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The impact of macroeconomic and bank internal factors on banking stability: Evidence from Kosovo banking sector

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Abstract

The aim of this research paper is to empirically identify the impact of internal and macroeconomic factors on the stability of the banking sector in Kosovo. The stability of banks is determined by the amount of risk they can be exposed to. NPLs (non-performing loans) are one of the main factors used to measure banking stability. In addition to the literature in the Eurozone and the United States, there is a gap in Kosovo regarding the impact of internal and macroeconomic factors on the stability of the banking sector. This paper aims to fill the existing gap and expand the literature and knowledge on banking stability. The paper attempts to answer the following questions: which are the internal and macroeconomic factors that impact the banking stability in Kosovo? Regression modelling using panel OLS, random and fixed effects was used to generate the main findings and results. Results show that return on assets, loan loss provision, capitalization, and bank size at p-value <0.05 have a statistically significant impact on non-performing loans, whereas loan growth, GDP, and inflation have statistically insignificant impact on non-performing loans. The research paper is helpful for senior management of the banks, central bank, investors, and government to take into consideration the internal and macroeconomic factors that impact the banking stability.

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1. Introduction

Banking sector is considered the backbone of the economy and plays a vital role in economic growth and stability of a country. Stability in the financial system has always been at the center of bank supervision and regulation. However, the issue has gained much prominence since the 2007/2008 global financial crisis, because evidence abounds that large banks accounted for the crisis that caused a significant damage to many economies across the globe (Michael, 2015). The management of banks has been aware of the significance of credit risk and nonperforming loans in banking operations for many years, and since 2013, it has considered them the greatest threat to the financial stability of banks in surveys (Kil & Miklaszewska, 2017). The size of NPLs is critical to country's banking sector stability (Khan, Siddique, & Sarwar, 2020). Ghosh (2015) states that minimization of NPLs is necessary to restore a sounder banking system and foster overall financial stability.

NPLs are one of the primary indicators of banking stability. In most banks, the portfolio of loans dominates the structure of assets. Ozili (2019) and Ozili and Thankom (2018) investigate the determinants of banking stability, using NPLs as a stability indicator. Kil and Miklaszewska (2017)state that quality of loans is

used to measure the financial stability of the entire banking sector. Both banks and supervisors use a variety of indicators to assess the quality of credit exposure. However, the most frequently used indicator is non-performing loans (NPL), also called non-performing exposures (ECB, 2017b). Standardization and definition of this indicator were proposed by the Basel Committee on Banking Supervision (BCBS, 2016).

Non-performing loans are often called "bad loans". A loan becomes non-performing when there are indications that the borrower is unlikely to repay the loan, or if more than 90 days have passed without the borrower paying the agreed instalments (European Central Bank – Banking Supervision, 2021). Definition of non-performing exposures as per (Central Bank of the Republic of Kosovo, 2019) is that bank shall classify the exposures as non-performing if one or both of the following criteria are satisfied: Material exposures are more than ninety (90) days past-due; the debtor is assessed as unlikely to pay its credit obligations in full without realization of collateral, regardless of the existence of any past-due amount or of the number of days past due.

The aim of this research paper is to empirically identify the impact of internal and macroeconomic factors on the stability of the banking sector in Kosovo. The stability of banks is determined by the amount of risk that the bank can be exposed to. The aim of banks is to be stable in their functioning and operations. The expected results of the research paper are the identification of the risks that can lead the bank to bankruptcy, the internal and macroeconomic factors that impact the stability of the banks, the key factors that banks should be aware of. In addition to the literature in the Eurozone and the United States, there is a gap in Kosovo regarding the impact of internal and macroeconomic factors on the stability of the banking sector. The gap in the literature exists for loan growth, loan loss provision, and capitalization as internal factors. This paper aims to fill the existing gap and expand the literature and knowledge on banking stability in Kosovo. The paper attempts to answer the following questions:

1. Which are the internal factors that impact the banking stability in Kosovo?
2. Which are the macroeconomic factors that impact the banking stability in Kosovo?

To answer the questions, the research paper employs a panel data using multiple regression analysis, ordinary least square including fixed and random effect. Banking sector in Kosovo is comprised by 12 commercial banks, out of which 10 are domestic banks and 2 are foreign banks. As per Central Bank of Republic of Kosovo banks operating in Kosovo are as follows: Bank for Business, Economic Bank, Nova Ljubljanska Banka, Turkiye Cumhuriyeti Ziraat Bankasi, Raiffeisen Bank Kosovo, TEB SH.A, ProCredit Bank, National Commercial Bank Kosovo, BKT, Turkiye Is Bankasi, Banka Credins Kosovo, PriBank and Komercijalna Banka.

The paper is organized as follows: section 2 presents the literature review and hypothesis development. Sections 3 and 4 describes the data, methodology and empirical findings whereas the last section concludes the paper.

2. Literature Review

The determinants of non-performing loans are categorized into bank internal or specific factors and macroeconomic factors. The literature reviews on the bank internal factors by the researchers are very extensive. Most researchers use non-performing loans as the dependent variable to measure banking stability. The main bank internal independent variables used by researchers to measure banking stability are: average return on assets, loan growth, loan loss provisions, capitalization and bank size. While the main macroeconomic independent variables are GDP and inflation, and the following papers reviewed have used the NPLs as the dependent variable and macroeconomic and bank internal factors as independent variables.

Average return on assets refers to a financial ratio that indicates how profitable a company is in relation to its total assets. We calculate ROA by dividing net income by the average total assets. Kjosevski and Petkovski (2021) examined a study of 21 commercial banks from Baltic States (Estonia, Latvia, and Lithuania), using NPL as dependent variable and selected macroeconomic and bank internal factors as independent variables for the period 2005-2016. Results provide evidence that growth of GDP, public debt, inflation, and unemployment influence the NPLs, while bank-specific factors that impact the NPLs are ROA (return on assets), equity to total assets ratio, return on equity, and growth of gross loans. Dimitrios, Helen, and Mike (2016) found out that ROA is negatively related to NPLs in most of the models.

The loan growth, as an explanatory variable, is calculated as a change in the value of the loan portfolio. According to Naili and Lahrichi (2022) loan growth was one of the main reasons triggering the recent financial crisis. Makri, Tsagkanos, and Bellas (2014) state in their study that faster loan growth leads to higher loan losses in the United States of America. In contrast, a study conducted by Livia, Owain, and Jonathan (2024) in 73 Italian banks covering the period from 2011 to 2017 used the dynamic panel data methods to analyzed the macroeconomic and bank internal factors. Findings of the study show an inverse relationship between credit growth and NPLs. As per capitalization as an independent variable, Livia et al. (2024) in the same study show that better capitalized banks tend to exhibit lower level of NPLs.

Banks use loan loss provision as a controlling credit risk strategy to prepare for expected credit losses. According to EuropeanCentralBank–BankingSupervision (2020) the bank estimates the expected future loss on the loan and books a corresponding provision, which means that the bank recognizes a loss on the loan ahead of time. Messai and Jouini (2013) studied 85 banks in Italy, Greece, and Spain, including GDP,

unemployment rate, and real interest rate as macroeconomic variables and return on assets, change in loans, and loan loss reserves to total loans as bank-specific variables. Results show that NPL varies negatively with GDP growth rate and return on assets and positively with unemployment rate, the loan loss reserve, and real interest rate.

GDP is the primary macroeconomic factor that measures the economy's development. It is expected to have a negative coefficient of GDP, which means if the GDP increases, the NPLs will decrease. Radosław and Krzysztof (2020) conducted a study of non-performing loans in bank operations in the European Union member states with a high level of NPL using panel data covering the period of 2011-2017. States included in the analysis were Bulgaria, Croatia, Cyprus, Italy, Ireland, Greece, and Portugal. The results of the study show that NPL is statistically significantly affected by both macroeconomic and internal bank factors. NPL is statistically significantly affected by GDP and unemployment rate as macroeconomic factors. Bank size as an explanatory variable is measured by natural logarithm of the total assets ratio, which is extensively used by the researchers. In the same study, Radosław and Krzysztof (2020) found that NPL is statistically affected by size of the banks.

Inflation is the rise in price of services and goods in an economy. It is expected to have a positive coefficient of inflation, which means that if the inflation increases, the NPLs will also increase. Makri et al. (2014) conducted a study on the determinants of non-performing loans in Eurozone, where inflation did not show any significant impact on NPL ratio. On the contrary, the Klein (2013) study of non-performing loans in CESEE determinants and their impact on macroeconomic performance shows that the level of NPLs tends to increase when inflation rate is high.

Based on the literature review the following hypotheses are developed:

Hypothesis 1. ROA has a significant negative impact on NPLs.
Hypothesis 2. Loan growth has a significant positive impact on NPLs.
Hypothesis 3. Loan loss provision has a significant positive impact on NPLs.
Hypothesis 4. Capitalization has a significant negative impact on NPLs.
Hypothesis 5. Bank size has a significant positive impact on NPLs.
Hypothesis 6. GDP has a significant negative impact on NPLs.
Hypothesis 7. Inflation has a significant positive impact on NPLs.

3. Data and Methodology

3.1. Sample and Variables

This study analyses the impact of macroeconomic and banks' internal factors on banking stability. Ozili (2019) and Ozili and Thankom (2018) investigate the determinants of banking stability, using NPLs as a stability indicator. Based on the literature review, in this study NPLs are used as a dependent variable to measure banking stability. Internal banks' independent variables used in this study, are average return on assets (ROA), loan growth (LG), loan loss provisions (LLP), capitalization (Cap.), bank size (BS). The macroeconomic independent variables in this study include the gross domestic product (GDP) and inflation (Inf.). Banking sector in Kosovo is comprised of 12 commercial banks, of which 10 are domestic banks and 2 are foreign banks. Secondary data were used to conduct the analysis, which included the period from Q4-2016 to Q4-2022, totalling 225 observations. It employs a balanced panel data using multiple regression analysis, panel ordinary least squares, including fixed and random effect models. Table 1 shows the description of selected internal and macroeconomic variables based on literature review.

Table 1. Description of variables.

Variables	Description	Elaboration	Expected sign	Research support
Dependent variable				
Non-performing loans	NPL	Non-performing loans		Livia et al. (2024); Kjosevski and Petkovski (2021); Radosław and Krzysztof (2020); Messai and Jouini (2013); Ghosh (2015); Louzis, Vouldis, and Metaxas (2012); Makri et al. (2014); Dimitrios et al. (2016); Ozili (2019); Bayar (2019) and Espinoza and Prasad (2010)
Specific independent variables				
Average return on assets	AROA	Net profit / Average total assets	-	Kjosevski and Petkovski (2021); Radosław and Krzysztof (2020); Messai and Jouini (2013); Ghosh (2015); Louzis et al. (2012); Makri et al. (2014); Dimitrios et al. (2016) and Ozili (2019)
Loan growth	LG	Loan growth (%)	+	Livia et al. (2024); Kjosevski and Petkovski (2021); Dimitrios et al. (2016);

Variables	Description	Elaboration	Expected sign	Research support
				Radosław and Krzysztof (2020); Foos, Norden, and Weber (2010); Messai and Jouini (2013); Bayar (2019) and Espinoza and Prasad (2010)
Loan loss provisions	LLP	Loan loss provisions to total loans	+	Ozili and Thankom (2018); Hasan and Wall (2004) and Messai and Jouini (2013)
Capitalization	Cap.	Equity / Total assets	-	Livia et al. (2024); Dimitrios et al. (2016) andBenthem (2017)
Bank size	BS	Natural log of total assets	+	Ozili and Thankom (2018); Atilla (2015) and Ć urak, Pepur, and Poposki (2013)
Macroeconomic independent variables				
Gross domestic product	GDP	Growth of GDP (%)	-	Kjosevski and Petkovski (2021); Radosław and Krzysztof (2020) and Dimitrios et al. (2016)
Inflation	Inf.	Inflation rate (%)	+	Kjosevski and Petkovski (2021); Makri et al. (2014) and Klein (2013).

3.2. Multicollinearity Test

Independent variables in a regression model exhibit multicollinearity when they exhibit strong correlations with each other. The variance inflation factor (VIF) is used to identify multicollinearity of independent variables. VIF values for independent variables are shown in Table 2, respectively.The values of VIF are ROA 2.173, LG 1.240, LLP 2.378, CAP 1.314, BS 2.373, GDP 1.074, and INF. 1.279, which are below the benchmark 5, hence multicollinearity does not occur.

Table 2. Multicollinearity test – VIF (Variance inflation factor).

Variables	VIF (Variance inflation factor)
Average return on assets	2.173
Loan growth	1.240
Loan loss provisions	2.378
Capitalization	1.314
Bank size	2.373
GDP	1.074
Inflation	1.279

3.3. Autocorrelation Test

The Durbin-Watson (DW) statistic is a test of autocorrelation in regression analysis. DW test investigates the autocorrelation in the regression analysis, and the values range from 0 to 4. Acceptable range is 1.50 to 2.50. If DW value is less than 1.50, it indicates the presence of positive autocorrelation, and if DW value is above 2.5, it indicates the negative autocorrelation. For our three models shown in Table 3, the DW values are OLS 2.35, FE 2.05 and RE 2.35. This indicates that there is no autocorrelation in our study models.

Table 3. Autocorrelation test – Durbin Watson test.

Durbin-Watson	Model 1 Ordinary least square regression (OLS)	Model 2 Fixed effect (FE)	Model 3 Random effect (RE)
Durbin-Watsonstat.	2.356	2.052	2.356

4. Empirical Findings and Discussion of Results

4.1. Descriptive Summary

Table 4 shows the descriptive statistics for the whole sample. The mean of NPLs is 2.41% with minimum, of 0% and maximum, of 6.63%. The average ROA is 1.72%, ranging from -3.86% to 3.58%. Loan Growth (LG) ranges from -11.4% to 57.8%. The average loan has loss provisions is 3.51%, whereas the average capitalization is 12.3%. GDP growth ranges from -12.7% to 16.7%. While inflation average for reporting period is 3.55%, ranging from -0.4% to 14.1%.

Table 4. Descriptive analysis for the whole sample.

Variables	NPL	ROA	LG	LLP	CAP.	BS	GDP	INF.
Mean	0.024	0.017	0.039	0.035	0.123	0.128	0.034	0.035
Median	0.024	0.020	0.030	0.033	0.112	0.130	0.040	0.018
Maximum	0.066	0.035	0.578	0.071	0.398	0.140	0.167	0.141
Minimum	0.00	-0.038	-0.114	0.009	0.082	0.099	-0.127	-0.004
Std. dev.	0.012	0.012	0.061	0.014	0.044	0.009	0.055	0.042
Observations	225	225	225	225	225	225	225	225

4.2. Correlation Analysis

Correlation analysis is a statistical method that identifies the relationship between variables. Table 5 displays the correlation matrix. If the coefficient is greater than 0.80, it shows that there is a high correlation between the variables. In our study, the coefficients of variables were less than 0.80, which concludes that there is no significant interrelationship between the variables. As shown in Table 5, NPL is positively correlated with ROA, LLP, and BS, whereas NPL is negatively correlated with LG, CAP, GDP, and Inflation. The strongest positive correlation is between the variables NPL and LLP with the coefficient, of 0.74 while the weakest positive correlation is between GDP and capitalization with the coefficient of 0.004. Additionally, the strongest negative correlation is between the variables LG and ROA with the coefficient of -0.37, whereas the weakest negative correlation is between the variables NPL and GDP with the coefficient of -0.008.

Table 5. Correlation analysis.

Variables	NPL	ROA	LG	LLP	CAP.	BS	GDP	INF.
NPL	1.000	0.338	-0.238	0.747	-0.374	0.442	-0.008	-0.198
ROA	0.338	1.000	-0.377	0.342	-0.348	0.706	0.035	0.132
LG	-0.238	-0.377	1.000	-0.210	0.257	-0.355	0.116	0.023
LLP	0.747	0.342	-0.210	1.000	-0.355	0.459	0.021	-0.194
CAP.	-0.374	-0.348	0.257	-0.355	1.000	-0.351	0.004	-0.147
BS	0.442	0.706	-0.355	0.459	-0.351	1.000	0.024	0.162
GDP	-0.008	0.035	0.116	0.021	0.004	0.024	1.000	0.206
INF.	-0.198	0.132	0.023	-0.194	-0.147	0.162	0.206	1.000

4.3. Empirical Models and Discussion of Results

In this study, a balanced panel data are conducted. Models performed in the study are panel ordinary least squares (OLS), fixed effect models and random effect regression using the EViews 12 program. Based on Hausman test and redundant fixed effect-likelihood ratio, the panel OLS model is the best fit. All three models were performed to compare the differences between the models in coefficients, T-statistics, and probability (p-values).

The OLS model for the study looks like this:

$$Y_{i,t} = a_0 + Y_{i,t-1} + \sum \beta i I_{i,t} + \sum BiM_{i,t} + \varepsilon \Rightarrow$$

$$Y_{i,t} = a_0 + Y_{i,t-1} + B_1ROA + B_2LG + B_3LLP + B_4CAP + B_5BS + B_6GDP + B_7INF + \varepsilon$$

Where:

- $Y_{i,t}$ *denotes the dependent variable, in our model is NPL.*
- *a is the constant.*
- $Y_{i,t-1}$ *is one-period-lagged.*
- $\sum \beta i I_{i,t}$ *are the coefficients of bank internal factors; ROA=Return on Assets, LG=Loan Growth, LLP=Loan Loss Provisions, CAP=Capitalization, BS=Bank Size.*
- $\sum BiM_{it}$ *are the coefficients of macroeconomic factors; GDP=Gross Domestic Product, INF=Inflation.*
- *i,t denotes the bank i at time t.*
- ε *indicates the error term.*

As shown in Table 6 all three models (OLS, Fixed Effect, and Random Effect models) are statistically significant (probability/p-value level at 0.000), which means that the empirical models are at satisfactory level (significance <5%). R-square value is 0.90, which indicates that 90% of the change in the dependent variable is explained by the included independent variables in the regression model, whereas the remaining 10% is explained by factors or independent variables that are not included in the regression model.

Table 6. OLS, fixed effect and random effect models.

Independent variables	Description	NPL (Dependent variable)		
		Panel OLS model	Fixedeffect model(FA)	Randomeffect model (RA)
Average return on assets	Coefficient	-0.131	-0.075	-0.131
	T-statistics	-4.488	-2.260	-4.895
	Probability (p-value)	0.000	0.024	0.000
Loan growth	Coefficient	-0.007	-0.003	-0.007
	T-statistics	-1.504	-0.789	-1.640
	Probability (p-value)	0.133	0.430	0.102
Loan loss provisions	Coefficient	0.084	0.322	0.084
	T-statistics	3.125	5.919	3.408
	Probability (p-value)	0.002	0.000	0.000

Independent variables	Description	NPL (Dependent variable)		
		Panel OLS model	Fixedeffect model(FA)	Randomeffect model (RA)
Capitalization	Coefficient	-0.015	-0.015	-0.015
	T-statistics	-2.364	-1.582	-2.578
	Probability (p-value)	0.019	0.115	0.010
Bank size	Coefficient	0.110	-0.158	0.110
	T-statistics	2.739	-0.960	2.987
	Probability (p-value)	0.006	0.337	0.003
GDP	Coefficient	-0.005	-0.006	-0.005
	T-statistics	-1.236	-1.419	-1.347
	Probability (p-value)	0.217	0.157	0.179
Inflation	Coefficient	-0.002	0.004	-0.002
	T-statistics	-0.426	0.613	-0.465
	Probability (p-value)	0.670	0.540	0.642
C	Coefficient	-0.007	0.023	-0.007
	T-statistics	-1.607	1.050	-1.752
	Probability (p-value)	0.109	0.294	0.081
F-statistic		258.1	156.4	258.1
Prob. (F-statistic)		0.000	0.000	0.000
Durbin-Watson stat		2.356	2.052	2.356

We can explain the outcomes of the panel OLS model as follows:

The study reports that ROA has a negative effect and significant impact on NPLs at p-value level of 0.000%, which is less than 5%, so the null hypothesis is approved. The coefficient value is -0.131, which means that NPL will decrease by -0.131 units if ROA increases by 1 unit. This states that if ROA increases, the NPLs will decrease. Messai and Jouini (2013) explain that the bank with strong profitability has less incentive to generate income and is therefore less constrained to engage in risky activities such as granting risky loans. The result of the study is in line with Messai and Jouini (2013); Ghosh (2015) and Louzis et al. (2012). Contrary to the expectations, ROA did not show any significant impact on NPL Makri et al. (2014). Whereas Dimitrios et al. (2016) in their study, resulted that ROA is significant and negatively related to the NPLs for mortgages and consumer loans but not significant for business loans.

Loan growth has a negative but insignificant impact on NPLs. The results show that NPLs decrease by -0.007 units if loan growth increases by 1 unit. Based on p-value of 0.133, the null hypothesis is rejected. The result of the study is consistent with Livia et al. (2024) and Dimitrios et al. (2016) but contrary to the results of Foos et al. (2010); Messai and Jouini (2013); Bayar (2019) and Espinoza and Prasad (2010).

LLP has a positive effect and a significant impact on NPLs based on the coefficient value of 0.084 and significance level of 0.2%, which is less than 5%, so that the null hypothesis is approved. This shows that NPLs will increase by 0.084740 units if LLP increases by 1%. The result of the study is in line with Ozili (2019); Hasan and Wall (2004) and Messai and Jouini (2013).

Capitalization has a negative effect and a significant impact on NPLs based on the coefficient value of -0.015, and a significance level at 0.019, which is less than 5%, so the null hypothesis is approved. This shows that NPLs will decrease by -0.015 units if capitalization increases by 1%. The result of the study is consistent with Benthem (2017) and Dimitrios et al. (2016) as for the negative effect of capitalization on NPLs but the result is statistically insignificant.

The study reveals that the bank size has positive effect and significant impact on NPLs at p-value level of 0.006, which is less than 5% so that the null hypothesis is approved. The coefficient value is 0.110, which means that NPL will increase by 0.110 units if bank size increases by 1 unit. This states that as the bank size increases, the NPLs will also increase. The result of the study is in line with Ozili and Thankom (2018) but in contrary to the results of Ć urak et al. (2013) and Atilla (2015).

GDP has a negative but insignificant impact on NPLs. The results show that NPLs decrease by -0.005 units if GDP increases by 1 unit. Based on p-value of 0.217, the null hypothesis is rejected. The result of the study is in line with Mehmet and Zeynep (2022) and Makri et al. (2014) but contrary to the results of Messai and Jouini (2013).

The study reports that inflation has negative but insignificant impact on NPLs at p-value level of 0.670, which is greater than 5%, so the null hypothesis is rejected. The result of the study is contrary to the results of Makri et al. (2014) and Klein (2013).

5. Conclusion

The research paper analyzes the impact of macroeconomic and bank internal factors on banking stability –NPLs. The findings show that ROA has a negative effect and a significant impact on NPLs at p-value level of 0.000%, which is less than 5%, so the null hypothesis is approved. Loan growth has negative but insignificant

impact on NPLs. The results show that NPLs decreased by -0.007 units if loan growth increases by 1 unit, based on p-value of 0.133, the null hypothesis is rejected. The study reveals that LLP has a positive effect and significant impact on NPLs based on the coefficient value of 0.084 and significance level of 0.2%, which is less than 5% so that the null hypothesis is approved. Capitalization has negative effect and significant impact on NPLs based on the coefficient value of -0.015, and significance level at 0.019, which is less than 5%, so the null hypothesis is approved. The results show the bank size has a positive effect and a significant impact on NPLs at p-value level of 0.006, which is less than 5% so the null hypothesis is approved.

Macroeconomic factors appeared to be statistically insignificant for NPLs. The findings show that GDP has negative but insignificant impact on NPLs. The results show that NPLs decrease by -0.005 units if GDP increases by 1 unit. Based on p-value of 0.217, the null hypothesis is rejected. The results show inflation has a negative effect but insignificant impact on NPLs at p-value level of 0.670, which is greater than 5%, so the null hypothesis is rejected.

The limitations of the study are that the unemployment rate as a macroeconomic variable and the interest rate as an internal variable were not included in the analysis due to the limitations of the variables that could be included in the model, which in this case were a total of seven most used variables from researchers.

Suggestions for future studies are to include the unemployment rate as an independent macroeconomic variable and the interest rate as an independent internal variable. Also, in order to have a more detailed analysis, we suggest that NPLs be divided into the business loan portfolio and the household loan portfolio.

The research paper contributes and is helpful for senior management of the banks, central bank, investors, and government to take into consideration the internal and macroeconomic factors that impact the banking stability - NPLs.

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