

## INTERRELATIONS OF STOCK EXCHANGE MARKETS DURING THE PERIOD OF CRISIS AND STABILITY (POST- CRISIS) PERIOD

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**Abstract:** This paper explores the empirical impact of the crisis in the interdependence degree of the stock exchanges during the period of 2008 financial crisis and the subsequent stability period until 2020.

In this regard, the interdependence between the Macedonian stock exchange index as a developing country and Italian stock exchange index as a developed country, has been analyzed by dividing the time framework into two sub – periods: during the global financial crisis and post-crisis. Thus, by conducting the Pearson correlation and linear regression model it has been revealed that there is higher interdependence between the Macedonian Stock Exchange and Italian Stock exchange during the period of global financial crisis, rather than during the post-crisis (stability) period.

**Keywords:** interrelations, stock exchange index, crisis, stability

### 1. INTRODUCTION

Financial markets, being interconnected on a global scale, experience dynamic relationships that have a crucial and significant effect on the performance of these markets. Undoubtedly, the stock exchange markets play a vital and crucial role on the global scale, thus enhancing economic growth and development. In this regard, it is very important to understand how will the interrelations between the stock exchange indexes of different countries with different level of development will be during the period of crisis and if they differ during the stability period. Since a lot of empirical and research evidence had lead to the fact that the stock exchanges have had a significant impact during the global financial crisis, thus making countries to experience long term negative effects on their economic growth. Global Financial Crisis (2008) has caused high turbulence in the financial markets and also widespread economic slowdown across the globe (Dhal, 2009). Thus, plenty research studies have been conducted in this regard, in order to analyze the effects of the global financial crisis on the interrelations between stock exchanges of developed and developing countries. This approach of the interdependence between stock exchanges of developed and developing countries during the period of crisis and stability has been on the agenda of many scholars, by investigating their correlation (Syriopoulos and Roumpis (2009); Liu (2013) Hwang et al. (2013); Shain (2015); Zdravkovski (2016); Angelovska (2017); Jiang et al. (2017) and Ji et al. (2018); Srbinska et al. (2021) ).

As a very young stock exchange market, it is understandable the evidence of the low level of liquidity and market depth of the Macedonian Stock exchange. During the global crisis period, there was experienced a decline in the FDI inflows as well as of the stock exchange index in the Republic of North Macedonia and it took a longer time for this exchange market to recover during the post – crisis period. Thus, having into consideration such evidences, the main objective of this study is to investigate from the empirical approach the interrelations between the Macedonian Stock Exchange and Italian stock exchange index (FTSE MIB), by utilizing monthly data from this indices for the time period 2007 until 2020. In particular the time framework is divided into two sub – periods, that of the global financial crisis and that of post – crisis (stability) period.

Finally, the paper contains the following structure: First section is dedicated to the Introduction, followed by the section of Literature Review, where are discussed theoretical and empirical papers that investigate the interdependence of the stock exchange markets during the crisis and stability periods. Research Methodology is presented in the third section, while in the fourth section are presented and illustrated the empirical results from the conducted empirical analysis. Last section is dedicated to the part of conclusions and recommendations, concerning the conducted research and findings.

### 2. LITERATURE REVIEW

Previous research has been conducted regarding the interrelations between stock exchange markets in developed and developing countries, during the crisis and stability period, thus highlighting the importance of understanding the linkages between the stock exchange markets, emphasizing also the role of information transmission as well as the investor sentiment.

By analyzing the interrelations of the some Balkan stock exchange markets such as Romania, Bulgaria, Croatia, Turkey, Cyprus and Greece with some developed stock exchange markets such as USA and Germany, Syriopoulos

and Roumpis (2009) highlighted that stock exchange markets of the Balkan countries gradually are becoming more integrated with these developed stock exchange markets. In this frame, also findings from the study of Kenourgios and Samitas (2011) were presented, through the empirical analysis of the interrelations between Balkan stock exchange markets and UK, Germany, Greece and US stock exchange market, during the time period 2000 - 2006. In addition, by investigating the interrelations of US, European and Australian stock exchange market during the period of Global financial crisis, in their paper authors Meric et al. (2012) suggested a significant incline of their interrelation during this crisis period.

Similar studies that have investigated the interrelations of Balkan stock exchange markets and developed countries have suggested similar results regarding these stock exchange correlations (Zdravkovski (2016); Angelovska (2017); Srbinska et al. (2021)). In this regard, in her paper Angelovska (2017) has revealed a bidirectional causal relationship between the Macedonian and Croatian stock markets during 2005 – 2017, while, Zdravkovski (2016) by applying the Johansen co-integration approach concluded that during the crisis a higher level of integration exists at Balkan stock exchange markets. In addition, Srbinska et al. (2021) by analyzing the interdependence of Macedonian (MBI10) stock exchange index with the Belgrade (BELEX15), the Six Swiss (SLI) and the Euronext Paris (CAC40) stock exchanges during the time period 2005 – 2018, suggested an inclined integration between Macedonian stock exchange and Belgrade and Euronext Paris Stock Exchanges, while opposite integration is noticed with the Six Swiss stock exchange during the crisis period compared with pre-crisis and post-crisis time period.

### 3. RESEARCH METHODOLOGY

In order to analyze the interrelations between the stock exchange markets in developed and developing countries during the period of crisis and stability period, this study analyzes the integration of the Macedonian (MBI10) stock exchange index with the Italian (FTSE MIB) stock exchange market during the period of Global financial crisis and the post – crisis (stability) period. Thus, data are divided into two period samples; Global Financial Crisis period starting from August 2007 until November 2011 and post-crisis (stability) period that contains data from December 2011 until December 2020.

Thus, main aim of this research lies on the investigation of the interrelations of the Macedonian Stock Exchange and Italian Stock exchange during and after the Global Financial Crisis. Thus the main null hypothesis has been set as following:

- $H_0$ : The correlation between Macedonian Stock Exchange (MBI10) and Italian Stock exchange (FTSE MIB) is higher during the period of crisis in comparison with post-crisis period.
- $H_1$ : The correlation between Macedonian Stock Exchange (MBI10) and Italian Stock exchange (FTSE MIB) is lower during the period of crisis in comparison with the post-crisis period.

Following the methodology of Srbinska et al. (2021), this study conducts linear regression analysis in addition to Pearson correlation and ANOVA test in order to investigate the interrelations between the Macedonian Stock Exchange (MBI10) and Italian Stock exchange (FTSE MIB) during the crisis and post-crisis (stability) period.

### 4. EMPIRICAL FINDINGS

Having into consideration the research methodology, which includes the linear regression analysis in addition to Pearson correlation and ANOVA test, initially in Table 1 is provided a descriptive statistics summary by indicating the values for the total number of observations that correspond to the crisis and post – crisis period, their mean value, standard deviation as well as the their minimum and maximum value.

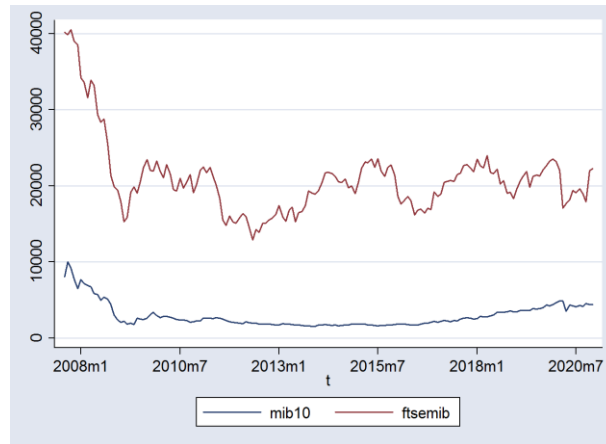
*Table1. Summary of the descriptive statistics*

Variable	Nr. of obs	Min value	Max value	Mean	Stand. Deviation
Period of Global Financial Crisis (August 2007 - November 2011)					
MBI10	52	1789.33	10014.82	3722.794	2148.691
FTSEMIB	52	14836.33	40512	23783.81	7073.293
Post- period crisis – stability period (December 2011 - December 2020)					
MBI10	109	1581.87	4893.28	2524.988	989.3406
FTSEMIB	109	12873.84	23979.37	19572.94	2676.612

Source: authors calculations.

In addition, the following graph illustrates the movements of the Macedonian Stock exchange market and Italian Stock Exchange market, during the time frame 2007 – 2020.

**Figure1. Trends of the Macedonian Stock exchange market and Italian Stock Exchange market, time period 2007 – 2020.**



Source: Monthly data of the stock exchanges index for the period 2007 – 2020

**Table2. Regression results of the relationship between MBI10-FTSE MIB during the GFC and post – crisis**

	Global Financial Crisis Period	Post-crisis (stability) Period
<b>R<sup>2</sup></b>	0.927	0.094
<b>Adj. R<sup>2</sup></b>	0.926	0.086
<b>Stand. Error</b>	147.23	945.82
<b>Obs</b>	52	109

Source: author's calculations.

The main hypothesis of this study investigates the correlation between Macedonian Stock Exchange (MBI10) and Italian Stock exchange (FTSE MIB) is during the period of crisis and post-crisis (stability) period. The results from the regression analysis confirm the null hypothesis, thus suggesting the existence of incline integration between the Macedonian Stock Exchange (MBI10) and Italian Stock exchange (FTSE MIB) during the period of Global Financial Crisis.

**Table3. ANOVA results during the GFC and post – crisis**

Global Financial Crisis period					
	df	SS	MS	F	Significance F
<b>Regression</b>	1	211169673	211169673	434.67	0.000
<b>Residual</b>	50	24290748.8	485814.976		
<b>Total</b>	51	2354604422	4616871.01		
Post-crisis (Stability) period					
	df	SS	MS	F	Significance F
<b>Regression</b>	1	9989697.19	9989697.19	11.17	0.0011
<b>Residual</b>	107	95720133.7	894580.689		
<b>Total</b>	108	105709831	978794.731		

Source: author's calculations.

## 5. CONCLUSIONS

This paper tries to investigate the interrelations among the Macedonian Stock Exchange and Italian Stock exchange market, during the Global Financial Crisis and post – crisis (stability) period, using monthly data for the time period

2007m8 do 2020m12. Furthermore, the time period was divided into two periods: Global Financial Crisis period (2007m8 – 2011m11) and post – crisis or stability period (2011m12 – 2020m12).

Although plenty of research has been done on this direction and there exist a lot of empirical findings that claim that a higher interdependence is seen between the stock exchanges during the period of crisis, then during the stability periods, this paper tries to identify the situation of the interrelations between the Macedonian Stock Exchange (MBI10) and Italian Stock exchange (FTSE MIB) during crisis and stability period. Thus, based on the empirical findings from the conducted research, we can conclude that there exists an increased interrelation during the period of crisis compared to the post-crisis (stability) period.

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