TEFMJ TRENDS IN ECONOMICS, FINANCE AND MANAGEMENT JOURNAL

DOI: https://doi.org//10.69648/IFVP1211

Trends in Economics, Finance and Management (TEFMJ), 2024; 6(1): 51-62

ijtns.ibupress.com

Online ISSN: 2671-3365

Application : 11.04.2024

Revision : 05.06.2024

Acceptance : 16.06.2024

Publication : 25.06.2024

Mustafa, E. (2024). Assessing the Impact of Non-Performing Loans and Capital Adequacy on Bank Profitability for the Case of North Macedonia. Trends in Economics, Finance and Management Journal, 6(1), 51-62

https://doi.org//10.69648/IFVP1211

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BALKAN JOURNALS

Assessing the Impact of Non-Performing Loans and Capital Adequacy on Bank Profitability for the Case of North Macedonia

Edita Mustafa

Abstract

This study investigates the influence of non-performing loans on the profitability of banks operating in the Republic of North Macedonia, providing insights into the specific dynamics of the banking sector. Non-Performing Loans (NPL) represent a critical concern for banking institutions worldwide, reflecting potential credit risk and weakening of financial stability. In the context of North Macedonia, where the banking sector has a significant function in driving economic growth and development, understanding the relationship between NPLs and profitability is of great importance. Also, taking into consideration the importance of the ratio of Capital to Risk Weighted Assets (CRWA), this study also investigates the relationship between Capital to RWA and bank profitability. By employing an autoregressive distributed lag (ADL) model, the study intends to uncover the trends and the relationship between variables, by also considering how past values affect the current values of the bank profitability. The results of the analysis disclose a highly significant negative influence of the NPLs on the bank profitability indicators, such as Return on Equity (ROE) and Return on Assets (ROA). Thus, the findings reveal important insights for the policymakers and the banking industry in North Macedonia, aiding in the formulation of effective risk management strategies and regulatory policies aimed at mitigating the adverse effects of NPLs and capital needs on bank profitability. At the same time, the study is expected to contribute to the existing body of literature on the topic by offering empirical evidence specific for the Macedonian banking sector, thus filling the gap in the research landscape.

Keywords: Non-performing loans, bank profitability, capital, assets, bank risk.

Introduction

The banking sector plays an essential role in fostering economic growth and stability and it serves as a crucial intermediary between savers and borrowers. Central to the performance and resilience of banking institutions is the management of credit risk, with Non-Performing Loans (NPLs) representing the key indicator of asset quality and financial soundness. In North Macedonia, where the banking sector is integral to the country's economic development, understanding the effect of NPLs and capital to risk weighted assets on bank profitability is of great importance.

Non-performing loans represent loans where borrowers have failed to meet scheduled payments for a specified period, posing significant challenges to bank profitability and stability. High levels of NPLs can erode bank earnings through increased provisioning for loan losses and reduced interest income, ultimately impeding credit intermediation and hindering economic growth. Therefore, understanding the effect of NPLs on bank profitability is crucial for assessing the financial health and resilience of banks in North Macedonia.

Similarly, the Capital Adequacy Ratio (CAR), also known as the Capital to Risk-Weighted Assets Ratio (CRWA), is a fundamental measure of a bank's financial strength and stability. CAR compares a bank's capital to its risk-weighted assets, providing insights into its ability to absorb potential losses and maintain solvency. Thus, analyzing the impact of CAR on bank profitability is essential for understanding the relationship between capital adequacy and financial performance in North Macedonia's banking industry.

This study is aimed at analyzing the impact of non-performing loans on the profitability of banks operating in North Macedonia, offering insights into the specific dynamics and challenges faced by the Macedonian banking sector. By examining the interplay between NPLs and key profitability indicators, such as Return on Assets (ROA) and Return on Equity (ROE), this research seeks to provide empirical evidence to inform policymakers, regulatory oversight bodies, and strategic decision-making bodies within the Macedonian banking industry.

Brief Literature Review

The relationship between non-performing loans and bank profitability has been extensively studied in the global context, with a growing body of literature highlighting the significant impact of NPLs on financial performance. According to

Demirgüç-Kunt and Detragiache (1998), elevated levels of NPLs can impair bank profitability by eroding interest income, necessitating higher provisioning expenses, and constraining lending capacity. Similarly, Berger and De Young (1997) found a negative correlation between NPLs and bank profitability, emphasizing the importance of effective credit risk management in sustaining financial health. Also, Samir and Kamra (2013) found that non-performing loans adversely affect bank profitability by diminishing interest income and undermining both current profits and the capital base through necessary provisions.

In the European context, research by Altunbas et al. (2007) demonstrated a robust link between NPLs and bank profitability, particularly in the aftermath of financial crises. The study underscored the adverse effects of NPLs on both ROA and ROE, signaling the need for prompt remedial action and regulatory intervention to restore stability. Moreover, Karasulu and Altunbas (2010) highlighted the role of macroeconomic factors, regulatory frameworks, and bank-specific characteristics in shaping the relationship between NPLs and profitability, emphasizing the importance of a comprehensive approach to risk management.

Turning to studies specific to the Balkan region, research by Simeonov et al. (2019) explored the determinants of NPLs in Southeast European countries, including North Macedonia, and their implications for bank profitability. The findings suggested a significant negative impact of NPLs on bank profitability, underscoring the challenges faced by banks in managing credit risk amid economic uncertainty and structural reforms.

However, despite the wealth of research on the topic, there remains a paucity of studies focusing specifically on the Macedonian banking sector. Thus, this study seeks to address this gap by conducting a comprehensive analysis of the relationship between NPLs and bank profitability in North Macedonia, offering valuable insights for policymakers, regulators, and industry stakeholders.

Methodology

This section explains the research methodology for investigating the effects of Non-Performing Loans (NPLs) on bank profitability, specifically focusing on Return on Assets (ROA) and Return on Equity (ROE), as well as the influence of the capital to risk-weighted assets (CRWA) ratio on these profitability indicators. The analysis employs an Autoregressive Distributed Lag (ADL) model using data from the World Bank spanning the years 2000 to 2021.

Model Specification

To understand both the immediate and cumulative impacts of NPLs and CRWA on ROA and ROE, the study employs an Autoregressive Distributed Lag (ADL) model. The advantage of the ADL model is that it captures dynamic relationships and accommodating time series data, which include both autoregressive components and distributed lags of the explanatory variables. The ADL model for each dependent variable (ROA and ROE) can be expressed as:

$$Y_t = \alpha + \sum_{i=1}^{p} \beta_i Y_{t-i} + \sum_{j=1}^{q} \gamma_i X_{t-j} + \varepsilon_t$$

where:

- Y_t represents the dependent variable (either ROA or ROE) at time t.
- X_t represents the independent variables (NPLs or CRWA) at time t.
- α is the intercept term.
- β_i are the coefficients for the lagged values of the dependent variable.
- γ_i are the coefficients for the lagged values of the independent variables.
- ε_t is the error term.
- p and q are the lag lengths for the dependent and independent variables, respectively.

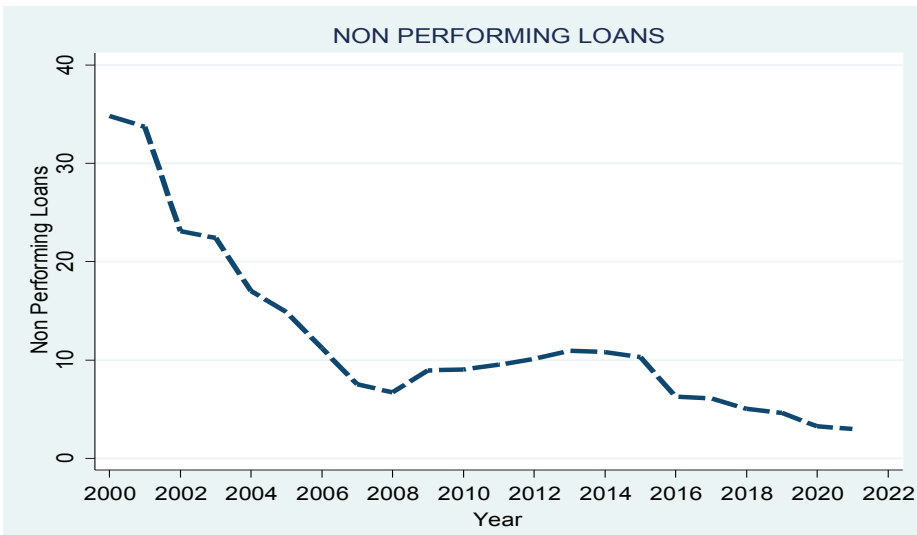
The ADL model is suitable for examining how past values of both the dependent and independent variables influence current values, thereby capturing both short-term and lagged effects. In the estimation procedure, the first to be tested is the stationarity of each time series using the Augmented Dickey-Fuller (ADF) test to ensure that the series are suitable for ADL modeling. The variables should be stationary or made stationary through differencing. Also, the appropriate lag lengths for both the dependent and independent variables are determined using criteria such as the Akaike Information Criterion (AIC) or the Bayesian Information Criterion (BIC). Finally, the ADL model is estimated using Ordinary Least Squares (OLS) regression. This involves regressing the dependent variable (ROA or ROE) on its own past values and the lagged values of the independent variables (NPLs or CRWA).

Empirical Results

The results section begins with a trend analysis of the key variables under study: Non-Performing Loans (NPLs), Return on Assets (ROA), Return on Equity (ROE), and the Capital to Risk-Weighted Assets (CRWA) ratio. This initial analysis provides a comprehensive overview of how these variables evolved from 2000 to 2021. The examination of these trends can provide a clear picture for the following econometric analysis and a better understanding of the dynamic relationships explored later. Each variable's trend is presented, highlighting significant patterns over the period, which set the stage for deeper analysis into the relationship between bank profitability, credit risk, and capital adequacy.

Figure 1

Non- performing loans



Source: World Bank

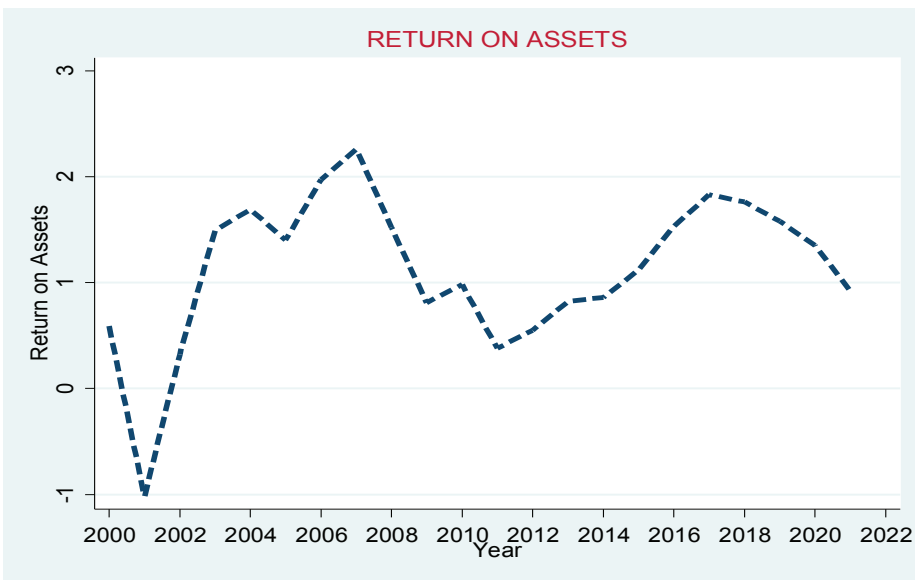
The level of non-performing loans in North Macedonia has undergone several changes over the last two decades (Figure 1). In the first part of the observation period, there was a continuous annual decrease, which was allowed by the implemented economic reforms such as privatization, financial liberalization and fiscal consolidation. As the overall financial stability was improved, this was also an effect seen in the level of the non-performing loans. An additional point was the increase in the government support programs and foreign investments and access

to finance. The decreasing trend continued until 2008 respectively, down to 7 from the level of 30, which was the highest point for the observation period. Following 2010, there was a consistent upward trend influenced by the Global Financial Crisis of 2007-2009 and the European Sovereign Debt Crisis of 2010-2012. In response to the 2008 crisis, the National Bank of the Republic of North Macedonia (NBRNM) implemented measures to curb credit activities and revised its methodology for calculating capital adequacy ratios. It also increased the required reserves for foreign currency liabilities (Boskovska & Gligorova, 2014).

To reduce the non-performing loans (NPLs), banks have shifted towards using credit derivatives instead of the traditional method of selling collaterals to settle outstanding debts (Sverko et al., 2010). This shift is viewed as a significant improvement, as there has been a steady decline in NPLs, except for the brief rise in 2017.

Figure 2

The level of bank profitability based on ROA

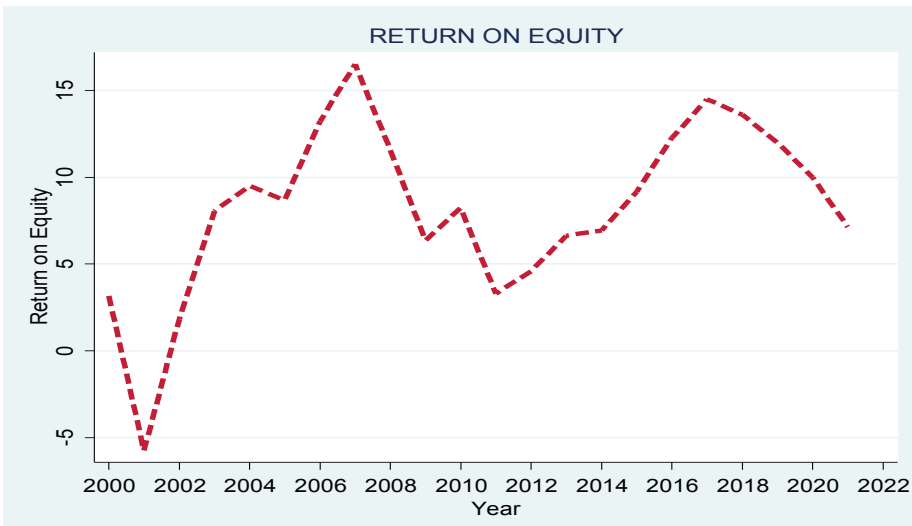


Source: World Bank

The movement of ROA in North Macedonia from 2000 to 2021 showed periods of both growth and fluctuation (Figure 2). The positive ROA values gave tracks that banks in North Macedonia were generally able to generate earnings from their assets, especially in the year of 2007, which was the highest point of the observation period, followed by a continuous increase from the year 2012 to 2017.

Figure 3

The level of ROE



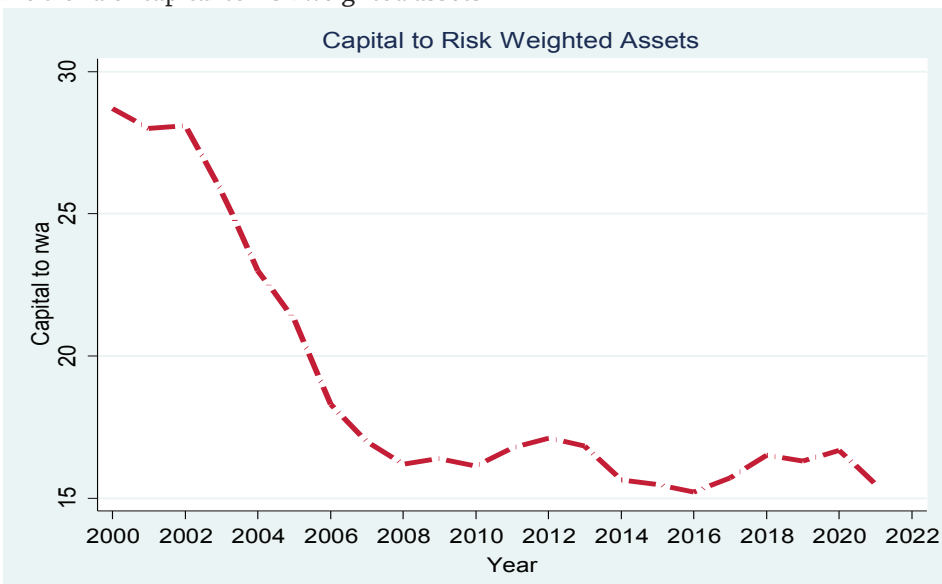
Source: World Bank

As there is a similar movement of return on equity related to ROA, that means that banks were also generally able to efficiently use their assets to generate profits, thereby making an increase in returns for their shareholders. This is seen from the period of 2002 to before the financial crisis which notes the highest point in ROE (Figure 3). Also, there is an increasing trend after 2012 until 2018 with the point of 14.

Regarding the capital to risk-weighted assets ratio, it was relatively high at 28.7% in 2000, indicating that banks in North Macedonia had a substantial capital buffer relative to their risk-weighted assets (Figure 4). From 2000 to 2006, there is a noticeable decline in CRWA, with the ratio dropping to 18.3% by 2006.

Figure 4

The trend of capital to risk weighted assets



Source: World Bank

Between 2006 and 2010, there is a slight increase in CRWA, but it remains relatively low compared to the levels seen in the early 2000s. This period is assumed to be a reflection of improvement of the capital adequacy in response to the global financial crisis. From 2010 to 2018, there was some fluctuation in CRWA, suggesting that banks in North Macedonia were able to maintain a moderate level of capital adequacy during this period. In 2020, it stands at 16.69%, indicating a slight increase compared to the previous years.

Regression Results

Based on the Dickey Fuller test, the time series were found to be stationary in their level, so it is not necessary to difference them. Concerning the optimal time lag for each variable, the BIC criterion was used and it was found that one time lag is optimal. (Table 1) presents the regression results based on the autoregressive distributed lag (ADL) model.

Table 1

Regression analysis results

Dependent variable	ROA		ROE		ROA	
Independent Variables	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
ROA_{t-1}	0.474538**	2.52	-	-	0.3514926	1.57
NPL_t	-0.1595957***	-3.22	-1.029631***	-3.34	-	-
NPL_{t-1}	0.114867**	2.69	- 0.6943684**	2.58	-	-
ROE_{t-1}	-	-	0.4580554**	2.35	-	-
$CRWA_t$	-	-	-	-	-0.31796*	-2.04
$CRWA_{t-1}$	-	-	-	-	0.2543901	1.93
Constant	0.9363646	1.43	7.379608	1.52	1.765835	1.92
R-Squared	0.6147	-	0.6832	-	0.4881	
F-Statistics	9.04	-	12.22	-	5.40	

*** p<0.01; ** p<0.05; *p<0.1

Source: Own research

The regression analysis provides insightful results regarding the relationship between non-performing loans (NPL) and bank profitability in North Macedonia. In the first analysis, the relationship between NPLs and bank profitability was investigated. The regression model demonstrated statistical significance with an F-statistics of 9.04, indicating that the model reliably captures the impact of NPLs on profitability. The coefficient of ROA with one time lag is positive and statistically significant meaning that past values of ROA positively affect the current values of it. The coefficient for NPL was found to be negative (-0.1595), suggesting that, for each unit increase in NPLs, the bank's profitability decreases by approximately 0.16 units, ceteris paribus. This negative relationship is statistically significant, as indicated by the p-value of 0.005, well below the significance level of 0.01. This implies that higher levels of non-performing loans are associated with lower profitability of banks in North Macedonia. Non-performing loans represent a portion of loans that are not generating income and may require write-offs, directly reducing profitability. Therefore, effective management of NPLs is crucial for maintaining or

enhancing bank profitability.

The second analysis was focused on the relationship between NPLs and ROE. This model also showed a statistically significant regression model, with an even greater F-statistics of 12.22. The coefficient for the lagged ROE_{t-1} is 0.4581, indicating that a 1-unit increase in the ROE from the previous period is associated with an increase of 0.4581 units in the current period's ROE, holding other factors constant. This positive relationship suggests that ROE tends to persist over time, with higher ROE in the past period contributing to higher ROE in the current period. The coefficient for NPL was also found to be negative -1.0296, indicating a more substantial impact on ROE. For each unit increase in NPLs, ROE decreases by approximately 1.03 units, ceteris paribus. Given the p-value, this relationship is highly statistically significant, emphasizing that higher NPL levels significantly undermine the bank's efficiency in generating returns on the shareholders' equity. ROE is a critical factor for investors, reflecting how well a bank uses its equity to generate profits. The pronounced negative effect of NPLs on ROE underscores the importance of managing NPLs to protect and improve shareholder value.

The third analysis examined the relationship between CRWA and bank profitability. The coefficient for the current period CRWA ratio is -0.3180, indicating that one unit increase in the CRWA ratio is associated with a decrease of 0.3180 units in the current period's ROA, holding other factors constant. This negative relationship suggests that higher capital adequacy may be linked to lower profitability in the short term, potentially due to the conservative use of the capital or higher costs of maintaining excess capital. The t-value of -2.04 and the p-value of 0.058 suggest that this effect is significant at the 10% level. The coefficient for the lagged $CRWA_{t-1}$ ratio is 0.2544, suggesting that one unit increase in the CRWA ratio from the previous period is associated with an increase of 0.2544 units in the current period's ROA, holding other factors constant. This positive relationship implies that higher capital adequacy in the past could contribute to better profitability in the subsequent period, possibly through enhanced financial stability and risk management.

Overall, these analyses settle several insights about the banking sector in North Macedonia. Firstly, there is a significant negative relationship between NPLs and bank profitability, suggesting that higher NPL levels reduce profitability. Secondly, NPLs also have a significant negative impact on ROE, indicating that rising NPLs erode the bank's ability to generate returns on equity. Lastly, while a higher CRWA is crucial for financial stability and meeting regulatory requirements, it tends to have a negative effect on profitability, indicating a need for the banks to balance

the capital adequacy with profitability goals. For banks in North Macedonia, these findings highlight the critical importance of managing NPLs and maintaining an optimal balance in capital allocation to sustain both stability and profitability.

Conclusion

Based on the results of the analyses conducted, several key findings emerge regarding the relationship between the Non-Performing Loans (NPLs), Return on Equity (ROE), Return on Assets (ROA), and Capital to Risk-Weighted Assets ratio (CRWA) in the context of North Macedonia. Firstly, the analysis reveals a statistically significant negative relationship between NPLs and both bank profitability indicators, ROE and ROA. This implies that, as the level of NPLs increases, both ROE and ROA tend to decrease, indicating a detrimental effect on the bank profitability. These findings are consistent with previous literature highlighting the adverse impact of NPLs on financial performance.

Secondly, the analysis of the relationship between CRWA and bank profitability indicates a statistically significant negative association between the two variables. As the CRWA increases, suggesting higher capital adequacy, ROA tends to decrease. This suggests that higher capitalization may not necessarily translate into improved profitability, which warrants further investigation into the underlying mechanisms driving this relationship.

Thus, the obtained results offer to policymakers, regulators, and bank industry stakeholders important insights as they can consider these findings when formulating policies and interventions aimed at addressing NPLs and improving bank profitability in North Macedonia. By implementing targeted measures to mitigate credit risk and optimize capital allocation, stakeholders can promote a more resilient and sustainable banking system, ultimately contributing to broader economic stability and growth.

References

Altunbas, Y., Carbo-Valverde, S., & Molyneux, P. (2007). Examining the Relationship between Capital, Risk and Efficiency in European Banking. European Financial Management, 13(1), 49–70.

Berger, A. N., & DeYoung, R. (1997). Problem Loans and Cost Efficiency in Commercial Banks. Journal of Banking & Finance, 21(6), 849–870.

Boskovska, D. & Gligorova, E. (2014). Effects of the Financial Crisis on the Lending Activity of Banks in the Republic of Macedonia. Economic Development. Journal of the Institute of Economics-Skopje. 16(1/2). pg. 67-76.

Demirgüç-Kunt, A., & Detragiache, E. (1998). The Determinants of Banking Crises: Evidence from Developing and Developed Countries. IMF Staff Papers, 45(1), 81–109.

Karasulu, M., & Altunbas, Y. (2010). Determinants of Bank Profitability and Its Implications on Risk Management Practices: Evidence from Turkey. International Research Journal of Finance and Economics, 46, 164–174.

Simeonov, P., Dimovski, P., & Bislimoski, Z. (2019). Determinants of Non-Performing Loans: Evidence from Southeast European Banking Systems. International Journal of Financial Studies, 7(3), 46

Samir, & Kamra, D. (2013). A Comparative Analysis of Non-performing Assets (NPAs) of Selected Commercial Banks in India. International Journal of Management, 3(1), pg. 68-80.

Sverko, I., Prga, I., & Vrdoljak, T. (2010). Non-performing Loans and Loan Loss Provisions: The

Case of Croatia. Conference Proceedings: International Conference of the Faculty of Economics Sarajevo. Economic Development Perspectives of SEE Region in Global Recession Context.