UNIVERSITY OF TARTU

Faculty of Social Sciences

School of Economics and Business Administration

Anna Pobedova

DECOUPLING BETWEEN EQUITY MARKETS AND ECONOMIES: EVIDENCE FROM CENTRAL AND EASTERN EUROPEAN COUNTRIES

Bachelor's Thesis

Supervisor: Junior Lecturer Mark Kantšukov

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I have written this bachelor’s thesis independently. Any ideas or data taken from other authors or other sources have been fully referenced.

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Introduction

The relationship between a country's economy and its equity market seems straightforward: economic growth should go hand in hand with increasing returns on the equity market. Following this notion, investors may assume that if the country's economy is expected to expand, its equity market will also prosper, providing higher returns and, consequently, increasing shareholders' wealth. However, this assumption is not necessarily accurate. Economic growth or decline will be insulated from equity market dynamics if the effect of decoupling is present.

Decoupling can occur on various levels and for different assets. Gulko (2002) examined the decoupling of Treasury bonds returns from the returns of U.S. stocks, while Menkhoff and Tolksdorf (2001) studied the decoupling between financial markets and the real economy. Decoupling can generally describe the phenomenon where traditional correlations or dependencies between assets or markets diverge. In the context of this thesis, according to the definition by Hayes (2022), the term decoupling implies that the performance of a country's equity market is insulated from the performance of its economy.

This phenomenon was observed by Ritter (2012), who found a negative correlation between real stock returns and real growth of gross domestic product (GDP) per capita from 1900 to 2011 in both developed and emerging markets. These findings allow one to conclude that these countries' stock markets were decoupled from their economies. Ritter (2012) argued that economic growth misleads investors who may think that it will benefit them because, in reality, different sets of variables define economic growth and equity returns. Therefore, understating of decoupling is important for rational investment decision-making.

Decoupling is also an essential concept for investment diversification. According to the study by Alexakis et al. (2016), in times of turmoil, emerging Baltic stock markets could be insulated from crises' adverse effects due to decoupling, offering superior diversification benefits for investors.

The significance of decoupling extends beyond its role in investment decision-making and diversification. Theoretical and empirical research substantiates the notion that the development of an efficient stock market in a country supports the growth of its economy (Caporale et al., 2004; Masoud, 2013). Thus, the existence of decoupling underscores the importance of a nuanced understanding of the dynamics between financial markets, their efficiency, and the broader economy.

Despite the significance of the decoupling phenomenon, it is surprisingly rare to find a systematic exploration of this topic in the scientific literature. The extensive body of

research about Central and Eastern European (CEE) countries is dedicated to the exploration of the dynamic interrelationships between the stock market and the economy. Still, the existence of decoupling between them over the long run has not yet been deliberately researched and estimated.

To the author's knowledge, there is no detailed study focused on decoupling between equity markets and economies of Central and Eastern European countries. Therefore, the current thesis aims to fill this research gap.

The aim of the bachelor thesis is to examine the presence of decoupling between the economy and the stock market in selected Central and Eastern European countries. The countries examined in this study are Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Serbia, Slovakia, and Slovenia. The choice of these countries for the analysis is justified by their shared experience of transitioning from planned to market economies, coupled with the re-establishment and development of their stock markets after the fall of socialist governments. The selected time frame, from 1995 to 2023, is determined by data availability and aligns with the objective of investigating the phenomenon of decoupling over the long term, since the inception of stock markets in these countries in the 1990s up to the present. Additionally, the study seeks to provide a comparative analysis identifying variations in the degree of decoupling among these countries.

To achieve the aim of the thesis, the author has set the following research tasks:

- to discuss the causal interrelationship between the equity market and the economy from the theoretical perspective,
- to introduce and discuss the concept of decoupling in economics and finance,
- to provide an overview of previous studies on the relationship between the economy and the equity market in Central and Eastern European countries,
- to introduce the methodology and argue its choice,
- to collect the data on equity markets' indices and gross domestic products for the group of countries under analysis,
- to conduct the analysis and discuss the results.

The thesis comprises two parts: theoretical and empirical. The theoretical part explores the relationship between the economy and the equity market, considering the causality and defining the expected interrelationships and fundamental ideas. It also examines the concept of decoupling in economics and finance, specifically focusing on measurement and theoretical feasibility. Then, the author provides an overview of previous empirical

studies on the stock market-economy relationship in the selected Central and Eastern European countries, analyzing key findings and methodologies.

The second part of the thesis involves a detailed description of data sources and variables, outlines and argues the choice of the methodology utilized for studying the data set and provides the analysis and comprehensive discussion of the results. The latter will be conducted in a general manner, discussing whether the effect of decoupling is present for the whole country group and for each country separately, examining where the decoupling is least and most pronounced.

Keywords: decoupling, equity market, Central and Eastern European Countries

1. Decoupling between equity markets and economies – theoretical foundation

1.1. Interrelationship between the equity market and the economy

For decades, the scientific literature has delved into the relationship between the equity market and the economy, seeking a deeper comprehension of the financial sector's role in the broader economy (Herring & Santomero, 1995; Caporale et al., 2004; Masoud, 2013; Yemelyanova, 2021). While empirical studies have yet to reach a consensus on the precise dynamics of this relationship, certain theoretical frameworks have emerged over time.

When examining the relationship between two variables, the direction of their connection or causality is often a primary consideration. Synthesizing the studies by Blum et al. (2002) and Naik et al. (2015), one can conclude that the nexus of financial development (stock market-based or bank-based) and economic growth can comply with the following patterns. Firstly, there may be no causal relationship, indicating that the development of the financial sector has no connection to real economic growth. Secondly, according to the supply-leading hypothesis, financial sector development spurs economic growth by accumulating capital and promoting innovations. Thirdly, following the demand-following hypothesis, the economy's growth increases the demand for capital and financial services, promoting financial development, but as pointed out by Blum et al. (2002), this dynamic is often considered as temporary and may occur, for example, when the country becomes a market economy. The next causality pattern is referred to as the interdependence or feedback hypothesis. It supports the notions of supply-leading and demand-following hypotheses, suggesting that causality goes both ways and that a mutual relationship exists between financial development and economic growth. The final causal link, found in empirical studies of countries with less developed economies, assumes the negative impact of the financial sector's development on the economy's growth.

Each of these causality patterns between financial development (stock market-based or bank-based) and economic growth is based on a solid theoretical background and supported by empirical literature. However, when focusing specifically on the relationship between the economy and the stock market, new considerations arise due to the nature of the latter. The stock market predicts economic fluctuations, and the index of stock prices is recognized as a leading indicator of the economy (Mankiw, 2009). Pearce (1983) was among the early scholars who empirically supported this notion. In practical terms, this implies that stocks will fall if the probability of recession increases and rise with the increased likelihood of recovery. Comincioli (1996) outlined two main explanations for the existence of this relationship, building on Pearce's (1983) work. Firstly, the current stock price should reflect

potential future cash flows, therefore predicting future economic growth or decline through investors' expectations about the company's profitability. Secondly, the "wealth effect" supports viewing the stock market as a leading indicator because it assumes that the stock price change directly impacts aggregate spending and essentially causes economic activity. (Comincioli, 1996)

By synthesizing the theoretical explanations of the stock market acting as a leading indicator of the economy, the author presents Figure 1. It illustrates how, in situations of economic growth and decline, the stock market is able to anticipate and directly impact the actual change in the economy through investors' expectations.

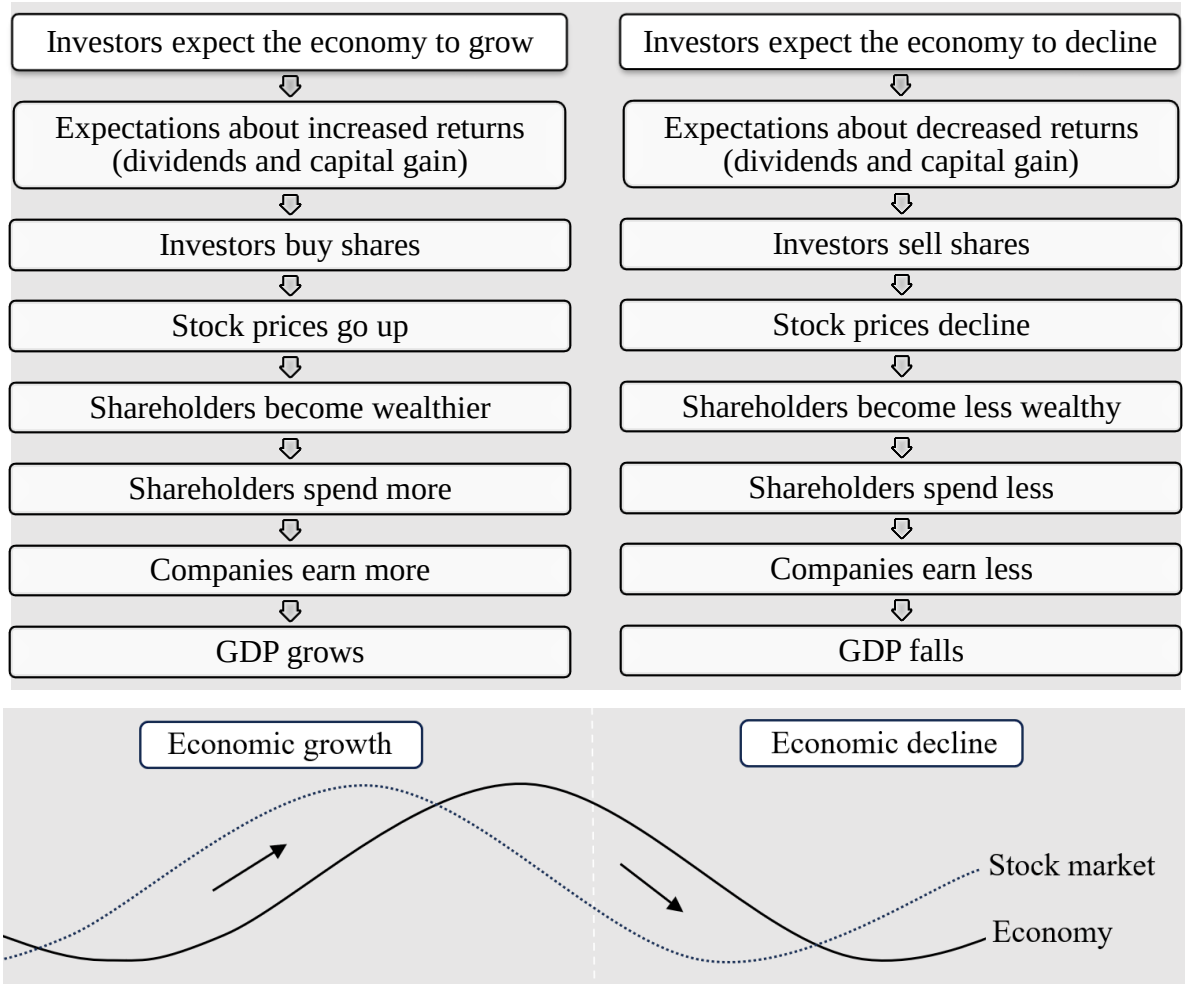

Figure 1. The process of the stock market acting as a leading indicator of economic activity
Source: compiled by the author based on Pearce (1983), Comincioli (1996) and Hofschire et al. (2023)

Evidently, the change in stock price caused by investors' expectations happens before the actual business cycle fluctuation. This predictive nature implies that stock market activity can forecast economic growth or decline and, crucially, induce such changes through

alterations in spending patterns. Therefore, one can conclude that, in theory, the causal impact runs from the stock market to the economy.

Conversely, scholars have also pointed out an opposite causality impact, providing theoretical reasoning. Horobet (2009) hypothesized that increases in economic output (GDP) would raise cash flows, boosting companies' profitability and increasing stock prices, with the reverse occurring during economic downturns. While this view on the economy-stock market causality is quite popular and finds empirical support, it does not account for the predictive nature of the stock market as a leading indicator and the potential of the stock market to affect economic growth.

The stock market's role in influencing economic growth is a significant focus of scientific research. Minier (2009) specifically investigated whether countries experienced heightened economic growth after opening a stock exchange and found affirmative empirical evidence for the first five years. According to Minier (2009), in theory, the stock market contributes to economic growth by increasing available investment and improving capital allocation efficiency through enhanced liquidity and diversification. Similar reasons are pointed out by Masoud (2013), who also emphasized the importance of stock markets in increasing production and attaining economic efficiency. Laopodis and Papastamou (2016) stressed that the expanding stock markets boost the confidence of businesses and consumers and contribute to a lower cost of funds, increasing the rationale to raise investment spending and, therefore, promoting economic growth.

Overall, academic literature seems to agree that the stock market advancement, through various mechanisms, should be causing economic growth. However, it is essential to point out that most of the abovementioned studies regarded the stock market as well-developed or well-functioning when discussing its potential to promote the growth of the economy. This might not be the case for emerging markets. Naik et al. (2015, p. 365) stated that in the case of emerging market economies, it is unclear whether stock markets cause economic growth or act "like a casino". Laopodis and Papastamou (2016) emphasized that underdeveloped regulatory systems in emerging markets may impede the transmission of funds from stock markets to the economy, posing risks to financial stability, competitiveness, and growth prospects. Based on that, one can conclude that the country's stock market's inability to stimulate the expansion of its economy could be a sign of inefficiency and even a threat to its economic well-being.

From the theoretical perspective, the equity market and the economy should exhibit a positive relationship regardless of causality direction. When the stock market declines, we

can expect the economy to go down as well, and when the prices of stocks increase, it indicates a possible improvement in the country's economic situation. If the country's output rises, the stock market should expand and become more active. Likewise, stock market expansion should promote economic growth. However, due to the broadness and sophistication of the economic environment, as in the example of emerging markets mentioned above, the reality might differ from theoretical expectations.

1.2. The concept of decoupling in the context of economics and finance

While the consensus among scholars lays out a general understanding of the economic process, the complexities of real-world economic interactions may defy established boundaries and theoretical expectations. At its core, decoupling challenges the conventional interconnectedness of economic variables, introducing a paradigm where traditional correlations diverge and dependencies take unexpected turns. Although the decoupling phenomenon may occur between various assets and markets, placing decoupling in the context of finance mainly assumes defining it as a deviation of the correlation between the returns of asset classes from expected or previously observed values (Hayes, 2022).

An example of decoupling between asset classes can be found in the research conducted by Gulko (2002), who described and estimated the decoupling phenomenon between the returns of U.S. stocks and Treasury bonds at the time of stock market crashes. The findings revealed a shift in stock-bond correlation from positive to negative during crises, confirming the decoupling between stocks and bonds' returns. To validate its presence, the author stressed that the correlation coefficient between the returns of stocks and bonds must not only change in magnitude but also in direction. A mere increase in absolute value without a change in sign would suggest contagion instead of decoupling. The author stated that while negative correlations between the assets' returns in the case of decoupling offer effective diversification for the investors, contagion moves the correlation to unity, decreasing the benefits of diversification. Notably, these practical implications for investors are aligned with the modern portfolio theory developed by Harry Markowitz (1952).

Similarly, highlighting the existence of diversification benefits in a situation of decoupling, the scholars examined its existence between equity markets and specific asset classes. Gil-Alana et al. (2020), relying on the cointegration analysis between six cryptocurrencies and six market indices, concluded that cryptocurrency, as a new investment asset class, is decoupled from conventional assets and, therefore, will benefit investors' portfolios. Ayadi et al. (2021) focused their research on commodities. They examined whether the commodity markets and the regional equity markets of the USA, Western

Europe, and BRICS exhibited evidence of decoupling or contagion during four recent major crises. The findings validated the presence of decoupling across most of the commodity classes during three crises, supporting the authors' idea to include these asset classes in the portfolio for hedging purposes.

Diversification with the aim of hedging can be relevant not only concerning assets exhibiting decoupling patterns but also across different markets. Alexakis et al. (2016) explored whether emerging Baltic and developed European equity markets were experiencing decoupling or contagion during two financial crises. This research revealed that Latvia and Lithuania were insulated from the negative impact of the European sovereign debt crisis (eurozone crisis) of 2009-2010, while Estonia exhibited decoupling during the 2007–2008 financial crisis. Therefore, the authors emphasized the importance of these findings for portfolio management practices and the potential for superior diversification within the Baltic markets.

The significance of decoupling extends beyond diversification and hedging concerns for the investors when studied for the whole economy. One of the extensively studied areas in this context is the phenomenon of decoupling between emerging and advanced economies. Pesce (2017) explored the puzzle of the previous literature that examined the decoupling between these economies, critically discussing existing approaches. The author stressed the complexity of this phenomenon within the economic landscape and highlighted its practical value, not only for investors and business practitioners focused on risk management and diversification but also for policymakers and their decision-making process. This conclusion underscores the significance of decoupling within the broader macroeconomic process.

It is apparent that decoupling can exist in various economic relationships: between individual assets, between asset classes and broader equity markets, between several equity markets and between economies according to the level of their development. While not explicitly, decoupling has also been studied and documented in the context of the relationship between a country's economy and its equity market.

There exists a body of research that, utilizing similar data and methods, estimated across extended periods and different groups of countries the correlation coefficient between a country's growth rate of GDP (primarily per capita) and the returns of its equity market, as measured by the index. Table 1 presents the correlation coefficients observed empirically by researchers across various periods and country groups. Although some p-values are missing and none reach conventional levels of significance at 5%, the author will analyze the results in line with scholars' interpretations.

Table 1

Previous results on the correlation between equity market returns and economic growth rates

Author	Period	Country group	Correlation coefficient	p-value
Siegel (1998)	1970−1997	17 developed countries	−0.32	(−)
		18 emerging markets	−0.03	(−)
Ritter (2005)	1900−2002	16 countries	−0.37*	(0.16)
Ritter (2012)	1900−2011	19 mostly developed countries	−0.39*	(0.10)
			−0.32**	(0.18)
	1970−2011	21 countries	−0.04*	(0.87)
			0.01**	(0.95)
	1988(or later)−2011	15 countries considered emerging in 1988	−0.41*	(0.13)
			−0.47**	(0.08)
Estrada (2012)	1987(or later)−2010	24 developed countries	−0.09*	(0.69)
			−0.13**	(0.54)
		21 emerging countries	−0.19*	(0.41)
			−0.14**	(0.54)
		49 countries combined	0.20*	(0.20)
			0.17**	(0.25)
Klement (2015)	1997−2013	44 developed and emerging markets	−0.29* (Small Cap)	(−)
			−0.28* (Mid Cap)	(−)
			−0.26* (Large Cap)	(−)

Note: * − local currency; ** − U.S. dollars

Source: compiled by the author

Jeremy Siegel was among the earliest scholars to identify and quantify the phenomenon of negative correlations. In his 1998 book, Siegel examined the correlation coefficient between stock market returns and economic growth across developing and emerging economies from 1970 to 1997. His findings, with the exception of Singapore, revealed negative correlation coefficients. Siegel remarked that these results were “quite surprising”. (Siegel, 1998, p. 131)

Ritter (2005) revealed that the unexpectedness of these findings lies in their opposition to the intuitive assumption that investing in countries with promising growth prospects benefits shareholders. The author employed a similar methodology in this research from 2005, estimating the correlation between real equity returns (dividends and capital gains) and real GDP per capita growth (allowing for inflation) across 16 countries from 1900 to 2002. The methodology assumed calculating geometric means of real equity returns and GDP growth rates for each country over the studied period and applying correlation analysis to the whole country group. Over such an extended period, the author found the correlation coefficient to be negative, similar to Siegel (1998).

Delving deeper into this phenomenon, Ritter (2012) estimated the correlation coefficients for developed countries and markets considered emerging over longer and

shorter periods using variables in local currencies and U.S. dollars. The values of the coefficients turned out to be close to zero or, again, negative. These findings supported the author's claim that, over the long run, the growth of a country's economy does not inherently benefit the shareholders because empirical analysis consistently indicates an inverse relationship between stock market returns and economic growth.

Applying a similar methodology, Estrada (2012) evaluated the correlation for developed and emerging markets, as Siegel (1998) and Ritter (2005, 2012) did, but also for both groups of countries combined. Employing both GDP and GDP per capita, measured in local currency and USD, the author sought to assess how the selection of variables might impact the final correlation results. However, the fact that none of the coefficients indicated a statistically significant relationship between economic growth and equity returns allowed the author to conclude that the choice of measure for these two variables is mainly irrelevant because they do not appear to have a positive correlation. This idea may be interpreted as follows: both the negative correlation between equity returns and economic growth and the absence of any correlation may be viewed as deviations from the expected positive relationship presumed by economic theory and conventional wisdom.

In line with Estrada (2012), Klement (2015) assessed the correlation between equity returns and economic growth across selected developed and emerging markets and within combined groups. Despite incorporating a novel perspective by investigating how the level of international diversification of the stock market, based on its capitalization size, might influence the dynamics of the returns-growth relationship (for instance, positing that large-cap equities, being more globally oriented, would exhibit less linkage with a country's economic growth), the author did not uncover any statistically significant findings.

In general, Siegel (1998), Ritter (2005, 2012), Estrada (2012), and Klement (2015) provided empirical evidence for the deviation of the theoretically appropriate, expected relationship between a country's economic growth and equity market performance from the existing ones. Essentially, this body of literature studied and documented the decoupling phenomenon between the economy and the equity market. Applying consistent methodology and variables in their research, the scholars proved that the stock market performance and economic growth are either uncorrelated or exhibit a negative correlation coefficient over the long term. As this methodology succeeded in grasping the decoupling phenomenon across various studies, it would be expedient to use it in the current thesis and future research.

However, before delving into the examination of decoupling between the equity market and the economy, it is crucial to understand why this phenomenon is theoretically

possible. One potential explanation, posited by Siegel (1998), was globalization and the fact that the companies listed on the country's stock markets are mainly multinationals whose performance is oriented towards the external markets and, therefore, may be disconnected from the state of the underlying economy. Estrada (2012) underscored that this scenario is particularly evident in emerging economies, where companies with substantial weight in the local equity market index tend to focus on selling their products abroad, thereby potentially insulating themselves from local economic downturns. Moreover, Estrada (2012), similar to Ritter (2005), pointed out that during periods of anticipated economic growth, heightened investor expectations lead to increased participation, driving up valuation multiples and potentially overpricing stocks. Consequently, despite the economic expansion and increased corporate profitability, returns turn out to be lower as more capital was invested to receive the same profits. Ritter (2012) also stressed the fundamental disconnection of the factors that influence the development of the economy and the performance of stock markets. While the growth of capital and labour and technological progress benefit consumers and workers, allowing corporations to generate higher profits, they do not benefit the shareholders. Both Ritter (2012) and Klement (2015) appeared to concur that economic growth is mainly irrelevant from the shareholders' standpoint, while valuations, incorporating forward-looking information, are the primary determinant of future equity market returns.

Evidently, the scientists proposed various explanations to theoretically justify the observed disconnect between economic growth and equity market returns. Given the focus of the current thesis on a specific group of countries, it is pertinent to contextualize these explanations within the framework of the analyzed country group. Gajdka and Pietraszewski (2016) explored the existence of negative correlations between the equity market and the economy in several Central and Eastern European countries. They posited that while the influence of multinational corporations in these stock markets might be less pronounced, factors such as the relatively limited number of listed companies, the potential inefficiency of information dissemination in these equity markets (leading to share prices failing to reflect relevant information fully), and investors' tendency to overreact due to uncertainties posed by external environment collectively underscore the importance of investigating the potential disconnect between stock market performance and economic growth.

Evidence from academic literature suggests that decoupling is a common occurrence across various relationships within the realms of finance and economics. Generally, it is not unusual for the expected or previously observed links to break and diverge. Despite this, recognizing and studying the decoupling phenomenon remains crucial as it deepens

comprehension of existing processes and concepts while offering valuable practical implications. Having outlined the appropriate methodology for capturing and evaluating this phenomenon within the long-term relationship between stock market performance and economic growth, the author argues that implementing it in the context of countries under analysis may contribute to a better understanding of the dynamics between financial markets, their efficiency, and the economy, as a consequence enabling more informed decision-making by investors, business practitioners and policymakers alike.

1.3. Prior research on equity market-economy links in Central and Eastern European countries

In the 1990s, most of the Central and Eastern European countries, including the ones examined in the current thesis (Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Serbia, Slovakia, and Slovenia), re-established their stock markets after the collapse of the socialist governments. Since then, numerous empirical studies have attempted to evaluate the relationship between these countries' economies and equity markets. The focus of the previous research is diverse. Table 2 presents the clustering of the empirical literature from Central and Eastern European countries by the study's primary aim.

Table 2

Previous empirical literature about CEE countries by the focus of the research

Author(s)	Aim
Hanousek & Filer (2000)	Assess the stock market-economy relationship from the perspective of informational efficiency.
Snieška et al. (2008); Horobet (2009); Pilinkus (2010); Hsing (2011); Hsing & Hsieh (2012)	Examine the impact of various macroeconomic indicators on the stock market performance and asses mutual relationships between the stock market and the economy.
Lyócsa et al. (2011); Molnár & Csiszárik-Kocsir (2022); Molnár & Csiszárik-Kocsir (2023)	Study the predictive power of the stock market as a leading indicator and estimate mutual relationships between the stock market and the economy.
Lyócsa (2014); Naik et al. (2015); Gajdka & Pietraszewski (2016); Laopodis & Papastamou (2016); Kajurová & Rozmahel (2017); Krkošková (2020); Prats & Sandoval (2020)	Explore the impact of stock market development on economic growth and estimate mutual relationships between economic growth and stock market development.

Source: compiled by the author

The diversity in the focus of previous empirical research enables the author to draw two conclusions. Firstly, there has been a shift in perspective over time. In the early stages,

when the stock markets were young, researchers focused on assessing the stability of their connection to the real economy and the existing transmission mechanisms. The aim was to determine if these relationships mirrored those observed in developed markets and whether equity markets could become classically efficient (Hanousek & Filer, 2000; Snieška et al., 2008). However, as the stock markets matured and expanded, scholars began to investigate the impact of these markets on the broader economy. Lyócsa (2014) and Naik et al. (2015) stressed the significance of investigating whether the development of the stock market contributes to economic growth in emerging markets similar to the patterns observed in developed economies. This evolution in research perspective underscores a transition from merely assessing equity market stability and efficiency to exploring their role in fostering broader economic development.

The first conclusion leads to the second one: the absence of consensus regarding the causality of the relationship between a country's equity market and its economy in previous research. The stock market is recognized as a leading indicator oriented towards the future and responds to events before the broader economy does (Mankiw, 2009). Therefore, the expected causality is from the stock market to the economy. However, the empirical findings indicate that the equity market-economy nexus is more complex and explores the impact of the economic variables on the equity market, which is especially evident in earlier studies. Lyócsa et al. (2011) emphasized that this relationship's dynamics are not static – they revolve over time and need periodic reassessment. The authors also pointed out that the earlier research results must be interpreted cautiously due to the small samples and the ongoing transformation process. Hence, it would be reasonable to focus on the latest research on the relationship between the stock market and the economy in the selected Central and Eastern European countries.

Studying this relationship, scholars varied in their choice of variables to represent the economy. Lyócsa et al. (2011) and Lyócsa (2014) investigated the predictive power of the stock market and its impact on the growth of real economic activity. Notably, as a proxy for the latter, the authors employed gross domestic product, industrial production, and consumer price index. Lyócsa et al. (2011) argued against using gross domestic product as the primary indicator for predicting stock market movements, suggesting that industrial production may offer superior insights due to its monthly frequency and its ability to provide a more nuanced view of the economy, especially in nations with a heavy reliance on industrial production. However, most recent research from Central and Eastern European countries predominantly employed gross domestic product as the key metric for real economic activity. Molnár and

Csiszárik-Kocsir (2022) claimed that GDP is today's most reliable metric for reflecting the nation's economic well-being.

The choice of variables used as proxies for the stock market also varied across studies. Naik et al. (2015) utilized the market capitalization ratio (size-based variable), the total value of shares traded ratio (liquidity-based variable), and turnover ratio to gauge the development of the stock market in selected countries. Prats and Sandoval (2020) specifically investigated whether stock market capitalization can drive GDP growth in Central and Eastern European countries. In the latest studies focused on the Central and Eastern European countries chosen for the current thesis, the countries' stock market index was predominantly used as a proxy for stock market performance. While this approach may have limitations as it reflects the performance of selected stocks rather than the entire market, it offers valuable insights into the dynamics of the country's stock market movements and overall performance.

Due to the tendency and rationale for using GDP as a proxy for the economy and the stock market index as a proxy for the country's equity market, further analysis will specifically focus on the studies that employed these indicators. Despite the shared choice of proxies, it is noteworthy that the methodologies diverged, introducing variations in analytical approaches and interpretations of the relationship between the two indicators.

Table 3 summarizes the econometric tests utilized by the authors and the findings of the latest empirical studies regarding the causality between the economy and the equity market for different countries. Given the lack of consensus on causality in previous research, the Granger causality test emerges as a popular method for studying the stock market-economy causal relationship. Kajurová and Rozmahel (2017) stated that this test does not directly indicate the presence of a cause-and-effect link but instead assesses whether one variable's historical values can forecast the values of another.

Table 3

The causality findings from previous empirical research

Author(s)	Methodology	Country/Countries	Causality findings
Laopodis & Papastamou (2016)	Cointegration analysis, VAR, panel analysis	Poland	Equity market → Economy
Kajurová & Rozmahel (2017)	Cointegration tests, Vector error correction models and Granger causality test	Euro area countries	Equity market → Economy, mutual relationship
		Non-euro area countries	Equity market → Economy
Przekota et al. (2019)	Correlation, ARDL model, Granger causality test	Estonia, Latvia, Lithuania	Equity market → Economy
		Poland, Hungary, Romania	Economy → Equity market
Krkošková (2020)	VECMs, Granger causality test, block erogeneity	Hungary, Slovakia	Mutual relationship
		Czechia, Hungary, Poland, Slovakia	Economy → Equity market
		Hungary, Poland, Slovakia	Equity market → Economy
Molnár & Csiszárik-Kocsir (2022, 2023)	Granger causality test, Johansen cointegration, ADL regression model	Czechia, Hungary, Poland, Slovakia	Mutual relationship

Source: compiled by the author

The substantial variability in results across countries, combined with differences in methodological choices, time frames, and variable frequencies, underscores the necessity for further research. These disparities prevent a straightforward comparison of the scientists' findings. Instead, the author will thoroughly analyze each study, with particular attention to results suggesting a disconnect between the equity market and the economy, potentially indicating the presence of decoupling.

Laopodis and Papastamou (2016) conducted a study covering 14 emerging economies from 1995 to 2014, using GDP to gauge the economic state and the stock market index as a measure of stock market development. Their findings revealed that in the case of Poland, it was particularly evident that the advancement of the stock market aided economic growth. However, implementing another econometric method showed that the only negative reaction of the economy to the shocks in the stock market was documented for Poland. The opposite situation was evident in Estonia and Hungary, where economic advances negatively impacted the stock market. The authors concluded that the equity market and the broader economy are separated there, which makes economic activity more expensive and inefficient for everyone involved.

Similar findings on the disconnect between stock market development and economic growth were revealed in the research from Kajurová and Rozmahel (2017). Notably, their study delved into the dynamics represented by the country's stock market index and quarterly GDP among both Euro and non-Euro area countries spanning from 1999 to 2015. The authors' analysis showed that while Euro area member countries generally showcased the long-term influence of stock market development on economic growth, along with a mutual relationship in both short and long terms, the non-Euro area country group (also including Poland, Hungary, and Czechia) only displayed a short-term impact of the stock market on the economy. These findings suggest that stock market development might have less potential to fuel economic growth in countries not utilizing the euro.

Additional evidence supporting the divergence between the equity market and the real economy in specific nations comes from the study conducted by Przekota et al. (2019). Employing correlation analysis, the authors determined that between 2010 and 2018, the stock markets in Central and Eastern European countries were strongly correlated with economic activity, with one notable exception: the Czech Republic. In contrast to other countries, the correlation coefficient in Czechia was negative during this period. This observation suggests that the stock market and economic activity in the Czech Republic moved in opposing directions, indicating a potential decoupling between them.

The findings of Krkošková (2020) are somewhat similar to those of Przekota et al. (2019). Investigating the interplay between stock market development and economic growth in the Visegrad Group countries (also known as V4 – Poland, Hungary, Czechia, and Slovakia) from 2005 to 2018, Krkošková (2020) observed a long-term relationship between stock market development and economic growth in Hungary and Slovakia. While Hungary exhibited a positive relationship, as indicated by the cointegration equation where GDP is positively affected by the country's stock index growth rate, Slovakia presented a contrasting scenario. In Slovakia, GDP negatively responded to the country's stock market index growth, implying a decoupling of the Slovak equity market from the real economy during the examined period.

The recent studies by Molnár and Csiszárik-Kocsir (2022) and Molnár and Csiszárik-Kocsir (2023) delved into the influence of the stock market on economic growth in the Visegrad Group countries. Their findings affirmed a long-term relationship between GDP and the stock market across the V4 nations from 1995 to 2021. While these studies did not unveil significant disconnections between stock market returns and economic growth, they shed light on the incorporation of seasonally adjusted and unadjusted GDP data. The authors

acknowledged that their 2022 research, which utilized adjusted data, may have contributed to inconsistencies in the results; hence, they opted for unadjusted data in their 2023 study. For future research, employing both seasonally adjusted and unadjusted data could provide valuable insights into potential variations in the outcomes.

The final empirical study included in this overview is by Gajdka and Pietraszewski (2016). In this 2016 research, the authors drew upon Ritter's (2012) study and conducted a correlation analysis to examine if the real GDP growth rate and real GDP growth rate per capita in Central and Eastern European countries is related to the real stock rate of return over the long term (from stock market index availability for each country up to 2013). The findings indicated a positive correlation with the real GDP growth rate but presented unclear results for the same indicator per capita. The authors highlighted the relatively short duration of the studied period, methodological limitations, and the need for further research to deepen understanding in this area.

Analysis of the extensive body of previous empirical research reveals that the relationship between the stock market and the economy in Central and Eastern European countries is intricate and still lacks comprehensive understanding. Contradictory findings for the same countries often arise due to variations in sample sizes and methodological choices across studies. Additionally, this relationship is dynamic, evolving over time, and variables do not consistently behave as anticipated. While researchers have observed negative relationships and instances of disconnection, these have been isolated to specific countries. A deliberate examination of long-term decoupling in the relationship between the equity market and the economy in this group of countries remains unexplored, representing the research gap the current thesis aims to address.

2. Examining decoupling between equity markets and economies of Central and Eastern European countries

2.1. Data and methodology

The specific group of countries selected for this thesis — Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Serbia, Slovakia, and Slovenia — was chosen based on several key factors. Firstly, these nations share the status of transition economies within Central and Eastern Europe while also being members of the European Union (except for Serbia). This shared membership suggests exposure to similar external influences. However, they vary in their levels of economic integration within the EU, with some countries adopting the euro while others maintaining their national currencies.

Additionally, the re-establishment of stock markets in these countries following the collapse of socialist governments in the 1990s offers insights into post-socialist market development. The transition from planned to market-driven economies, coupled with their integration into the European Union, has resulted in dynamic stock exchange markets at various stages of maturity across the region. This unique setting provides an opportunity to study the relationships between economic fundamentals and equity market performance within a diverse and evolving economic landscape.

Based on the analysis of the previous empirical studies and the nature of the phenomenon, the evaluation of decoupling between the economy and the equity market within the selected group of countries will involve the examination of respective variables: seasonally adjusted and non-adjusted nominal quarterly GDP in local currency at current prices according to the expenditure approach, representing the economy, and nominal quarterly stock market index value, serving as a proxy for the equity market. The choice of quarterly data is motivated by the need to expand the dataset and reduce data noise, thus minimizing inertia in economic movements.

While acknowledging that the stock market index may be seen as insufficient, as it does not encompass all operating companies, the author aligns with previous studies that extensively utilized it to gauge overall stock market trends and achieved significant findings. Since the stock market index is a nominal indicator and not calculated per capita, gross nominal GDP is employed. Although the validity of GDP as a measure of a nation's economic well-being is debated, as noted by Molnár and Csiszárik-Kocsir (2022), the author acknowledges its limitations but opts to follow previous empirical research in utilizing this metric as the best attainable to date.

The employment of both seasonally adjusted and unadjusted GDP values attempts to explore whether accounting for short-term economic fluctuations yields more significant results. Moreover, given the currency considerations highlighted in previous studies, especially in the research from Kajurová and Rozmahel (2017), the author will use values in their original currency to assess if the dynamics between equity markets and economies will differ across the countries depending on the currency adopted.

Given the constrained availability of stock market indices data dating back to the 1990s and quarterly GDPs being available starting from the first quarter of 1995 for most countries, the earliest available data will be used up to the fourth quarter of 2023. Although the initial time frame had to be narrowed for most countries due to the unavailability of data or the later introduction of the index, the study remains pertinent and will contribute insights

into the dynamic relationship between the economy and stock market performance in the specified regions.

To conduct the empirical analysis, the author gathered data on both seasonally adjusted and non-adjusted nominal quarterly GDP in local currency at current prices, based on the expenditure approach, as well as quarterly closing stock market indices. The data collection spanned from the first quarter of 1995 (or the earliest available) to the fourth quarter of 2023. The values of GDP were sourced from domestic statistical office databases for Estonia (Statistics Estonia), Latvia (Official Statistics Portal), Lithuania (Official Statistics Portal), and Serbia (only seasonally unadjusted GDP values were available from the Statistical Office of the Republic of Serbia). For the remaining countries, data were retrieved from the OECD Data Explorer.

Data on the domestic stock market indices of the countries under analysis were gathered from two databases. The data was collected from Stooq.com for Estonia (OMXT), Latvia (OMXR), Lithuania (OMXV), Poland (WIG), Slovakia (SAX), Czechia (PX), Hungary (BUX), Bulgaria (SOFIX), Romania (BET). Values of domestic stock market indices for Slovenia (SBITOP), Serbia (BELEX), and Croatia (CROBEX) were retrieved from the Investing.com platform database.

The current thesis adopts a methodology to examine the decoupling phenomenon that is consistent with approaches used in previous empirical studies conducted by Siegel (1998), Ritter (2005, 2012), Estrada (2012), and Klement (2015). Through correlation analysis, these studies effectively captured the disconnect between a country's economic growth and equity market performance over the long term. By employing a similar method, the author intends to facilitate comparison with previous findings and contribute to the ongoing academic discourse while also offering a new perspective for exploring the decoupling phenomenon.

The steps of the analysis include:

1. Computing both discretely and continuously compounded quarterly GDP growth rates and stock market index returns.
2. Calculating geometric mean values for discretely compounded GDP growth rates and stock market returns.
3. Conducting correlation analysis for the whole group of countries using the geometric mean values obtained in the previous step.
4. Computing correlation coefficients for quarterly GDP growth rates and stock market returns for each country individually.

5. Conducting correlation analysis between stock market returns with different time lags (up to four quarters) and GDP growth rates for each country individually.

Lags-based analysis should reveal whether past stock market return values exhibit a stronger association with GDP growth rates and should help retrieve more statistically significant results, considering the nature of the stock market index as a leading indicator. Similar to Lyócsa et al. (2011) and Molnár and Csiszárik-Kocsir (2023), who investigated the relationship between equity markets and economies using quarterly data and set the number of lags to four, the author intends to lag stock market index returns for up to four quarters.

All the correlation tests were conducted in STATA software using the Pearson correlation coefficient. The author adopts a parametric quantitative approach as the data type is numeric and despite the relatively small number of observations. Recognizing the limitations of using the Pearson correlation coefficient in such analyses, the author follows the approach of earlier empirical studies by Ritter (2005, 2012), Estrada (2012), Klement (2015), and Gajdka and Pietraszewski (2016), which employed this coefficient for small samples. A 5% significance level will be used to interpret the findings. The resulting correlation coefficients, ranging from –1 to 1, will demonstrate the strength and the direction of the relationship between the equity market and the economy. The strength of the positive or negative correlation will be interpreted according to the following scale by Ratner (2009):

- less or equal to 0.3 – weak,
- more than 0.3 but less than 0.7 – moderate,
- more or equal to 0.7 – strong.

Negative statistically significant correlation coefficients will be interpreted as the presence of decoupling between the economy and the equity market. If the correlation coefficients are equal to zero, the author will also consider the stock markets' performance as being decoupled from the real economy, as it represents a deviation from the theoretically assumed positive relationship between them. If the effect of decoupling is present, its strength will be interpreted and compared among countries. The findings will be compared to those from previous studies, and potential practical implications will be drawn from them.

The author assumes that this methodology will ensure a nuanced and systematic estimate of the existence of the decoupling within the chosen group of countries. It builds upon the approaches employed in prior empirical studies while introducing novel elements, such as the use of both seasonally adjusted and unadjusted data, the analysis of an extended

period with more observations due to the choice of quarterly indicators, and the incorporation of lags in correlation analysis.

2.2. Results of the analysis

Table 5 displays geometric means of quarterly GDP growth rates (both seasonally adjusted and unadjusted) and quarterly stock market returns and the correlation coefficients between them. The correlation coefficients are calculated for the whole group of selected Central and Eastern European countries, while geometric means for each country are computed based on all the observed values over the period under examination.

Table 5

Geometric means of quarterly stock market returns and GDP growth rates and the correlation between them

Country	Period	Stock market quarterly return (geometric mean)	Quarterly GDP growth rate (geometric mean)	
			Seasonally unadjusted	Seasonally adjusted
Estonia	2000Q1−2023Q4	3.04%	2.05%	2.01%
Latvia	2000Q1−2023Q4	2.74%	1.92%	1.93%
Lithuania	2000Q1−2023Q4	2.37%	1.82%	1.84%
Poland	1995Q2−2023Q4	2.23%	2.17%	2.08%
Slovakia	1995Q4−2023Q4	0.58%	1.65%	1.67%
Czechia	1995Q2−2023Q4	1.06%	1.48%	1.39%
Hungary	1995Q2−2023Q4	3.45%	2.49%	2.38%
Slovenia	2006Q2−2023Q4	0.32%	1.21%	1.10%
Serbia	2005Q4−2023Q4	−0.18%	2.13%	−
Croatia	1998Q2−2023Q4	0.97%	1.32%	1.26%
Bulgaria	2001Q4−2023Q4	2.31%	2.03%	2.03%
Romania	2001Q1−2023Q4	3.70%	3.25%	3.23%
Correlation coeficient			0.70*	0.87*
p-value			(0.0110)	(0.0005)

Note: * − correlation coefficient is significant at 5% level

Source: author's calculations in STATA

The correlation coefficient between quarterly seasonally unadjusted GDP growth rates and quarterly stock market returns was 0.70, indicating a strong positive correlation. Its associated p-value of 0.011 suggests statistical significance at the 5% level. Similarly, the correlation coefficient between quarterly seasonally adjusted GDP growth rates and quarterly stock market returns was slightly higher at 0.87, indicating a strong positive correlation. Its p-value of 0.0005 confirms statistical significance at both the 5% and 1% levels. Hence, over the long run, stock market returns in this group of countries demonstrated a statistically significant strong positive correlation with GDP growth rates, whether seasonally adjusted or unadjusted.

Appendix A presents correlation coefficients between quarterly equity market returns and seasonally adjusted and unadjusted GDP growth rates for the same quarters, along with corresponding p-values and numbers of observations for each country. Among the twelve Central and Eastern European countries, only Poland exhibited a statistically significant correlation coefficient at the 5% level. Specifically, a correlation coefficient of 0.21 was observed when the GDP growth rate was discretely compounded and 0.20 when continuously compounded, with p-values of 0.0217 and 0.0239, respectively. Consequently, Poland's quarterly seasonally adjusted GDP growth rates demonstrated a weak positive correlation with the discretely compounded quarterly rates of return on its equity market. Conversely, countries with a similar number of observations to Poland, such as Slovakia, Czechia, and Hungary, did not display statistically significant correlation coefficients.

Furthermore, a pattern of negative correlation signs between stock market returns and seasonally unadjusted GDP growth rates was evident in the case of Estonia, Lithuania, Czechia, Serbia, Croatia, Bulgaria, and Romania. However, the coefficients' values were not statistically significant at the 5% level. Thus, the author concludes that, apart from Poland, which exhibited a weak positive correlation, the quarterly stock market returns and GDP growth rates, regardless of seasonal adjustment or compounding method, were not correlated over the long term in the countries under analysis.

When lagging the stock market returns for up to four quarters, the author observed more statistically significant results across countries. Appendix B presents correlation coefficients between lagged quarterly equity market returns and seasonally adjusted and unadjusted GDP growth rates with corresponding p-values and numbers of observations for each country. In Table 6, the author presents correlation coefficients between stock market returns with different time lags and GDP growth rates that were statistically significant at 5% across the countries under examination.

Table 6

The correlation between stock market returns with different time lags and GDP growth rates

Country	Quarterly stock market returns lags	Quarterly GDP growth rates	
		Seasonally unadjusted	Seasonally adjusted
Estonia	t−1	0.29^{dd}, 0.29^{dc}, 0.30^{cd}, 0.30^{cc}	0.35^{dd}, 0.35^{dc}, 0.39^{cd}, 0.40^{cc}
	t−2	non-significant	0.27^{dd}, 0.27^{dc}, 0.29^{cd}, 0.30^{cc}
	t−3	non-significant	0.27^{dd}, 0.27^{dc}, 0.28^{cd}, 0.28^{cc}
	t−4	non-significant	0.26^{dd}, 0.26^{dc}, 0.27^{cd}, 0.27^{cc}
Latvia	t−1	non-significant	0.27^{dd}, 0.28^{dc}, 0.31^{cd}, 0.32^{cc}
	t−2	non-significant	0.30^{dd}, 0.31^{dc}, 0.33^{cd}, 0.34^{cc}
	t−3	non-significant	0.23^{dd}, 0.23^{dc}, 0.25^{cd}, 0.25^{cc}
	t−4	0.23^{dd}, 0.23^{dc}, 0.24^{cd}, 0.24^{cc}	0.33^{dd}, 0.33^{dc}, 0.34^{cd}, 0.34^{cc}
Lithuania	t−1	0.20^{dd}, 0.21^{dc}, 0.25^{cd}, 0.26^{cc}	0.30^{dd}, 0.31^{dc}, 0.39^{cd}, 0.40^{cc}
	t−2	non-significant	0.34^{dd}, 0.34^{dc}, 0.37^{cd}, 0.37^{cc}
	t−3	non-significant	0.24^{dd}, 0.24^{dc}, 0.28^{cd}, 0.28^{cc}
	t−4	non-significant	0.31^{dd}, 0.30^{dc}, 0.32^{cd}, 0.31^{cc}
Hungary	t−1	non-significant	0.19^{dd}, 0.19^{dc}, 0.21^{cd}, 0.22^{cc}
	t−2	non-significant	non-significant
	t−3	non-significant	0.24^{dd}, 0.23^{dc}, 0.22^{cd}, 0.21^{cc}
	t−4	non-significant	non-significant
Slovenia	t−1	non-significant	0.42^{dd}, 0.42^{dc}, 0.44^{cd}, 0.44^{cc}
	t−2	non-significant	non-significant
	t−3	non-significant	0.27^{dd}, 0.27^{dc}, 0.26^{cd}, 0.26^{cc}
	t−4	non-significant	non-significant
Czechia	t−1	non-significant	0.25^{dd}, 0.25^{dc}, 0.28^{cd}, 0.28^{cc}
	t−2	non-significant	non-significant
	t−3	non-significant	non-significant
	t−4	non-significant	0.20^{dd}, 0.20^{dc}, 0.20^{cd}, 0.20^{cc}
Bulgaria	t−1	non-significant	0.21^{dd}, 0.22^{dc}, 0.24^{cd}, 0.24^{cc}
	t−2	non-significant	non-significant
	t−3	non-significant	non-significant
	t−4	non-significant	0.24^{dd}, 0.24^{dc}, 0.23^{cd}, 0.24^{cc}
Romania	t−1	non-significant	0.29^{dd}, 0.29^{dc}, 0.31^{cd}, 0.32^{cc}
	t−2	non-significant	non-significant
	t−3	non-significant	non-significant
	t−4	non-significant	0.29^{dd}, 0.29^{dc}, 0.30^{cd}, 0.30^{cc}
Poland	t−1	non-significant	non-significant
	t−2	non-significant	non-significant
	t−3	non-significant	0.24^{dd}, 0.23^{dc}, 0.21^{cd}, 0.21^{cc}
	t−4	non-significant	non-significant

Country	Quarterly stock market returns lags	Quarterly GDP growth rates	
		Seasonally unadjusted	Seasonally adjusted
Croatia	t−1	non-significant	0.28^{dd}, 0.28^{dc}, 0.31^{cd}, 0.32^{cc}
	t−2	non-significant	non-significant
	t−3	non-significant	non-significant
	t−4	non-significant	non-significant
Slovakia	t−1	non-significant	0.19^{cd}, 0.19^{cc}
	t−2	non-significant	non-significant
	t−3	non-significant	non-significant
	t−4	non-significant	non-significant

Note: the superscripts accompanying the coefficients denote the compounding method utilized in calculations. Specifically, „d“ denotes discrete compounding, while „c“ denotes continuous compounding. The first letter represents the compounding method for stock market returns, and the second represents the method for GDP growth rates.
Source: compiled by the author

The Baltic states, comprising Estonia, Latvia and Lithuania, form a distinctive group with similar findings. Firstly, these three countries were the sole ones to display statistically significant correlation coefficients between lagged stock market returns and seasonally unadjusted GDP growth rates. Secondly, they were also the only ones to exhibit statistically significant correlation coefficients between seasonally adjusted GDP growth rates and equity market return on the index at every lag length. The correlations were positive and ranged from weak to moderate. Specifically, in Estonia and Lithuania, the stock market returns lagged by one quarter exhibited the strongest correlation with GDP growth rates over the long run, whereas, in Latvia, the strongest correlation was observed with the stock market returns lagged by four quarters.

As previously mentioned, the findings reveal that, apart from the Baltic states, no other countries showed statistically significant correlations between seasonally unadjusted GDP growth rates and lagged stock market returns. Since the analysis excluded seasonally adjusted GDP values for Serbia due to data unavailability, it stood as the only country without any statistically significant correlation coefficients.

Poland, Croatia and Slovakia were the only countries with statistically significant correlations between seasonally adjusted GDP growth rates and equity market returns at one specific lag length. In Poland, stock market returns lagged by three quarters showed a weak positive correlation with GDP growth rates, with correlation coefficients ranging from 0.21 to 0.24, depending on the compounding method used in calculations. Croatia exhibited comparable results, with statistically significant correlations observed for equity market returns lagged by one quarter. However, the correlation coefficient tended to be higher,

ranging from 0.28 to 0.32. Notably, Slovakia's statistically significant results were retrieved only when stock market returns were calculated as continuously compounded. Seasonally adjusted GDP growth rates in Slovakia demonstrated a weak positive correlation with equity market returns lagged by one quarter, with a correlation coefficient of 0.19.

The remaining countries under examination exhibited a statistically significant relationship between seasonally adjusted GDP growth rates and equity market returns for two lag lengths. The findings reveal that Hungary and Slovenia displayed a positive correlation between seasonally adjusted GDP growth rates and equity market returns lagged by one and three quarters. Generally, this correlation was weak; however, in Slovenia, the coefficient value indicated a moderate positive correlation between economic growth rates and stock market returns lagged by one quarter.

In the case of Czechia, Bulgaria, and Romania, the correlation was positive between seasonally adjusted GDP growth rates and equity market returns lagged by one and four quarters. For Czechia and Bulgaria, the correlation tended to be weak, while it leaned to moderate in Romania if stock market returns were calculated as continuously compounded. Notably, in Czechia and Romania, the correlation tended to be slightly stronger when returns on the stock market index lagged by one quarter compared to four.

2.3. Discussion of results

The resulting correlation coefficients between mean geometric GDP growth and mean geometric stock market returns diverge from those reported in previous studies. Scholars like Siegel (1998), Ritter (2005, 2012), Estrada (2012), and Klement (2015) examined various country groups and found negative correlation coefficients, none of which reached significance at the conventional 5% level. These findings led these scholars to conclude that, over the long run, the country's economic growth is mainly irrelevant to returns on the stock market. Gajdka and Pietraszewski (2016) applied a similar methodology to study a group of Central and Eastern European countries, yielding a moderate positive correlation but also statistically insignificant at a 5% level.

In contrast, the current thesis delved into a slightly different set of Central and Eastern European countries over a more extended period, utilizing quarterly data. The analysis yielded statistically significant correlation coefficients, displaying a strong positive correlation between mean geometric stock market returns and mean geometric GDP growth rates. Notably, the correlation coefficient was higher for seasonally adjusted GDP growth rates (0.87) compared to unadjusted ones (0.7). The author suggests this discrepancy could be attributed to the reduced noise in seasonally adjusted data or the exclusion of Serbia due to

the unavailability of seasonally adjusted GDP values. Serbia was the only country with a negative mean geometric stock market return (−0.18%).

Overall, the results of the correlation analysis of mean geometric stock market returns and mean geometric GDP growth rates lead to the conclusion that the economy and the equity market in this group of Central and Eastern European countries as a whole exhibited a strong positive relationship over the long run and are not decoupled. The general dynamics of the stock market over the period under examination were not insulated from the economic performance of this country group, as returns on the stock markets were strongly correlated to economic growth rates.

From the policymaking perspective, these findings suggest that this group of Central and Eastern European countries, after the fall of socialist governments and transitioning to market economies, have managed to establish equity markets that are not disconnected from their economies and have the potential to support their economic growth. This assumption stems from the research conducted by Laopodis and Papastamou (2016), who argued that a disconnect between the economy and the stock market implies that the former may not be able to benefit from the latter. Moreover, understanding these general dynamics may contribute to the region's long-term economic planning. Policymakers can use this knowledge to develop strategies that leverage the relationship between economic growth and stock market performance to promote sustainable economic development.

From the investors' standpoint, interpreting these findings is more nuanced. The positive relationship between economic growth and equity returns in this group of Central and Eastern European countries over the long term may imply that if they have good economic growth prospects, investors can expect increased returns on these countries' equity markets. However, delving into the specific dynamics between each country's stock market returns and economic growth rates unveils new considerations.

The correlation analysis for quarterly equity market returns and GDP growth rates (seasonally adjusted and unadjusted) for the same quarter did not reveal statistically significant results for 11 out of 12 countries under analysis. This means that while the general dynamics of the relationship between equity markets and economies for the country group seemed positive, the same did not hold when examining the observations more closely. Over the long term, quarterly stock market returns were uncorrelated with GDP growth rates for the same period across 11 out of 12 Central and Eastern European countries. Poland was the sole exception, displaying a weak positive relationship between equity market returns and seasonally adjusted economic growth rates.

These findings contrast with those of Przekota et al. (2019), who explored the correlation between quarterly stock exchange indices and seasonally adjusted and unadjusted GDP in local currency for a similar group of Central and Eastern European countries and found the correlation coefficients to be consistently positive and strong for most countries. Notably, the researchers observed a shorter period from 2010 to 2018 and did not calculate returns.

Consequently, the author concludes that, over the long term, a disconnect existed between stock market performance and economic growth in the same period across the analyzed Central and Eastern European countries, except for Poland. It is also possible to conclude the presence of decoupling as the lack of a statistically significant relationship between stock market returns and GDP growth rates is a deviation from the theoretically appropriate and expected positive relationship. However, the results of correlation analysis utilizing lagged values of stock market returns presented a more nuanced picture, revealing that the equity market performance of the examined countries was not as disconnected from their economic activity as it might initially appear.

Each country's stock market returns lagged up to four quarters displayed at least one weak or moderate correlation with the GDP growth rate over the period under analysis. The only exception is Serbia, which did not reveal any statistically significant results. The author will not denote the Serbian stock market as the most decoupled from its economy, acknowledging the possibility of a different outcome if seasonally adjusted GDP data could be included in the analysis.

The Baltic states stand out as the only countries with statistically significant correlations between lagged stock market returns and seasonally unadjusted GDP growth rates, indicating a weak to moderate positive relationship over the long run. Specifically, this relationship was notable for stock market returns lagged by one quarter in Estonia and Lithuania and by four quarters in Latvia. These findings suggest that the stock market dynamics in the preceding quarter for Estonia and Lithuania and in the same quarter of the previous year for Latvia can form one's expectations of quarterly seasonal economic fluctuations over the long term. The author assumes that investors in these countries, anticipating such fluctuations, became more active in the equity markets, stimulating market activity and potentially influencing economic movements.

A weak to moderate positive relationship over the long term between stock market returns for every lag length and seasonally adjusted GDP growth rates across all Baltic states indicates that the equity markets and economies were not disconnected there, and their

relationship does not suggest the presence of decoupling. Moreover, the positive relationship between the stock market dynamics of the previous periods and economic activity over the long term suggests that stock market indices acted as leading indicators of future economic activity in the Baltic states. It establishes Estonia, Latvia and Lithuania among Central and Eastern European countries as a separate group that exhibited similar patterns of relationship between stock market and economy.

The relationship between lagged equity returns and economic growth rates was not as consistent among other countries as in the Baltic states. In Poland, a weak positive correlation emerged between stock market returns lagged by three quarters and economic growth rates over the long term, mirroring the results obtained when analyzing the indicators for the same quarters. The author concludes that the stock market and economy there are not decoupled as the equity market dynamics in the same quarter and lagged by three quarters were related to the country's economic growth over the long run.

Similar conclusions apply to Croatia and Slovakia, but only for the equity market returns that lagged by one quarter. Although no significant correlations were observed between the stock market and the economy when analyzed for the same quarter, the economic growth rate had a moderate and weak positive relationship with the preceding quarter's equity market returns in Croatia and Slovakia accordingly. Notably, the correlation coefficient observed in the case of Slovakia was the lowest one, assuming that while the economy and stock market there were not disconnected, the link was weaker than in other analyzed countries.

Czechia, Hungary, Bulgaria, Slovenia and Romania consistently demonstrated a predominantly weak positive relationship over the long run between economic growth and equity market returns at two lag lengths. The stock market activity in the preceding quarter and the same quarter in the previous year was positively related to economic growth in Czechia, Bulgaria and Romania over the long term. The same holds for stock market activity in the previous quarter and dated three quarters back for Hungary and Slovenia. Notably, the correlation coefficient for lag length in one quarter in Slovenia was the highest observed, assuming that the previous quarter's equity market dynamics had a moderate positive correlation with future economic activity over the long term. These findings suggest that the stock markets of these countries are not decoupled from their, as the stock market advancements were positively related to future economic growth.

Analyzing the findings from the perspective of the currency adopted by the country, it is difficult to make straightforward assumptions. The euro-adopting nations such as Estonia,

Latvia, Lithuania and Slovenia tended to exhibit higher correlation coefficients compared to countries utilizing local currencies such as Poland, Czechia, Hungary and Bulgaria, suggesting that the relationship between the economy and equity market was more robust in countries that use euro. On the other hand, Romania, which uses its local currency, demonstrated correlations closer to those of euro-adopting nations, while Slovakia, which uses the euro, exhibited the lowest correlation coefficients. Additionally, Croatia revealed correlation coefficients similar to those of nations using the euro, and the GDP values in the analysis were in the euro. However, before 2023, and therefore, over the examined period, it used its local currency.

Overall, the correlation analysis incorporating lagged stock market returns revealed that the equity markets of Central and Eastern European countries are not decoupled from their economies. Although Serbia did not demonstrate statistically significant correlations, the author chooses not to consider its equity market decoupled, understanding the analysis limitations without seasonally adjusted GDP data. All the other countries, except for Serbia, revealed a low to moderate positive correlation between lagged equity market returns and GDP growth rates over the long term. It assumes that the stock market in this group of countries was not disconnected from the economy and acted as its leading indicator, which means that the equity market performance had a positive relationship with future economic activity.

These findings suggest that for policymakers, monitoring equity market performance can provide insights into future economic activity in Central and Eastern European countries. Recognizing the positive relationship between equity market returns and GDP growth rates can aid long-term economic planning and decision-making. For investors, understanding that equity market performance is related to economic growth rates in these countries can inform investment decisions. Recognizing the equity market as a leading indicator of economic activity may guide investors in identifying potential opportunities and risks in the region’s markets.

Conclusion

The relationship between the country’s equity market and economy is generally expected to be positive. Scholars drew meaningful explanations and created theories describing why it is supposed to be this way. One of the most fundamental explanations is that the stock market is a leading indicator of economic activity and can predict and directly influence it (Comincioli, 1996). These theoretically appropriate and expected positive relationships between the economy and equity market create an assumption that investing in

countries with promising growth prospects will result in increased returns on the stock market and benefit shareholders. However, this assumption will not hold if the country's equity market is decoupled from its economy.

Decoupling generally challenges the traditional and expected relationships between the variables, causing the dependencies to deviate and correlations to break. In economics and finance, the decoupling phenomenon was studied and documented across various asset classes, markets and economies (Gulko, 2002; Alexakis et al., 2015; Pesce, 2017). When considered in the context of the stock market-economy relationship, decoupling means that the stock market performance is isolated from the country's economic performance (Hayes, 2022).

Studies conducted by Siegel (1998), Ritter (2005, 2012), Estrada (2012), and Klement (2015) employing correlation analysis found empirical evidence of the disconnection between economic growth rates and stock market returns over the long term for various groups of countries. Consequently, these scholars documented the presence of decoupling between the performance of equity markets and economies.

The scientific literature about Central and Eastern European countries has explored various aspects of the relationship between the economy and the stock market. However, even the general dynamics of their relationship are not yet fully understood – there is a lack of consensus on the causality, the long-term and short-term trends, the direction and the strength of the connection. Additionally, no author deliberately focused on evaluating the possibility of disconnection that may have formed between them since the stock market inception till the present. The thesis aimed to address this gap by estimating the presence of decoupling, a phenomenon where the performance of a country's equity market is isolated from the performance of its economy.

The author gathered quarterly seasonally adjusted and unadjusted GDP data and quarterly stock index data for twelve selected Central and Eastern European countries from the first quarter of 1995 (or earliest available) to the fourth quarter of 2023. After calculating stock market returns and GDP growth rates (as discretely and continuously compounded), the correlation tests were conducted in STATA for the whole country group, each country separately based on the observations for the corresponding quarters and also for lagged stock market returns and GDP growth rates.

The analysis revealed that the Central and Eastern European group of countries as a whole had a strong positive relationship between the stock market and economic performances over the long term, which means that the two are not decoupled and that, since

the stock market re-establishment, this group of countries have succeeded to develop equity markets that have the potential to spur their economic growth. Each country individually exhibited a weak to moderate correlation between lagged values of equity market returns and economic growth rates, assuming the absence of decoupling and the ability of stock markets to act as leading indicators of economic activity. The Baltic states exhibited similar patterns with statistically significant correlations at every lag length. Additionally, it is possible to assume that countries adopting the euro have a slightly stronger positive relationship between the performance of the economy and the stock market than countries that use local currency.

The author acknowledges several limitations encountered during the analysis, such as the utilization of the Pearson correlation coefficient for a relatively small dataset and data unavailability leading to fewer observations than initially intended. Incorporating non-parametric quantitative methods or exploring novel approaches for estimating the decoupling phenomenon could benefit further studies in this area. Moreover, future research could examine the decoupling phenomenon across different groups of countries, facilitating a comparative analysis to discern the factors influencing decoupling. Investigating the development of investment strategies based on decoupling dynamics and evaluating the stock market's reliability as a predictor of future economic growth could also be promising avenues for further exploration in this field.

By reviewing scientific literature, collecting data and conducting the quantitative analysis, the author achieved the research aim of examining the presence of decoupling between equity markets and economies in the Central and Eastern European countries. Additionally, an empirical study containing correlation data across twelve analyzed countries spanning an extended period and integrating lagged stock market return values contributes to the scientific literature, providing evidence of the intricate relationship between equity markets and economies.

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APPENDIX A

Correlation coefficients for stock market returns and GDP growth rates with p-values and numbers of observations

Country	Stock market return on index	Seasonally unadjusted GDP growth rate (discretely compounded)	Seasonally adjusted GDP growth rate (discretely compounded)	Seasonally unadjusted GDP growth rate (continuously compounded)	Seasonally adjusted GDP growth rate (continuously compounded)
Estonia	Discretely compounded	−0.0915 (0.3753) 96	0.1560 (0.1290) 96	−0.0843 (0.4142) 96	0.1553 (0.1309) 96
	Continuously compounded	−0.0627 (0.5437) 96	0.1913 (0.0619) 96	−0.0555 (0.5915) 96	0.1912 (0.0620) 96
Latvia	Discretely compounded	0.1692 (0.0994) 96	0.1281 (0.2136) 96	0.1747 (0.0886) 96	0.1281 (0.2135) 96
	Continuously compounded	0.1870 (0.0681) 96	0.1634 (0.1117) 96	0.1924 (0.0604) 96	0.1643 (0.1098) 96
Lithuania	Discretely compounded	−0.0079 (0.9391) 96	0.0379 (0.7141) 96	−0.0051 (0.9606) 96	0.0375 (0.7168) 96
	Continuously compounded	0.0078 (0.9401) 96	0.0968 (0.3482) 96	0.0096 (0.9257) 96	0.0962 (0.3514) 96
Poland	Discretely compounded	0.0285 (0.7621) 115	0.2139* (0.0217) 115	0.0291 (0.7573) 115	0.2033* (0.0293) 115
	Continuously compounded	0.0262 (0.7808) 115	0.1799 (0.0544) 115	0.0265 (0.7788) 115	0.1706 (0.0682) 115
Slovakia	Discretely compounded	0.0008 (0.9934) 113	0.0936 (0.3240) 113	0.0016 (0.9863) 113	0.0931 (0.3269) 113
	Continuously compounded	0.0027 (0.9774) 113	0.0871 (0.3590) 113	0.0035 (0.9706) 113	0.0865 (0.3623) 113
Czechia	Discretely compounded	−0.1355 (0.1487) 115	0.0236 (0.8021) 115	−0.1311 (0.1624) 115	0.0207 (0.8266) 115
	Continuously compounded	−0.1210 (0.1977) 115	0.0415 (0.6598) 115	−0.1167 (0.2142) 115	0.0388 (0.6805) 115
Hungary	Discretely compounded	0.0648 (0.4913) 115	0.0560 (0.5525) 115	0.0677 (0.4719) 115	0.0534 (0.5708) 115

Country	Stock market return on index	Seasonally unadjusted GDP growth rate (discretely compounded)	Seasonally adjusted GDP growth rate (discretely compounded)	Seasonally unadjusted GDP growth rate (continuously compounded)	Seasonally adjusted GDP growth rate (continuously compounded)
Hungary	Continuously compounded	0.0670 (0.4770) 115	0.0439 (0.6416) 115	0.0688 (0.4650) 115	0.0413 (0.6610) 115
Slovenia	Discretely compounded	0.1749 (0.1445) 71	0.1303 (0.2789) 71	0.1742 (0.1462) 71	0.1278 (0.2883) 71
	Continuously compounded	0.1675 (0.1627) 71	0.1385 (0.2493) 71	0.1672 (0.1635) 71	0.1362 (0.2574) 71
Serbia	Discretely compounded	−0.0598 (0.6153) 73	–	−0.0582 (0.6248) 73	–
	Continuously compounded	−0.0387 (0.7451) 73	–	−0.0375 (0.7530) 73	–
Croatia	Discretely compounded	−0.1403 (0.1575) 103	0.1221 (0.2193) 103	−0.1397 (0.1593) 103	0.1142 (0.2509) 103
	Continuously compounded	−0.1296 (0.1920) 103	0.1281 (0.1972) 103	−0.1294 (0.1926) 103	0.1198 (0.2283) 103
Bulgaria	Discretely compounded	−0.1403 (0.1575) 103	0.1221 (0.2193) 103	−0.1397 (0.1593) 103	0.1142 (0.2509) 103
	Continuously compounded	−0.1296 (0.1920) 103	0.1281 (0.1972) 103	−0.1294 (0.1926) 103	0.1198 (0.2283) 103
Romania	Discretely compounded	−0.0311 (0.7687) 92	0.1081 (0.3050) 92	−0.0359 (0.7343) 92	0.1037 (0.3251) 92
	Continuously compounded	−0.0261 (0.8050) 92	0.1031 (0.3279) 92	−0.0297 (0.7785) 92	0.0994 (0.3460) 92

Note: * − correlation coefficient is significant at 5% level

Source: author's calculations in STATA

APPENDIX B

Correlation coefficients for lagged stock market returns and GDP growth rates with p-values and numbers of observations

Country	Stock market return	Seasonally unadjusted GDP growth rate (discretely compounded)	Seasonally adjusted GDP growth rate (discretely compounded)	Seasonally unadjusted GDP growth rate (continuously compounded)	Seasonally adjusted GDP growth rate (continuously compounded)
Estonia	Discretely compounded, lag (1)	0.2897* (0.0044) 95	0.3468* (0.0006) 95	0.2902* (0.0043) 95	0.3505* (0.0005) 95
	Discretely compounded, lag (2)	0.0691 (0.5083) 94	0.2656* (0.0097) 94	0.0737 (0.4805) 94	0.2689* (0.0088) 94
	Discretely compounded, lag (3)	0.1482 (0.1562) 93	0.2661* (0.0099) 93	0.1518 (0.1464) 93	0.2677* (0.0095) 93
	Discretely compounded, lag (4)	−0.0465 (0.6595) 92	0.2610* (0.0120) 92	−0.0403 (0.7031) 92	0.2612* (0.0119) 92
	Continuously compounded, lag (1)	0.3003* (0.0031) 95	0.3928* (0.0001) 95	0.3036* (0.0028) 95	0.3980* (0.0001) 95
	Continuously compounded, lag (2)	0.0808 (0.4391) 94	0.2911* (0.0044) 94	0.0855 (0.4123) 94	0.2950* (0.0039) 94
	Continuously compounded, lag (3)	0.1444 (0.1672) 93	0.2750* (0.0076) 93	0.1479 (0.1572) 93	0.2771* (0.0072) 93
	Continuously compounded, lag (4)	−0.0293 (0.7818) 92	0.2664* (0.0103) 92	−0.0233 (0.8257) 92	0.2665* (0.0102) 92
Latvia	Discretely compounded, lag (1)	0.1401 (0.1756) 95	0.2705* (0.0080) 95	0.1534 (0.1378) 95	0.2790* (0.0062) 95
	Discretely compounded, lag (2)	−0.0478 (0.6474) 94	0.2982* (0.0035) 94	−0.0435 (0.6775) 94	0.3064* (0.0027) 94
	Discretely compounded, lag (3)	0.0779 (0.4582) 93	0.2304* (0.0263) 93	0.0671 (0.5225) 93	0.2309* (0.0263) 93
	Discretely compounded, lag (4)	0.2336* (0.0250) 92	0.3297* (0.0013) 92	0.2340* (0.0248) 92	0.3290* (0.0014) 92
	Continuously compounded, lag (1)	0.1587 (0.1246) 95	0.3135* (0.0020) 95	0.1726 (0.0944) 95	0.3234* (0.0014) 95

Country	Stock market return	Seasonally unadjusted GDP growth rate (discretely compounded)	Seasonally adjusted GDP growth rate (discretely compounded)	Seasonally unadjusted GDP growth rate (continuously compounded)	Seasonally adjusted GDP growth rate (continuously compounded)
	Continuously compounded, lag (2)	−0.0280 (0.7886) 94	0.3340* (0.0010) 94	−0.0228 (0.8274) 94	0.3432* (0.0007) 94
	Continuously compounded, lag (3)	0.0725 (0.4896) 93	0.2541* (0.0140) 93	0.0612 (0.5601) 93	0.2544* (0.0139) 93
	Continuously compounded, lag (4)	0.2444* (0.0189) 92	0.3435* (0.0008) 92	0.2442* (0.0190) 92	0.3429* (0.0008) 92
Lithuania	Discretely compounded, lag (1)	0.2048* (0.0465) 95	0.3011* (0.0030) 95	0.2147* (0.0367) 95	0.3094* (0.0023) 95
	Discretely compounded, lag (2)	−0.0666 (0.5239) 94	0.3406* (0.0008) 94	−0.0588 (0.5732) 94	0.3422* (0.0007) 94
	Discretely compounded, lag (3)	0.1221 (0.2436) 93	0.2419* (0.0195) 93	0.1177 (0.2613) 93	0.2434* (0.0187) 93
	Discretely compounded, lag (4)	0.0586 (0.5787) 92	0.3052* (0.0031) 92	0.0573 (0.5873) 92	0.3027* (0.0034) 92
	Continuously compounded, lag (1)	0.2493* (0.0149) 95	0.3874* (0.0001) 95	0.2624* (0.0102) 95	0.3985* (0.0001) 95
	Continuously compounded, lag (2)	−0.0624 (0.5499) 94	0.3660* (0.0003) 94	−0.0536 (0.6079) 94	0.3686* (0.0003) 94
	Continuously compounded, lag (3)	0.1146 (0.2742) 93	0.2785* (0.0069) 93	0.1103 (0.2926) 93	0.2798* (0.0066) 93
	Continuously compounded, lag (4)	0.0622 (0.5561) 92	0.3158* (0.0022) 92	0.0598 (0.5715) 92	0.3132* (0.0024) 92
Poland	Discretely compounded, lag (1)	−0.0199 (0.8335) 114	0.1551 (0.0995) 114	−0.0201 (0.8322) 114	0.1621 (0.0848) 114
	Discretely compounded, lag (2)	0.0714 (0.4521) 113	0.0621 (0.5137) 113	0.0787 (0.4073) 113	0.0632 (0.5064) 113
	Discretely compounded, lag (3)	0.0691 (0.4694) 112	0.2382* (0.0114) 112	0.0688 (0.4709) 112	0.2331* (0.0134) 112

Country	Stock market return	Seasonally unadjusted GDP growth rate (discretely compounded)	Seasonally adjusted GDP growth rate (discretely compounded)	Seasonally unadjusted GDP growth rate (continuously compounded)	Seasonally adjusted GDP growth rate (continuously compounded)
	Discretely compounded, lag (4)	−0.0022 (0.4694) 111	0.1713 (0.0722) 111	−0.0041 (0.9663) 111	0.1680 (0.0779) 111
	Continuously compounded, lag (1)	−0.0270 (0.7757) 114	0.1461 (0.1210) 114	−0.0272 (0.7740) 114	0.1542 (0.1015) 114
	Continuously compounded, lag (2)	0.0756 (0.4259) 113	0.0546 (0.5655) 113	0.0831 (0.3818) 113	0.0558 (0.5574) 113
	Continuously compounded, lag (3)	0.0594 (0.5335) 112	0.2106* (0.0258) 112	0.0588 (0.5377) 112	0.2062* (0.0292) 112
	Continuously compounded, lag (4)	−0.0007 (0.9940) 111	0.1477 (0.1220) 111	−0.0032 (0.9732) 111	0.1447 (0.1296) 111
Slovakia	Discretely compounded, lag (1)	−0.0162 (0.8653) 112	0.1820 (0.0548) 112	−0.0155 (0.8713) 112	0.1856 (0.0501) 112
	Discretely compounded, lag (2)	−0.0298 (0.7565) 111	−0.0275 (0.7742) 111	−0.0324 (0.7354) 111	−0.0266 (0.7816) 111
	Discretely compounded, lag (3)	0.1479 (0.1230) 110	0.0709 (0.4620) 110	0.1465 (0.1266) 110	0.0714 (0.4585) 110
	Discretely compounded, lag (4)	−0.0320 (0.7413) 109	0.0499 (0.6062) 109	−0.0311 (0.7481) 109	0.0490 (0.6126) 109
	Continuously compounded, lag (1)	−0.0183 (0.8480) 112	0.1894* (0.0455) 112	−0.0172 (0.8571) 112	0.1935* (0.0409) 112
	Continuously compounded, lag (2)	−0.0382 (0.6904) 111	−0.0413 (0.6668) 111	−0.0413 (0.6670) 111	−0.0404 (0.6739) 111
	Continuously compounded, lag (3)	0.1502 (0.1173) 110	0.0624 (0.5175) 110	0.1483 (0.1221) 110	0.0628 (0.5144) 110
	Continuously compounded, lag (4)	−0.0304 (0.7538) 109	0.0408 (0.6733) 109	−0.0297 (0.7593) 109	0.0398 (0.6812) 109
Czechia	Discretely compounded, lag (1)	0.1093 (0.2469) 114	0.2506* (0.0072) 114	0.1020 (0.2800) 114	0.2548* (0.0062) 114

Country	Stock market return	Seasonally unadjusted GDP growth rate (discretely compounded)	Seasonally adjusted GDP growth rate (discretely compounded)	Seasonally unadjusted GDP growth rate (continuously compounded)	Seasonally adjusted GDP growth rate (continuously compounded)
	Discretely compounded, lag (2)	0.0014 (0.9880) 113	0.0644 (0.4981) 113	0.0030 (0.9752) 113	0.0651 (0.4930) 113
	Discretely compounded, lag (3)	0.1321 (0.1649) 112	0.0790 (0.4078) 112	0.1317 (0.1663) 112	0.0798 (0.4029) 112
	Discretely compounded, lag (4)	−0.0759 (0.1649) 111	0.1975* (0.0378) 111	−0.0746 (0.4367) 111	0.1975* (0.0385) 111
	Continuously compounded, lag (1)	0.1081 (0.2521) 114	0.2788* (0.0027) 114	0.1009 (0.2856) 114	0.2838* (0.0027) 114
	Continuously compounded, lag (2)	0.0097 (0.9189) 113	0.0535 (0.5734) 113	0.0115 (0.9041) 113	0.0548 (0.5643) 113
	Continuously compounded, lag (3)	0.1206 (0.2052) 112	0.0802 (0.4005) 112	0.1204 (0.2060) 112	0.0809 (0.3965) 112
	Continuously compounded, lag (4)	−0.0652 (0.4963) 111	0.2018* (0.0337) 111	−0.0638 (0.5056) 111	0.2008* (0.0346) 111
Hungary	Discretely compounded, lag (1)	−0.0532 (0.5740) 114	0.1894* (0.0436) 114	−0.0516 (0.5854) 114	0.1947* (0.0379) 114
	Discretely compounded, lag (2)	0.1335 (0.1587) 113	0.1237 (0.1918) 113	0.1318 (0.1642) 113	0.1224 (0.1964) 113
	Discretely compounded, lag (3)	0.0187 (0.8452) 112	0.2375* (0.0117) 112	0.0219 (0.8185) 112	0.2323* (0.0137) 112
	Discretely compounded, lag (4)	0.0672 (0.4836) 111	0.1631 (0.0871) 111	0.0703 (0.4633) 111	0.1601 (0.0932) 111
	Continuously compounded, lag (1)	−0.0464 (0.6243) 114	0.2106* (0.0245) 114	−0.0451 (0.6340) 114	0.2167* (0.0205) 114
	Continuously compounded, lag (2)	0.1348 (0.1544) 113	0.1197 (0.2067) 113	0.1333 (0.1591) 113	0.1189 (0.2099) 113
	Continuously compounded, lag (3)	0.0070 (0.9414) 112	0.2187* (0.0205) 112	0.0100 (0.9163) 112	0.2137* (0.0236) 112

Country	Stock market return	Seasonally unadjusted GDP growth rate (discretely compounded)	Seasonally adjusted GDP growth rate (discretely compounded)	Seasonally unadjusted GDP growth rate (continuously compounded)	Seasonally adjusted GDP growth rate (continuously compounded)
	Continuously compounded, lag (4)	0.0657 (0.4932) 111	0.1339 (0.1611) 111	0.0683 (0.4763) 111	0.1316 (0.1685) 111
Slovenia	Discretely compounded, lag (1)	0.2011 (0.0951) 70	0.4195* (0.0003) 70	0.2073 (0.0851) 70	0.4210* (0.0003) 70
	Discretely compounded, lag (2)	0.0194 (0.8745) 69	0.1203 (0.3250) 69	0.0264 (0.8298) 69	0.1252 (0.3052) 69
	Discretely compounded, lag (3)	−0.0500 (0.6857) 68	0.2713* (0.0252) 68	−0.0553 (0.6542) 68	0.2692* (0.0264) 68
	Discretely compounded, lag (4)	0.2344 (0.0562) 67	0.1508 (0.2233) 67	0.2287 (0.0626) 67	0.1519 (0.2197) 67
	Continuously compounded, lag (1)	0.2094 (0.0819) 70	0.4353* (0.0002) 70	0.2169 (0.0713) 70	0.4378* (0.0002) 70
	Continuously compounded, lag (2)	0.0095 (0.9384) 69	0.1167 (0.3396) 69	0.0162 (0.8946) 69	0.1219 (0.3183) 69
	Continuously compounded, lag (3)	−0.0354 (0.7743) 68	0.2648* (0.0291) 68	−0.0405 (0.7427) 68	0.2625* (0.0306) 68
	Continuously compounded, lag (4)	0.2157 (0.0796) 67	0.1545 (0.2119) 67	0.2111 (0.0864) 67	0.1554 (0.2093) 67
Serbia	Discretely compounded, lag (1)	0.0934 (0.4351) 72	−	0.0914 (0.4452) 72	−
	Discretely compounded, lag (2)	−0.0578 (0.6323) 71	−	−0.0562 (0.6415) 71	−
	Discretely compounded, lag (3)	0.0819 (0.5003) 70	−	0.0761 (0.5314) 70	−
	Discretely compounded, lag (4)	0.0115 (0.9251) 69	−	0.0103 (0.9330) 69	−
	Continuously compounded, lag (1)	0.0856 (0.4744) 72	−	0.0843 (0.4815) 72	−

Country	Stock market return	Seasonally unadjusted GDP growth rate (discretely compounded)	Seasonally adjusted GDP growth rate (discretely compounded)	Seasonally unadjusted GDP growth rate (continuously compounded)	Seasonally adjusted GDP growth rate (continuously compounded)
	Continuously compounded, lag (2)	−0.0352 (0.7710) 71	–	−0.0329 (0.7853) 71	–
	Continuously compounded, lag (3)	0.0508 (0.6760) 70	–	0.0462 (0.7043) 70	–
	Continuously compounded, lag (4)	0.0297 (0.8086) 69	–	0.0283 (0.8178) 69	–
Croatia	Discretely compounded, lag (1)	0.0507 (0.6131) 102	0.2764* (0.0049) 102	0.0570 (0.5694) 102	0.2827* (0.0040) 102
	Discretely compounded, lag (2)	0.1533 (0.1258) 101	0.1597 (0.1107) 101	0.1571 (0.1167) 101	0.1547 (0.1224) 101
	Discretely compounded, lag (3)	0.0436 (0.6664) 100	0.0342 (0.7357) 100	0.0406 (0.6883) 100	0.0355 (0.7258) 100
	Discretely compounded, lag (4)	−0.1452 (0.1516) 99	0.1027 (0.3117) 99	−0.1464 (0.1483) 99	0.0991 (0.3289) 99
	Continuously compounded, lag (1)	0.0755 (0.4509) 102	0.3117* (0.0014) 102	0.0811 (0.4180) 102	0.3186* (0.0011) 102
	Continuously compounded, lag (2)	0.1474 (0.1414) 101	0.1716 (0.0862) 101	0.1508 (0.1322) 101	0.1663 (0.0966) 101
	Continuously compounded, lag (3)	0.0227 (0.8224) 100	0.0198 (0.8449) 100	0.0192 (0.8500) 100	0.0217 (0.8301) 100
	Continuously compounded, lag (4)	−0.1354 (0.1813) 99	0.1057 (0.2976) 99	−0.1370 (0.1762) 99	0.1018 (0.3161) 99
Bulgaria	Discretely compounded, lag (1)	0.0675 (0.5321) 88	0.2137* (0.0455) 88	0.0766 (0.4779) 88	0.2152* (0.0440) 88
	Discretely compounded, lag (2)	−0.1133 (0.2963) 87	0.0626 (0.5644) 87	−0.1094 (0.3133) 87	0.0640 (0.5556) 87
	Discretely compounded, lag (3)	0.0547 (0.6171) 86	0.1767 (0.1036) 86	0.0465 (0.6707) 86	0.1757 (0.1056) 86

Country	Stock market return	Seasonally unadjusted GDP growth rate (discretely compounded)	Seasonally adjusted GDP growth rate (discretely compounded)	Seasonally unadjusted GDP growth rate (continuously compounded)	Seasonally adjusted GDP growth rate (continuously compounded)
	Discretely compounded, lag (4)	0.1110 (0.3118) 85	0.2413* (0.0261) 85	0.1046 (0.3406) 85	0.2444* (0.0242) 85
	Continuously compounded, lag (1)	0.0888 (0.4107) 88	0.2353* (0.0273) 88	0.0976 (0.3654) 88	0.2367* (0.0264) 88
	Continuously compounded, lag (2)	−0.1086 (0.3166) 87	0.0623 (0.5665) 87	−0.1035 (0.3400) 87	0.0634 (0.5594) 87
	Continuously compounded, lag (3)	0.0364 (0.7395) 86	0.2057 (0.0574) 86	0.0279 (0.7990) 86	0.2051 (0.0582) 86
	Continuously compounded, lag (4)	0.1113 (0.3105) 85	0.2333* (0.0316) 85	0.1049 (0.3394) 85	0.2360* (0.0297) 85
Romania	Discretely compounded, lag (1)	0.1049 (0.3224) 91	0.2885* (0.0056) 91	0.1049 (0.3226) 91	0.2937* (0.0047) 91
	Discretely compounded, lag (2)	0.0001 (0.9996) 90	0.1339 (0.2084) 90	0.0025 (0.9810) 90	0.1355 (0.2030) 90
	Discretely compounded, lag (3)	0.0289 (0.7877) 89	0.0255 (0.8123) 89	0.0274 (0.7989) 89	0.0201 (0.8516) 89
	Discretely compounded, lag (4)	−0.0120 (0.9117) 88	0.2884* (0.0064) 88	−0.0133 (0.9018) 88	0.2876* (0.0066) 88
	Continuously compounded, lag (1)	0.0964 (0.3634) 91	0.3126* (0.0026) 91	0.0967 (0.3617) 91	0.3189* (0.0021) 91
	Continuously compounded, lag (2)	0.0073 (0.9453) 90	0.1474 (0.1655) 90	0.0112 (0.9162) 90	0.1506 (0.1565) 90
	Continuously compounded, lag (3)	0.0300 (0.7800) 89	0.0279 (0.7949) 89	0.0291 (0.7864) 89	0.0229 (0.8311) 89
	Continuously compounded, lag (4)	−0.0040 (0.9707) 88	0.3038* (0.0040) 88	−0.0037 (0.9730) 88	0.3038* (0.0040) 88

Note: * − correlation coefficient is significant at 5% level

Source: author's calculations in STATA

Resümee

AKTSIATURGUDE LAHTISIDUMINE MAJANDUSEST KESK- JA IDA-EUROOPA RIIKIDE NÄITEL

Anna Pobedova

Aktsiaturu lahtisidumine majandusest on oluline, kuid akadeemilises kirjanduses seni vähest käsitlust leidnud uurimisteema. Siiani ei ole täielikult välja selgitatud majanduse ja aktsiaturu üldise dünaamika omavaheline seos – puudub üksmeel suhte kausaalsuse, pika- ja lühiajaliste trendide, suuna ja tugevuse osas. Kui eelnevalt koostatud uuringud käsitlesid Kesk- ja Ida-Euroopa riikide majanduste ja aktsiaturgude omavaheliste seoste erinevaid aspekte, pole teadustöödes otseselt hinnatud majanduste lahtisidumise võimalust aktsiaturgudest alates aktsiaturgude taastamisest 1990ndatel. Käesoleva bakalaureusetöö eesmärgiks on selle uurimislünga täitmine: töö keskendub lahtisidumise nähtusele, mille kohaselt riigi aktsiaturg on justkui isoleeritud riigi majanduse arengust, s.t. aktsiaturg ja majandus võivad liikuda erinevas suunas.

Selle nähtuse uurimise asjakohasus seisneb lahtisidumise tähtsuse mõistmises ratsionaalsete, kaalutletud investeerimisotsuste langetamise seisukohast, eriti ulatusliku majanduskasvu või -languse tingimustes. Investorid sageli eeldavad, et majanduslik tõus viib omakorda aktsiaturgude tootluste kasvuni, kuid lahtisidumise olemasolu vaidlustab sellise otsese seose. Keskendudes Kesk- ja Ida-Euroopa riikide pikaajalistele andmeridade uurimisele pakub käesolev lõputöö sissevaadet majanduste ja aktsiaturgude toimimise nüansirikkasse dünaamikasse käsitletavas regioonis, arvestades analüüsitavate riikide ainulaadset postsotsialistlikku tausta, suhteliselt noori aktsiaturgusid ja mitmekesiseid valuuta kasutuselevõtu stsenaariumeid.

Empiirilise analüüsi läbiviimiseks kasutas autor 12 Kesk- ja Ida-Euroopa riigi kvartaalseid sesoonselt kohandamata ja kohandatud SKPde andmeid ning kvartaalseid aktsiaturgude indeksite andmeid ajavahemikus 1995. a I kvartal (või muu varaseim ajahetk) kuni 2023. a IV kvartal. Valim koosnes järgnevatest riikidest: Bulgaaria, Eesti, Horvaatia, Leedu, Läti, Poola, Rumeenia, Serbia, Slovakkia, Sloveenia, Tšehhi Vabariik ja Ungari. Hindamaks lahtisidumise efekti olemasolu, viis autor läbi majanduse (SKP) ja aktsiaturgude kasvumäärade vahelise korrelatsioonanalüüsi, muuhulgas kasutades ka viitajaga aktsiaturgude tootluse näitajaid (viitaja pikkusega kuni neli kvartalit).

Analüüsi tulemused näitasid, et Kesk- ja Ida-Euroopa riikidel tervikuna on pikas perioodis tugev positiivne seos aktsiaturgude liikumise ja majanduste arengu vahel, mis viitab sellele, et käsitletud riikide majandused ja aktsiaturud pole lahti seotud, ning et alates

aktsiaturgude taastamisest olid riigid edukad arendamaks aktsiaturge nii, et turud on ergutanud riikide majanduse arengut. Üksikute riikide tasandil läbiviidud analüüs võimaldas tuvastada nõrga kuni mõõduka korrelatsiooni viitajaga aktsiaturgude tootluste ja majanduskasvu määrade vahel, mis viitab samuti lahtisidumise puudumisele ning sellele, et aktsiaturud toimivad majandusliku aktiivsuse juhtivindikaatoritena. Balti riikide – Eesti, Läti ja Leedu – puhul oli täheldada sarnaseid mustreid statistiliselt oluliste korrelatsioonidega iga viitaja pikkuse puhul. Täiendavalt on võimalik oletada, et riikides, mis võtsid kasutusele euro, on veidi tugevam positiivne seos majandusarengu ja aktsiaturu liikumise vahel võrreldes riikidega, mis ei kuulu eurotsooni.

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Anna Pobedova

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