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Deposit Insurance System under Different Financial Conditions*

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Abstract

The deposit insurance system is a fundamental component of financial stability, as it protects depositors and mitigates the risk of bank runs. However, its impact on bank risk is not unambiguous and depends on the phase of the economic cycle. The aim of this paper is to examine the differential effects of deposit insurance systems on bank stability before, during and after a financial crisis. The analysis employs a dynamic panel model estimated with the Arellano-Bond GMM estimator on a sample of the European Union (EU) and selected Southeast European (SEE) countries in the period from 2005 to 2014. Bank stability was proxied by the z-score and the share of non-performing loans. The results show that the deposit insurance system has a stabilising effect during a crisis, as it mitigates the risk of banking system instability, while risk appetite increase in the periods before and after the crisis, suggesting the presence of moral hazard. In line with the research results and the lessons learned during the Global Financial Crisis, the EU continues to discuss the completion of the third pillar of the Banking Union, namely the common European Deposit Insurance Scheme (EDIS). Although a consensus has not yet been reached among the Member States, due to differences in the characteristics of national financial systems, EDIS is seen as an instrument that could contribute to greater coordination and resilience of the banking sector in future crises.

Keywords: *bank stability, dynamic panel analysis, moral hazard, Banking Union*

JEL classification: *C33, E32, G21*

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1. Introduction

The deposit insurance system (DIS) is one of the fundamental instruments for protecting depositors and preserving the stability of the banking system. Its importance stems from the fact that the stability of banks is largely conditioned by the trust of depositors in the financial system, and that the loss of this trust can result in the destabilisation of the entire banking sector. In this context, the DIS forms an integral component of the broader financial safety net, alongside the central bank's role as the lender of last resort and the banking regulatory and supervisory framework (Kahn & Santos, 2005).

Given the inherent instability of the banking industry and the vulnerability of the financial system to shocks, it is crucial that countries have adequate crisis prevention and management mechanisms in place (Učkar & Petrović, 2021). In this sense, Ayadi and Lastra (2010) distinguish ex-ante measures, which include regulation, supervision and business transparency, and ex-post measures that are activated in crisis situations. These include the abolition of deposit convertibility, central bank interventions, DIS, insolvency resolution procedures and implicit protection of banks or depositors in cases of systematically important institutions (too big to fail).

The DIS performs two key public functions: preventing bank runs and protecting small depositors (Barth et al., 2006). The latter function is particularly important because small depositors often lack sufficient knowledge and information to properly assess investment risks and the financial health of banks (Faulend & Kraft, 2004).

Accordingly, Carisano (1992) points out that preventing mass withdrawals from banks is the basis for justifying the existence of a DIS. Furthermore, Zolea (2023) emphasised that deposits represent a key source of funding for traditional banking, which further confirms the importance of the insurance system in preserving the stability of the banking sector.

Although DIS has an important stabilising role, its application can cause unwanted effects. Duttagupta and Cashin (2008) warn of the ambiguity of a system that, on the one hand, prevents bank runs, but, on the other, encourages moral hazard. According to Garcia (1996), adverse selection and the principal-agent relationship problem are among the main "*traps*" of deposit insurance. Moral hazard results from the reduced incentive of depositors to monitor banks and banks' tendencies to take greater risks (Cullen, 2023; Kundid Novokmet, 2015; Pierret & Howarth, 2023; Protić, 2002). Adverse selection occurs when all banks pay the same premium, regardless of risk, which favours smaller and riskier banks (Garcia, 1999; Huberdeau-Reid & Pennacchi, 2025; Suljić Nikolaj et al., 2022; Wheelock, Kumbhakar, 1995). The problem of principal-agent relationships is further exacerbated if the insurance system operates under political or sectoral influence or if there is a lack of coordination among supervisory institutions (Faulend, 2002). Although numerous studies indicate a higher risk in the behaviour of banks in systems with deposit insurance (Allen et al., 2011; Calomiris & Jaremski, 2016; Dewenter et al., 2018; Gropp & Vesala, 2004; Laeven, 2002; Lambert et al., 2017), its basic function, preventing destabilisation through withdrawal of deposits, remains crucial (Alam et al., 2021; Matutes & Vives, 1996; Martin et al., 2016; Merton, 1977). Therefore, Ayadi and Lastra (2010), and Dávila and Goldstein (2023) point out that a well-designed system, with effective supervision, strengthens confidence in the banking system.

This is confirmed by the Global Financial Crisis (GFC), which, in addition to having a pronounced debt character, also took on the characteristics of a banking crisis in a large number of EU countries (Laeven & Valencia, 2013). It was precisely in such circumstances that it was crucial to ensure the stability of deposits and preserve the confidence of depositors despite the pressures and the distrust generated by the crisis. In response to these challenges, the EU initiated the process of creating a Banking Union, the third pillar of which is a single DIS. The proposal for the EDIS Regulation, which was submitted by the European Commission in 2015 (European Council, 2024), has not yet been formally adopted as a common DIS that would replace national schemes.

The reason for this is that there is still no consensus among the Member States on a common DIS, primarily due to concerns about moral hazard, possible cross-border subsidization and uneven risk distribution (Kuznichenko et al., 2021; Single Resolution Board, 2025). For this reason, the aforementioned topic stimulates the current debate on the role and optimal design of DIS in ensuring financial stability (Arda & Dobler, 2022; Beck et al., 2022; Ferri & Pesic, 2025; Gómez Fernández-Aguado et al., 2022; Gruenberg, 2024; Tümmler, 2022).

This study is structured as follows. Section 2 provides a review of the relevant literature on DIS and its impact on the banking stability in different economic conditions. Section 3 presents the research methodology, while Section 4 describes the data set used. Section 5 is dedicated to the analysis and interpretation of the empirical results, whereas the final section presents conclusions and discusses the theoretical and practical implications of the research.

2. Literature review

Scientific research consistently shows that the effects of DIS are not unambiguous, but depend on economic conditions. In stable periods, the system often encourages moral hazard and greater risk-taking (Angkinand & Wihlborg, 2010; Brandao-Marques et al., 2013; Chesini, 2014; Chiaramonte et al., 2020; Cull et al., 2005; Dewenter et al., 2018; González, 2005; Ioannidou & Penas, 2010; Kusairi et al., 2018; Lakštutienė et al., 2011; Laeven & Levine, 2009; Ngalawa et al., 2016; Ntwaepelo, 2023; Osborne & Lee, 2001; Prabha & Wihlborg, 2014; Yilmaz & Muslumov, 2008). Conversely, in crisis periods, the DIS helps stabilise the banking system by preventing depositor panic and large-scale withdrawals (Anginer et al., 2014; Engineer et al., 2013; Hasan et al., 2017; Prabha & Wihlborg, 2014; Weiß et al., 2014).

Although Anginer et al. (2014) also emphasise that the DIS weakens market discipline in calm periods and encourages banks to take on greater risk, they also note that, in crisis conditions, it contributes to preserving stability by reducing the risk of sudden deposit outflows. The authors further point out that the negative effects in stable conditions are often stronger than the positive effects in a crisis. Similarly, Prabha and Wihlborg (2014) argue that the DIS reduces overall risk for banks in crisis periods, but, in stable conditions, it encourages risky placements and thus can increase the vulnerability of the system in the long term.

Osborne and Lee (2001) warn that negative effects in stable periods can be a trigger for future crises. In their analysis, Demirgüç-Kunt and Detragiache (2002) show that systems with a higher coverage and lower level of supervision have higher probability of banking crises. Laeven (2002) adds that the DIS reduces depositor discipline, especially in banks with lower capital, which, in turn, increases business risk. Cull et al. (2005) and González (2005) emphasise that the problem of moral hazard intensifies if the system does not differentiate premiums according to the risk taken by banks, while Wagster (2007) emphasises the connection between extended deposit insurance and an increased propensity toward risky loans. Laeven and Levine (2009) empirically confirm that banks in countries with more developed and stricter DIS are less dependent on market discipline, which increases their vulnerability to future crises.

Furthermore, Yilmaz and Muslumov (2008) and Ioannidou and Penas (2010) find that the safety of depositors weakens their motivation to supervise banks, whereas banks use the existence of a DIS as a protection against the failure of risky investments. Angkinand and Wihlborg (2010) emphasise the importance of system design (e.g. risk-sensitive premiums) in mitigating negative effects. DeLong and Saunders (2011) indicate that the lack of transparency and information asymmetry between regulators, banks and depositors further aggravates the problem of moral hazard.

Lakštutienė et al. (2011) show that the negative effects are more pronounced in countries with weaker regulatory frameworks and institutional infrastructure. Brandao-Marques et al. (2013) and Chesini (2014) confirm that the DIS can increase systemic risk in the long term if it is not accompanied by strong supervisory mechanisms. Finally, Barth et al. (2006) and Ngalawa et al. (2016) emphasise that system design, regulatory framework and institutional context decisively determine the ultimate effects of deposit insurance.

Despite the extensive literature on deposit insurance and banking stability, existing studies predominantly focus on either cross-country comparisons or single-period analyses, without explicitly distinguishing between different phases of the economic cycle. Furthermore, limited attention has been given to comparative analyses between EU and SEE countries, particularly in the context of the Global Financial Crisis.

This study aims to address this gap by providing a dynamic panel analysis of the effects of deposit insurance across pre-crisis, crisis, and post-crisis periods, using both z-score and NPL as complementary measures of bank risk. In doing so, it contributes to the literature by offering a more nuanced understanding of the cyclical implications of deposit insurance systems in different institutional environments.

Based on the above research review and the identified research gap, the following research questions are formulated:

> RQ1: *How does the deposit insurance system affect the level of bank risk before, during, and after the GFC?*

> RQ2: *To what extent do the effects of the deposit insurance system differ across the phases of the economic cycle?*

In order to provide an empirical answer to these questions, the following hypotheses are proposed. To ensure consistency between the research design and the empirical framework, the general hypothesis is further decomposed into three sub-hypotheses reflecting the distinct phases of the economic cycle analysed in this study.

> H1: *The effect of the deposit insurance system on bank risk differs depending on the phase of the economic cycle.*

> H1a: *In the pre-crisis period, the deposit insurance system is associated with higher incentives for bank risk-taking, reflecting moral hazard, adverse selection, and weaker market discipline.*

This expectation is grounded in the literature which suggests that deposit insurance weakens market discipline and encourages banks to take on additional risk in stable periods (Anginer et al., 2014; Demirgüç-Kunt & Detragiache, 2002; Laeven, 2002)

> H1b: *During the crisis period, the deposit insurance system is associated with a stabilising effect on bank risk through increased depositor confidence and reduced likelihood of systemic instability.*

Contrary to the previous hypothesis, during crisis periods, deposit insurance plays a key stabilising role by preventing depositor panic and large withdrawals (Anginer et al., 2014; Hasan et al., 2017).

> H1c: *In the post-crisis period, the deposit insurance system is associated with changes in bank risk, with effects that may differ depending on the risk measure used.*

In the post-crisis period, the effects of deposit insurance remain ambiguous, as stabilisation mechanisms coexist with renewed incentives for risk-taking (Prabha & Wihlborg, 2014).

The above hypotheses are empirically tested using a dynamic panel data approach, which allows the assessment of the impact of deposit insurance system characteristics on bank risk across different phases of the economic cycle.

3. Methodology

This study uses a dynamic panel data approach to examine the effects of deposit insurance systems (DIS) on bank risk across different phases of the economic cycle. The empirical analysis employs the two-step Arellano-Bond difference Generalised Method of Moments (GMM) estimator developed by Arellano and Bond (1991).

A dynamic panel framework is appropriate because bank risk is persistent over time, with current risk levels influenced by previous conditions. Therefore, lagged values of the dependent variable are included among the regressors. In these circumstances, conventional panel estimators may yield biased and inconsistent results due to unobserved heterogeneity, autocorrelation, and potential endogeneity between bank risk and the explanatory variables.

The Arellano-Bond difference GMM estimator addresses these issues by transforming the model into first differences and using lagged levels of endogenous variables as internal instruments. This approach helps mitigate endogeneity arising from reverse causality, omitted variable bias, and the dynamic structure of the model. In line with the recommendations of Roodman (2009), the number of instruments is restricted to avoid instrument proliferation and preserve the validity of the Hansen test.

The two-step estimator is used because it provides more efficient and consistent estimates in the presence of heteroscedasticity. In the second step, residuals from the first-step estimation are used to construct a consistent variance-covariance matrix (Adeboye & Ogunnusi, 2026; Višić & Škrabić Perić, 2011). As standard two-step GMM standard errors may be downward biased in finite samples, robust standard errors corrected according to the methodology proposed by Windmeijer (2005) are applied.

Model validity and specification are evaluated using several diagnostic tests. First, the Arellano-Bond autocorrelation test is applied to examine serial correlation in the differenced residuals. Consistent with model assumptions, first-order autocorrelation is expected, while the absence of second-order autocorrelation indicates correct model specification (Arellano & Bond, 1991).

Second, the Hansen test of over-identifying restrictions is used to assess the validity of the instrumental variables. Compared with the traditional Sargan test, the Hansen test is more robust in the presence of heteroscedasticity and is therefore considered more appropriate for the estimated models. The null hypothesis of the Hansen test assumes that the instruments are valid and uncorrelated with the error term.

Finally, the Wald test is used to examine the joint statistical significance of the explanatory variables included in the models. The combination of these diagnostic tests supports the adequacy and reliability of the estimated specifications.

The empirical analysis is conducted using the STATA software package.

3.1. Sample and model

The sample covers 34 banking systems and 1,453 credit institutions over the period 2005–2014. The data are obtained from the Orbis Bank Focus database and include EU (1,330 credit institutions) and SEE countries (123 credit institutions). The sample structure reflects the focus of this study on comparing EU Member States with non-EU SEE countries, a group that has received relatively limited attention in the existing literature. By including both groups, this study aims to address this research gap and provide a more comprehensive analysis of deposit insurance systems across different institutional environments.

Given the research hypotheses and the absence of a universally accepted definition of bank stability, it is approximated in this research by a combination of bank risk indicators. It is operationalized through two dependent variables that are common in the relevant literature (Angkinand & Wihlborg, 2006, 2010; Anginer et al., 2014; Fang et al., 2014; Forssbaeck, 2011; Fonseca & González, 2010; González, 2005; Ioannidou & Penas, 2010; Lambert et al., 2017; Laeven & Levine, 2009; Lè, 2013; Yan et al., 2014).

1. Z-score, which measures the bank's distance from insolvency (a higher score implies a lower risk appetite).

2. Share of non-performing loans (NPL) in total loans, which reflects the quality of the loan portfolio and exposure to credit risk.

In order to test the hypothesis, set out in this paper, according to which the effects of the deposit insurance system on banks' risk-taking behaviour depend on the level of general economic activity, the following models were formulated:

$$\begin{aligned} z-score_{i,t} &= a + yz-score_{i,t-1} + \beta_1 DIS * BEFORECRISIS_{i,t} + \\ &+ \beta_2 DIS * CRISIS_{i,t} + \beta_3 DIS * POSTCRISIS_{i,t} + \beta_4 lnFDPPCAPITA_{i,t} + \\ &+ \beta_5 SAVGDP_{i,t} + \beta_{11} EUSTATE_{i,t} + \varepsilon_{i,t};\ i = 1,\ldots,1453,\ t = 1,\ldots,10. \end{aligned} \tag{1}$$

$$NPL_{i,t} = a + yNPL_{i,t-1} + \beta_1 DIS * BEFORECRISIS_{i,t} + \beta_2 DIS * CRISIS_{i,t} + \\ + \beta_3 DIS * POSTCRISIS_{i,t} + \beta_4 lnFDPPCAPITA_{i,t} + \beta_5 SAVGDP_{i,t} + \\ + \beta_{11} EUSTATE_{i,t} + \varepsilon_{i,t};\ i = 1,\dots,1453,\ t = 1,\dots,10. \quad (2)$$

To examine the implications of the deposit insurance system on bank risk across different phases of the economic cycle, the key explanatory variables are specified as interaction terms between period-specific dummy variables and the deposit insurance variable (DIS). In the empirical model, DIS is operationalised as the natural logarithm of the deposit insurance coverage amount.

Specifically, three interaction variables are constructed: (DIS x PRECRISIS) for the pre-crisis period (2005–2007), (DIS x CRISIS) for the crisis period (2008–2012), and (DIS x POSTCRISIS) for the post-crisis period (2013–2014). These variables capture the period-specific effects of deposit insurance on bank risk, allowing the impact of deposit insurance to vary across different phases of the economic cycle. Definitions and descriptions of all variables included in the empirical models are reported in Table 4 in the Appendix.

In addition, dummy variables (PRECRISIS, CRISIS, POSTCRISIS) are included in alternative model specifications to account for the direct effects of macroeconomic conditions on bank risk. It is important to distinguish between these dummy variables, which reflect general economic conditions, and the interaction terms, which measure how the effect of deposit insurance changes across different periods. This specification follows the empirical approach of Anginer et al. (2014) and Prabha and Wihlborg (2014), enabling a more nuanced assessment of the cyclical implications of deposit insurance systems. However, unlike these studies, which define the crisis period as 2007–2009 due to their broader global sample, this study identifies the crisis period as 2008–2012 based on macroeconomic indicators such as GDP growth and GDP per capita within the observed countries.

In addition to the baseline specification, further model variations are estimated to address potential multicollinearity and to test the robustness of the results. These alternative specifications include additional characteristics of the deposit insurance system, such as the ratio of coverage amount to GDP per capita, the mode of system administration, and the type of premium, as well as macroeconomic control variables. Dummy variables are also included to indicate the pre-crisis, crisis, and post-crisis periods. The models are estimated using z-score and NPL as dependent variables.

$$z-score_{i,t} = \alpha + \gamma z-score_{i,t-1} + \beta_1 PRECRISIS_{i,t} + \beta_2 limgdp_{i,t} + \\ + \beta_3 PREMIA_{i,t} + \beta_4 ADMINISTRATION_{i,t} + \beta_5 lnGDPPCAPITA_{i,t} + \\ + \beta_{11} SAVGDP_{i,t} + \beta_{12} EUSTATE_{i,t} + \varepsilon_{it};\ i = 1,...,1453,\ t = 1,\dots,10. \quad (3)$$

$$z-score_{i,t} = \alpha + \gamma z-score_{i,t-1} + \beta_1 CRISIS_{i,t} + \beta_2 limgdp_{i,t} + \beta_3 PREMIA_{i,t} + \\ + \beta_4 ADMINISTRATION_{i,t} + \beta_5 lnGDPPCAPITA_{i,t} + \beta_{11} SAVGDP_{i,t} + \\ + \beta_{12} EUSTATE_{i,t} + \varepsilon_{i,t};\ i = 1,...,1453,\ t = 1,\dots,10. \quad (4)$$

$$z-score_{i,t} = \alpha + \gamma z-score_{i,t-1} + \beta_1 POSTCRISIS_{i,t} + \beta_2 limgdp_{i,t} + \beta_3 PREMIA_{i,t} + \beta_4 ADMINISTRATION_{i,t} + \beta_5 lnGDPPCAPITA_{i,t} + \beta_{11} SAVGDP_{i,t} + \beta_{12} EUSTATE_{i,t} + \varepsilon_{i,t};\ i = 1,...,1453,\ t = 1,\ldots,10. \quad (5)$$

$$NPL_{i,t} = \alpha + \gamma NPL_{i,t-1} + \beta_1 PRECRISIS_{i,t} + \beta_2 limgdp_{i,t} + \beta_3 PREMIA_{i,t} + \beta_4 ADMINISTRATION_{i,t} + \beta_5 lnGDPPCAPITA_{i,t} + \beta_{11} SAVGDP_{i,t} + \beta_{12} EUSTATE_{i,t} + \varepsilon_{i,t};\ i = 1,...,1453,\ t = 1,\ldots,10. \quad (6)$$

$$NPL_{i,t} = \alpha + \gamma NPL_{i,t-1} + \beta_1 CRISIS_{i,t} + \beta_2 limgdp_{i,t} + \beta_3 PREMIA_{i,t} + \beta_4 ADMINISTRATION_{i,t} + \beta_5 lnGDPPCAPITA_{i,t} + \beta_{11} SAVGDP_{i,t} + \beta_{12} EUSTATE_{i,t} + \varepsilon_{i,t};\ i = 1,...,1453,\ t = 1,\ldots,10. \quad (7)$$

$$NPL_{i,t} = \alpha + \gamma NPL_{i,t-1} + \beta_1 POSTCRISIS_{i,t} + \beta_2 limgdp_{i,t} + \beta_3 PREMIA_{i,t} + \beta_4 ADMINISTRATION_{i,t} + \beta_5 lnGDPPCAPITA_{i,t} + \beta_{11} SAVGDP_{i,t} + \beta_{12} EUSTATE_{i,t} + \varepsilon_{i,t};\ i = 1,...,1453,\ t = 1,\ldots, 10. \quad (8)$$

The period encompassing the GFC is particularly relevant for investigating the impact of DIS, as this crisis exposed the structural weaknesses of banking systems and regulatory frameworks at the time. In such conditions, the DIS serves as a key mechanism for limiting bank panics and preserving confidence. The crisis period therefore provides insight into the stabilising role of DIS during financial instability, while the pre- and post-crisis periods highlight potential moral hazard and risk-taking incentives associated with the financial safety net. This sample therefore enables a clearer comparison of the effects of DIS at different stages of the cycle and under varying financial conditions, which would not be possible in stable or single-phase periods.

In contrast, the same period also represents a limitation of this paper. Although the time frame 2005-2014 covers the pre-crisis, crisis, and post-crisis periods, it does not include subsequent regulatory changes, such as the full implementation of Basel III, the establishment of the SRM, and more recent reforms at EU level. Therefore, future research should focus on the period after 2014 to examine the effects of DIS in the new regulatory and institutional environment.

3.2. Descriptive statistics and correlation

Descriptive statistics show that the dummy variables DIS x PRECRISIS, DIS x CRISIS, and DIS x POSTCRISIS have lower standard deviations among the observed credit institutions. This is due to the varying number of institutions observed from countries included in the research sample and the differences in DIS characteristics across countries. Following the descriptive statistics, the results of the econometric model are preceded by an analysis of the correlation among the observed independent variables, as a high correlation between individual variables indicates multicollinearity, which distorts the significance of the estimated parameters. Pearson's correlation coefficient ranges from -1 to 1 and indicates the direction and strength of the linear statistical correlation between variables. A value of 0 indicates no correlation between the observed variables, positive values indicate a consistent increase, and negative values indicate that as one variable increases, the other decreases. Complete correlation is observed at the extreme values of the coefficient. According to Field (2009) and Lovrić (2005), multicollinearity may be present when correlation coefficients between pairs of independent variables exceed 0.8 or are less than -0.8. The correlation matrix preceding the dynamic panel analysis is presented below.

Table 1a: Descriptive statistics for model variables with z-score and NPL as dependent variables

Variable		Arithmetic mean	Standard deviation	Minimum value	Maximum value	Number of observations
z-score	overall	2.876875	1.557244	-4.66531	8.902474	N = 11,433
	between		1.503968	-2.808699	6.818049	n = 1,368
	within		0.38116303	-2.801569	6.825821	T = 8.35746
NPL	overall	8.128249	10.76065	-4.35	108.71	N = 5,369
	between		10.0161	0.0257143	104.885	n = 1,126
	within		5.988975	-32.49318	88.777	T = 4.76821
lnlimit	overall	10.94649	0.7570291	7.846199	11.56637	N = 13,576
	between		0.3990982	8.006368	11.52912	n = 1,453
	within		0.650518	8.977107	12.07456	T = 9.34343
ADMIN-ISTRA-TION	overall	0.1783202	0.3827953	0	1	N = 14,502
	between		0.3367885	0	1	n = 1,453
	within		0.1817097	-0.5216798	0.8783202	T = 9.98073
PREMIA	overall	0.376224	0.484454	0	1	N = 14,502
	between		0.2910743	0	1	n = 1,453
	within		0.3880854	-0.323776	1.076224	T = 9.98073
lnGDPP-CAPITA	overall	10.07438	0.6893274	7.49599	11.99526	N = 14,530
	between		0.6776451	7.777148	11.27312	n = 1,453
	within		0.1274905	9.637592	12.07964	T = 10
GDS	overall	22.87887	8.469526	-13.8	52.8	N = 14,526
	between		8.294994	-5.56	50.62	n = 1,453
	within		1.775576	13.37887	31.24887	T = 9.99725
EUSTATE	overall	0.9227805	0.2669487	0	1	N = 14,530
	between		0.2530475	0	1	n = 1,453
	within		0.0852539	0.1227805	1.72278	T = 10

Variable		Arithmetic mean	Standard deviation	Minimum value	Maximum value	Number of observations
NOEUS-TATE	overall	0.0772195	0.2669487	0	1	N = 14,530
	between		0.2530475	0	1	n = 1,453
	within		0.852539	-0.7227805	1.8772195	T = 10

Source: Author's calculations using STATA 13.0

Table 1b: Descriptive statistics for the deposit insurance system – related independent variables by general economic activity (pre-crisis, crisis, and post-crisis periods)

Variable		Arithmetic mean	Standard deviation	Minimum value	Maximum value	Number of observations
PRECRI-SIS	overall	0.3	0.4582733	0	1	N = 14,530
	between		0	0.3	0.3	n = 1,453
	within		0.4582733	0	1	T = 10
CRISIS	overall	0.5	0.5000172	0	1	N = 14,530
	between		0	0.5	0.5	n = 1,453
	within		0.5000172	0	1	T = 10
POSTCRI-SIS	overall	0.2	0.4000138	0	1	N = 14,530
	between		0	0.2	0.2	n = 1,453
	within		0.400138	0	1	T = 10
DIS * PRECRI-SIS	overall	3.023516	4.64048	0	11.54531	N = 14,530
	between		0.2428861	0.3	3.463593	n = 1,453
	within		4.634123	-0.4400772	12.58254	T = 10
DIS * CRISIS	overall	4.988742	5.557795	0	11.56049	N = 14,530
	between		0.8748512	0.5	5.762941	n = 1,453
	within		5.488552	-0.7741993	13.89909	T = 10
DIS * POSTCRI-SIS	overall	2.28118	4.572569	0	11.56637	N = 14,530
	between		0.1073507	1.251293	2.308037	n = 1,453
	within		4.571308	-0.0268574	12.54282	T = 10
limgdp	overall	0.8872844	0.7690834	-2.028799	2.967707	N = 13,576
	between		0.5048752	-0.2805814	2.231066	n = 1,453
	within		0.5789886	-2.044542	1.95216	T = 9.34343

Source: Author's calculations using STATA 13.0

The correlation matrix displays only correlation coefficients that are statistically significant at the 5% level (95% confidence level), with an asterisk indicating coefficients significant at the 1% level (99% confidence level). Based on the reported correlation coefficients, it is possible to identify pairs of independent variables that could potentially cause a multicollinearity problem. According to the adopted threshold, defined as a positive or negative correlation greater than 0.8, no variable exceeds the threshold of 0.8 or -0.8. The correlation between gross domestic product per capita (lnGDPPCAPITA) and EU membership (EUSTATE) is 0.7091, indicating a positive association between GDP per capita and EU membership; that is, higher GDP per capita is observed among EU members. The results for the variable representing non-EU membership (NOEUSTATE) are the same as those for the membership variable (EUSTATE), but with the opposite sign. Therefore, the correlation between NOEUSTATE and lnGDPPCAPITA is -0.7091. A positive correlation of 0.7159 was recorded between the GDS variable, which represents the interest rate on deposits adjusted for inflation, and the GDP per capita variable (lnGDPPCAPITA). Additionally, the correlation between lnGDPPCAPITA and SAVEGDP is 0.72, which implies that increases in GDP per capita are accompanied by increases in the savings rate. Among other pairs of independent variables, the correlation coefficients are not at levels that could lead to multicollinearity.

Table 2: Correlation matrix of dependent and independent model variables

	z-score	NPL	PRECRISIS	CRISIS	POSTCRISIS	DISxPRECRISIS	DISxCRISIS	DISxPOSTCRISIS	limgdp	ADMINISTRATION	PREMIA	lnGDPPCAPITA	SAVGDP	EUSTATE	NOEUSTATE
z-score	1														
NPL		1													
PRECRISIS		-0.1380*	1												
CRISIS				1											
POSTCRISIS	0.0302*	0.0883*			1										
DISxPRECRISIS		-0.1407*				1									
DISxCRISIS	0.0264*						1								
DISxPOSTCRISIS	0.0327*	0.0779*						1							
limgdp	-0.2355*	0.3228*	-0.6737*	0.4213*	0.2542*	-0.6598*	0.4216*	0.2527*	1						
ADMINISTRATION	-0.2205*		0.0514*	-0.0334*	-0.0172	0.0724*		-0.0184	-0.0404*	1					
PREMIA	-0.0837*		0.4612*	-0.3027*	-0.1498*	0.4464*	-0.2170	-0.1481*	-0.2538*	-0.1212*	1				
lnGDPPCAPITA	0.2875*	-0.3203*	-0.1001*	0.0323*	0.0743*	-0.0684*		0.0825*	-0.4686*	0.1233*	-0.1617*	1			
SAVGDP	0.1387*	-0.2544*	0.0294*	-0.0379*		0.0470	-0.0634*	0.0193	-0.4156*	0.1812*	-0.1267*	0.7159*	1		
EUSTATE	0.1807*	-0.2420*	-0.0385*		0.0402*			0.0516*	-0.1866*		0.0618*	0.7091*	0.5508*	1	
NOEUSTATE	-0.1807*	0.2420*	0.0385*		-0.0402*			-0.0516*	0.1866*		-0.0618*	-0.7091*	-0.5508*		1

Note: * indicates statistical significance at the level of 1%; bolded values suggest a correlation to 0.8.

** Empty cells in the correlation matrix do not indicate the absence of a relationship between variables, but rather correlations that are not statistically significant at the 5% level and are therefore not relevant for assessing multicollinearity in the model.

Source: Author's calculations using STATA 13.0

The correlation matrix is followed by the estimation of the dynamic panel model using the two-step Arellano-Bond (AB) estimator.

4. Empirical data

This chapter presents the results of the dynamic panel analysis examining the implications of DISs for bank risk at different stages of the economic cycle. The empirical models are estimated using a two-step Arellano-Bond GMM estimator, which accounts for the dynamic nature of bank risk indicators and the potential endogeneity of the explanatory variables. Tables 3a to 3d present the estimated coefficients of the models, in which the dependent variables include the z-score and the share of non-performing loans in total loans (NPL). The models differ in how they incorporate the DIS characteristics: some specifications use interaction variables for the pre-crisis, crisis, and post-crisis periods, while alternative models use dummy variables indicating the phases of economic activity. The models also include variables for EU membership and non-membership to control for institutional differences across the observed countries.

Table 3a: Overview of the panel analysis results on the impact of deposit insurance systems on bank risk by general economic activity (including EU membership)

Dependent variables	z-score	NPL
Independent variables		
Lagged dependent variable	0.544*** (0.076)	0.417** (0.163)
DIS * PRECRISIS	0.013*** (0.0014)	-0.087 (0.090)
DIS * CRISIS	0.142*** (0.016)	0.124* (0.073)
DIS * POSTCRISIS	0.100*** (0.0014)	0.159** (0.076)
lnGDPPCAPITA	0.137** (0.057)	-5.793** (2.393)
SAVGDP	0.005* (0.003)	0.036 (0.029)
EUSTATE	-0.201*** (0.072)	1.644 (1.311)
constant	-1.141 (0.574)	58.670** (23.568)
Z(1)	-6.432***	-1.805*
Z(2)	0.103	-0.295
Wald test	323.35***	64.04***
No. of instruments	43	43
No. of observations	8,503	3,107
No. of banks	1,325	816
Stage	2	2

Note: *,**,*** – level of significance at 10%, 5% and 1%

Source: Author's calculations using STATA 13.0

Table 3b: Overview of the panel analysis results on the impact of deposit insurance systems on bank risk by general economic activity (including EU membership)

Dependent variables	z-score	z-score	z-score	NPL	NPL	NPL
Independent variables						
Lagged dependent variable	0.516*** (0.612)	0.473*** (0.073)	0.524*** (0.074)	0.364* (0.190)	0.278* (0.174)	0.281* (0.169)
PRECRISIS	0.129*** (0.024)			-0.256 (0.627)		
CRISIS		-0.033*** (0.010)			0.439** (0.199)	
POSTCRISIS			0.018* (0.011)			0.540*** (0.196)
limgdp	0.091*** (0.154)	0.056*** (0.013)	0.042*** (0.121)	2.147*** (0.561)	2.748*** (0.441)	2.482*** (0.400)
PREMIA	0.735*** (0.228)	0.060*** (0.023)	0.061** (0.024)	0.766** (0.339)	0.995** (0.298)	0.889*** (0.264)
ADMINISTRA-TION	-0.473 (0.035)	0.034 (0.031)	0.058* (0.032)	-0.617 (0.464)	-1.067** (0.433)	-0.847** (0.415)
lnGDPPCAPITA	0.288*** (0.048)	0.168*** (0.040)	0.159*** (0.044)	-2.332 (2.419)	-1.702 (1.975)	-2.339 (2.034)
SAVGDP	0.004 (0.003)	0.007*** (0.002)	0.008*** (0.003)	0.009 (0.023)	0.026 (0.025)	0.035 (0.026)
EUSTATE	-0.224*** (0.065)	-2.242*** (0.067)	-0.218*** (0.066)	0.983 (1.227)	0.202 (1.237)	0.241 (1.222)
constant	-1.561*** (0.429)	-0.239 (0.411)	-0.320 (0.471)	24.049 (23.747)	18.217 (19.313)	24.265 (19.882)
Z(1)	-6.809***	-6.259***	-6.435***	-1.260	-0.949	-0.992
Z(2)	-1.924	-0.331	-0.176	0.084	0.215	0.187
Wald test	278.74***	290.81***	261.90***	62.96***	59.57***	66.83***
No. of instruments	44	44	44	44	44	44
No. of observa-tions	7,218	7,218	7,218	2,959	2,959	2,959
No. of banks	1,321	1,321	1,321	811	811	811
Stage	2	2	2	2	2	2

Note: *,**,*** – level of significance at 10%, 5% and 1%

Source: Author's calculations using STATA 13.0

Table 3c: Overview of the panel analysis results on the impact of deposit insurance systems on bank risk by general economic activity (including non-EU membership)

Dependent variables	z-score	NPL
Independent variables		
Lagged dependent variable	0.544*** (0.076)	0.417** (0.163)
DIS * PRECRISIS	0.013*** (0.0014)	-0.087 (0.090)
DIS * CRISIS	0.142*** (0.016)	0.124* (0.073)
DIS * POSTCRISIS	0.100*** (0.0014)	0.159** (0.076)
lnGDPPCAPITA	0.137** (0.057)	-5.793** (2.393)
SAVGDP	0.005* (0.003)	0.036 (0.029)
NOEUSTATE	0.201*** (0.072)	-1.644 (1.311)
constant	-0.342 (0.572)	60.314** (23.729)
Z(1)	-6.432***	-1.805*
Z(2)	0.103	-0.295
Wald test	323.35***	64.04***
No. of instruments	43	43
No. of observations	8,503	3,107
No. of banks	1,325	816
Stage	2	2

Note: *,**,*** – level of significance at 10%, 5% and 1%

Source: Author's calculations using STATA 13.0

Table 3d: Overview of the panel analysis results on the impact of deposit insurance systems on bank risk by general economic activity (including non-EU membership)

Dependent variables	z-score	z-score	z-score	NPL	NPL	NPL
Independent variables						
Lagged dependent variable	0.516*** (0.612)	0.473*** (0.073)	0.524*** (0.074)	0.364* (0.190)	0.278* (0.174)	0.281* (0.169)
PRECRISIS	0.129*** (0.024)			-0.256 (0.627)		
CRISIS		-0.033*** (0.010)			0.439** (0.199)	
POSTCRISIS			0.018* (0.011)			0.540*** (0.196)
limgdp	0.091*** (0.154)	0.056*** (0.013)	0.042*** (0.121)	2.147*** (0.561)	2.748*** (0.441)	2.482*** (0.400)
PREMIA	0.745*** (0.228)	0.060*** (0.023)	0.061** (0.024)	0.766** (0.339)	0.995** (0.298)	0.889*** (0.264)
ADMINISTRA-TION	-0.473 (0.035)	0.034 (0.031)	0.058* (0.032)	-0.617 (0.464)	-1.067** (0.433)	-0.847** (0.415)
lnGDPPCAPITA	0.288*** (0.048)	0.168*** (0.040)	0.159*** (0.044)	-2.332 (2.419)	-1.702 (1.975)	-2.339 (2.034)
SAVGDP	0.004 (0.003)	0.007*** (0.002)	0.008*** (0.003)	0.009 (0.023)	0.026 (0.025)	0.035 (0.026)
NOEUSTATE	0.224*** (0.065)	2.242*** (0.067)	0.218*** (0.066)	-0.983 (1.227)	-0.202 (1.237)	-0.241 (1.222)
constant	-1.785*** (0.430)	-0.481 (0.406)	-0.539 (0.465)	25.032 (23.801)	18.419 (19.360)	24.506 (19.854)
Z(1)	-6.809***	-6.259***	-6.435***	-1.260	-0.949	-0.992
Z(2)	-1.924	-0.331	-0.176	0.084	0.215	0.187
Wald test	278.74***	290.81***	261.90***	62.96***	59.57***	66.83***
No. of instruments	44	44	44	44	44	44
No. of observa-tions	7,218	7,218	7,218	2,959	2,959	2,959
No. of banks	1,321	1,321	1,321	811	811	811
Stage	2	2	2	2	2	2

Note: *,**,*** – level of significance at 10%, 5% and 1%

Source: Author's calculations using STATA 13.0

The coefficients of the lagged dependent variable are positive and statistically significant in all model specifications, confirming inertia in the movement of bank risk indicators and supporting the use of the dynamic panel approach.

Variables describing the DIS characteristics are statistically significant in presented models, with the intensity and direction of the estimated effects varying according to the dependent variable and the economic period observed. The models also include macroeconomic control variables, such as gross domestic product per capita (lnGDPPCAPITA), the share of savings in GDP (SAVGDP), and the ratio of the amount of protection to GDP per capita (limGDP), all of which have statistically significant coefficients in several specifications. Institutional characteristics of DIS, including the administration of the system (ADMINISTRATION), the premium structure (PREMIA), and variables indicating membership or non-membership in the EU (EUSTATE and NOEUSTATE), are included to capture differences in the regulatory and institutional environment across the sample countries.

The Arellano–Bond test confirms the presence of first-order autocorrelation and the absence of second-order autocorrelation, supporting the correct specification of the model. The Wald test indicates the joint statistical significance of the explanatory variables.

A detailed interpretation of the results obtained and their connection with theoretical assumptions and relevant empirical literature is presented in the next section.

5. Results and discussion

The results of the panel analysis of the implications of DIS on bank risk in different economic periods show differentiated effects. It is important to note that the interpretation of coefficients differs depending on the risk measure used. An increase in the z-score indicates lower bank risk, while an increase in the share of non-performing loans (NPL) reflects higher credit risk. Therefore, the same coefficient sign may imply different risk implications across these two measures. The different behaviour of the z-score and NPL indicators may also reflect the fact that these variables capture different dimensions of bank risk. While the z-score is a broader forward-looking indicator of bank stability that incorporates profitability, leverage, and earnings volatility, NPL primarily reflects realised credit risk and tends to adjust more slowly to changes in macroeconomic conditions. Similar findings on the heterogeneous behaviour of financial risk indicators are reported by Svoboda et al. (2025), who show that different financial stability and risk assessment models may produce systematically different classifications depending on the risk dimension considered.

In the pre-crisis period (2005–2007), the DIS × PRECRISIS variable shows a positive and statistically significant relationship with the z-score, indicating a reduction in overall bank risk. In contrast, the relationship with NPL is negative but statistically insignificant, suggesting that credit risk dynamics were less sensitive to deposit insurance coverage during this period of economic expansion.

During the crisis period (2008–2012), the DIS × CRISIS variable exhibits a positive and significant relationship with the z-score, indicating a stabilising effect of deposit insurance on bank risk. However, the relationship with NPL is also positive and significant, reflecting an increase in credit risk. This finding suggests that deposit insurance primarily operates through the liability side of bank balance sheets by stabilising depositor behaviour and reducing liquidity pressures, with only a limited capacity to affect the quality of previously extended loans. These dynamics in bank stability are also illustrated in Graph 1 presented in the Appendix.

In the post-crisis period (2013–2014), the DIS × POSTCRISIS variable shows a positive and significant relationship with both the z-score and NPL. This suggests that while overall bank stability improves, as reflected in higher z-scores, credit risk remains elevated. These findings indicate that the stabilising effects of deposit insurance persist, but are accompanied by continued vulnerabilities in loan quality. The movement of NPL ratios across the observed period is presented in Graph 2 in the Appendix.

Overall, these results confirm that the effects of deposit insurance are not uniform across different dimensions of bank risk. While the system effectively reduces insolvency risk during periods of financial stress, it does not fully eliminate incentives for excessive risk-taking nor does it prevent the accumulation of credit risk, particularly after crisis periods. The findings therefore support the moral hazard hypothesis, which suggests that stronger deposit protection may weaken market discipline and encourage greater risk-taking during periods of economic stability.

Control variables such as Gross Domestic Product per capita (lnGDPPCAPITA) show a positive and significant relationship with the z-score and a negative and significant relationship with NPL, confirming that a higher level of economic development reduces bank risk. The savings ratio (SAVGDP) is positive and significant only with the z-score, meaning that an increase in savings reduces risk, primarily in periods of stability. EU membership (EUSTATE) is associated with higher risk, while non-membership (NOEUSTATE) shows the opposite effect, partly reflecting different experiences of banking crises within the EU. The ADMINISTRATION variable suggests that private DIS reduce risk, which is consistent with empirical research indicating that private models can have a disciplining effect ((Brandao-Marques et al., 2013; Calomiris, 1990; Demirgüç-Kunt & Detragiache, 2002; Demirgüç-Kunt et al., 2007; Garcia, 1996, 1999). The relationship between deposit insurance premiums (PREMIA) and risk measures is also positive and significant, confirming that more fairly structured premiums can reduce risk measured by the z-score, but at the same time increase exposure to credit risk (NPL).

The results indicate that the DIS contributed to reducing bank risk during the crisis period, as reflected in the higher z-score values, thereby supporting its stabilising function. However, the same system could not prevent the increase in NPLs, which are the result of the pre-crisis credit expansion and macroeconomic deterioration. This suggests that the stabilising effect of deposit insurance may be insufficient to fully offset the long-term consequences of excessive credit growth. From a regulatory perspective, these findings imply that deposit insurance alone cannot guarantee banking stability unless accompanied by effective supervision, prudent lending standards, and mechanisms limiting excessive risk-taking. Consistent with the research of Anginer et al. (2014), Anginer and Demirgüç-Kunt (2018), and Prabha and Wihlborg (2014), these findings support the hypothesis that the implications of deposit insurance schemes for bank risk vary across phases of the economic cycle. Overall, the findings provide empirical support for the hypothesis that the effects of deposit insurance are cyclical and depend on the broader macroeconomic environment, as well as on the specific dimension of bank risk being examined.

6. Conclusions

The aim of this paper was to examine the effects of DIS on bank risk across different phases of the economic cycle, with particular emphasis on the periods before, during, and after the GFC. Using a dynamic panel analysis on a sample of EU and SEE countries for the period 2005 to 2014, the relationship between the characteristics of DIS and two measures of bank risk, the z-score and the share of non-performing loans in total loans, was analysed. The results confirm that the effects of DIS on bank risk are not unambiguous, but largely depend on the phase of the economic cycle. During the financial crisis, the DIS played a pronounced stabilising role, reflected in reduced risk as measured by the z-score. This finding highlights the importance of DIS in preventing depositor panic and maintaining confidence in the banking system during periods of increased financial uncertainty.

In contrast, the results also indicate the limited capacity of the DIS to influence banks' credit risk. During the crisis and in the post-crisis period, the increase in the level of deposit protection did not prevent the increase in non-performing loans, confirming that credit risk is largely a consequence of pre-crisis credit expansion and deteriorating macroeconomic conditions. This demonstrates that, although a DIS is crucial for maintaining the stability of the deposit base, it cannot independently address the structural weaknesses of banks' credit portfolios.

During the pre-crisis and post-crisis periods, increased risk appetite was observed, indicating the presence of moral hazard and weaker market discipline in a stable economic environment. Furthermore, the results highlight the importance of the design of DIS, with features such as the level of protection relative to GDP, the premium structure, and system administration exerting a significant influence on bank behaviour and the degree of risk assumed.

The findings of this study add to the existing literature by providing empirical evidence on the cyclical effects of DIS on bank risk in Europe. The main contribution of the paper is its comparative analysis of EU and SEE countries, highlighting differences in institutional and regulatory environments that influence the effectiveness of DIS.

The results have important implications for ongoing debates on further development of the Banking Union and the creation of a common EDIS. The findings indicate that an increase in the level of deposit protection can have positive effects during crises, while the long-term stability of the banking system requires a carefully designed scheme that protects depositors yet limits incentives for excessive risk-taking.

The limitations of this paper relate mainly to the time frame of the analysis, which ends in 2014 and does not cover subsequent regulatory changes, such as the full implementation of Basel III, the establishment of the Single Resolution Mechanism (SRM), and recent reforms at EU level. Future research should examine more recent periods to assess whether changes in the regulatory framework have altered the effects of DIS on bank risk, and provide a deeper analysis of the interaction between DIS, supervision, and other elements of the financial safety net. These findings support hypotheses H1a–H1c, confirming the cyclical nature of deposit insurance effects.

Note: This manuscript is based on the author's doctoral thesis: "*Deposit insurance system in the function of banking stability*".

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Sustav osiguranja depozita u različitim financijskim uvjetima

Stella Suljić Nikolaj[1]

Sažetak

Sustav osiguranja depozita predstavlja jednu od ključnih sastavnica financijske stabilnosti jer štiti deponente i smanjuje rizik od navale na banke (engl. bank run). Međutim, njegov utjecaj na bankovni rizik nije jednoznačan te ovisi o fazi gospodarskog ciklusa. Cilj ovoga rada jest ispitati različite učinke sustava osiguranja depozita na stabilnost banaka prije, tijekom i nakon financijske krize. Analiza se temelji na dinamičkom panel-modelu procijenjenom primjenom Arellano-Bondova GMM procjenitelja na uzorku zemalja Europske unije i odabranih zemalja jugoistočne Europe, u razdoblju od 2005. do 2014. godine. Bankovna stabilnost mjerena je z-score pokazateljem i udjelom nenaplativih kredita (engl. non-performing loan – NPL). Rezultati pokazuju da sustav osiguranja depozita tijekom krize ima stabilizirajući učinak jer ublažava rizik nestabilnosti bankovnog sustava. S druge strane, u razdobljima prije i nakon krize dolazi do povećane sklonosti preuzimanju rizika, što upućuje na prisutnost moralnog hazarda. U skladu s rezultatima ovog istraživanja i iskustvima stečenima tijekom globalne financijske krize, u Europskoj uniji nastavljaju se rasprave o dovršetku trećeg stupa Bankovne unije, odnosno zajedničkog europskog sustava osiguranja depozita (engl. European Deposit Insurance Scheme – EDIS). Iako među državama članicama još nije postignut konsenzus zbog razlika u obilježjima nacionalnih financijskih sustava, EDIS se smatra instrumentom koji bi mogao pridonijeti većoj koordinaciji i otpornosti bankarskog sektora u budućim krizama.

Ključne riječi: *bankovna stabilnost, dinamička panel-analiza, moralni hazard, bankovna unija*

JEL klasifikacija*:C33, E32, G21*

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Appendix

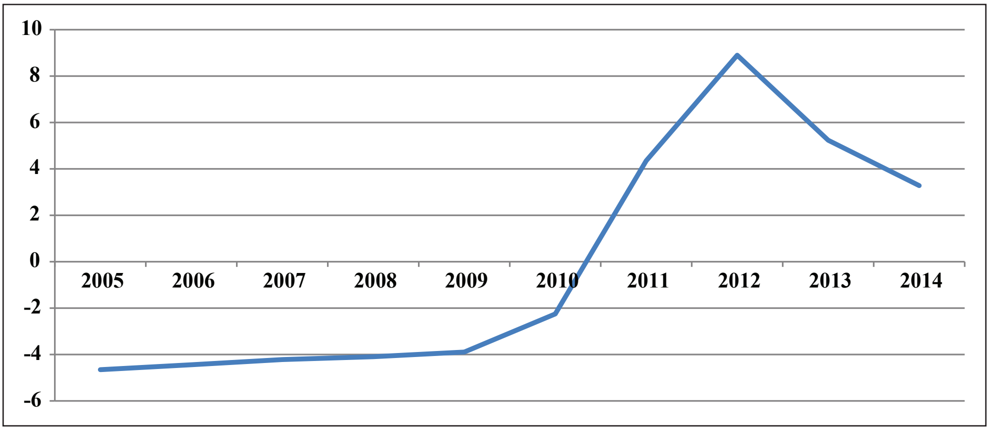
Table 4: List of variables

Name of variable	Label	Explenation	Source
Dependent variables			
Bank risk indcators			
z-score	z-score	Measure of bank stability z-score = [E(ROA) + CAP] / σROA the natural logarithm of the z-score	Authors' calculation by rolling window analysis for 3 years according to data on return on assets and the ratio of capital to total assets, Orbis Bank Focus Database
Non-performing loans/total loans	NPL	Share of non-performing loans in total loans (%) Deposit volatility indicators	Orbis Bank Focus Database
Independent variables			
Characteristics of the deposit insurance system			
Limit/GDP	limgdp	Natural logarithm of the ratio of the protection amount provided by the deposit insurance system to GDP per capita	Authors' calculations based on Schich (2008); CESifo DICE Report 4/2008, 4/2011; Demirguc-Kunt et al. (2014); and data from deposit insurance institutions, central banks, and the WDI
Management of the deposit insurance system	ADMINIS-TRATION	Dummy variable: 0 – state 1 – private way of managing the deposit insurance system	Schich (2008); CESifo DICE Report 4/2008, 4/2011; Demirguc-Kunt, et al. (2014); Data-from deposit insurance institutions and central banks
Premia	PREMIA	Dummy variable: 0 – undifferentiated premium according to the credit institution's risk 1 – differentiated (fair premium) according to risk	Schich (2008); CESifo DICE Report 4/2008, 4/2011; Demirguc-Kunt, et al. (2014); Data from deposit insurance institutions and central banks

Name of variable	Label	Explenation	Source
Independent variables			
Characteristics of the deposit insurance system			
Characteristics of the deposit insurance system before the crisis	DIS x PRE-CRISIS	the product of the amount of protection and a dummy variable indicating the period before the crisis	Authors' calculation
Characteristics of the deposit insurance system during the crisis	DIS x CRISIS	the product of the amount of protection and a dummy variable indicating the crisis period	Authors' calculation
Characteristics of the deposit insurance system after the crisis	DIS x POST-CRISIS	the product of the amount of protection and a dummy variable indicating the period after the crisis	Authors' calculation
Indicators of economic conditions			
Pre-crisis period	PRECRISIS	Dummy variable: 1 - pre-crisis period (2005 to 2007) 0 - periods not related to the pre-crisis period	Laeven and Valencia (2013)
A period of crisis	CRISIS	Dummy variable: 1 - crisis period (2008-2012) 0 - periods not related to the crisis period	Laeven and Valencia (2013)
Post-crisis period	POSTCRISIS	Dummy variable: 1 - post-crisis period (2013-2014) 0 - periods not related to the post-crisis period	Laeven and Valencia (2013)
EU membership	EUSTATE	Dummy variable: 1 – EU members 0 – SEE countries	
Non-EU membership	NOEUSTATE	Dummy variable: 1 – SEE countries 0 – EU members	
Macroeconomic indicators			
GDP per capita	GDPPCAP-ITA	The natural logarithm of the annual amount in thousands of dollars, converted into thousands of euros	World Bank - World Development Indicators [WDI] (2026a)
Savings rate	SAVGDP	Gross domestic savings (% of GDP)	World Bank - World Development Indicators [WDI] (2026b)

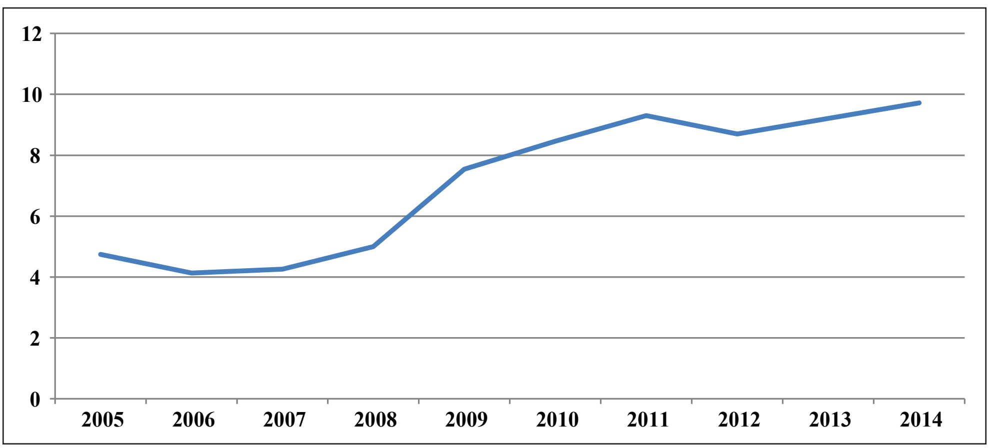
Source: Author's representation

Graph 1: Movement of the annual average of the natural logarithm of the z-score of credit institutions from EU and SE Europe countries, in the period from 2005 to 2014



Source: Author's calculations based on data from Orbis Bank Focus Database

Graph 2: Movement of the annual average of the share of non-performing loans in total loans (NPL) of credit institutions from EU and SE Europe countries, in the period from 2005 to 2014 (in %)



Source: Author's calculations based on data from Orbis Bank Focus Database