IMPACT OF FOREIGN CAPITAL INFLOWS ON DOMESTIC INVESTMENTS: A PANEL DATA ANALYSIS FOR SELECTED DEVELOPING COUNTRIES

YABANCI SERMAYE GİRİŞLERİNİN YURTİÇİ YATIRIMLARA ETKİSİ: SEÇİLMİŞ GELİŞMEKTE OLAN ÜLKELER İÇİN BİR PANEL VERİ ANALİZİ

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ABSTRACT

This paper empirically analyzes the relationship between the foreign capital inflows and domestic investment in 14 developing countries -Bangladesh, Botswana, Brazil, China, India, Indonesia, Mexico, Morocco, Pakistan, Peru, Philippines, South Africa, Thailand, and Turkey- over the period 1990-2017. Pesaran's Cross-Section Dependence Test was performed to test the correlation and IPS Unit Root Test was applied to reveal the stationarity level between the units. Dumitrescu and Hurlin's Granger Panel Causality test results confirmed a one-way causality from Portfolio Investment (PRF) to Gross Fixed Capital Formation (GFC) and a bidirectional causality between GFC and Gross Domestic Product (GDP), GFC and Foreign Direct Investment (FDI), GFC and Foreign Loans (LNS) in the short-term. Long-term relationships between the variables were tested with the DOLSMG estimator. According to the test results; a 1% rise in FDI decreases GFC by 0.59 %, a 1% rise in GDP increases GFC by 0.45 %, a 1% rise in PRF increases GFC by 1.68 %, and a 1% rise in LNS boosts GFC by 2.12 %.

Key Words: Foreign Direct Investment (FDI), Portfolio Investment, Foreign Loan, Domestic Investment, Panel Data Analysis.

ÖZ

Bu çalışma; Bangladeş, Botswana, Brezilya, Çin, Endonezya, Fas, Filipinler, Güney Afrika, Hindistan, Meksika, Pakistan, Peru, Tayland ve Türkiye'den oluşan 14 gelişmekte olan ülkede yabancı sermaye girişleri ve yurtiçi yatırımlar arasındaki ilişkileri 1990-2017 dönemi için ampirik olarak analiz etmektedir. Birimler arasındaki korelasyonu test etmek için Pesaran Yatay Kesit Bağımlılığı Testi, durağanlık seviyelerinin belirlenmesi için IPS Birim Kök Testi uygulanmıştır. Dumitrescu ve Hurlin Panel Granger Nedensellik testi sonuçları kısa vadede; Portföy Yatırımlarından (PRF) Gayri Safi Sabit Sermaye Oluşumuna (GFC) doğru tek yönlü, GFC ile Gayri Safi Yurtiçi Hasıla (GDP), GFC ve Doğrudan Yabancı Yatırım (DYY) ve GFC ile Yabancı Krediler (LNS) arasında ise çift yönlü bir nedensellik ilişkisi olduğunu göstermiştir. Değişkenler arasındaki uzun vadeli ilişkiler DOLSMG tahmincisi

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ile test edilmiştir. Test sonuçlarına göre; DYY'deki %1'lik artış GFC'yi %0.59 oranında azaltmakta, GSYH'deki %1'lik artış GFC'yi %0.45 oranında, PRF'deki %1'lik artış GFC'yi %1.68 oranında ve LNS'deki %1'lik artış GFC'yi %2.12 oranında artırmaktadır.

Anahtar Kelimeler: Doğrudan Yabancı Yatırım (DYY), Portföy Yatırımı, Yabancı Kredi, Yurtiçi Yatırım, Panel Veri Analizi.

INTRODUCTION

Developing countries with insufficient domestic savings have struggled for many years to access the low-cost financial resources needed to finance their investments. At the end of the 1980s, the Washington Consensus, which was put forward by the International Monetary Fund (IMF) and the World Bank, attempted to propose a solution to the capital deficit problem in these countries. It was proposed to encourage the integration of the developing countries with the global capital markets and to finance the new capital stock with foreign funds by implementing capital market liberalization policies and allowing foreign capital to enter the country. Policymakers have taken steps at the national, regional and international level to close the output gap in developing countries and promote long-term development. The measures taken at the legal, political and economic level and the policies implemented, also with the help of the accelerating globalization movements in the 1990s, have led to significant increases in foreign capital inflows to developing countries. Foreign direct investment inflows, which were $29 billion at the end of 1980, reached $706 billion as of 2018. (UNCTC, 1991; UNCTAD, 2019). However, there is an ongoing debate as to whether foreign capital flows stimulate domestic investment in these countries.

According to economists and politicians who argue that foreign capital inflows have a positive impact on domestic investments, the ability to benefit from the international financial capital pool offers great benefits to many developing countries. Low capital levels per worker in these countries have long been seen as a factor that keeps the production level low. In this context, net inflow of external resources is thought to increase private savings and help countries achieve higher capital accumulation and growth rates (Borensztein et al., 1998; Grossman and Helpman, 1991). It is also claimed that the increasing levels of financial integration created by foreign capital inflows have reduced the cost of equity in emerging markets through the interaction of four key factors: increased risk-sharing between domestic and foreign investors, reduced financial constraints due to higher foreign

capital inflows, increased liquidity in stock markets and greater adoption of more advanced corporate governance practices by local companies to attract foreign shareholders (Levin and Zervos, 1998; Stulz, 2005). Unrestricted capital flows may offer other advantages, as noted by Feldstein (2000). International capital flows can reduce the risks that capital owners face by providing diversification in lending and investment. Global integration of capital markets can contribute to the dissemination of best corporate governance practices, accounting rules, and legal traditions.

Capital inflows, especially foreign direct investments, can provide significant benefits to both investors and the host country. First, foreign direct investments, especially the form of greenfield, contribute to the new factory and equipment. FDI also improves efficiency by facilitating the transfer of managerial and technological gains. Second, FDI can stimulate new investments through links between companies, beyond the direct increase in capital stock. For example, if multinational companies purchase inputs from domestic suppliers, local companies may be encouraged to make new investments. Portfolio investments made by purchasing stocks or government debt securities and foreign bank loans contribute to the depth and breadth of domestic financial markets. Also, both FDI, portfolio flows and foreign loans may facilitate the financing of domestic investments by lowering interest rates and increasing credit opportunities. Harrison et al. (2004) showed that especially foreign direct investment alleviates the financing constraints of firms in developing countries and this effect is stronger in low-income regions compared to high-income regions. Apart from these direct effects, foreign capital, as proposed by Kose et al. (2009), may have an indirect impact on domestic investment by offering collateral benefits. Even if not used for direct capital formation, foreign loans can be directed to increase or regulate consumption, contributing to the growth of Gross Domestic Product (GDP) during periods of stagnant demand. Furthermore, according to the views supporting the liberalization of international capital flows, cross-border free capital flows allow for the creation of more disciplined macroeconomic policies, reducing the frequency of policy errors and forcing governments of developing countries to improve institutions and improve governance to attract foreign investors.

On the other hand, according to opponents, foreign capital flows will not be successful in encouraging domestic investments. Foreign direct investment, especially in the form of mergers and acquisitions (M&A), will not contribute

directly to the formation of direct capital unless the foreign investor modernizes or expands existing facilities by investing in new technology. Besides, the increase in productivity by multinational enterprises may leave the local competitors out of the market, creating a "crowding-out" effect on domestic investments. This is usually the case if multinational companies use imported inputs or enter sectors that previously dominated by state-owned companies. Foreign portfolio investments are also often accused of disrupting domestic financial markets. The fact that short-term portfolio investments increase the volatility and instability in the markets prevents new investments. Because local companies will be reluctant to expand their capital stocks when they do not expect the steady flow of foreign capital (Stiglitz, 2000; Singh and Weisse, 1998). Recent empirical evidence suggests that, as in the 2008 global financial crisis, foreign capital investors devote a large amount of portfolio investments from developing economies to developed economies during the periods of financial instability. Because of the costly correction of capital stocks, uncertainty about equity valuation caused by a sudden reversal of foreign capital inflows discourages new investments. In addition, the cyclical nature of portfolio investments harms these economies. Rapid and large volume of portfolio flows during economic booms cause serious economic damage, by creating bubbles in real estate and financial asset prices, in developing countries and sudden reversals can overheat exchange rates (Aizenman & Pasricha, 2013).

Empirical studies investigating the effects of foreign capital flows on domestic investment have failed to reach a consensus. The uncertainty of the effects of foreign capital investments has led policymakers to take severe measures against the free entry or exit of capital, especially in times of crisis. However, these measures sometimes cause crises to move faster, leading to permanent damage in an economy. In this context, especially in developing countries that need foreign capital for their growth and development, understanding the effect of foreign capital flows on domestic investment is crucial in terms of determining policies to encourage or restrict foreign capital. Although there are studies conducted with different methods and country samples in the literature, these studies mostly measure the effect of only foreign direct investment on domestic investment. When the composition of foreign investments in developing countries is taken into consideration, it is equally important to understand the impact of portfolio investments and foreign loans on domestic investment. When these empirical studies were examined, it was observed that the number of studies that analyzing

these three different investment types by including them in the same model is limited and these studies have produced different results. Bosworth and Collins (1999), one of the first researchers to investigate the effect of foreign capital on domestic investments taking into account three types of capital flows (FDI, portfolio, foreign loans) found a positive relationship between the foreign capital flows and domestic investment. On the other hand, Fahinde et al. (2015) concluded that foreign investments crowd-out domestic investments.

The inconclusive empirical literature and the ongoing discussions by the economists and policymakers in terms of the effect of foreign capital on domestic investment constitutes the main motivation of this study. By studying three different types of capital flows, this study aims to fill the gap in the literature. Findings of the study are believed to shed light on the policies to be applied to foreign capital flows in developing countries. The following section provides an overview of previous research. Section II includes an econometric analysis and the findings. The conclusions of the research are described in the final section.

1. LITERATURE REVIEW

In this section, empirical findings of the existing literature are presented. Studies are grouped based on the type of foreign capital incorporated in the model. Firstly, findings of the studies that used three types of foreign capital (FDI, portfolio investment, and foreign loan), as in this study, are evaluated. Then, the studies that included FDI or portfolio investments as independent variables are reviewed.

Bosworth and Collins (1999) investigated the relationship between foreign capital flows and domestic investment in 58 countries from East Asia, Sub-Saharan Africa, Middle East, North Africa, and Latin America regions for the period 1978-1995. They applied the Ordinary Least Squares (OLS) method to test the impact of FDI, portfolio investment, and foreign loans. The results of the model revealed that a one unit increase in FDI inflows increases domestic investments by 0.81 units and a one unit increase in foreign loans increases domestic investments by 0.50 units. There was no statistically significant relationship observed between portfolio investments and capital formation. Hecht et al. (2004), using a panel data set from 64 countries, estimated the data for the period 1976-1997 with OLS and Two-Stage Least Squares (TSLS) methods. In the study, FDI was found to

be the most influential type of capital form on domestic investment, with portfolio investments and foreign loans having significant effects on domestic investment as well. Fahinde et al. (2015), using the data of 1996-2011 period examined the crowding-out and crowding-in effects of foreign capital inflows (FDI, official development aid, and migrant remittances) in West African Economic and Monetary Union countries (Benini Burkina Faso, Cote d'Ivoire, Guinea Bissau, Mali, Niger, Senegal, Togo). Results using the Generalized Moments Method (GMM) showed that FDI and official development aid had a crowding-out effect on domestic investments in both the short and long term. Migrant remittances did not have a significant impact on domestic investments in the member countries.

Mody and Murshid (2005) examined the relationship between capital flows and domestic investment in 60 developing countries for the period 1979-1999 by including FDI, loans and portfolio investments in the model. The first-difference one-step generalized moment estimator developed by Arellano and Bond proved a positive and significant relationship between foreign capital flows and domestic investments. The test results report that a one unit increase in FDI inflows increases domestic investments by 0.72 units, a one unit increase in foreign loans increases domestic investments by 0.61 units, and a one unit increase in portfolio investment inflow increases domestic investments by 0.46 units. In their study, a comparative analysis was also conducted for the 1980s and 90s, and it was observed that FDI and foreign loans were more effective on domestic investments in the 1980s, and this situation was reversed in the 1990s, strengthening the effect of portfolio investments. Shah et al. (2010) examined the effect of foreign capital inflows on domestic investments in Pakistan by using Equation Systems and OLS estimation techniques. The findings of the study conducted with the data of 1990-2010 period showed a one-to-one relationship between foreign direct investments and domestic investments, while the role of portfolio investments and foreign loans in promoting domestic investment found to be insignificant. Amadou (2011) investigated the effects of FDI, portfolio investments and foreign loan on domestic investments in Togo for the 1970-2008 period. Results of the Error Correction Model (ECM) confirmed FDI and foreign loans as the most important channels affecting domestic investments in Togo. According to the analysis results, a one unit increase in FDI inflows increases domestic investments by 1.116 units, while the same amount of credit inflows increase domestic investments by 0.911 units. On the other hand, although the impact of portfolio investments on domestic investments was negative, the effect of this variable was not statistically significant.

In the study conducted by Mileva (2008) by using static and dynamic panel data analysis with the 1995-2005 annual data of 22 transition countries, the effect of capital flows in the form of Foreign Direct Investment (FDI), foreign loans and portfolio investments on gross capital formation was investigated. In the study using the Generalized Moments (GMM) estimator, it was concluded that FDI and foreign loans increased domestic investments while portfolio investments did not have an effect on domestic investments. To test the effect of FDI, portfolio investments, foreign aid, and foreign credit capital flows on GDP growth rate and gross fixed capital formation in India, Ranjan and Kumar (2012) applied the Johansen and Johansen & Julius cointegration tests on 1996:2-2010:1 quarterly data. Findings of the analysis indicated that a one unit increase in capital flows increases gross fixed capital formation by 0.37 units in the long term.

Meurer (2016) assessed the relationship between portfolio flows, GDP, domestic investments and financial variables using the 1995-2009 quarterly data in Brazil. Results of the descriptive statistics, correlation coefficients, and the Granger causality test confirmed a significant and positive relationship between portfolio flows, GDP, and domestic investments. A strong relationship between the real effective exchange rate and portfolio flows was found. The real effective exchange rate has been accepted as a factor that can affect real indicators in the economy by affecting domestic and foreign production costs through portfolio investments.

Colombo et al. (2019) examined the effect of capital inflows on domestic investments using 1996-2015 quarterly data of Brazil. Results of the VARX approach demonstrated a one-way causality relationship from capital flows to domestic investments in the period before the 2008 global crisis. Portfolio flows did not have any real impact on domestic investments in the period following the 2008 global crisis. This may be explained by significant increases in state intervention in the Brazilian economy in the post-crisis period.

Esener et al. (2017) studied the effects of public expenditures, FDI and openness level on the fixed capital formation in the period between 1999-2014 by using static and dynamic panel data analysis. The positive impact of FDI on fixed capital formation has been put forward in the study.

Bulut and Çoşkun (2015) evaluated the impact of FDI inflows on domestic investments in Turkey. They performed Johansen Cointegration and Granger

causality tests with the quarterly data belongs to the 2012-2014 period. Results of the Error Correction Model have shown that FDI crowded-out domestic investments in the short term, however, this effect was reversed in the long term in favor of domestic investments. Ugwuegbe et al. (2014) analyzed the effect of FDI on capital formation in Nigeria for the period 1986-2012 by using an Ordinary Least Squares (OLS) estimation method. The results of the analysis reports a two-way causality relationship between FDI and gross fixed capital formation.

In a research carried out by Ullah et al. (2014) to investigate the dynamic relationship between domestic investment, FDI, and economic growth in Pakistan for the period 1976-2010, Johansen cointegration test and Toda Yamamoto causality approach were adopted. Results of the analysis established a two-way causality relationship between FDI and domestic investments. Acar et al. (2012) explored the effect of FDI on domestic investments with the data of 1980-2008 period belonging to 13 Middle East and North African countries (Seven oil-rich and six oil-poor) by using panel data analysis. The results of the GMM estimator found that FDI reduced domestic investments, causing a crowding-out effect. Massoud (2013) conducted a time series analysis to examine the effect of FDI on capital formation in Egypt between 1977-2011. Using a Least Squares method, that study found that FDI did not increase domestic investments. Megbowon et al. (2016) studied the relationship between FDI and capital formation in South Africa with data from 1980-2014. No causality relationship was found between the variables.

2. ECONOMETRIC ANALYSIS

2.1. Data Set, Variables, Methodology

In line with the purpose of this study, different types of capital flows included in the model as independent variables. In the sixth edition of the Balance of Payments Manual (BPM6), IMF (2009) distinguished among three types of capital flows: FDI, portfolio investment (including bonds), and other financial flows (primarily bank loans). Although, current transfers such as foreign aids and migrant remittances have also been considered as capital flows in a few studies, they appear in the current account of the balance of payments and therefore, not included in this model.

This dataset covers 392 observations between 1990-2017 for the series of gross fixed capital formation (GFC), foreign direct investment (FDI), economic growth (GDP), portfolio investment (PRF) and loans (LNS) and was compiled from the World Bank database for 14 countries.2 Gross fixed capital formation (% of GDP) measures the domestic investment in the model. It is defined as the acquisition of produced assets (including purchases of second-hand assets), including the production of such assets by producers for their own use, minus disposals. Foreign direct investment shows the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor, and is divided by GDP. Economic growth represented by the GDP growth (annual %) is included as a control variable as it aeffects the domestic investment through accelerating demand. Annual percentage growth rate of GDP at market prices based on constant local currency. Portfolio investment (PRF) variable is the sum of equity securities including shares, stocks, depository receipts, and direct purchases of shares in local stock markets by foreign investors and cross-border public and publicly guaranteed and private nonguaranteed bond issues. Loans (LNS) variable include public and publicly guaranteed commercial bank loans from private banks and other private financial institutions, nonguaranteed long-term commercial bank loans from private banks and other private financial institutions, and public and publicly guaranteed debt from private creditors (The World Bank, 2018).

The reason for choosing this country set as a sample is twofold. These countries have seen large inflows of foreign capital over the last three decades. Selection criteria was also based on the economic similarities of these countries in terms of growth rates and foreign capital dependency to survive the economic growth levels. The panel data analysis was conducted using STATA program.

In the outset of the metric analysis, primarily functional and statistical models will be formed. Because of the critical importance in the selection of proper methods in analyses of the long-term and the short-term, the stationarity of the series, correlation between the units and heterogeneity of the parameters will be examined. Accordingly, the long-term and short-term test method will be determined and the relationships between the series will be revealed.

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2   These countries are Bangladesh, Brazil, Botswana, China, India, Indonesia, Mexico, Morocco, Pakistan, Peru, Philippines, Thailand, South Africa, and Turkey.

2.2. Model

Eq.(1) is the functional form of the model that will be examined. In the model, GFC is the predicted variable that shows gross fixed capital formation (% of GDP), while FDI-foreign direct investment (% of GDP), GDP-economic growth (annual %), PRF-Portfolio+Bonds (% of GDP) and LNS-loans (% of GDP) are the predictor variables.

$$GFC = f\,(FDI, GDP, PRF, LNS) \qquad (1)$$

- GFC : Gross fixed capital formation (% of GDP)
- FDI : Foreign direct investment, net inflows (% of GDP)
- GDP : GDP growth (annual %)
- PRF : Equity+Bonds (% of GDP)
- LNS : Loans (% of GDP)

$$GFC_{it} = a + \beta_1 FDI_{it} + \beta_2 GDP_{it} + \beta_3 PRF_{it} + \beta_4 LNS_{it} + u_{it} \qquad (2)$$

Eq.(2) is the statistical expression of the model. In this model represents the "constant term", while , are the coefficients that predict the relations between the dependent variable and relevant independent variable. denotes the countries and time periods (1990…2017) and refers to the error term.

By considering the lagged values of the series, the VAR model can be expressed as dynamic equations seen in equation system from Eq. (3) to Eq.(7):

$$dGFC_t = a_1 + \sum_{l=1}^{n} \beta_{1l} dGFC_{it-l} + \sum_{l=1}^{n} \beta_{2l} dFDI_{it-l} + \sum_{l=1}^{n} \beta_{3l} dGDP_{it-l} + \sum_{l=1}^{n} \beta_{4l} dPRF_{it-l} + \sum_{l=1}^{n} \beta_{5l} dLNS_{it-l} + u_{1t} \qquad (3)$$

$$dFDI_t = a_2 + \sum_{l=1}^{n} \beta_{6l} dFDI_{it-l} + \sum_{l=1}^{n} \beta_{7l} dGFC_{it-l} + \sum_{l=1}^{n} \beta_{8l} dGDP_{it-l} + \sum_{l=1}^{n} \beta_{9l} dPRF_{it-l} + \sum_{l=1}^{n} \beta_{10l} dLNS_{it-l} + u_{2t} \qquad (4)$$

$$dGDP_t = a_3 + \sum_{l=1}^{n} \beta_{11l} dGDP_{it-l} + \sum_{l=1}^{n} \beta_{12l} dFDI_{it-l} + \sum_{l=1}^{n} \beta_{13l} dGFC_{it-l} + \sum_{l=1}^{n} \beta_{14l} dPRF_{it-l} + \sum_{l=1}^{n} \beta_{15l} dLNS_{it-l} + u_{3t} \qquad (5)$$

$$dPRF_t = a_4 + \sum_{l=1}^{n} \beta_{16l} dPRF_{it-l} + \sum_{l=1}^{n} \beta_{17l} dGFC_{it-l} + \sum_{l=1}^{n} \beta_{18l} dFDI_{it-l} + \sum_{l=1}^{n} \beta_{19l} dGDP_{it-l} + \sum_{l=1}^{n} \beta_{20l} dLNS_{it-l} + u_{4t} \qquad (6)$$

$$dLNS_t = a_5 + \sum_{l=1}^{n} \beta_{17l} dLNS_{it-l} + \sum_{l=1}^{n} \beta_{18l} dGFC_{it-l} + \sum_{l=1}^{n} \beta_{19l} dFDI_{it-l} + \sum_{l=1}^{n} \beta_{20l} dGDP_{it-l} + \sum_{l=1}^{n} \beta_{21l} dPRF_{it-l} + u_{5t} \qquad (7)$$

2.3. Application and Findings

Before estimating the model, descriptive statistics of the variables are reported in Table1 and the pairwise correlation between the variables are presented in Table 2.

Table 1: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
GFC	392	24.58093	6.746279	12.52063	45.51477
FDI	392	1.949401	1.650054	-6.89768	8.93102
GDP	392	4.589065	3.512596	-13.12673	14.23139
PRF	392	5.93e+09	1.33e+10	-1.33e+10	1.16e+11
LNS	392	2.81e+09	8.64e+09	-2.22e+10	6.76e+10

Table 1 shows the mean, standard deviation, minimum and maximum value of the variables that will be used in the model.

Table 2: Pearson's Correlation Coefficient

	GFC	FDI	GDP	PRF	LNS
GFC	1.0000				
FDI	0.2364	1.0000			
GDP	0.4328	0.1747	1.0000		
PRF	0.3197	0.1002	0.1347	1.0000	
LNS	0.2130	0.1601	0.0924	0.3566	1.0000

The correlation analysis aims to determine whether a precise linear relationship exists between the variables to avoid taking the both regressors in the same model. Therefore, it should be revised whether there is a correlation statistic with a value of 0.80 and above. As it is seen in Table 2, the highest correlation statistic is 0.43 between GDP and GFC. Hence, the regressors do not have precise linear representations of each other.

Stationarity of the series, or in another words the integration levels of the series, are crucial to define the proper causality method. However, to define the right unit root test method for the stationarity analysis, the cross-sectional dependency, the correlation between the units should be examined. In case of non-existence of correlation between the units, the appropriate method should be "one of the first-generation panel unit root tests, otherwise one of the second-generation should be chosen" (Erkisi & Ceyhan: 89).

Cross Dependence Analysis

To examine the existence of correlation between the units "Pesaran 2004 Test" was employed and the results are reported in Table 3.

Table 3: Pesaran's CD-Test

Variables	CD-test	p-value	Corr	Abs(corr)
GFC	8.98	0.000	0.178	0.411
FDI	10.43	0.000	0.207	0.268
GDP	8.21	0.000	0.163	0.214
PRF	18.77	0.000	0.372	0.381
LNS	12.76	0.000	0.253	0.312

The cross-section dependence is tested "under the null hypothesis of cross-section independence". The p-values of all series are lower than 0.05 the significance level and hence H0 is rejected. The outcomes of Pesaran 2004 CD-Test indicated the existence of cross- section dependence. Consequently, one of the second-generation unit root tests will be employed to investigate the stationary of the series.

Stationarity Analysis

In order to reduce the effect of correlation between the units, Im, Pesaran, and Shin (IPS) Panel Unit Root Test, which allows the autoregressive parameter to be heterogeneous, is employed to the series taken from the cross-section averages. The outcomes of the IPS Test are reported in Table 4.

Table 4: IPS Unit Root Test

Variables	W-t-bar Statistic	p- value
GFC	2.4025*	0.0081
FDI	5.6042*	0.0000
GDP	-12.8612*	0.0000
PRF	-3.3408*	0.0004
LNS	5.2217*	0.0000

The outcomes of Table 4 revealed that all the series are stationary at level or in another word the integration order is I(0) because of the all p-values belong to the series are lower than 0.05.

Heterogeneity Analysis

Testing the heterogeneity of the parameters should be examined to define the proper causality analysis method. In case of existence of heterogeneity of the parameters, one of the heterogeneous panel data analysis method should be chosen, otherwise homogenous panel data ought to be employed. Swamy S Test was conducted to define the heterogeneity and the results are reported in Table 5.

Table 5: Heterogeneity Test

Reg.	χ^2 (65)	Prob > χ^2
	1014.58	0.0000

The heterogeneity was tested under the null hypothesis of parameters are homogenous. Prob > χ^2 is lower than 0.05, therefore, H0 is rejected and results confirmed that the parameters are heterogeneous.

Optimal Lag Length Value

It is important to determine the appropriate lag length before proceeding to the analysis of long-term and short-term relationships to achieve accurate results. Hansen J Test was used to determine the appropriate lag length. The results are reported in Table 6.

Table 6: Optimal Lag Length Test

lag	CD	J	J p-value	MBIC	MAIC	MQIC
1	.9900558	91.99293	.7035229	-460.95	-108.0071	-250.024
2	.7447326	53.49032	.9715146	-361.2169	-96.50968	-203.0224
3	-.4577345	16.38874	.9999982	260.0827	-83.61126	-154.6197
4	-2.054276	5.607277	.9999824	-132.6285	-44.39272	-79.89695

Table 6 shows the results of the Hansen J statistic (J) and probability value (J p-value), Bayesian information criterion (MBIC), Akaike information criterion (MAIC) and Hannan Quinn information criterion values for 4 lag-lengths. When Hansen J statistics and probability values are examined, it is seen that "the null of the over identification restrictions are valid (J = 0)", is accepted for all lag-length values. It means that the instrumental variables are valid for all lag values. Therefore, "instrument set is appropriate". When the results of information criterions revised, the MBIC value is minimum at first lag, while the MAIC and MQIC are minimum at second lag. According to the results, the appropriate lag length was determined as 1 because MAIC and MQIC indicated that the appropriate lag-length is 2.

Short-Term Causality Analysis

In the short-term causality analysis between the series, Dumitrescu and Hurlin (2012) Granger Panel Causality Test, which takes into account the heterogeneity, is employed and the outcomes are shown in Table 7.

Table 7: VAR Panel Causality Test Results

H_0:			W-bar Stat.	Z-bar Stat. (p-value)	Z-bar tilde (p-value)
GDP	⇏	GFC	8.0899*	18.7580 (0.0000)	15.8287 (0.0000)
GFC	⇏	GDP	3.1978*	5.8148 (0.0000)	4.7649 (0.0000)
FDI	⇏	GFC	1.9801**	2.5930 (0.0095)	2.0109 (0.0443)
GFC	⇏	FDI	2.7737*	4.6928 (0.0000)	3.8057 (0.0001)
PRF	⇏	GFC	3.0893*	5.5277 (0.0000)	4.5195 (0.000)
GFC	⇏	PRF	1.0973	0.2575 (0.7968)	0.0145 (0.9884)
LNS	⇏	GFC	9.0290*	2.0290 (0.0002)	0.6758 (0.0047)
GFC	⇏	LNS	2.2596*	3.3325 (0.0009)	2.6430 (0.0082)

Note: "* and ** indicate the granger causality at %1 and 5% significance level respectively".

(⇏) refers "does not Granger-cause"

Table 7, which shows the outcomes of Dumitrescu and Hurlin (2012) Granger Panel Causality Test revealed that:

GDP is the granger cause of GFC.

GFC is the granger-cause of GDP

FDI is the granger-cause of GFC

GFC is the granger-cause of FDI

PRF is the granger-cause of GFC

GFC is not the granger cause of PRF

LNS is the granger cause of GFC

GFC is the granger-cause of LNS

Consequently, there is a unidirectional causality from PRF to GFC and bidirectioanl causality between GFC and GDP; GFC and FDI; GFC and LNS The results of the short-term analysis are presented in Table 8.

Table 8. Short-term Relationships

Variable	direction	Variable
GFC	⇔	GDP
GFC	⇔	FDI
GFC	⇐	PRF
GFC	⇔	LNS

Long-term Analysis

The long-term relationship between the series will be investigated with the help of the Dynamic Ordinary Least Squares Mean Group (DOLSMG) estimator, which considers the heterogeneity of the parameters. However, before employing the DOLSMG Estimator, Pedroni's (2001) Cointegration Test will be performed to reveal the existence of long-term relationships.

Table 9: Outcomes of Pedroni's Cointegration Test

Test Stats.	Panel	Group
v	-2.073**	
rho	1.98**	3.278*
t	.5461	1.396
adf	2.096**	3.905*

Note: "* and ** indicate that the statistics are significant at %1 and %5 significance level respectively".

Table 9 includes v, rho, t and ADF test statistics for both panel and group. The cointegration relationship is tested "under the null hypothesis of no cointegration". By considering the outcomes of Adf, rho and v test statistics, H0 is rejected and it is concluded that there is a cointegration relationship between the series. Because of Pedroni Cointegration test result was confirmed a long-term relationship, DOLSMG Estimator can be employed to produce further detail. Hence, the outcomes of DOLSMG are reported in Table 10.

Table 10: DOLSMG Estimator Outcomes

Variables	Beta	t-stat
FDI_td	-.5852	2.652
GDP_td	.4533	3.301
PRF_td	1.68e-10	10.34
LNS_td	2.12e-10	2.679

Note: "t-statistic table value ($\alpha = 0.05$) is 1,96."

The long-term parameters are estimated by converting variables by taking cross-section averages with the help of DOLSMG Estimator. The values of beta show the long-term parameters of the variables. The values of all t-statistics are higher than 1.96, therefore statistically significant at the 0.05 significance level.

Accordingly, the long-term relationships between the variables are as follows. A one percent rise in FDI decreases GFC by 0.59 percent, a one percent rise in GDP increases GFC by 0.45 percent, a one percent rise in PRF increases GFC by 1,68 percent, and a one percent rise in LNS boosts GFC by 2.12 percent.

Diagnostic Tests

In order to control the stability of the model Multicollinearity Test, Heteroscedasticity Test, Normality Test, and Omitted Variable Test were conducted under the below titles.

a) Multicollinearity Test

Estimation of the "Variance Inflation Factors" of the independent variables of the model are reported in Table 11 in order to reveal if there are any multicollinearity problems.

Table 11: Variance Inflation Factor Test Outcomes

Variables	VIF	1/VIF
FDI	1.16	0.864236
GDP	1.04	0.959662
PRF	1.10	0.910904
LNS	1.04	0.958872
Mean VIF	1.08	

Table 11 includes the calculated VIF values of the variables. Because of all the VIF values, which belong to FDI, GDP, PRF and LNS, are below than 5, it is concluded that there are no multicollinearity problems in the model.

b) Heteroscedasticity Test

"Under the null hypothesis of constant variance" the model was tested by employing Breusch-Pagan / Cook-Weisberg Heteroscedasticity Test and the outcomes are presented in Table 12.

Table 12: Breusch-Pagan / Cook-Weisberg Heteroscedasticity Test Outcomes

	Chi2	Prob > chi2
"H_0: Constant variance"	0.39	0.5310

Table 12 shows the chi2 and probability values. It is seen that the probability value is 0.5310 and higher than 0.05 significance level, therefore the null hypothesis is accepted and concluded that there is no heteroscedasticity problem in the model.

c) Normality Test

It is needed to test if the residuals are normally distributed. For this purpose, "Under the null hypothesis of normality", a Skewness & Kurtosis Normality test was used and the outcomes are presented in Table 13.

Table 13: Skewness & Kurtosis Normality Test Outcomes

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	------------joint------------	
				adj chi2(2)	Prob>chi2
residual	392	0.5177	0.6652	0.61	0.7363

Table 13 includes the probability values of Skewness and Kurtossis, chi2 and probability value of chi2. As the probability value of chi2 is significantly higher than 0.05 significance level, the null hypothesis of normality is supported and it can be concluded that the residuals are normally distributed.

d) Powers of the fitted values of GFC

Under the null hypothesis, the model may have omitted variables. Ramsey's Regression Specification Error Test (RESET) was employed to reveal if there are any "omitted variables" in the model and the outcomes are reported in Table 14.

Table 14: Ramsey Reset Test Outcomes

	F Stat.	Prob > chi2
"H_0: model has no omitted variables"	2.09	0.1017

Table 14 shows the F Statistic and Probability value of chi2. The probability value is 0.1017 and higher than 0.05 significance level. Therefore, the null hypothesis is not rejected, and it is concluded that there are no omitted variables. The diagnostic tests indicate that the model is stable.

CONCLUSION

The formation of fixed capital is of great importance in terms of reducing the gap between developing and developed countries. Fixed capital investments can increase a country's income level and to prepare a foundation for future economic growth and development. Therefore, theoretical and empirical studies on the formation of fixed capital are frequently encountered in the literature. Developing countries, which liberalized capital accounts in the early 1990s, have been able to attract high volumes of foreign capital inflows in the form of FDI, portfolio investment and loans over the last three decades. However, whether these foreign capital flows have a significant impact on investments is still a matter of discussion among academics and policymakers. Therefore, in an attempt to contribute to this

body of knowledge, this study investigates the relationship between foreign capital and domestic capital investment in developing countries. The set of developing nations included in this research is Bangladesh, Brazil, Botswana, China, India, Indonesia, Mexico, Morocco, Pakistan, Peru, Philippines, South Africa, Thailand, and Turkey over a period of almost 30 years.

For this study the relationships were modeled empirically using statistical analysis and VAR models. Pesaran's (2004) CD test was applied to examine the existence of a correlation between the units. Subsequently, as implied by the test results, a second-generation unit root test IPS was performed to evaluate stationarity of the series. To access the proper causality test method, a Swamy S test was conducted followed by Dumitrescu and Hurlin (2012) Granger Panel Causality Test since heterogeneity was detected between the series. The short-term test results found a unidirectional causal relationship running from portfolio investment to domestic investment, and a bidirectional causal relationship between domestic investment and GDP, domestic investment and foreign loans. Long-term relationships were estimated by employing Pedroni's cointegration test. As long-term relationships were observed, the DOLSMG estimator was performed to obtain these results. The test results confirmed that a one percent rise in FDI decreases GFC by 0.59 percent, a one percent rise in GDP increases GFC by 0.45 percent, a one percent rise in PRF increases GFC by 1.68 percent, a one percent rise in LNS boosts GFC by 2.12 percent in the long-term in selected developing countries.

The results of the econometric analysis can be interpreted as follows. Foreign direct investment inflows show a crowding-out impact on domestic investment in selected developing countries. Displacement of domestic investment by the foreign investors can be explained by the large share of Merger & Acquisition type of FDI in these countries. Another possible reason for the exit of domestic investors might be due to their inability to compete with the technological level of the foreign companies. Government incentives given to foreign investors might have also played a role in the crowding-out impact of FDI.

On the other hand, the positive impact of portfolio inflows and foreign loans in financing capital formation in these countries are significantly high. Contribution of these short-term flows to domestic investment is noteworthy. However, considering the volatile nature of these flows, it becomes more important to develop economic policies and ensure a stable economic atmosphere to secure foreign capital for the long term. The results of this study demonstrate the importance of implementing economic policies that encourages foreign direct investment, but at the same time ensuring its positive interaction with domestic investment.

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