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Stock Market Development, Financial Development, and Economic Growth Relationship: An Application in Fragile Economies

Borsa Gelişmişliği, Finansal Gelişme ve Ekonomik Büyüme İlişkisi: Kırılgan Ekonomilerde Bir Uygulama

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ABSTRACT

This study investigates the relationship between stock market development, financial development, and economic growth in fragile economies. Annual data from 2000 to 2020 are analyzed for Türkiye, Brazil, India, Indonesia, Mexico, and South Africa using panel data techniques. Stock market development is measured by the ratio of market capitalization to GDP. The independent variables are economic growth (GDP growth rate), financial development (domestic credit to the private sector), and foreign direct investment (FDI as a share of GDP). The study applies the Panel ARDL method to examine both short- and long-term relationships. The results indicate that economic growth and bank credit positively influence stock market development in the long term, while FDI has no significant effect. Panel causality tests show unidirectional causality from stock market development to credit and from FDI to stock market development. The findings highlight the importance of strengthening financial systems to enhance market development in fragile economies, while suggesting that FDI alone may not generate long-term benefits due to structural vulnerabilities.

Anahtar Kelimeler:
Finansal Gelişme,
Ekonomik Büyüme,
Kırılgan Ekonomiler,
Doğrudan Yabancı Yatırım
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E44, G15, 016, F21

ÖZET

Bu çalışma, kırılgan ekonomilerde hisse senedi piyasası gelişimi, finansal gelişme ve ekonomik büyüme arasındaki ilişkiyi incelemektedir. Türkiye, Brezilya, Hindistan, Endonezya, Meksika ve Güney Afrika'ya ait 2000–2020 dönemi yıllık verileri panel veri teknikleri ile analiz edilmiştir. Hisse senedi piyasası gelişimi, piyasa değeri/GSYH oranı ile ölçülmüştür. Bağımsız değişkenler olarak ekonomik büyüme (GSYH büyüme oranı), finansal gelişme (bankalarca özel sektöre verilen yurtiçi krediler) ve doğrudan yabancı yatırımlar (FDI/GSYH oranı) kullanılmıştır. Kısa ve uzun dönem ilişkileri incelemek amacıyla Panel ARDL yöntemi uygulanmıştır. Bulgulara göre, ekonomik büyüme ve banka kredileri uzun vadede hisse senedi piyasası gelişimini pozitif yönde etkilemektedir. Ancak FDI'nın anlamlı bir etkisi bulunmamıştır. Panel nedensellik analizleri, hisse senedi piyasası gelişiminden krediye ve FDI'dan sermaye piyasasına doğru tek yönlü nedensellik ilişkileri olduğunu göstermektedir. Bulgular, kırılgan ekonomilerde finansal sistemlerin güçlendirilmesinin sermaye piyasası gelişimini desteklediğini, ancak yapısal kırılganlıklar nedeniyle FDI'nın tek başına uzun vadeli fayda sağlamayabileceğini ortaya koymaktadır.

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1. INTRODUCTION

In today's global economy, the barriers to capital flows have significantly declined, particularly due to financial liberalization and rapid technological advancements. According to UNCTAD's 2021 World Investment Report, global foreign direct investment (FDI) inflows increased by 38% in 2021, reaching approximately $1.65 trillion, signaling a strong recovery and growing cross-border financial integration. Similarly, the Bank for International Settlements reports that the daily turnover in foreign exchange markets has surpassed $7.5 trillion as of 2022, indicating the scale and speed of global financial transactions. These developments are closely tied to the expansion of digital financial infrastructure such as electronic trading platforms, blockchain-based asset transfers, and high-frequency trading algorithms. As transaction costs have decreased and market access has become easier, capital has increasingly flowed from developed to emerging economies in search of higher returns. While this has contributed to capital market development, it has also introduced new risks. Particularly in fragile markets, foreign portfolio investors may rapidly withdraw funds in response to political or economic instability, leading to sharp depreciation in exchange rates and heightened market volatility. As a result, developing countries have increasingly turned to foreign direct investment (FDI) as a more stable and productive form of capital inflow.

In 2008, the FED expanded its monetary policy to overcome the global financial crisis, resulting in global liquidity abundance until 2013. During this period, a large portion of cheap capital flowed into emerging economies with high rates of return, leading to expansion in their financial and capital markets. In May 2013, the FED announced that it would end its expansionary policy and switch to an asset purchase program. This decision created a shock effect on emerging economies and dramatically changed financial markets. By the end of 2013, foreign portfolio investments in developing countries had significantly decreased, while developing country currencies and stock prices had depreciated, and government bond market interest rates and CDS premiums had increased considerably. During this period, Morgan Stanley classified some emerging market economies that had distanced themselves from the FED's decision as more fragile, listing Türkiye, Brazil, Indonesia, India, Mexico, Pakistan, Argentina, Colombia, Egypt, Qatar, Russia, and South Africa as Fragile Economies (Yıldırım, D., & Çelik, A. K., 2020). Morgan Stanley made this classification, thinking that inflation, current account deficit, uncertainty in capital flows, and growth performance instability would affect a country's currency. Moreover, a report published by Morgan Stanley in December 2013 stated that elections to be held, especially in these five countries, in 2014 would cause the fragility of these economies to persist. The currencies of these countries lost value by 14% to 24% in 2014 compared to 2013. Similarly, the stock markets in Türkiye (-12%), Indonesia (-12%), and Brazil (-8%) lost value. The stock market index of the Fragile Five countries became more volatile than other emerging markets.

In the current literature, studies on this subject have generally examined the financial development-economic growth relationship, the FDI-growth relationship, or the financial development-FDI relationship separately. However, the limited number of studies that consider all three variables together, and the lack of any study in the literature that examines all three in fragile economies, were determining factors in selecting this topic. Due to this gap, the study is expected to contribute to the literature. This study investigates the relationship between stock market development, financial development, foreign direct investment (FDI), and economic growth in fragile economies. In this context, the effects of economic growth (GDP), financial development (bank credit and stock market size), and foreign direct investment (FDI) on stock market development are examined using panel data from six fragile economies. The short-term and long-term effects of the variables were examined using the Panel ARDL model. Financial development variables included domestic credit to the private sector by banks and stock market development. In addition, cointegration and causality relationships among the variables were also examined.

The remaining part of the study presents the literature review on the subject. The next part includes the research methodology and findings, respectively.

2. LITERATURE REVIEW

Numerous studies have examined the relationship between economic growth and financial development in different countries, with other variables, and using different analytical methods across various periods (Schumpeter, 1911; Patrick, 1966; King & Levine, 1997; Lee & Chang, 2009; Ang, 2009; Hermes & Lensink, 2003; Malik & Amjad, 2013; Arestis et al., 2001; Güngör & Yılmaz, 2008; Kirkpatrick & Green, 2002).

In his seminal supply-side study, Schumpeter (1911) was the first to reveal a relationship between financial development and economic growth, suggesting that financial development positively affects economic growth.

On the other hand, Robinson (1952) argued from a demand-side perspective that economic growth positively affects financial development. Later studies by Patrick (1966), Goldsmith (1969), and King & Levine (1997) concluded that this relationship is both supply- and demand-side and has a positive effect. In their study, Kirkpatrick & Green (2002) argued that financial markets develop due to economic growth, but that developed financial markets promote further economic growth, creating a cyclical relationship. Some researchers, however, have argued that this relationship may not exist (Stern, 1989; Demetriades & Hussein, 1996; Greenwood & Smith, 1997; Al Yousif, 2002).

In studies examining the relationship between FDI and financial development indicators, some studies found a bidirectional causal relationship between FDI and financial development indicators in the long run (Lee & Chang, 2009; Malik & Amjad, 2013), while other studies concluded that FDI had both direct and indirect positive effects on the real sector through financial development in the long run (Ang, 2009). On the other hand, Hermes & Lensink (2003) supported the view that FDI positively affects economic growth only if the local financial system reaches a certain minimum level of development. The literature reveals mixed findings, particularly regarding the impact of FDI on financial development and growth. For example, while Lee & Chang (2009) and Malik & Amjad (2013) identified a bidirectional causality between FDI and financial development, Hermes & Lensink (2003) emphasized that such positive effects are conditional on the existence of a well-developed financial system. Conversely, other studies such as Ekpenyong & Acha (2011) found no significant relationship at all. These contradictions may arise due to differences in country contexts, time periods, institutional quality, and the composition of FDI (e.g., resource-seeking vs. efficiency-seeking). The current study's finding that FDI does not have a significant long-term impact on stock market development in fragile economies aligns more closely with studies emphasizing structural and institutional constraints. This suggests that without robust domestic financial institutions, the expected positive spillovers from FDI may not materialize. For sectoral development, some studies have found that the FDI relationship has been positive in sectors with high FDI concentration in recent years but negative in other sectors (Malik & Amjad, 2013).

Studies that argue that stock market development positively affects economic growth have shown that, especially in highly liquid stock markets, incentives increase for investors to obtain information about companies and improve corporate governance (Holmstrom & Tirole, 1993). Greenwood & Smith (1997) argued that large stock markets can reduce the cost of moving savings among different financial assets, thereby facilitating investment in productive technologies. Benecivenga et al. (1995) argued that a strong and positive relationship exists between stock market liquidity, economic growth rate, productivity growth, and capital accumulation. Levine & Zervos (1998), in their regression analyses involving both bank credits and stock market liquidity variables, found that both variables positively affect productivity growth, growth, and capital accumulation, and that there is a strong relationship between stock market size, volatility, and degree of international integration and growth.

Some studies have also found a long-term and positive relationship between stock market development, banking system development, and economic growth (Arestis et al., 2001; Güngör & Yılmaz, 2008; Çeştepe & Yıldırım, 2016; Türkoğlu, 2016). Studies conducted in Türkiye have concluded that there is a bidirectional causality relationship between financial development and economic growth in both the short and long term (Çeştepe & Yıldırım, 2016; Türkoğlu, 2016). Aslan & Korap (2006) identified a long-term relationship between financial development indicators and economic growth in the Turkish economy. Altunç (2008) identified a bidirectional causality relationship between Türkiye's GDP, M2, OSKB, the ratio of total financial assets to GDP (FIN), and the ratio of securities to GDP (MEN) and economic growth.

When studies to date are examined according to the development level of the country or country groups, it is generally seen that studies have concentrated on developing countries. In most of the studies conducted in developing countries, positive relationships have been identified, either one-way or bidirectional (Ang & McKibbin, 2007; Ofori-Abebrese et al., 2017; Saci & Holden, 2008; Bozoklu & Yılancı, 2013; Yıldırım et al., 2013). In Malaysia and Ghana, it was found that financial development positively and unidirectionally affects growth (Ang & McKibbin, 2007; Ofori-Abebrese et al., 2017). Data from thirty developing countries show that countries with more developed financial systems grow faster (Saci & Holden, 2008). Data from fourteen developing countries also support this finding with causality relationships (Bozoklu & Yılancı, 2013). Yıldırım et al. (2013) found a one-way causality from economic growth to financial development for ten developing European countries. Sönmez & Sağlam (2018) found a one-way causality relationship between financial development and growth for developing European countries and a bidirectional causality relationship between trade openness and growth. In a few studies, however, it has been found that there is no relationship between financial development and economic growth in developing countries (Ekpenyong & Acha, 2011). Studies conducted by Temelli & Şahin (2018) in APEC countries, which include both developed and developing countries, and by Acaravcı et al. (2009)

in sub-Saharan African countries with similar mixed country groups, have determined a bidirectional causality relationship between financial development and growth. Similarly, data from twelve Latin American countries, including developed and developing countries, revealed a one-way causality relationship from financial development to economic growth (Gregorio & Guidotti, 1995). Swamy & Dharani (2018) found a bidirectional causality relationship between financial development and economic growth in 24 developed economies. A study in Austria, a developed country, found that financial markets and intermediation activities have a positive and one-way causality relationship with economic growth (Thangevelu & Jiunn, 2004). In China, on the other hand, it was found that there is a bidirectional relationship, with a more substantial effect from economic growth to financial development (Shan & Jianhong, 2006). In Bangladesh, one of the least developed countries, it was revealed that financial development has an adverse effect on growth (Hye & Islam, 2013).

Identifying financial development indicators is one of the most critical challenges in determining the relationship between financial development and economic growth. Financial development indicators vary depending on the country's economic, political, and other conditions. When the studies in the literature are examined, it is seen that financial development indicators are discussed in three dimensions: the first is monetary size; the second is the size of credits; and the third is the size of the capital market (Lynch, 1996).

In this study, different financial development indicators recorded in the literature were examined; among the credit-based size indicators, domestic credit to the private sector by banks and stock market development were used.

3. DATASET and METHODOLOGY

3.1. Dataset

In this study, the relationship between stock market development, financial development, and economic growth in fragile economies—namely Türkiye, Brazil, India, Indonesia, Mexico, and South Africa—was investigated for the period between 2000 and 2020. Although there are 12 fragile economies, Qatar, Egypt, Pakistan, Russia, Colombia, and Argentina were excluded from the study due to missing data for some years. Although this study adopts the "Fragile Economies" classification originally proposed by Morgan Stanley (2013), it is important to acknowledge that the economic structures and fragility levels of these countries may have evolved since then. For instance, Pakistan and Argentina have experienced recurring macroeconomic crises, whereas India has demonstrated more resilience in recent years. Alternative classifications based on macroeconomic vulnerability indicators—such as those used by the IMF (e.g., External Sector Report) or the World Bank's CPIA index—offer more dynamic and criteria-based perspectives. Nevertheless, Morgan Stanley's classification remains a relevant benchmark widely cited in the literature, particularly for historical comparison of market vulnerabilities following the 2013 taper tantrum.

The exclusion of six countries originally categorized under the Fragile Economies group—namely Qatar, Egypt, Pakistan, Russia, Colombia, and Argentina—due to data unavailability represents a limitation of this study. These countries display varied macroeconomic profiles and structural vulnerabilities. Their exclusion may introduce a selection bias that could affect the generalizability of the findings. For instance, Pakistan and Argentina have experienced persistent currency and inflation crises, which might have altered the direction or strength of relationships observed in the model. Therefore, the results should be interpreted with caution, acknowledging that they may better reflect the dynamics of relatively data-rich and structurally stable fragile economies.

The variables used in the study are as follows: stock market development (LMC), one of the most important indicators of financial stability in countries; real GDP (1995 base year) (GDP) as a measure of economic growth; domestic credit to the private sector by banks as a percentage of GDP (LEND) as an indicator of financial development; and net inflows of foreign direct investment as a percentage of GDP (FDI) as another indicator of economic stability and growth. The study's data were obtained from the World Bank's World Development Indicators (WDI) online database. The study uses annual data, and to reduce the heteroscedasticity problem that may arise in the models, the natural logarithms of all variables were taken.

In this study, stock market development (LMC) is measured using the market capitalization to GDP ratio, which is widely accepted in the literature as a proxy for the size of capital markets relative to the economy. Although other indicators such as trading volume or market liquidity could provide complementary insights—especially regarding market efficiency and depth—comprehensive and comparable data for these metrics were not consistently available for all countries and years in the fragile economies group. Therefore, market capitalization

to GDP was selected due to its broad coverage, comparability across countries, and frequent use in empirical studies on financial development.

Table 1. Descriptive Statistics and Correlation Matrix

	LMC	GDP	LEND	FDI
Observations	126	126	126	126
Mean	35.435	3.575	40.619	1.991
Std. Dev.	26.841	3.539	18.011	1.226
Min	3.165	-8.309	11.612	-2.757
Max	124.369	11.2	70.92	5.368
	LMC	**GDP**	**LEND**	**FDI**
LMC	1			
GDP	-0.040	1		
LEND	0.635	-0.109	1	
FDI	-0.192	-0.212	0.042	1

Note: LMC represents stock market development; GDP indicates economic growth; LEND refers to domestic credit provided to the private sector by banks; and FDI denotes foreign direct investment.

Table 1 presents the descriptive statistics and correlation matrix for the research variables. The correlation matrix shows that the strongest positive relationship is between domestic credit to the private sector (LEND) and stock market development (LMC), with a correlation coefficient of 0.635. This suggests that increases in bank credit are likely associated with larger or more developed capital markets in these economies. In contrast, economic growth (GDP) and FDI both show weak or even negative correlations with the other variables. The negative correlation between GDP and FDI (-0.212), as well as between LMC and FDI (-0.192), may reflect the structural volatility of fragile economies where capital inflows and growth are not always synchronized. Overall, the relatively low correlation coefficients indicate that multicollinearity is unlikely to be a concern in the panel model estimation. The average LMC value for the examined countries is 35.435. The minimum and maximum LMC values are 3.165 and 124.369, respectively. The GDP values of the countries range from a minimum of -8.309 to a maximum of 11.2, with an average of 3.575. The mean LEND value is 40.619, with minimum and maximum values of 11.612 and 70.92, respectively. The minimum and maximum values of FDI are -2.757 and 5.368, with an average of 1.991. According to the results of the correlation analysis of the variables, the linear relationships between all the variables are weak. Therefore, it is not problematic to use them in the same model. There is a negative correlation between economic growth, domestic credit to the private sector by banks, and foreign direct investment. The relationship between domestic credit and the private sector by banks and stock market development is the highest at 63%.

3.2. Research Model

In econometrics, panel data are used as the data type, which combines time series and cross-sectional data. Panel data are formed by combining cross-sectional and time series data. The panel data method, formed by the combination of cross-sections and periods, expresses the total of observations on cross-sections such as individuals, households, countries, firms, industries, and similar groups in an integrated manner.

The representation of the panel data model is shown below:

$$Y\_it = \alpha + X\_it' \beta + \upsilon\_it \quad (1)$$

Here, i = 1, 2, …, N represents the cross-section unit, and t = 1, 2, …, T represents the time period. α represents the scalar quantity of data, β represents (k x 1), and X_it shows the number of observations related to the explanatory variables with K variables.

In time series analyses, it is essential to determine the stationarity and know the degree of stationarity. In time series analysis, stationarity refers to a property of a variable whose statistical characteristics—such as mean and variance—do not change over time. If a variable is stationary at its level form, it is called I(0); if it becomes stationary only after first differencing, it is referred to as I(1). Testing for unit roots helps determine the stationarity level of variables. This is crucial because applying regression models to non-stationary data can produce misleading or spurious results. In this study, the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests were used to check whether variables are stationary and at what order. After deciding that the variables are

stationary at the same order, cointegration analysis is performed to determine whether there is a long-term relationship between the variables. However, in cases where the series are not stationary at the same order, the Panel ARDL method developed by Pesaran & Shin (1995), Pesaran & Smith (1998), and Pesaran et al. (1999) is used. The autoregressive distributed lag (ARDL) model approach allows for the examination of cointegration relationships when variables have different orders of stationarity, such as level I(0) and first difference I(1) (Özdamar, 2015). One of the advantages of Panel ARDL is that it tests whether there is a cointegration relationship regardless of the order of stationarity of the variables. In the Panel ARDL (p, q1, …, qt) model, the pth and qth order lags of the dependent and independent variables are included on the right-hand side of the equation.

The representation of the Panel ARDL model is given below:

$$Y\_it = \sum(j=1)^p \lambda\_ij \, Y(i,t-j) + \sum(j=0)^q \delta\_ij \, X(i,t-j) + \mu\_i + \varepsilon\_it \quad (2)$$

Here, i = 1, 2, …, N denotes the number of countries, t = 1, 2, …, T denotes the time, j = 1, 2, …, T denotes the lag order, μ_i denotes the fixed effects, X_it denotes the explanatory variable vector (k x 1), λ_ij denotes the coefficients of the lags of the dependent variable, and δ_ij denotes the coefficient vector (k x 1) (Pesaran et al., 1999).

A unit root test was performed on the natural logarithms of the time series data in the established database. The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests determined the stationary data levels.

The Hausman test was applied to decide which estimator would be used in the model to be established.

The Panel ARDL method investigated the long-term relationship between stock market development, financial development, and economic growth. The variables of the model include stock market development (LMC), real GDP (1995 base year) (GDP) as a measure of economic growth, domestic credit to the private sector by banks as a percentage of GDP (LEND) as an indicator of financial development, and net inflows of foreign direct investment as a percentage of GDP (FDI) as an indicator of financial stability and development.

Model 1 LMC = GDP + LEND + FDI (3)

Model 2 GDP = LMC + LEND + FDI (4)

Model 3 LEND = LMC + GDP + FDI (5)

Model 4 FDI = LMC + LEND + GDP (6)

LMC: Stock market development
GDP: Economic Growth
LEND: Domestic credit to the private sector by banks
FDI: Foreign Direct Investment

4. FINDINGS

The results of the ADF and PP unit root tests for the variables in the study are presented in Table 2. Accordingly, the levels at which the series are stationary have been determined. It was determined that the LMC and LEND series are stationary at the first difference, while the GDP and FDI series are stationary at their current levels.

Table 2. Unit Root Test Results of the Variables

	LMC	**GDP**	**LEND**	**FDI**
I(0)	ADF	With const	0.2401*	0.8660*
	With const & trend	0.5324	0.9881	0.1879**
	Without const & trend	0.5464	0.2864**	0.9707
	PP	With const	0.2728	0.8660*
	With const & trend	0.5341	0.9986	0.6950***
	Without const & trend	0.6049	0.2864**	0.9656
I(1)	ADF	With const	0.0002	0.3129***
	With const & trend	0.0011**	0.4193***	0.0435***

LMC	GDP	LEND	FDI
Without const & trend	0.0000**	0.0499***	0.0098
PP	With const	0.0002***	0.3129***
With const & trend	0.0011***	0.6875***	0.0862***
Without const & trend	0.0000***	0.0499***	0.0088***

Note: *, **, and *** indicate significance levels at 10%, 5%, and 1%, respectively. LMC represents stock market development; GDP indicates economic growth; LEND refers to domestic credit to the private sector by banks; and FDI denotes foreign direct investment.

After the stationarity test, the second step, cointegration testing, was performed using the Pedroni cointegration test to examine the long-term relationship between these series.

Table 3. Pedroni Cointegration Test

Test Statistic	Panel (Within Dimension)	Group (Between Dimension)
v	1.453*	.
rho	0.118	0.958
t	-0.232	0.480
adf	3.513***	4.702***

Note: **, *, and *** indicate significance levels at 10%, 5%, and 1%, respectively. The Pedroni Cointegration Test reports both Panel (within-dimension) and Group (between-dimension) statistics. The test statistics include the panel v-statistic (v), panel rho-statistic (rho), panel t-statistic (t), and panel Augmented Dickey-Fuller statistic (adf).

When the cointegration test results were examined, the null hypothesis of no cointegration was rejected. The cointegration test results among the series, which were found to have different levels of stationarity, are significant. The result indicates that there is a long-term relationship among the variables.

Table 4. Specification Test (Hausman, 1978)

Coefficient	Chi-square test value	1.103
P-value		0.776

According to the result of the Hausman test, the probability value is higher than the critical value. Therefore, the null hypothesis is accepted, and it was decided that the Pool Mean Group (PMG) estimator is appropriate for the model. The GDP coefficient has an adverse short-term effect on LMC ($p<0.01$). The LEND coefficient has a positive short-term impact on LMC ($p<0.05$). The error correction coefficient of the model shows that the model is working correctly ($p<0.01$). Approximately 45% of the deviations occurring in the short term are corrected in the following period, and the long-term equilibrium is reached. In the long term, the GDP and LEND coefficients positively affect LMC ($p<0.01$; $p<0.05$).

Table 5. Panel ARDL Estimations (Dependent Variable: LMC)

Short-term				
Coefficient	**Std. Error**	**z**	**P>z**	**95% Confidence Interval**
GDP	-3.207879	1.096984	-2.92	0.003
LEND	0.409203	0.158505	2.58	0.010
FDI	0.197670	2.066825	0.10	0.924
Long-term				
Coefficient	**Std. Error**	**z**	**P>z**	**95% Confidence Interval**
Error Correction Term	-0.445272	0.133043	-3.35	0.001
ΔGDP	0.788979	0.307200	2.57	0.010
ΔLEND	1.788343	0.611986	2.92	0.003
ΔFDI	0.376977	1.602654	0.24	0.814
Constant	13.485900	5.013759	2.69	0.007

Note: Table 5 reports the Panel ARDL estimations with LMC (stock market development) as the dependent variable. GDP indicates economic growth; LEND refers to domestic credit to the private sector by banks; and FDI denotes foreign direct investment. The error

correction term captures the speed at which deviations from the long-term equilibrium are corrected. The model's log-likelihood value is -402.00. *, **, and *** indicate significance levels at 10%, 5%, and 1%, respectively.

The LEND coefficient has an adverse short-term effect on GDP ($p<0.01$). The error correction coefficient shows that the model functions correctly ($p<0.01$). Approximately 53% of the deviations occurring in the short term are corrected in the following period, reaching the long-term equilibrium. In the long term, none of the variables' coefficients statistically affect GDP ($p>0.05$).

Table 6. Panel ARDL Estimations (Dependent Variable: GDP)

Short-term				
Coefficient	**Std. Error**	**z**	**P>z**	**95% Confidence Interval**
LMC	0.050412	0.047866	1.05	0.292
LEND	-0.129749	0.033702	-3.85	0.000
FDI	-0.209185	0.485756	-0.43	0.667
Long-term				
Coefficient	**Std. Error**	**z**	**P>z**	**95% Confidence Interval**
Error Correction Term	-0.530675	0.184703	-2.87	0.004
ΔLMC	-0.033793	0.030651	-1.10	0.270
ΔLEND	0.151288	0.173121	0.87	0.382
ΔFDI	-0.156322	0.429113	-0.36	0.716
Constant	3.243289	1.275973	2.54	0.011

Note: Table 6 presents the Panel ARDL estimations with GDP (economic growth) as the dependent variable. LMC represents stock market development; LEND refers to domestic credit to the private sector by banks; and FDI denotes foreign direct investment. The error correction term indicates the speed of adjustment back to the long-term equilibrium. *, **, and *** indicate significance levels at 10%, 5%, and 1%, respectively.

The LMC coefficient has a positive short-term effect on LEND ($p<0.10$). The error correction coefficient shows that the model functions correctly ($p<0.05$). Approximately 1.5% of the deviations occurring in the short term are corrected in the following period, reaching the long-term equilibrium. In the long term, only the GDP coefficient positively affects LEND ($p<0.05$).

Table 7. Panel ARDL Estimations (Dependent Variable: LEND)

Short-term				
Coefficient	**Std. Error**	**z**	**P>z**	**95% Confidence Interval**
LMC	3.797242	2.286049	1.66	0.097
GDP	12.12109	10.74527	1.13	0.259
FDI	-18.93197	18.77231	-1.01	0.313
Long-term				
Coefficient	**Std. Error**	**z**	**P>z**	**95% Confidence Interval**
Error Correction Term	-0.014932	0.007155	-2.09	0.037
ΔGDP	-0.173293	0.091654	-1.89	0.059
ΔLMC	0.026569	0.040186	0.66	0.509
ΔFDI	0.523119	0.345485	1.51	0.130
Constant	-0.326650	0.510429	-0.64	0.522

Note: Table 7 reports the Panel ARDL estimations with LEND (domestic credit to the private sector by banks) as the dependent variable. LMC represents stock market development; GDP indicates economic growth; and FDI denotes foreign direct investment. The error correction term shows the speed of adjustment back to the long-run equilibrium. *, *, and *** indicate significance levels at 10%, 5%, and 1%, respectively.

In the model, all the independent variables (LMC, GDP, and LEND) have a positive short-term effect on FDI ($p<0.01$; $p<0.10$; $p<0.05$). The error correction coefficient shows that the model functions correctly ($p<0.01$). Approximately 58% of the deviations occurring in the short term are corrected in the following period, reaching the long-term equilibrium. In the long term, none of the variables' coefficients statistically affect FDI ($p>0.05$).

Table 8. Panel ARDL Estimations (Dependent Variable: FDI)

Short-term				
Coefficient	**Std. Error**	**z**	**P>z**	**95% Confidence Interval**
LMC	0.027189	0.006378	4.26	0.000
GDP	0.081681	0.046023	1.77	0.076
LEND	0.019138	0.009704	1.97	0.049
Long-term				
Coefficient	**Std. Error**	**z**	**P>z**	**95% Confidence Interval**
Error Correction Term	-0.581771	0.062899	-9.25	0.000
ΔLMC	0.006638	0.027926	0.24	0.812
ΔGDP	-0.040050	0.035505	-1.13	0.259
ΔLEND	0.002731	0.051346	0.05	0.958
Constant	0.111323	0.394323	0.28	0.778

Note: Table 8 presents the Panel ARDL estimations with FDI (foreign direct investment) as the dependent variable. LMC represents stock market development; GDP indicates economic growth; and LEND refers to domestic credit to the private sector by banks. The error correction term captures the speed of adjustment back to the long-term equilibrium. *, **, and *** indicate significance levels at 10%, 5%, and 1%, respectively.

Table 9. Panel ARDL Estimations (Country-Level Results with Dependent Variable: LMC)

Country	**GDP**	**LEND**	**FDI**
Brazil	1.041	3.218**	-2.064
	(1.064)	(1.320)	(3.369)
India	1.554	3.096*	1.029
	(1.476)	(1.641)	(5.560)
Indonesia	0.837	0.151	-0.426
	(0.620)	(0.476)	(0.668)
Mexico	0.0894	0.379	1.363***
	(0.139)	(0.281)	(0.345)
South Africa	-0.295	0.766	-4.641*
	(1.683)	(0.968)	(2.717)
Türkiye	1.507*	3.120***	7.001
	(0.873)	(1.039)	(5.902)
Panel	3.208***	0.409***	0.198
	(1.097)	(0.159)	(2.067)

Note: Table 9 reports country-level Panel ARDL estimations with LMC (stock market development) as the dependent variable. GDP indicates economic growth; LEND refers to domestic credit to the private sector by banks; and FDI denotes foreign direct investment. The values in parentheses are robust standard errors. *, **, and *** indicate significance levels at 10%, 5%, and 1%, respectively.

According to the country-level estimations, the effect of GDP on LMC is positive in 5 out of 6 countries and negative in one country. Only in Türkiye, the GDP coefficient of 1.507 is statistically significant ($p<0.10$). It is estimated that a 1% increase in GDP could increase LMC by 1.5% in Türkiye. The estimated coefficients for Brazil, India, Indonesia, Mexico, and South Africa are not statistically significant ($p>0.05$).

The effect of LEND on LMC is positive for all countries. The countries where these coefficients are statistically significant are Brazil (3.218, $p<0.05$), India (3.096, $p<0.05$), and Türkiye (3.120, $p<0.01$). A 1% increase in LEND could increase LMC by 3.2% in Brazil, 3.0% in India, and 3.1% in Türkiye.

The effect of FDI on LMC is negative and positive in three countries. The countries where FDI is statistically significant are Mexico (1.363, $p<0.01$) and South Africa (-4.641, $p<0.10$). An estimated 1% increase in FDI could increase LMC by 1.4% in Mexico and decrease it by 4.6% in South Africa.

Table 10. Causality Test Results

Panel	LMC	GDP	LEND	FDI
LMC	-	0.0504	3.797	0.0272***
		(1.05)	(1.66)	(4.26)
GDP	-3.208	-	12.12	0.0817
	(-2.92)		(1.13)	(1.77)
LEND	0.409**	-0.130***	-	0.0191*
	(2.58)	(-3.85)		(1.97)
FDI	0.198	-0.209	-18.93	-
	(0.10)	(-0.43)	(-1.01)	
ECT	-0.023*	-0.531**	-0.0149*	-0.582***
	(-2.12)	(-2.87)	(-2.09)	(-9.25)

Note: Table 10 presents the causality test results for the Panel ARDL estimations. LMC represents stock market development; GDP indicates economic growth; LEND refers to domestic credit to the private sector by banks; and FDI denotes foreign direct investment. ECT stands for the error correction term, which shows the speed of adjustment toward the long-run equilibrium. The values in parentheses are the z-statistics. *, **, and *** indicate significance levels at 10%, 5%, and 1%, respectively.

The panel causality test results show a one-way and statistically significant causal relationship between LMC and LEND ($p<0.05$). A one-way and statistically significant causal relationship exists between GDP and LEND ($p<0.01$). Moreover, a one-way and statistically significant causal relationship exists between FDI, LMC, and LEND ($p<0.01$; $p<0.10$).

5. CONCLUSION

In recent years, significant developments have occurred in the world economy. The removal of barriers to capital flows and the impact of technological developments have increased transaction volumes in markets. This situation has led to the growing importance of capital markets. It has made it an important discussion topic to understand the factors affecting stock market development and how they affect it. This study examined the effects of foreign direct investment, financial development, and economic growth on stock market development in six countries classified as fragile economies.

The variation in country-level results highlights the importance of domestic economic and institutional contexts. Türkiye's statistically significant positive coefficients for both GDP and LEND suggest that its relatively more developed banking system and deeper capital markets may facilitate the effective transmission of macroeconomic growth and credit into stock market development. In contrast, the divergent effects of FDI—positive in Mexico and negative in South Africa—may stem from structural differences. Mexico's relatively open market policies and stable investment climate could attract efficiency-seeking FDI that integrates with financial markets. Meanwhile, in South Africa, high political uncertainty and capital control risks may cause FDI to take non-productive or speculative forms, thereby undermining stock market stability. These patterns suggest that generalizing across fragile economies without accounting for national differences may obscure meaningful dynamics.

It was found that the GDP and LEND variables positively affect stock market development in fragile economies. The finding that GDP has a negative short-term effect on stock market development (LMC), despite its positive long-term impact, may reflect lagged transmission mechanisms in fragile economies. Economic growth may initially trigger uncertainties, policy changes, or inflationary pressures, which can temporarily unsettle capital markets. Moreover, fragile economies often face structural rigidities that delay the translation of macroeconomic growth into financial sector improvements. Regarding FDI, its insignificant long-term effect on LMC suggests that foreign capital inflows are not always effectively absorbed due to institutional weaknesses, underdeveloped financial markets, or policy instability. FDI may be concentrated in non-listed sectors or directed toward short-term speculative ventures rather than fostering deep capital market integration. Unlike a few previous studies that argued no such relationship (Stern, 1989; Al Yousif, 2002), most found a positive effect (Schumpeter, 1911; Robinson, 1952; Kirkpatrick & Green, 2002; Levine & Zervos, 1998). The FDI variable was found to have no significant effect. Since previous studies did not focus on fragile economies, different conclusions were reached; due to fragility, FDI was not found to have a substantial impact.

Panel causality tests revealed the presence of one-way causal relationships. A one-way causal relationship exists between LMC, GDP, FDI, and LEND. Unlike the one-way causality relationship from LMC to GDP found in a previous study examining fragile economies, no such relationship was found in this study. However, consistent with previous studies, a one-way causal relationship from LMC to LEND was identified (Arestis et al., 2001; Güngör & Yılmaz, 2008). In some studies, no such relationship was found (Ekpenyong & Acha, 2011).

Moreover, a one-way causal relationship between FDI and LMC and LEND was identified. However, this study found only one-way causality, contrary to the bidirectional causal relationship found in previous studies (Lee & Chang, 2009; Malik & Amjad, 2013). In conclusion, due to the fragile nature of the countries examined in this study and their lack of a robust financial system, the effective use of FDI in the long term is problematic unless a sustainable system is established.

Based on the empirical findings, fragile economies should adopt structural policies that strengthen their domestic financial systems to improve the long-term effectiveness of capital inflows. These may include promoting regulatory transparency, strengthening investor protection laws, enhancing banking sector oversight, and incentivizing the listing of domestic firms to deepen capital markets. To make FDI more productive, governments should target efficiency-seeking investments rather than speculative or extractive flows, through sector-specific incentives and long-term stability agreements. Moreover, improving macroeconomic stability, policy credibility, and digital financial infrastructure would reduce short-term volatility and increase the absorptive capacity of the financial system. International cooperation, such as technical assistance from development banks, may also support institutional reform efforts.

Future research could benefit from the inclusion of micro-level firm data or investor behavior metrics to analyze transmission mechanisms in more depth. In addition, integrating structural macroeconomic models or simulation-based policy tools may allow for scenario testing on the effects of institutional reforms and financial shocks. Comparative studies across broader country groups could also illuminate the heterogeneity of financial development pathways among fragile economies.

AUTHORS' DECLARATION:

There is no need to obtain ethical permission for the current study as per the legislation.

AUTHORS' CONTRIBUTIONS:

Conceptualization, writing-original draft, editing – **MY** and **DY**, data collection, methodology, formal analysis – **DY** and **MY**, Final Approval and Accountability – **DY** and **MY**.

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