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ECONOMIC GROWTH AND STOCK MARKET DEVELOPMENT: EVIDENCE FROM SELECTED COUNTRIES

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ABSTRACT

By sustaining the required capital and investment, the financial sector plays a critical role in achieving economic growth and stability. This paper conducts a comprehensive examination of the relationships between stock market development and economic growth in 11 post-socialist countries and China. Unbalanced panel data from selected countries from 1995 to 2020 were used for this study. We wanted to disclose the cointegration of crucial variables in assessing Granger causalities using the Vector Auto-Regressive (VAR) model. Our findings confirm the Neutrality Hypothesis (NLH) when we investigated the existence of an independent association between Economic Growth (EG) and the Composite Index of Stock Market Development (SMD). The study's recommendations emphasize the significance of changing economic policies to account for disparities in economic growth and stock market development to ensure sustainable development in the selected countries.

Keywords: Stock Market Development (SMD); Economic Growth (EG), Vector Auto-Regressive (VAR) model; Granger Causality (GG); unit root; cointegration

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INTRODUCTION

The remarkable proliferation of stock markets in the last decade has attracted considerable global attention, sparking prolonged discussions among scholars and policymakers globally about the influence of these markets on economic growth.

Stock markets can influence economic growth through various mechanisms, including the mobilization and allocation of savings, the

facilitation of risk sharing, and the provision of investment. This viewpoint is supported by the works of scholars such as Hou et al. (2010); Olifisayo et al. (2009); and Philip et al. (2001). As the findings of Hailemariam et al. (2014) determined, the operation and effectiveness of the stock market are considered essential financial instruments that play a vital role in fostering economic growth within an economy.

The findings of Ilkay Sendeniz-Yuncu et al. (2018) contributed to this ongoing exploration of the relationship between these variables. Lei and Mishra's (2018) study explored the impact of China's stock market on its GDP, highlighting a negative long-run connection between the stock market and the real sector due to excessive market growth and banking sector imbalances. Importantly, no short-run relationship between China's real economy and the stock market was observed in the study.

Osaseri and Osamwonyi (2020) analyzed Nigeria and the BRICS group (Brazil, Russia, China, and South Africa) from 1995 to 2015 using quarterly data. They utilized Ordinary Least Squares and the Granger causality test with panel estimation to study the impact of the stock exchange on economic growth. Their findings suggest that, in the Nigerian context, there is no evidence of a causal link between economic growth and the stock exchange. Additionally, it reveals that changes in the stock exchange are not influenced by economic growth in the country.

Nguyen Kim (2022) studied the influence of macroeconomic variables on stock prices within the Vietnamese market spanning the period from 2009 to 2019, employing the Autoregressive Distributed Lag (ARDL) model. The research found a significant link between stock prices and key factors: GDP, the money supply, interest rates, the consumer price index, and oil prices. More precisely, GDP and the consumer price index exhibited a positive correlation with the stock market, indicating a direct relationship. Conversely, the money supply, interest rates, and oil prices demonstrated divergent effects on stock prices.

Suvdaa.D et al. (2022) conducted a comparative study into stock market volatility in 11 post-socialist countries with similar levels of development that have transitioned into the market economy over the same timeframe. Their empirical results suggested that economic freedom consistently exerts a substantial influence. Nevertheless, despite the positive impact of the previous year's turnover ratio (TOR) on the current year, it concurrently exerted an adverse effect on stock market development (SMD). In conclusion, detailed comparative and selective studies should be carried out consecutively to determine each country's situation and development.

Thus, abundant studies have been done to reveal the options and impact factors of stock market development by regions, countries, and development scales. Therefore, our focus is directed towards emphasizing the requirements essential for enhancing stock market development in post-socialist countries.

We added China to our study, along with the 11 Post Socialist countries, making the total number of countries analyzed 12. Our research aims to investigate the causal relationship between economic growth and stock market development in selected countries, identifying whether they are mutually reliant or operate independently.

The structure of the paper is as follows: an Introduction, a literature review, Data and Methodology, and a Conclusion.

LITERATURE REVIEW

Indeed, according to experts, it is well-documented in extensive literature that financial development exerts a robust and favorable impact on economic growth, as highlighted by (Levine, 2005).

The widely held conceptions of research in this field have accentuated the need for financial markets and institutions to invest in more encouraging economic sectors. As scholars (Piea et al., 2015; Olufisayo et al., 2009; and Levine et al., 2004) have remarked, '… a well-functioning financial system plays a pivotal role in fostering high economic growth…"

Both low- and high-income countries have been examined to perform a comparative analysis of economic growth and stock market development, as demonstrated by Felix Rioja (2014). The findings of that analysis highlighted the fluctuating dynamics of financial systems and their roles in developing economic growth across economies of different income scales.

However, it is important to note that the integration of the stock market into the

enhancing economic growth process has received relatively limited attention (Piea et al., 2015; Ngare et al., 2014; Levine et al., 2000) compared to the development of the banking sector.

The research by Pradhan.R (2018) investigated the long-term correlation between economic growth and stock market development across G-20 countries from 1980 to 2015. Using the VAR model to analyze the Granger causalities test, that study identified both bidirectional and unidirectional causality between economic growth and stock market development.

(Collin, 2023) conducted a study to explore the influence of the stock market in Zimbabwe within an environment characterized by economic instability, encompassing elevated inflation rates and political turmoil. The research employed a time series VAR model with quarterly data spanning from 2013 to 2022. The study's outcomes revealed a statistically significant positive correlation between economic growth and the stock market at the 10% significance level.

Most scholars who have studied the coordination between SMD and economic growth suggested the following hypotheses and found different results.

1) The supply leading hypothesis (SLH)

2) The demand following hypothesis (DFH)

3) The feedback hypothesis (FBH)

4) The neutrality hypothesis (NLH).

Among the various perspectives on this matter, the SLH posits that stock market development is a fundamental prerequisite for fostering economic growth. According to this viewpoint, the causal relationship originates from stock market development, leading to the stimulation of economic growth. This perspective is supported by the research of scholars such as Piea et al. (2015; Ngare et al. (2014); Pradhan et al. (2013); Olifisayo et al. (2009; Beck et al. (2004); Levine et al. (1998); and Leigh (1997).

The Demand Following Hypothesis, on the other hand, proposes that causality runs from economic growth to stock market development. Advocates of this idea contend that stock market development has a secondary role in affecting economic growth, acting as a result rather than a trigger. Pradhan.R. (2018); Kar et al. (2011) and Odhiambo (2008) are among the scholars who support this point of view.

According to the feedback hypothesis (FBH), economic growth and stock market development can be complementary and mutually reinforcing. In this viewpoint, stock market development and economic growth mutually impact and cause each other, as agreed upon by Pradhan (2018), Marques et al. (2013), and Hou et al. (2010).

The Neutrality Hypothesis (NLH) contends that economic growth and stock market development are mutually exclusive. Proponents of the NLH argue that stock market development does not affect economic growth and vice versa. Pradhan et al. (2013) and Vo et al. (2016) are among the researchers who support this hypothesis.

In his research, Meyer (2022) examined the primary objective of investigating the influence and correlation between domestic investment and multiple determinants, such as country risk, governance indicators, and economic development. The analysis involved estimating both long-term associations and short-term causality relationships. The study findings, combined with insights synthesized from the literature review, reiterate the critical role of domestic investment in facilitating rapid economic growth and development, highlighting its significance as a primary driver.

Research conducted by Chibuikem Dibor-Alfred et al. (2023) investigated the impact of stock market performance on Nigeria's economic growth spanning from 1985 to 2021, employing the Autoregressive Distributed Lag (ARDL) model. Market capitalization, total value of transactions, and all share indexes were utilized as proxies for stock market performance, while gross domestic product (GDP) served as the proxy for economic growth. Consequently, governmental entities must establish an enabling environment conducive to nurturing a positive association between stock market performance and gross domestic product.

DATA AND METHODOLOGY

We have studied 12 countries, such as Bulgaria, Czech Republic, Estonia, Hungary, Kazakhstan, Latvia, Lithuania, Mongolia, Poland, Russia, Ukraine, and China. We collected panel data from the selected countries between 1995 and 2020 from several sources, namely The World Bank, TheGlobalEconomy.com, the Global Financial Development Database, the CEIC Database, and the Stock Exchanges of the countries.

According to the World Bank classification, we divided and studied the countries as mentioned above into three sub-groups:

1. High-income countries cover six countries: the Czech Republic, Estonia, Hungary, Latvia, Lithuania, and Poland (hereafter, Panel A).
2. Upper-middle-income countries cover four countries: Bulgaria, China, Kazakhstan, and Russia (hereafter, Panel B).
3. Lower-middle-income countries cover two countries, Mongolia and Ukraine (hereafter, Panel C).
4. All countries (hereafter, Panel D).

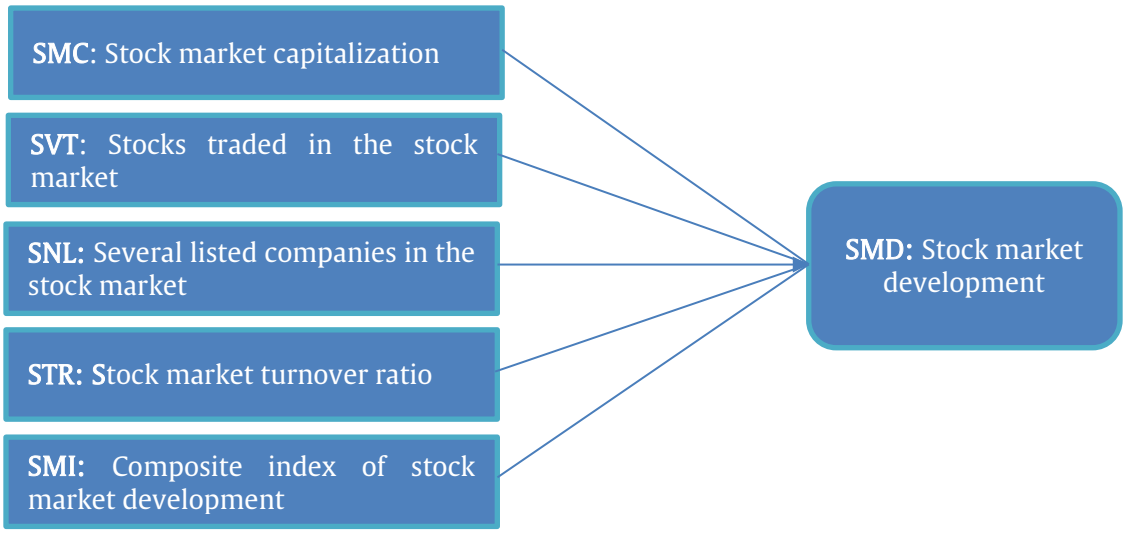

Figure 1: Stock market development indicators

Source: Author's finding.

The study aims to produce a particular result with the following hypotheses:

H1: According to the Granger causality analysis, each year, stock market development (SMD) has an impact on economic growth.

H2: Economic growth each year impacts the Stock Market Development according to Granger causality analysis.

To evaluate the two hypotheses mentioned above, we used the following variables to discover the two hypotheses mentioned above (See Table 1).

Table 1: Definitions of the variables

Variables	Definitions
SMC	Stock market capitalization is determined by the ratio of market capitalization to the present Gross Domestic Product (GDP).
SVT	The total value traded in the stock market is quantified as the percentage of Gross Domestic Product (GDP) represented by the total value of shares traded on the stock markets.
STR	The stock market turnover ratio is calculated as the quotient of the value of domestically traded shares divided by their corresponding market capitalization.
SNL	The number of listed companies in the stock market is explicitly defined as the ratio of listed companies per 10,000 population.
SMI	Composite indexes of stock market development are obtained via principal component analysis, incorporating four key stock market development indicators: SMC, SVT, STR, and SNL.
EG	The annual percentage growth of GDP in constant 2010 US dollars is described as economic growth.

Table 2: Stock Market Development Index Analysis

Principal components/variables				
	Eigenvalues	% Variation	% Cumulative	
Case 1: eigenvalues				
PC1	1.548	0.599	0.599	
PC2	0.935	0.218	0.818	
PC3	0.689	0.119	0.936	
PC4	0.505	0.064	1.000	
	PC1	*PC2*	*PC3*	*PC4*
Case 2: rotation matrix				
SMC	0.523	-0.066	0.847	-0.073
SVT	0.557	0.279	-0.381	-0.683
STR	0.561	0.301	-0.260	0.726
SNL	-0.319	0.909	0.265	-0.036

Source: Calculated by authors.

The first, second, third, and fourth principal components are denoted as PC1, PC2, PC3, and PC4, respectively. The four PCs - SMC, SVT, STR, and SNL- are 59.9, 21.8, 11.9, and 0.64% of the standardized variance, respectively (refer to Table 2).

According to the findings demonstrated in Table 3, the standard deviation of SMC for China is high (25.96), while it is relatively high for Panel B (23.08), which indicates variability among countries. The STR value is high for China (86.14) and Bulgaria (40.91), while SVT for China is very high (78.73) and 28.86 for Hungary. SNL is the highest for Lithuania (39.82).

Table 3: Descriptive statistics

Countries	SMC		SVT		STR		SNL		EG	
High-income countries										
Czech Republic	21.22	[7.26]	9.19	[5.46]	42.28	[21.22]	3.24	[2.54]	2.48	[3.14]
Estonia	22.03	[10.91]	5.74	[3.62]	32.62	[28.45]	10.71	[3.20]	4.08	[6.60]
Hungary	20.79	[7.23]	102.99	[28.86]	66.21	[30.62]	4.73	[0.56]	2.34	[3.02]
Latvia	6.62	[2.87]	0.90	[0.88]	13.31	[13.42]	21.38	[4.43]	4.59	[6.59]
Lithuania	15.48	[7.16]	1.81	[1.18]	11.78	[6.25]	27.85	[39.82]	4.68	[5.90]
Poland	25.44	[12.13]	9.57	[4.73]	40.10	[13.54]	12.54	[8.11]	3.95	[2.14]
Panel A-as a group	19.36	[10.23]	25.35	[41.07]	37.41	[27.73]	12.11	[17.15]	3.53	[4.52]
Upper middle-income countries										
Bulgaria	12.91	[12.38]	1.84	[3.41]	26.04	[40.91]	36.16	[20.72]	2.84	[4.16]
China	46.60	[25.96]	90.67	[78.73]	182.51	[86.14]	1.47	[0.70]	8.77	[2.35]
Kazakhstan	20.30	[11.94]	1.54	[2.03]	7.72	[7.79]	4.44	[0.51]	5.51	[3.70]
Russia	41.53	[12.78]	16.88	[11.23]	39.01	[16.85]	2.22	[0.98]	0.82	[3.55]
Panel B-as a group	30.57	[23.08]	34.1	[61.17]	76.37	[93.99]	11.33	[18.11]	5.19	[4.48]
Lower middle-income countries										
Mongolia	4.48	[3.41]	0.47	[0.35]	11.33	[11.86]	152.62	[14.52]	6.04	[4.37]
Ukraine	11.15	[8.05]	0.39	[0.68]	2.28	[2.56]	3.39	[0.97]	0.15	[5.07]
Panel C-as a group	6.79	[6.21]	0.44	[0.48]	8.20	[10.55]	100.96	[73.33]	4.00	[5.35]
Panel D-all countries	21.70	[17.15]	25.47	[47.62]	47.19	[62.38]	21.93	[40.79]	4.14	[4.65]

Note: Open figures show the meaning of the variables, with square brackets [ ] representing the standard deviation of the variables.

Source: Calculated by authors.

Methodology

We used the following regression model in this research to see the short-run and long-run causal relationship between EG and SMD,

$$EG_{it} = \alpha_{GDP_{it}} + \beta_i \cdot SMD_{it} + \varepsilon_{it} \quad (1)$$

Here, EG stands for economic growth; SMD represents Stock Market Development. i = 1, 2…N denotes a country, t = 1, 2 …. T denotes time, ε_{it} is an independent, normally distributed unexpected error with a zero mean and a limited different variance (σ_i^2). Indeed, other variations of Eq. (1) are also accepted to make the dependent variable different from EG to SMD. When we tried to notice the individual country analysis, the letter' *i*' was taken away from Eq. (1). The parameter describes the long-run ability to adjust the value of EG in relation to SMD. The task was calculating the parameters in Eq. (1) and running panel tests on the causal link between these two variables.

A rise in SMD will certainly produce an increase in EG. The Granger causality (GC) test is employed at a more advanced level to know the position of causality between EG and SMD. The classic Granger causality model (1988) is utilized for individual country analysis, while the panel Vector autoregressive (VAR) model (Douglas Holtz-Eakin, 1988) is employed for the panel position.

We used the following VAR models to determine the Granger causal link between EG and SMD.

Model 1. For individual country analysis

$$\begin{bmatrix}\Delta EG_t \\ \Delta SMD_t\end{bmatrix} = \begin{bmatrix}\mu_1 \\ \mu_2\end{bmatrix} + \sum_{k=1}^{p} \begin{bmatrix}d_{1\,1,k}(L) d_{1\,2k}(L) \\ d_{2\,1,k}(L) d_{2\,2k}(L)\end{bmatrix} \cdot \begin{bmatrix}\Delta EG_{t-k} \\ \Delta SMD_{t-k}\end{bmatrix} + \begin{bmatrix}\eta_1 ECT_{1t-1} \\ \eta_2 ECT_{2t-1}\end{bmatrix} + \begin{bmatrix}\varepsilon_{1t} \\ \varepsilon_{2t}\end{bmatrix} \quad (2)$$

The null and alternative hypotheses test are as follows:

$$H_0: d_{1\,2k} = 0; and \quad \delta_{1k} = 0 \quad for \quad k = 1,2,\cdots,p.$$
$$H_A: d_{1\,2k} \neq 0; and \quad \delta_{1k} \neq 0 \quad for \quad k = 1,2,\cdots,p.$$
$$H_0: d_{2\,1k} = 0; and \quad \delta_{2k} = 0 \quad for \quad k = 1,2,\cdots,p.$$
$$H_A: d_{2\,1k} \neq 0; and \quad \delta_{2k} \neq 0 \quad for \quad k = 1,2,\cdots,p.$$

In equation (2), the symbol Δ represents the first-order differencing filter, the term ECT is used to designate the error correction term, which is obtained from the long-run cointegration equation, and p is employed to indicate the number of lag terms that have been picked for the estimation process.

Model 2. For panel data analysis

$$\begin{bmatrix}\Delta EG_{it} \\ \Delta SMD_{it}\end{bmatrix} = \begin{bmatrix}\mu_{1j} \\ \mu_{2j}\end{bmatrix} + \sum_{k=1}^{p} \begin{bmatrix}d_{1\,1,ik}(L) d_{1\,2ik}(L) \\ d_{2\,1,ik}(L) d_{2\,2ik}(L)\end{bmatrix} \cdot \begin{bmatrix}\Delta EG_{it-k} \\ \Delta SMD_{it-k}\end{bmatrix} + \begin{bmatrix}\eta_1 ECT_{it-1} \\ \eta_2 ECT_{it-1}\end{bmatrix} + \begin{bmatrix}\xi_{1it} \\ \xi_{2it}\end{bmatrix} \quad (3)$$

The null and alternative hypotheses test are written as follows:

$$H_0: d_{1\,2ik} = 0; and \quad \delta_{1ik} = 0 \quad for \quad k = 1,2,\cdots,p.$$
$$H_A: d_{1\,2ik} \neq 0; and \quad \delta_{1ik} \neq 0 \quad for \quad k = 1,2,\cdots,p.$$
$$H_0: d_{2\,1ik} = 0; and \quad \delta_{2ik} = 0 \quad for \quad k = 1,2,\cdots,p.$$
$$H_A: d_{2\,1ik} \neq 0; and \quad \delta_{2ik} \neq 0 \quad for \quad k = 1,2,\cdots,p.$$

Let *i* be an index representing individual countries within a panel dataset, ranging from 1 to N. Similarly, let *t* be an index representing periods within the same panel dataset, ranging from 1 to T.

The present analysis adheres to the guidelines put forth by Engle and Yoo (1987) and uses the Akaike information criterion (AIC) statistics to ascertain the most suitable lag duration. The analysis commences by performing unit root and cointegration tests at both the individual nation level and inside the panel dataset. The objective of this procedure is to assess the degree of integration and verify the existence of cointegration between EG and SMD.

Empirical results

In these studies, Granger causality tests were applied to explore the causal relationship between economic growth (EG) and stock market development (SMD). A crucial prerequisite for carrying out these tests entails ascertaining the sequence of integration of the time series variables and clarifying their cointegrating interactions.

Table 4: Correlations

Variables	EG	SMC	SVT	STR	SNL	SMI
Case 1: High-income countries						
EG	1.00	0.12	-0.13	-0.08	0.15	-0.09
SMC		1.00	0.17	0.21*	-0.17	0.56***
SVT			1.00	0.59***	-0.23***	0.86***
STR				1.00	-0.26***	0.76***
SNL					1.00	-0.44***
SMI						1.00
Case 2: Upper middle-income countries						
EG	1.00	0.26**	0.29***	0.3***	-0.2*	0.33***
SMC		1.00	0.73***	0.5***	-0.31***	0.83***
SVT			1.00	0.84***	-0.27***	0.96***
STR				1.00	-0.35***	0.9***
SNL					1.00	-0.4***
SMI						1.00
Case 3: Lower middle-income countries						
EG	1.00	0.03	0.1	-0.01	0.29*	-0.43*
SMC		1.00	0.62***	-0.29	-0.46***	0.75***
SVT			1.00	0.4*	0.07	0.19
STR				1.00	0.38*	-0.33
SNL					1.00	-0.96***
SMI						1.00
Case 4: All countries						
EG	1.00	0.19***	0.08	0.17**	0.11	0.14*
SMC		1.00	0.56***	0.51***	-0.35***	0.81***
SVT			1.00	0.73***	-0.23***	0.87***
STR				1.00	-0.23***	0.86***
SNL					1.00	-0.49***
SMI						1.00

Note: The reported results are limited to the panel level exclusively, given space limitations. The symbol * denotes statistical significance at the 1% level, ** indicates statistical significance at the 5% level, and *** signifies statistical significance at the 10% level.

Source: Calculated by authors.

We employed unit root tests in our research, specifically the Augmented Dickey-Fuller (ADF) test introduced in 1981, as well as the Phillips & Perron (PP) test developed in 1988. These tests were applied individually to each country in our study. For panel data analysis, we used the Maddala & Wu (1999) test, as presented in Table 5. Consequently, regarding the Czech Republic, Estonia, Poland, Bulgaria, Kazakhstan, Russia, and Mongolia, it can be observed that there are variations in economic growth and stock market development when analyzing the data, but these variations do not occur when examining the first difference. Hungary demonstrates the absence of a unit root for the SVT and SNL variables. The presence of a unit root in the SNL variable is not observed in Latvia, and China does not exhibit unit roots in the SVT and SMI variables. In a similar vein, it may be observed that Ukraine does not exhibit a unit root for the SMC variable.

Furthermore, it can be shown from Panel A that the EG, SVT, and SNL variables do not exhibit any unit roots. In Panel B, the variables STR and SMI exhibit the absence of unit roots. In Panel C, the variables EG, STR, and SVT exhibit the absence of unit roots, whereas in Panel D, the variables EG, STR, SVT, SNL, and SMI demonstrate the lack of unit roots. For comprehensive details, please consult Table 5.

Table 5: Results of unit root test

Stationary of the variables						
Countries	**EG**	**SMC**	**SVT**	**STR**	**SNL**	**SMI**
High-income countries						
Czech Republic	I [1]	I [1]	I [1]	I [1]	I [1]	I [1]
Estonia	I [1]	I [1]	I [1]	I [1]	I [1]	I [1]
Hungary	I [1]	I [1]	I [0]	I [1]	I [0]	I [1]
Latvia	I [1]	I [1]	I [1]	I [1]	I [0]	I [1]
Lithuania	I [1]	I [1]	I [1]	I [1]	I [0]	I [1]
Poland	I [1]	I [1]	I [1]	I [1]	I [1]	I [1]
Panel A-as a group	I [0]	I [1]	I [0]	I [1]	I [0]	I [1]
Upper middle-income countries						
Bulgaria	I [1]	I [1]	I [1]	I [1]	I [1]	I [1]
China	I [1]	I [1]	I [0]	I [1]	I [1]	I [0]
Kazakhstan	I [1]	I [1]	I [1]	I [1]	I [1]	I [1]
Russia	I [1]	I [1]	I [1]	I [1]	I [1]	I [1]
Panel B-as a group	I [1]	I [1]	I [1]	I [0]	I [1]	I [0]
Lower middle-income countries						
Mongolia	I [1]	I [1]	I [1]	I [1]	I [1]	I [1]
Ukraine	I [1]	I [0]	I [1]	I [1]	I [1]	I [1]
Panel C-as a group	I [1]	I [1]	I [0]	I [0]	I [1]	I [1]
Panel D-all countries	I [0]	I [1]	I [0]	I [0]	I [0]	I [0]

Note: Statistical significance is observed at a significant level of 5%.

Source: Calculated by authors.

Following this, we utilize the Johansen Maximum Likelihood cointegration test (also known as the by and test) for each country. Furthermore, we employed the cointegration test introduced by Pedroni Peter (1999) in the context of panel data analysis to evaluate the presence of cointegration between economic growth and stock market development. The results of the test statistics for both sets are displayed in Tables 6 and 7.

The results of this study indicate that, in a significant number of instances, including various countries and panel positions, the variables under investigation exhibit cointegration. This suggests the existence of long-term linkages between economic growth and stock market development. However, it is worth noting that in certain instances, cointegration is observed exclusively inside specific countries.

In the context of our investigation into Granger causality research, we employed the Vector Error Correction Model (VECM) in cases where there is evidence of cointegration between economic growth and stock market development. In cases when there is an absence of cointegration between the two variables, the Simple Vector Autoregressive (VAR) model was utilized.

Through an analysis of Table 5, it becomes evident that some countries display data that lacks unit root features, hence eliminating the need for cointegration evaluations.

Table 6: Cointegration test by individual countries

Countries	Variables (with EG)				
	SMC	SVT	STR	SNL	SMI
High-income countries:					
Czech Republic	0	0	0	1	0
Estonia	1	0	0	0	0
Hungary	0	-	0	-	0
Latvia	1	0	0	-	1
Lithuania	1	1	0	-	1
Poland	0	0	0	0	0
Upper middle-income countries:					
Bulgaria	0	0	0	0	1
China	0	-	0	0	-
Kazakhstan	0	0	1	1	0
Russia	0	0	0	1	0
Lower middle-income countries:					
Mongolia	0	0	0	1	0
Ukraine	-	1	1	0	1

Note: Variables marked with '-' are not required for cointegration testing.

Source: Calculated by authors.

The panel data used in this study is characterized by being unbalanced, meaning that not all observations have the same number of data points. Consequently, the cointegration results obtained by the microanalytic approach proposed by Pedroni (1999) are presented in Table 7. Concerning Panel C, the unavailability of sufficient data makes it impractical to make estimations for SVT and SMI. However, Panels A and D display data that do not possess unit roots, hence eliminating the need for cointegration analysis. Furthermore, it can be shown from Table 7 that Panel B exhibits the absence of unit roots for STR and SMI, while Panel C demonstrates the same characteristic for SVT and STR. Consequently, it is not necessary to conduct cointegration estimation in this context.

Table 7: Cointegration test panel

Variables (with EG)	υ panel	ρ panel	*t* panel	*ADF* panel	ρ group	*t* group	*ADF* group
Panel B-as a group							
SMC	1	0	1	0	0	0	0
SVT	0	0	0	0	0	0	0
STR	-	-	-	-	-	-	-
SNL	0	0	1	0	0	0	0
SMI	-	-	-	-	-	-	-
Panel C-as a group							
SMC	0	0	0	0	0	0	0
STR	-	-	-	-	-	-	-
SNL	0	0	0	0	0	0	0

Source: Calculated by authors.

After confirming the presence of cointegration among the variables, our next step was to determine the direction of the causal relationship between economic growth and

stock market development. This determination was performed by employing the Granger causality test and presenting the corresponding estimated outcomes in Table 8.

Table 8 provides a comprehensive summary of the enduring causal relationships between the two sets of variables. The basis of this research relies on discrete variables about economic growth and the development of the stock market. The presence of a long-term equilibrium link is commonly observed when examining the Granger causation from stock market development to economic growth. Nevertheless, the lack of a long-term equilibrium link becomes apparent when reviewing the Granger causation from economic growth to stock market development. As a result, we observe divergent results when considering the concept of long-term Granger causation. The results of this section are shown below.

Table 8: The Granger causality test was conducted to examine the long-term relationship.

Countries	EG vs. SMC	EG vs. SVT	EG vs. STR	EG vs. SNL	EG vs. SMI
High-income countries					
Czech Republic	SLH	NLH	NLH	NLH	NLH
Estonia	NLH	NLH	SLH	NLH	NLH
Hungary	NLH	NLH	NLH	NLH	NLH
Latvia	NLH	NLH	NLH	NLH	NLH
Lithuania	SLH	SLH	NLH	DFH	NLH
Poland	NLH	NLH	NLH	NLH	NLH
Panel A-as a group	SLH	DFH	NLH	DFH	NLH
Upper middle-income countries					
Bulgaria	NLH	NLH	NLH	DFH	NLH
China	SLH	NLH	NLH	NLH	NLH
Kazakhstan	NLH	NLH	NLH	NLH	NLH
Russia	NLH	SLH	NLH	NLH	NLH
Panel B-as a group	SLH	DFH	NLH	DFH	NLH
Lower middle-income countries					
Mongolia	DFH	NLH	NLH	DFH	NLH
Ukraine	NLH	NLH	NLH	NLH	NLH
Panel C-as a group	SLH	DFH	NLH	DFH	NLH
Panel D-all countries	SLH	DFH	NLH	DFH	NLH

Note: Testing is conducted at the 5% level of significance.

Source: Calculated by authors.

GRANGER CAUSALITY TEST RESULTS

FBH is the feedback relationship between EG and SMD; SLH is the sully leading hypothesis between EG and SMD; DFH is the demand following hypothesis between EG and SMD, and NLH is the neutrality hypothesis between EG and SMD (see Table 8).

Result 1: Between economic growth (EG) and stock market capitalization (SMC)

For Mongolia, there is unidirectional causality from economic growth to stock market development (EG =>SMC), whereas, for the Czech Republic, Lithuania, and China, stock market development causes economic growth (SMC =>EG). Furthermore, according to Granger causality analysis, in the context of Estonia, Hungary, Latvia, Poland, Bulgaria, Kazakhstan, Russia, and Ukraine, economic growth does not impact stock market development (EG<#>SMC).

Result 2: Between economic growth (EG) and stock market turnover ratio (STR)

For Estonia, stock market development causes economic growth (STR =>EG). Furthermore, in the context of all countries except Estonia, it is observed that economic growth does not exhibit Granger causality towards stock market development (EG<#>STR). This suggests that in these countries, changes in economic growth do not precede or influence changes in stock market development, as indicated by Granger causality tests.

Result 3: Between economic growth (EG) and

stock market value traded (SVT)

For Lithuania and Russia, a unidirectional causality stock market development causes economic growth (SVT =>EG). While in the context of the Czech Republic, Estonia, Hungary, Latvia, Poland, Bulgaria, China, Kazakhstan, Mongolia, and Ukraine, economic growth does not impact stock market development (EG<#>SVT) according to Granger causality analysis.

Result 4: Between economic growth (EG) and listed companies in the stock market (SNL)

For Lithuania, Bulgaria, and Mongolia, there is unidirectional causality from economic growth to stock market development (EG =>SNL), yet in the case of the Czech Republic, Estonia, Hungary, Latvia, Poland, China, Kazakhstan, Russia, and Ukraine, economic growth does not impact stock market development (EG<#>SNL), as indicated by Granger causality tests.

Result 5: Between economic growth (EG) and a composite index of stock market development (SMI)

Across all countries, it is evident that economic growth does not exhibit Granger causality towards stock market development (EG<#>SMI). The outcomes of these individual country-level analyses highlight the nuanced and country-specific nature of the causal relationship between economic growth and stock market development.

In certain instances, stock market development may drive economic growth, while in others, economic growth may stimulate stock market development. Additionally, there are scenarios where they mutually reinforce each other and, conversely, cases where they do not exhibit any causal connection, indicating an independent or neutral relationship between the two variables.

Based on the findings from the individual countries, establishing a direct correlation between economic growth and stock market development through the country's stock market indicator is not straightforward. It becomes evident that the recent economic recession has a discernible impact on the stock market.

DISCUSSION

The scope of this investigation encompasses twelve countries where the Neutrality Hypothesis (NLH) is scrutinized concerning the interaction between economic growth (EG) and the Composite Index of Stock Market Development (SMI).

Our study findings exhibit unity with those of prior researchers. According to the Neutrality Hypothesis (NLH), economic growth and stock market development are intrinsically independent, implying their autonomous operation. This concurrence is consistent with Lucas's (1988) Neutrality Hypothesis of finance, as elucidated in studies by Xuan Vinh Vo et al. (2016; Piea and Kasper (2015); and Pradhan et al. (2013).

Pradhan's (2018) investigation delved into the correlation between stock market development and per capita economic growth in G-20 nations, suggesting that per capita economic growth can serve as a catalyst or influencer of stock market growth.

However, our research has been conducted within nations characterized by a dominant banking sector, revealing a dissociation between economic growth and capital market development.

CONCLUSION AND RECOMMENDATION

Initially, our research aimed to encompass 17 countries for the study. Yet, due to data constraints or missing information within the specified time frame, we focused primarily on examining the causal relationships between economic growth and stock market development within 12 selected countries from 1995 to 2020.

Indeed, it is observed that there is no correlation between the development of the stock market and the economic growth in countries where the banking sector plays a dominant role.

After conducting a comprehensive examination of how various stock market indicators influence economic growth, the following conclusions have been reached:

- The SLH finds support in the relationship between SMC and EG.
- The DFH is supported by associations involving SNL, SVT, and EG.
- However, we found no significant relationship between STR and EG.

Considering the possibility for reverse or bidirectional causality in some contexts, it is desirable to undertake policies targeted toward

promoting economic growth (such as initiatives to stimulate investment). Therefore, to stimulate economic growth, it is necessary to prioritize policies that greatly focus on the development of the stock market. The current focus needs to turn toward boosting stock market development and confronting the numerous challenges along the stock market growth spectrum. In essence, authorities should diligently seek to establish a stable financial environment to cement the connection between economic growth and stock market development.

REFERENCES

Beck, T. L. (2004). Stock markets, banks, and growth: Panel evidence. *Journal Banking & Finance*, 423-442. doi:https://doi.org/10.1016/S0378-4266(02)00408-9

Chibuikem Dibor-Alfred, O. A. (2023). Stock market performance and economic growth: empirical evidence from Nigeria employing the ARDL approach. *SN Business & Economics*, 1-15. doi:DOI: 10.1007/s43546-023-00603-4

Collin, C. a. (2023). The Impact of the Stock Market on Liquidity and Economic Growth: Evidence of Volatile Market. *Economies 11(6)*, 155. doi:https://doi.org/10.3390/economies11060155

Dickey, D. &. (1981). Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root. *Econometrica, 49(4)*, 1057-1072. doi:https://doi.org/10.2307/1912517

Douglas Holtz-Eakin, W. N. (1988). Estimating Vector Autoregressions with Panel Data. *Econometrica, 56*(6), 1371-1395. doi:https://doi.org/10.2307/1913103

Felix Rioja, N. V. (2014). Stock markets, banks and the sources of economic growth in low and high income countries. *Journal of Economics and Finance*, 302-320. doi:10.1007/s12197-011-9218-3

Granger, C. (1988). Some recent development in a concept of causality. *Journal of Econometrics, 39*, 199-211. doi:https://doi.org/10.1016/0304-4076(88)90045-0

Hailemariam, A. &. (2014). Stock Market Development and Economic Growth: Empirical Evidence for Emerging Market Economics. *International Journal of Economics, Finance and Management Sciences, 2*, 171-181. doi:https://doi.org/10.11648/j.ijefm.20140202.19

Hou, H. a. (2010). The Roles of Stock market in the Finance Growth Nexus: Time Series Cointegration and Causality Evidence from Taiwan. *Applied Financial Economics*, 975-981. doi:https://doi.org/10.1080/09603101003724331

Ifuero Osamwonyi, a. G. (2020). A Causality Study of Stock Market Development and Economic Growth in Nigeria and BRICS. *Acta Universitatis Danubius. Administration 12*, 7-23. Retrieved from https://dj.univ-danubius.ro/index.php/AUDA

Ilkay Sendeniz-Yüncü, L. A. (2018). Do stock index futures affect economic growth? Evidence from 32 countries. *Emerging Markets Finance and Trade 54*, 410-429. doi:https://doi.org/10.1080/1540496X.2016.1247348

Lamin Y Leigh. (1997). *Stock market equilibrium and macroeconomic fundamentals.* Retrieved from http://pi.lib.uchicago.edu/1001/cat/bib/12497815

Lei Pan, a. V. (2018). Stock market development and economic growth: Empirical evidence from China. *Economic Modelling 68*, 661-673. doi:https://doi.org/10.1016/j.econmod.2017.07.005

Levine. (2005). *Handbook of Economic Growth.* Elsevier.

Levine, R. a. (1998). Stock Markets, Banks, and Economic Growth. *American Economic Review, 88*, 537-558. Retrieved from https://www.jstor.org/stable/116848

Levine, R. L. (2000). Financial intermediation and growth: Causality analysis and causes. *Journal of Monetary Economics, 46*, 31-77. doi:http://dx.doi.org/10.1016/S0304-3932(00)00017-9

Lucas, R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics, 22(3)*, 3-42. doi:https://doi.org/10.1016/0304-3932(88)90168-7

Luís Miguel Marques, J. A. (2013). Does the stock

market cause economic growth? Portuguese evidence of economic regime change. *Economic Modelling, 32(3)*, 316-324. doi:https://doi.org/10.1016/j.econmod.2013.02.015

Maddala, G., & Wu, S. (1999). A comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and Statistics, 61*, 631-652. doi:https://doi.org/10.1111/1468-0084.0610s1631

Meyer, D. F. (2022). The relationships between domestic investment, country risk, governance, and economic development: a comparison of Kazakhstan versus Poland. *JOURNAL OF EASTERN EUROPEAN AND CENTRAL ASIAN RESEARCH*, 1055-1071. doi:https://doi.org/10.15549/jeecar.v9i6.1196

Muhsin Kar., A. H. (2011). Financial development and economic growth nexus in the MENA countries: Bootstrap panel granger causality analysis. *Economic Modelling*, 685-693. doi:https://doi.org/10.1016/j.econmod.2010.05.015

Ngare, E. N. (2014). Stock market development and economic growth in Africa. *Journal of Economics and Business, 74*, 24-39. doi:https://doi.org/10.1016/j.jeconbus.2014.03.002

Nguyen, K. Q. (2022). Determinants of stock market modern development: Evidence from Vietnam. *Journal of Eastern European and Central Asian Research*, 951-964. doi:https://doi.org/10.15549/jeecar.v9i6.987

O.Olufisayo, A. A. (2009). Stock market development and economic growth: Evidence from seven sub-Sahara African countries. *Journal of Economics and Business*, 162-171. doi:https://doi.org/10.1016/j.jeconbus.2008.05.001

Odhiambo, N. M. (2008). Financial Development in Kenya: a DynamicTest of the Finance-led Growth Hypothesis. *Economic Issues*, 21-36. Retrieved from http://www.economicissues.org.uk/Files/208Odhiambo.pdf

Pedroni Peter. (1999). Critical Values for Cointegration Tests in Heterogeneous Panels with Multiple Regressors. *Oxford Bulletin of Economics and Statistics, 61*, 653-670. doi:https://doi.org/10.1111/1468-0084.61.s1.14

Perron, P. C. (1988). Testing for a Unit Root in Time Series Regression. *Biometrika, 75, No. 2,*, 335-346. doi:https://doi.org/10.2307/2336182

Philip Arestis, P. O. (2001). Financial Development and Economic Growth: The Role of Stock Markets. *Journal of Money, Credit and Banking*, 16-41.

Piea & Kasper. (2015). Finance and Growth: Times series evidence on causalty. *Journal of Financial Stability*, 105-118. doi:https://doi.org/10.1016/j.jfs.2014.11.005

Pradhan R.P. (2018). Development of stock market and economic growth: the G-20 evidence. *Euroasian Economic Review*, 161-181. doi:https://doi.org/10.1007/s40822-018-0094-4

Pradhan R.P, M. A. (2013). The impact of stock market development on inflation and economic growth of 16 Asian countries: A panel var approach. *Applied Econometrics and International Development 13*, 203-220. Retrieved from http://www.usc.es/economet/reviews/aeid13116.pdf

Robert F. Engle, B. S. (1987). Forecasting and testing in cointegrated systems. *Journal of Econometrics, 35*(1), 143-159. doi:https://doi.org/10.1016/0304-4076(87)90085-6

Suvdaa D, O. D. (2022). Macroeconomic determinants of Stock Market Volatility: Evidence from post socialist countries. *Journal of Eastern Europe and Central Asian Research*, 569-580. doi:https://doi.org/10.15549/jeecar.v9i4.966

Xuan Vinh Vo, H. H. (2016). Financial structure and economic growth: The case of Vietnam. *Eurasian Business Review, 6*, 141–154. doi:10.1007/s40821-016-0042-8

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