and Return on Equity (ROE) indicators will be used to analyze financial performance.

In the period under analysis, 2009 - the year of the financial crisis - stands out, when the banking system recorded losses and profitability ratios were negative. However, in the post-crisis years, banks managed to improve their profitability ratios significantly, with the exception of 2014 (the year of problem banks) and 2020 (the pandemic year). In 2024, ROE amounted to 14.8% and ROA - 2.2%. Although the evolutions are substantial, it can be noted that profitability indicators were higher in 2008 - the pre-crisis year.



Figure 4. Profitability evolution 2008-2024 (%)

Source: author based on data from the National Bank of Moldova [online] [cited February 2, 2025]. Available: <a href="http://bnm.md"><a href="http://bnm.md"></a>.

If we look at the situation on a system-wide basis, we note that the relationship between capital and liquidity indicators and profitability indicators is not linear. Thus, the relationship is non-monotonic and requires the determination of an optimal level at which the profitability levels are maximized. In order to find an optimal level of liquidity and capitalization, it is proposed to use a polynomial regression of degree 2.

 $y = a * x^2 + b * x + c$ 

Where:

y – the dependent variable (in our case ROE or ROA)

a - the coefficient of the quadratic term, which measures the curvature of the relationship between the variables x and y (in our case, Liquidity or Capital and Profitability)

b - the coefficient of the linear term, which measures the slope of the linear relationship between x and y and shows the direct effect of x on y

c - the free term or intercept, which is the theoretical value of y when x is zero

Based on this equation, we can find the optimal level of x:

$$x_opt = (-b)/2a \tag{2}$$

(1)

If the whole period of analysis is taken into account, the situation becomes even more complex taking into account the structural changes in the system (the 3 bank failures between 2013-2024) as well as regulatory changes. It is therefore considered appropriate to analyze correlations by sub-periods. In the case of analyzing the correlations between liquidity indicators and ROA, individual indicators per bank were considered and weighted by the systemic importance of each bank (calculated as the share of assets in total assets in the system). Correlations were analyzed and the regression results yielded the equations below.

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Liquidity indicators	Calculation sub-	Equation	Calculated optimal
	periods		level
Principle I	2016-2021	$y = -2.9855x^2 + 3.5748x - 0.0235$	0,5987
		$R^2 = 0.8301$	
	2022-2024	$y = -9.6573x^2 + 6.0017x - 0.0478$	0,3108
		$R^2 = 0.9452$	

Principle II	2016-2021	y = 0.0008x2 + 0.0338x - 0.0157	21,125%
		$R^2 = 0.8065$	
Principle III	2016-2021	$y = -0.0403x^2 + 0.2747x - 0.0314$	3,41
_		$R^2 = 0.4022$	
LCR	2022-2024	$y = -5*10^{(-5)x^2} + 0.0152x - 0.0932$	152%
		$R^2 = 0.813$	

Source: author based on data from the National Bank of Moldova [online] [cited February 2, 2025]. Available: <a href="http://bnm.md"><a href="http://bnm.md"></a>.

For the analysis of correlations between ROE and capital ratios, individual ratios per bank, weighted by systemic importance and normalized, were used. The analysis was also performed by sub-periods, taking into account the change in the regulated limit.

## Table 5. Calculation of the optimal level of capital indicators, by sub-periods of analysis

Capital indicators	Calculation	Equation	Normalized	Denormalized	
	sub-periods		optimal level	optimal level	
Capital adequacy	2013-2017	-188.49x <sup>2</sup> + 100.96x - 13.07	0,268	34,56	
	2018-2024	$-2.6198x^{2}+1.7233x+0.0076$	0,329	20,89	
	2015-2024	$-3.221x^{2}+2.0861x-0.039$	0,324	25,35	
Debts/ Capital	2013-2024	$7.8794x^2 - 7.1223x + 1.8572$	0,452	3,85	

Source: author based on data from the National Bank of Moldova [online] [cited February 2, 2025]. Available: <a href="http://bnm.md"></a>.

## 3. Conclusions

Regulation and supervision are interrelated processes, as they are instruments of the supervisory authority - both in the dimension of dictating rules and in the dimension of checking how these rules are respected and serve macroeconomic and social objectives.

If regulation is based on clear rules and verifiable information, then supervision is much more discretionary and can go beyond regulation to cover risks that the law may have failed to regulate. Because supervisory resources are limited, it is important to emphasize efficiency in carrying out supervision.

Measuring the effectiveness of banking supervision is important to determine whether the costs of supervisory resources outweigh the benefits and the solution to market failure is worse than the failure itself (supervisory failure).

Although it is difficult to construct a portfolio of performance indicators, the effectiveness of supervision needs to be analyzed in terms of the causal relationship between interventions and supervision objectives, as well as opportunity costs.

Taking into account that no public data on the NBM's supervisory expenses (direct costs) were available, we made a mathematical calculation based on regression equations and found the optimal levels of liquidity and capital ratios, at which ROA and ROE reach maximum levels.

The optimal levels are well above the regulated minimums, which means that the liquidity and capital ratios recorded by banks in the system present significant opportunity costs to their performance. This reality is driven on the one hand by regulatory pressures, but also has other potential underlying causes, such as low demand for high quality credit, low cost of liquidity and capital, a safety net measure in conditions of economic and political uncertainty.

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