Research Article

Rethinking the Nexus Between Stock Market Development and Macroeconomic Factors: An Analysis on Türkiye

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Abstract: The investigation of the relationship between economic growth and financial development began with Walter Bagehot's work in 1873. Although research on the relationship between the two variables later focused on financial development in the context of stock or capital markets, the pertinent literature was also separated into two categories: supply-leading hypothesis and demand-following hypothesis. Using yearly data for the years 1993–2022, this study aims to empirically measure the impact of real gross domestic product per capita and the proportion of total savings in gross domestic product on stock market development for case of Türkiye. The demand-following hypothesis forms the basis of the investigation in this regard. Both short-term and long-term empirical relationships between variables were analyzed using the error correction model and ARDL bounds testing. According to the empirical findings, the stock markets development is not statistically impacted over the long term by the amount of real gross domestic product per capita or the proportion of savings in gross domestic product. The proportion of savings in gross domestic product, on the other hand, has a negative, albeit significant, impact on stock markets development in the short term, whereas the level of real gross domestic product per capita has a positive and significant impact.

Keywords: Stock Markets Development, Gross Domestic Product Per Capita, Savings, ARDL Bound Test, Türkiye

Jel Codes: G1, E21, O40

Hisse Senedi Piyasası Gelişimi ile Makroekonomik Faktörler Arasındaki Bağlantının Yeniden Düşünülmesi: Türkiye Üzerine Bir Analiz

Öz: Finansal gelişme ve ekonomik büyüme arasındaki etkileşimin incelenmesi, 1873 yılında Walter Bagehot tarafından yayınlanan çalışmaya kadar uzanmaktadır. İki değişken arasındaki ilişkiyi ele alan çalışmalar sonraki süreçte finansal gelişmişliği daha spesifik olarak sermaye piyasaları ya da hisse senedi piyasaları çerçevesinde ele alırken, aynı zamanda ilgili literatür arz öncülü hipotezi ve talep takipli hipotez olmak üzere ikiye ayrılmıştır. Bu çalışma, 1993-2022 dönemine ait yıllık verilerden hareketle kişi başına düşen reel gayrisafi yurtiçi hasıla düzeyi ve toplam tasarrufların gayrisafi yurtiçi hasıladaki payının hisse senedi piyasalarının gelişmişliği üzerindeki etkisini ampirik olarak ölçmeye çalışmaktadır. Çalışma bu açıdan talep takipli hipotezi temel almaktadır. Değişkenler arasındaki kısa ve uzun dönemli ampirik ilişkilerin analizinde ARDL sınır testi ve hata düzeltme modelinden yararlanılmıştır. Elde edilen ampirik sonuçlar; uzun dönemde kişi başına düşen reel gayrisafi yurtiçi hasıla düzeyi ve tasarrufların gayrisafi yurtiçi hasıladaki payının hisse senedi piyasalarının gelişmişliği üzerinde istatistiksel olarak anlamlı bir etki doğurmadığını göstermiştir. Diğer taraftan kısa dönemde ise, kişi başına düşen reel gayrisafi yurtiçi hasıla düzeyi hisse senedi piyasalarının gelişmişlik düzeyini pozitif ve anlamlı bir biçimde etkilerken, tasarrufların gayrisafi yurtiçi hasıladaki payının ise hisse senedi piyasalarının gelişmişliği üzerindeki etkisi anlamlı olmasına rağmen negatiftir.

Anahtar Kelimeler: Hisse Senedi Piyasasının Gelişmişliği, Kişi Başına Düşen Gayrisafi Yurtiçi Hasıla, Tasarruf, ARDL Sınır Testi, Türkiye

Jel Kodları: G1, E21, O40

1.   Introduction

Financial markets play a significant role in an economy in addition to goods, services, and factors markets. Market participants who will manufacture goods and services in order to carry out these activities efficiently will always require funding. The financial markets are the primary source of the capital needed for private sector investments. Currently, ensuring the effective flow of funds from those with excess funds to those in need of funds is the main and essential responsibility of financial markets. One of the organizations mediating this fund transfer is stock markets (Van-Home, 1989, p. 23; Perry et al., 1993, pp. 675-676). For stable and sustainable economic growth, development, capital accumulation, investment growth, and employment growth, the stock markets development, particularly the financial markets, is crucial (Yartey, 2008, p. 4; Raza & Jawaid, 2014, p. 376; Nguyen & Minh, 2025, p. 38).

Having a developed stock market or capital market is one of the most fundamental characteristics of developed countries (Boshkovska et al., 2016, p. 2). An advanced and efficient stock market enhances capital formation and augments the existing capital stock within the economy (Shahbaz et al., 2016, p. 75). The key indicator of stock market development is capitalization ratio (market capitalization as a proportion GDP). The World Bank (2025) estimates that the amount of the global market capitalization in 2022 would be around $93.6 trillion. Since the start of the twenty-first century, market capitalization has about tripled in size. Among countries, the United States ranks first in this field with a size of $40 trillion.

In terms of both population and GDP, Türkiye is among the most significant countries in the world. With a GDP of $1.1 trillion in 2023, it was the 18th largest economy in the world and managed to find a place among the top 20 largest economies, according to World Bank (2025) statistics. However, it was able to find a place for itself in somewhat lower rankings in terms of market capitalization size throughout the same period. The market capitalization of Türkiye was at $330 billion in 2022. Although this amount is substantial, it is less than the market capitalization of countries like Saudi Arabia ($2.6 trillion), Iran ($1.6 trillion), the United Arab Emirates ($873 billion), and Malaysia ($454 billion). Panel A in Figure 1 shows the Market Capitalization of Listed Domestic Companies (current $) in Türkiye between 1993-2022, and Panel B shows the Market Capitalization of Listed Domestic Companies (% of GDP) in Türkiye between 1993-2022. Panel A shows that Türkiye's market capitalization size grew quickly following the 2001 crisis. The 2008 crisis caused market capitalization, which peaked in 2007 at about $284 billion, to drop to $117 billion. With the exception of a few years, it has been declining since 2012, when it reached $315 billion. Reaching $330 billion in 2022, it rose once again from 2021.
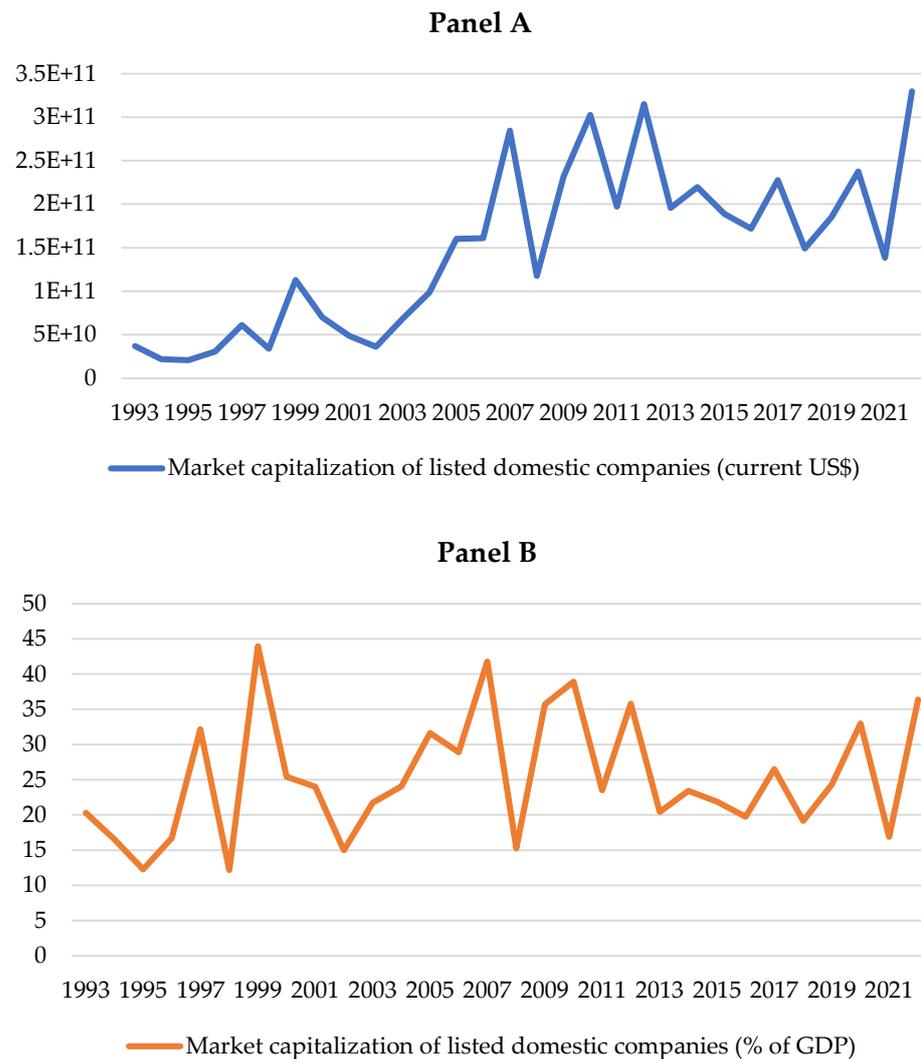
Panel A

Market capitalization of listed domestic companies (current US$)

Panel B

Market capitalization of listed domestic companies (% of GDP)

Figure 1. Market Capitalization of Listed Domestic Companies (current $) in Panel A and Market Capitalization of Listed Domestic Companies (% of GDP) in Panel B (**Source:** World Bank (2025).)

Panel B shows the share of market capitalization in GDP in Türkiye. Between 1999 and 2002, the share of market capitalization in GDP fell sharply, notwithstanding the 1990s' fluctuating trend. The period from 2002 to 2007 shows a new increasing trend. During this period, the share of market capitalization in GDP increased from 15% to 41.7%. Despite its fluctuating trend throughout the 2010s, the share of market capitalization in GDP, which fell once again as a result of the 2008 financial crisis, could not surpass 40%.

Examining the variables influencing countries' stock market developments becomes crucial in this situation. The amount of research looking at the factors that influence stock market developments in emerging market economies, both theoretically and empirically, is rather low (Yartey, 2010, p. 1616). This study aims to show how economic growth and total savings impact stock market developments in the context of the Turkish economy. In this way, it will be easier to ask why Türkiye, one of the most significant countries in the world in terms of GDP, is not in a comparable situation with regard to stock market developments. Additionally, it seeks to fill a major gap in the literature on emerging market economies. Using yearly data for the period 1993–2022, the study aims to empirically measure the impact of real GDP per capita level and the share of total savings in GDP on the size of the market capitalization of listed domestic companies (% of GDP). Both short-term and long-term empirical relationships were analyzed using the error

correction model and ARDL bounds testing. In the long term, the market capitalization of listed domestic companies (% of GDP) is not significantly impacted by real GDP per capita or the share of savings in GDP, according to the findings. Conversely, the market capitalization of listed domestic companies (% of GDP) is positively and significantly impacted by real GDP per capita in the short term, but the share of savings in GDP has a negative, albeit significant, impact on the same.

There are five sections in the study, including the introduction. Following the introduction, the results of the research in the literature are presented in the second section. Information on the Data Set, Model, and Methodology is included in the third section. The results of empirical research were gathered and examined in the fourth section. The fifth and final section presents test results pertaining to the validity of the results drawn from empirical models.

2. Literature Review

Since Bagehot (1873), researchers have studied the relationships between financial development and economic growth. Developments in the banking sector and stock markets are mostly responsible for this relationship (Gözbaşı, 2015, p. 270). The studies of McKinnon (1973) and Shaw (1973), on the other hand, were the first to address the theoretical and empirical relationships between stock market developments and macroeconomic issues. Few studies also examine how macroeconomic factors affect stock market developments (demand-following hypothesis), whereas a sizable portion of studies examine the relationship between two variables from stock market developments to macroeconomic factors (supply-leading hypothesis). The impact of stock market developments on economic growth is also the subject of significant studies. Among these significant studies are those by Demirgüç-Kunt & Levine (1996), Singh (1997), and Levine & Zervos (1998), who came to the conclusion that stock market developments had a favorable impact on economic growth for various country groups (Owiredu et al., 2016, p. 35).

The majority of studies that follow the supply-leading hypothesis come to the conclusion that capital market development or stock market development has a favorable impact on income growth and economic growth (Regmi, 2012; Tan & Shafi, 2021; Chikwira & Mohammed, 2023). Gözbaşı (2015) was unable to determine the cointegration relationship between the two variables in their investigation. While there is a favorable relationship between some indicators of stock market development and capital market development and economic growth, some indicators have no effect on economic growth, according to the studies of Algaeed (2021) and Nneka et al. (2025). In both the short and long term, stock market development is the Granger cause of economic growth, according to the results of Müslümov & Aras (2002). Finally, according to Bonser-Neal & Dewenter (1999), a positive relationship was found between stock market development and savings.

The impacts of numerous macroeconomic factors, particularly economic growth and savings, on stock market development have been examined in studies that adhere to the demand-following hyphothesis, in contrast to the studies mentioned above. One of these studies, Yartey (2008), investigates the effects of some economic factors on stock market development in 42 emerging market economies during the period 1990-2004. The increase in income level, one of these macroeconomic determinants, has a favorable and considerable impact on stock market development, according to one of the study's most significant findings. During the years 2000–2010, Raza & Jawaid (2014) examined how economic growth and foreign direct investment affected the stock market capitalization of 18 Asian nations. The findings from the Panel ARDL bounds testing approach indicate that economic growth and foreign direct investment have a short- and long-term negative and positive impact on stock market capitalization, respectively.

Boshkovska et al. (2016) employed the multivariate linear regression technique in their analysis of the impact of economic growth on capital market development in North Macedonia from 1997 to 2013. Empirical results show that economic growth and savings

have a negative impact on capital market development. North Macedonia is a small and undeveloped country, according to the authors, which is the main cause of this predicament. Owiredu et al. (2016) examined the macroeconomic factors influencing stock market development in Ghana using data from 1992 to 2012. The findings derived from the linear regression model indicated that savings and real income levels do not significantly influence stock market development. Shahbaz et al. (2016) examine the macroeconomic factors of stock market development in Pakistan, an emerging market economy, from 1974 to 2010. Economic growth, a key macroeconomic element, enhances stock market development. Economic growth is the cause of stock market development, according to the results of the VECM Granger causality test between the two variables.

Şahin & Temelli (2018) investigate the institutional and macroeconomic factors that influenced stock market development in Türkiye and eight other APEC nations between 1995 and 2015. Among the macroeconomic factors, per capita income level and gross domestic savings have a positive and substantial impact on stock market development, according to the study's findings utilizing the panel regression approach. Phuong et al. (2023) analyzed the impact of macroeconomic variables, including economic growth, on stock market capitalization across 15 nations from 2008 to 2019. Based on the study's results, stock market capitalization is negatively impacted by economic growth in the OLS estimating framework. In the framework of FGLS and GMM estimators, economic growth has no significant effect on stock market capitalization. Finally, Nguyen & Minh (2025) examined the factors that influence market capitalization in Vietnam from 2007 to 2022 using firm-level data. The results provided using the System generalized moments estimator framework indicate that market capitalization is negatively impacted by economic growth.

3. Data Set, Model and Methodology

The present study utilized a dataset comprising 28 observations spanning from 1993 to 2022 for Türkiye, sourced from the World Bank World Development Indicators database. The dataset pertains to the series of savings, income, and stock market development. The model's variables and their respective proxies are presented in Table 1.

Table 1. Variables

Variables	Abbr.	Proxy	Source
Savings	GDS	Gross domestic savings (% of GDP)	World Bank (2025)
Income level	GDPC	GDP per capita (constant LCU)	World Bank (2025)
Stock market development	MCDC	Market capitalization of listed domestic companies (% of GDP)	World Bank (2025)

The functional formulation of the model can be seen in the equation as presented below (1).

$$\text{Stock market development} = f \text{ (Income level, } \text{Savings)}$$
$$MCDC = f(GDPC, \quad GDS) \qquad (Eq.1)$$

The functional expression of the model given in Equation 1 can be written in statistical form as follows

$$MCDC_t = a + \beta_1 lnGPC_t + \beta_2 GDS_t + u_t \quad (Eq.2)$$

β1 and β2 are the regression coefficients that describe the change in UE related to the per-unit change in IM and GDP. The letter t stands for a time trend. "α" represents the constant, whereas "u_t" is the disturbance term that refers to the variations from the trend that occur in each individual year. Figure 2 shows the time series graphs of GDP per capita, gross domestic savings and market capitalization series.
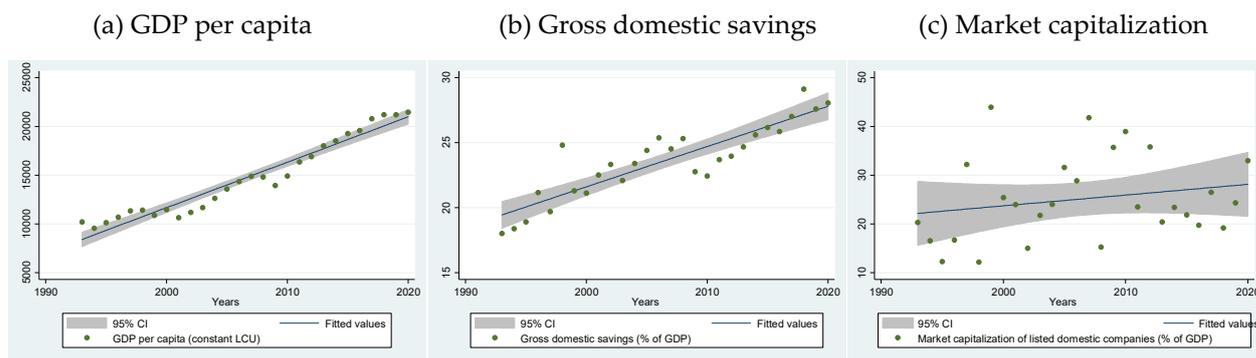
(a) GDP per capita   (b) Gross domestic savings   (c) Market capitalization

Figure 2. Time Series Plot of the Variables

Upon examination of Figure 2, it is evident that there exists a positive trend in GDP per capita and Gross domestic savings. The graph depicting market capitalization displays a positive trend, albeit with a relatively flat trajectory. Table 2 shows the descriptive statistics consist of mean, standard deviation, minimum and maximum values of the series.

Table 2. Descriptive Statistics

Variable	GDS	GDPC	MCDC
Mean	23.621	14699.754	25.148
Min	18.013	9551.703	12.192
Max	29.128	21448.761	43.963
Std. Dev.	2.873	3945.807	8.68
Variance	8.254963	1.56E+07	75.34692
Skewness	-0.2045581	0.4327731	0.5271265
Kurtosis	2.46973	1.791081	2.440968
Obs	28	28	28

Table 2 shows descriptive statistics consist of (i) mean the measure of central tendency. (ii) measure of dispersion which means how data is spread out that consist of (a) the range which means difference between the highest and lowest value, (b) the variance, how widely observations vary and (c) the standard deviation that means how far observations are from the sample average; (iii) measures of normality stem from (a) Kurtosis, the measure of the peakness and flatness of the distribution of the series, (b) skewness, the measure of the degree of asymmetry of the series.

The mean value of GDS, GDPC and MCDC are 23.621, 14699.754 and 25.148 respectively. The deviation of mean of the GDS, GDPC and MCDC are 2.873, 3945.807 and 8.68 respectively. Since the values of the series of Kurtosis of GDS, GDPC and MCDC are less than 3, the series are normally distributed with the Kurtosis of 3. The values of the Skewness of GDS, GDP and MCDC are close to 0, it can be said that distributions of the series are symmetric around the means. Figure 3 also includes the research design of the study.
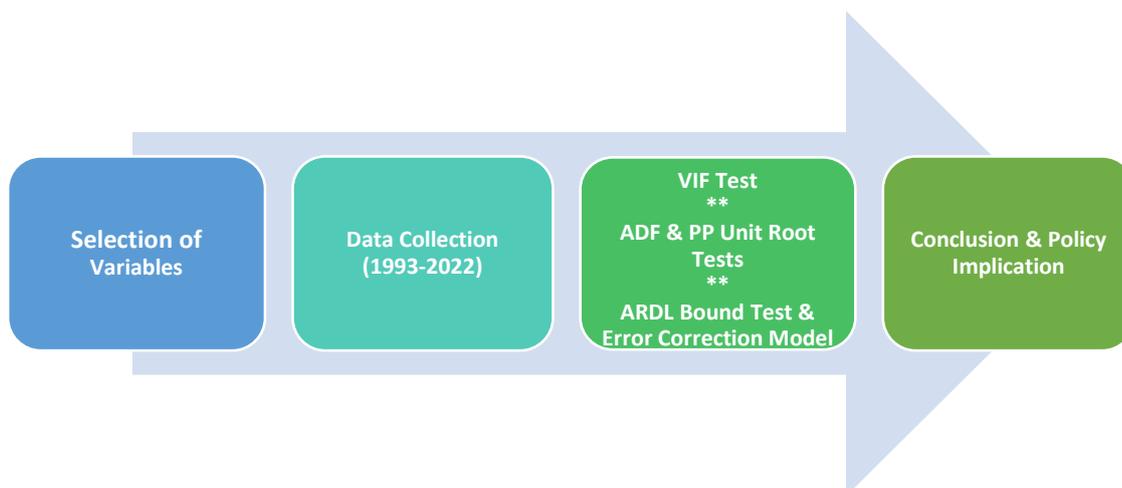
 Figure 3. Research Design

To determine the degree of correlation between variables, it is essential to present a correlation matrix. A correlation matrix can be utilized to provide a concise overview of a substantial dataset, allowing for the identification of patterns and informed decision-making based on the findings. Table 3 presents the correlations between the variables.

Table 3. Matrix of correlations

Variables	(1)	(2)	(3)
(1) MCDC	1.000		
(2) GDPC	0.129	1.000	
(3) GDS	0.057	0.871	1.000

The correlation coefficient possesses a range of values between -1 and +1. A value of -1 denotes a complete negative correlation, while a value of +1 denotes a complete positive correlation. A value of 0 indicates the absence of any correlation. The correlation coefficient between GDPC and MCDC is 0.129, indicating a weak positive relationship. Similarly, the correlation coefficient between GDS and MCDC is 0.057, also indicating a weak positive relationship. The correlation coefficient between GDS and GDPC is 0.871, indicating a very strong positive correlation between the two variables. This could cause of multicollinearity. Consequently, the Variance Inflation Factor (VIF) test was conducted in order to identify the issue of multicollinearity. The findings of this test are presented in Table 4.

Table 4. VIF – Multicollinearity Test

Variable	VIF	1/VIF
GDS	4.04	0.247774
LnGDPC	4.04	0.247774
Mean VIF	4.04	

When the value of VIF equals 1, it indicates that there is no correlation between the variables. When the Variance Inflation Factor (VIF) falls within the range of 1 to 5, it indicates a moderate level of correlation between the variables. When the VIF value exceeds 5, it is inferred that there exists a high correlation between the variables. A value equal to or greater than 10 is considered problematic. Following examination of Table 4, it can be observed that the VIF values are in close proximity to 4. Thus, it can be asserted that there exists a minimal degree of multicollinearity between the aforementioned variables.

4.   Empirical Results

The degree of the integration of the series is a critical issue for causality analysis. Therefore, stationary of the series was examined with "Augmented Dickey-Fuller Unit Root Test (ADF-Test)" and Philips Perron unit root (PP) the outcomes are reported in Table 5.

Table 5. ADF and PP Unit Root Test Results

H$_0$: series contain unit root	ADF				PP			
	I(0)		I(1)		I(0)		I(1)	
Variable	Stat.	Prob.	Stat.	Prob.	Stat.	Prob.	Stat.	Prob.
MCDC	-5.471***	0.0000	-	-	-5.466***	0.0000		
GDS	-1.839	0.3613	-8.199***	0.0000	-1.626	0.4695	-8.789***	0.0000
LnGDPC	0.724	0.9903	-4.777***	0.0001	0.687	0.9896	-4.778***	0.0001

Note: *** p<.01, ** p<.05, * p<.1

The study conducted an analysis to test the null hypothesis that the series contains a unit root. The results indicated that the null hypothesis of the MCDC series was rejected at a significant level of 0.01, leading to the conclusion that the series was stationary. The t-statistics probability values for the GDS and LnGDP series were found to be above the 0.05 significance level. As a result, the null hypothesis could not be rejected, leading to the conclusion that the series were non-stationary. Upon taking the first difference of both series, it is observed that the series attain stationarity. The order of integration for MCDC is I(0), whereas for LnGDP and GPS it is I(1).

The Autoregressive Distributed Lag (ARDL) Bounds Test is utilized to examine whether there is a long-term association between the variables. This assessment is especially valuable in situations where a model comprises both stationary and non-stationary variables. Due to the mixed, we will employ ARDL for estimation of the parameters Appropriate lag lengths need to be determined before proceeding to parameter estimations. Table 6 displays the results of the Optimal Lag Length Selection Test.

Table 6. Optimal lag-length selection

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-120.086				5.71839	10.2572	10.2962	10.4044
1	-71.888	96.396	9	0.000	.220126	6.99066	7.14693	7.57969*
2	-63.969	15.838	9	0.070	.251436	7.08074	7.35421	8.11154
3	-56.005	15.927	9	0.068	.305864	7.16711	7.55778	8.63968
4	-34.119	43.772*	9	0.000	.131166*	6.09327*	6.60114*	8.00761

In Table 6, the endogenous variables are MCDC, LnGDPC, GDS, and the appropriate lag-length is specified as 4 by FPE, AIC, HQIC while 1 by SBIC. Because of the proper lag-length was selected as 2 by LR, FPE, AIC and HQIC, it is decided to choose 2 as optimal lag-length value. Thus, it was determined that the optimal lag length is 4. Table 7 displays the optimal lags specified for each variable to conduct ARDL estimation. The test results have indicated that the appropriate lag length has been identified as (4, 4, 3).

Table 7. Specifying ARDL Lag Structure

e(lags) [1,3]	MCDC	LnGDPC	GDS
r1	4	4	3

The presence of cointegration among the variables in the model was assessed using the ARDL Bounds Test, and the findings were documented in Table 8. The statistical values of F and t, along with the k_2 values for I0 and I1 within the 1%-10% confidence interval, are presented in the table.

Table 8. Pesaran – Shin - Smith ARDL Bounds Test

F = 16.392

t = - 6.937

	Critical Values (0.1-0.01), F-statistic, Case 3							
	[I_0]	[I_1]	[I_0]	[I_1]	[I_0]	[I_1]	[I_0]	[I_1]
	L_1	L_1	L_05	L_05	L_025	L_025	L_01	L_01
k_2	3.170	4.140	3.790	4.850	4.410	5.520	5.150	6.360
	Critical Values (0.1-0.01), t-statistic, Case 3							
	[I_0]	[I_1]	[I_0]	[I_1]	[I_0]	[I_1]	[I_0]	[I_1]
	L_1	L_1	L_05	L_05	L_025	L_025	L_01	L_01
k_2	-2.570	-3.210	-2.860	-3.530	-3.130	-3.800	-3.430	-4.100

The F statistic value of 16,392 in Table 8 exceeds the [I_0] bound. Thus, based on the rejection of the null hypothesis of no cointegration, it can be inferred that the series exhibit cointegration in the model with MCDC serving as the dependent variable. The findings of ARDL regression-based short-term and long-term parameter estimations are presented in Table 9.

Table 9. ARDL regression – Error correction model

Lags: (4,4,3)		R-squared = 0.9468		
Log likelihood = -61.165203		Adj R-squared = 0.8775		
		Root MSE = 4.7939		
D.MCDC	Coef.	Std.Err.	t	Prob.
ADJ				
MCDC				
L1.	-2.281	0.329	-6.940	0.000
LR				
LnGDPC	6.505	5.427	1.200	0.258
GDS	-0.949	0.619	-1.530	0.156
SR				
MCDC				
LD.	0.823***	0.261	3.150	0.010
L2D.	0.849***	0.243	3.500	0.006
L3D.	0.891***	0.206	4.330	0.001
LnGDPC				
D1.	78.960*	40.806	1.940	0.082
LD.	90.915*	44.777	2.030	0.070
L2D.	1.847	39.967	0.050	0.964
L3D.	108.875***	33.886	3.210	0.009
GDS				
D1.	-4.442***	1.357	-3.270	0.008
LD.	-4.639***	1.359	-3.410	0.007
L2D.	-3.860***	1.229	-3.140	0.010
cons	-34.606	88.932	-0.390	0.705

The concept of speed of adjustment pertains to the velocity at which a given variable moves towards its state of long-term equilibrium following an external shock. The requisite criteria for the speed of adjustment include a negative value that is less than one

in absolute terms, alongside statistical significance. The "ec term" exhibits statistical significance at the 1% level and bears a negative sign, yet its absolute value exceeds one ($|-2.281| > 1$).

The long-run results reveals that relationship between LnGDPC and MCDC is characterized by a coefficient of 6.505, indicating a positive effect of LnGDPC on MCDC. However, it lacks statistical significance. Thus, it can be inferred that the impact of "GDP per capita" on "Market capitalization of listed domestic companies" is not statistically significant in the long-run.

The variable of GDS exhibits a long-term coefficient of -0.949, indicating a negative influence on MCDC. Nevertheless, the results lack statistical significance. Thus, it can be inferred that the long-term impact of "Gross Domestic Savings" on the "Market Capitalization of Listed Domestic Companies" is not statistically significant.

In the short-run, the findings indicate that LnGPDC has a statistically significant positive impact on MCDC with a significance level of 10%. An increase of 1% in the LnGPDC results in a corresponding increase of 0.79 units in the MCDC. An increase of one percent in LnGDPC results in a corresponding increase of 0.91 units and 1.09 units in the first and the third lagged values of MCDC, respectively.

In the short term, it is seen that GDS has a negative effect on MCDC at the 1% significance level. A one unit increase in GDS reduces MCDC by 4.44 units. Similarly, a one-unit increase in GDS for the first and second lagged values of GDS decreases MCDC by 4.6 units and 3.9 units, respectively.

In the short run, the first, second and third lagged values of MCDC have a positive effect on MCDC at the 1% level of significance. Accordingly, a one-unit increase in the first, second, and third lagged values of MCDC increases MCDC by 0.82 units, 0.85 units, and 0.89 units, respectively.

5. Model Validation

The Durbin Watson Test is a statistical tool utilized to assess the presence of autocorrelation, also known as serial correlation, within residuals derived from regression analysis. Autocorrelation refers to the degree of similarity exhibited by a time series across consecutive time periods. The utilization of small sample sizes may result in an underestimation of the standard error, potentially leading to a misinterpretation of the significance of predictors.

If DW statistics is 2 that means no autocorrelation. It has been empirically observed that test statistic values in the range of 1.5 to 2.5 indicate a relatively normal distribution. Values that lie outside this range may require special consideration. According to Field's (2009) research, values less than 1 or greater than 3 are an evident cause for concern. Considering the Durbin-Watson d-statistic (14, 24) = 2.148527, it can be inferred that there is an absence of serial correlation.

To confirm this result we can perform Breusch-Godfrey LM test for autocorrelation. The null hypothesis of no serial correlation was examined with the Breusch-Godfrey LM test. Since the p-value is 0.016 in Table 10, the null hypothesis is rejected and it is concluded that the mode suffers from serial correlation. According to existing literature, it is recommended to consider the Breusch-Godfrey LM test for autocorrelation when incorporating lagged values. Therefore, we concluded that the model suffers from serial correlation.

Table 10. Breusch-Godfrey LM test for autocorrelation

lags(p)	$\chi 2$	Df	Prob > $\chi 2$
4	12.215	4	0.0158

H_0: no serial correlation

The output of White test for homoscedasticity of null hypothesis tested against "unrestricted heteroscedasticity of alternative hypothesis" and the results reported in the first line of Table 11. Thus, based on the analysis conducted, the null hypothesis is not

rejected, leading to the conclusion that there is no presence of heteroscedasticity issue in the model. Based on the results of the Skewness and Kurtosis tests, it can be observed that the residuals exhibit a normal distribution.

Table 11. Cameron & Trivedi's decomposition of IM-test

Source	χ^2	Df	p
Heteroskedasticity	24.000	23	0.404
Skewness	10.560	13	0.648
Kurtosis	0.070	1	0.795
Total	34.630	37	0.581

The graph depicted in Figure 4 illustrates the Cusum model stability test. Thus, it can be inferred that the model exhibits stability.
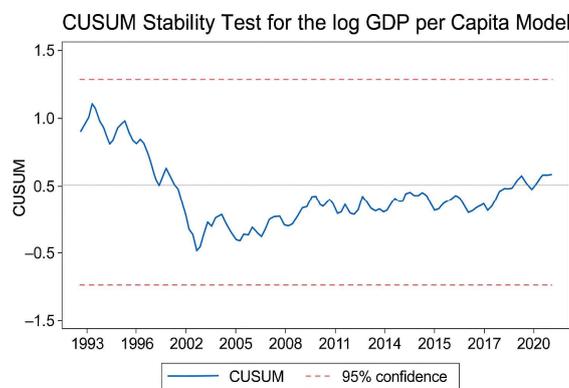

Figure 4. CUSUM Stability Test for the lnGDP per Capita Model Including GDS and MCDC

Figure 4 illustrates the CUSUM stability test applied to a linear regression model where the log of GDP per capita serves as the dependent variable, and domestic savings (GDS) alongside market capitalization (MCDC) are included as explanatory variables. Throughout the sample period from 1993 to 2020, the cumulative sum of recursive residuals remains entirely within the 95% confidence bounds. This trajectory implies that the estimated coefficients exhibit structural stability over time, with no statistically significant breaks or shifts in model behavior.
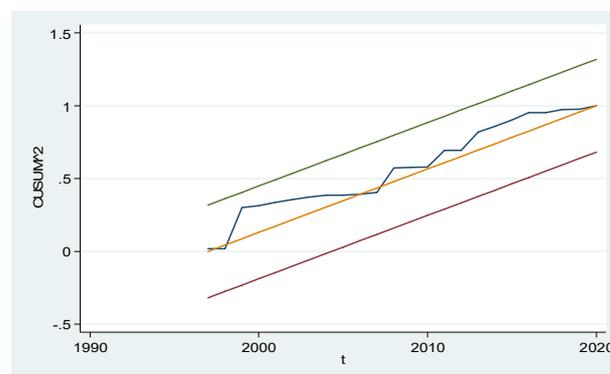

Figure 5. CUSUM of Squares Stability Test with 95% Confidence Bounds

Figure 5 illustrates the structural stability of the regression model using the CUSUM of Squares test. The red line represents the cumulative sum of squared recursive residuals, while the dotted green lines denote the 95% confidence boundaries derived from the test's critical values.

Throughout the sample period (1997–2020), the test statistic remains well within the prescribed bounds. This implies that there is no evidence of structural breaks in the variance of the residuals, reinforcing the temporal stability of the model's parameters. The result supports the assumption of homoscedasticity over time and confirms the reliability of the model for policy inference and empirical interpretation.

6.   Conclusion and Policy Implication

Numerous research in the literature have investigated the relationship between financial development and macroeconomic factors. More precisely, the primary emphasis of this study is the significant research that has been done on the relationship between macroeconomic factors and stock market development. As previously mentioned, several research in this field examine the relationship between two variables, ranging from stock market developments to macroeconomic factors. In the literature, this scenario has been acknowledged as the supply-leading hypothesis. This study's main aim is to examine how macroeconomic factors affect stock market developments. In the literature, this circumstance is referred to as the demand-following hypothesis. Examining the variables influencing stock market developments is a crucial topic for developing countries, particularly emerging economies. These countries' actual economic levels and growth are significantly influenced by the development of their stock markets. This study was also inspired by the literature, which includes a more restricted investigation of the issue from this angle.

The impact of economic growth and total savings on stock market developments is examined in this research for Türkiye, a significant player in emerging market economies. This has made it easier to understand why Türkiye, one of the most significant countries in the world in terms of GDP, is not in a comparable situation with regard to stock market developments. Based on yearly data for the years 1993–2022, the study experimentally examined the impact of real GDP per capita and the GDP share of total savings on the market capitalization size of listed domestic companies (% of GDP). ARDL bounds testing and error correction model were used in the analysis of short and long-term empirical relationships. In the long term, the market capitalization of listed domestic companies (as a percentage of GDP) is not significantly impacted by real GDP per capita or the share of savings in GDP, according to the findings. However, in the short term, the market capitalization of listed domestic companies (as a percentage of GDP) is positively and significantly impacted by real GDP per capita, while the market capitalization of listed domestic companies (as a percentage of GDP) is negatively, albeit significantly, impacted by the share of savings in GDP.

The results are very astounding. The positive relationship between economic growth and stock market development is highlighted by the results of research by Şahin & Temelli (2018), Raza & Jawaid (2014), Shahbaz et al. (2016), and Yartey (2008). On the other hand, research by Boshkovska et al. (2016), Nguyen & Minh (2025), Owiredu et al. (2016), and Phuong et al. (2023) indicates that there is either no significant relationship or a negative relationship between economic growth and stock market development. "Savings did not significantly affect stock market development," according to the study by Owiredu et al. (2016). The results of this study show both short- and long-term parallels and contrasts with previous research in the literature. The shallowness of the financial markets in the countries and price instability are the reasons why economic expansion has little effect on stock market development, particularly over the long run. The market capitalization size reduction in Türkiye, particularly after 2012, is heavily influenced by the political, social, and economic events at the time. The rise in inflation rates in recent years has also had a detrimental impact on GDP and resulted in a real reduction in total savings when prices have increased.

Like other emerging economies in its category, including Saudi Arabia, Iran, the United Arab Emirates, and Malaysia, Türkiye needs to maintain price stability and economic stability in order to encourage the transfer of savings from consumption to the

longer-term stock market. To guarantee that Türkiye, one of the 20 most significant countries in the world in terms of actual economic development, is also better off financially, it is advised that the appropriate arrangements be made and effective measures be done.

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Appendix

Summary for interpretation of parameters for functions

Model	Dependent Variable	Independent Variable	Interpretation of β_1
level-level	y	x	$\Delta y = \beta_1 \Delta x$
level-log	y	$\log(x)$	$\Delta y = (\beta_1/100)\% \Delta x$
log-level	$\log(y)$	x	$\% \Delta y = (100\beta_1)\Delta x$
log-log	$\log(y)$	$\log(x)$	$\% \Delta y = \beta_1 \% \Delta x$