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Research Article

TESTING THE LONG-RUN GROWTH EFFECTS OF FOREIGN DIRECT INVESTMENT IN TÜRKIYE: EVIDENCE FROM ARDL & NARDL ANALYSIS

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ABSTRACT

This study examines the linear and nonlinear effects of foreign direct investment on the long-run economic growth in Türkiye for the period of 1970-2020, within the framework of a simple endogenous growth model represented by a production function in the form of Cobb-Douglas, where the assumptions of constant returns to scale and decreasing productivity are valid for all collectible capital inputs. For this purpose, the study investigates whether the changes in fixed capital and foreign direct investment rates affect the GDP per capita growth rate linearly and non-linearly by using the ARDL & NARDL approach. The findings show that there is a linear and a nonlinear cointegration relationship between the foreign direct investment rate and GDP per capita growth rate, but the foreign direct investment rate does not make significant contributions to the growth rate in the long run. According to another finding, positive and negative shocks in the foreign direct investment rate, depending on the contraction and expansion periods of the Turkish economy, do not significantly and asymmetrically affect the growth rate in the long run.

Keywords: Economic growth, Foreign direct investment, ARDL & NARDL approach.

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INTRODUCTION

Foreign capital investments (FDI) play an important role in financially integrated world economies. FDI is a long-run investment that requires the acquisition of a substantial 10% stake in a company and participation in company management. FDI reflects a country's international investment position and is the most dynamic element of the balance of payments of a financial account when compared to portfolio investment and other investments as other forms of international investment. Because FDI is not a purely financial investment it differs from other forms of capital inflows (Demir, 2022: 137).

The fact that FDI has developed around a growing trend in the last 40 years on a global scale with financial liberalization, it has been a neoclassical premise that growing FDI affects economic growth and the growing economy attracts FDI. In this context, it has been widely stated that FDI has many benefits, both directly and indirectly, and it has even been described as the engine of economic growth. However, this claim is not generally accepted. The benefits of direct investments are theoretical. Because the empirical evidence for the positive effects of FDI is very weak (Kozul-Wright and Rayment, 2008).

It is generally accepted that FDI benefits a country by influencing its production skills. However, there is also evidence of the negative effects of FDI on economic growth. One of the reasons for this is that the benefits of FDI to the economy in general and their positive effects on economic growth, in particular, are theoretical. Another reason is that global companies with FDI can buy very few goods from local producers and import most inputs. In addition to these reasons, FDI may have entered through global companies to exploit the recipient country's natural resources or cheap labor. In the long run, the most important negative effect of FDI may be that it makes it difficult for the receiving country to increase its production skills (Chang, 2014: 374).

The rest of this study is organized as follows: In the first part, the results of some selected studies in the empirical literature on the linear relationship between FDI rates and economic growth are reported. In the second part, the methodological framework consisting of the theoretical specification, the data description, and the empirical specification of the study is shortly introduced. In the third part, empirical findings obtained from the predicted model are given. In the fourth part, the findings are summarized in their theoretical and empirical dimensions and policy implications.

LITERATURE REVIEW

Empirical evidence for the relationship between FDI and economic growth in the literature gives a complex picture. Some studies find that FDI supports economic growth, but some studies do not.

Soto (2000) reached the following findings in his study with a dynamic panel using annual data for the period 1986-1997 within the scope of a sample of 44 developing countries: First, FDI and portfolio stock flows exhibit a strong positive correlation with economic growth. Second, portfolio bond flows are not significantly linked to economic growth. Third, in countries with under-capitalized banking systems, bank-sourced capital inflows are negatively correlated with the economic growth rate.

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Borensztein et al. (1998), using data from 69 developing countries for the period 1970-1989, tested them in a cross-country regression framework. As a result of the analysis, they showed that FDI is an important tool for technology transfer and contribute more to economic growth than domestic investments. However, the higher productivity of FDI only applies if the receiving country has a minimum threshold human capital stock.

Durham (2004), using data from 80 countries for the period 1979-1998, examined the effects of FDI and portfolio stock investments on economic growth with Extreme Bounds Analysis (EBA). The results show that largely lagged FDI and portfolio stock investment do not directly and completely positively affect economic growth.

Choong et al. (2010), using annual data for the period 1988-2002, investigated how FDI, portfolio investment, and external debt affect economic growth in developed and developing countries with GMM. The findings reveal that FDI has a positive effect on growth, while portfolio investments and external debt have a negative effect on economic growth in all countries in the sample.

Aizenman et al. (2011) examined the lagged relationship between capital flows and economic growth in the context of the relationship between FDI, portfolio investments, stock investments, and short-term debt, for the period before and after the global crisis, over a sample of 100 countries, in the 1990-2010 period. As a result of the analysis, a strong relationship was found between FDI inflows and outflows and economic growth.

Adekunle and Sulaimon (2018) analyzed the relationship between capital flow patterns and economic growth in Nigeria using the ARDL method, using annual data for the period 1986-2015. According to the findings, net FDI inflows have a positive short-term effect on economic growth, while net portfolio investment inflows and net foreign remittance inflows have significant short-term negative effects on economic growth.

Adams and Klobodu (2018) examined the effects of capital flows on economic growth in five of the Sub-Saharan African (SSA) countries during the period 1970-2014, with ARDL method. The findings showed that different capital flows have different effects on economic growth in the long run. FDI has a significant positive effect in Burkina Faso, negative effects in Gabon and Niger, and foreign debt has a negative effect in all countries.

Insel and Sungur (2003) examined the effects of capital flows on Türkiye's economic growth performance for the period 1989Q3-1999Q4. As a result of the analysis, they found that there is no causality between capital flows and economic growth other than FDI. In addition, they stated that FDI, which is small and at low rates in total capital flows, greatly impacts economic growth.

Afsar (2007), in his study, using quarterly data covering the period 1992:1 to 2006:3, determined the causality relationship between FDI to economic growth in Türkiye. He stated that there is a one-way relationship between FDI and economic growth and the direction of this relationship is from FDI to economic growth.

Temiz and Gokmen (2013) applied the Johansen cointegration test, Granger causality, and OLS to the quarterly data in order to determine the relationship between FDI inflows and GDP growth in Türkiye for the 1992: Q1-2007: Q3

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period. The findings show that there is no significant relationship between FDI inflow and GDP growth in Türkiye in both the short-run and long run.

Berument et al. (2015) investigated the effect of FDI, portfolio investment, and other investments on macroeconomic variables in Türkiye with the VAR method on the basis of monthly data within the period 2000:1-2012:12. The impulse response analysis showed that a positive shock from total gross capital inflows (FDI + portfolio investment + other investment) lowered the interest and inflation rate and increased real GDP, as the domestic currency appreciated. While FDI and portfolio investments have statistically significant effects on macroeconomic variables, other investments do not.

METHODOLOGY

The methodological framework in this study consists of a data description, a theoretical specification, and an empirical specification.

Data Description

In this study, in which the linear and nonlinear relationship between FDI and economic growth is tested, the per capita GDP growth rate variable was obtained from the WB-WDI database, and the data on the FDI rate and fixed capital investment rate variables were obtained from the UNCTAD database. Table 1 summarizes the variables and data sources used in the study.

Table 1. *Variables and Data Sources*

Variable	Description	Unit	Source
$ln\, y$	Logaritmic GDP per capita	2015 US $	WB
$\Delta ln\, y$	GDP per capita growth rate	2015 US $	WB
i_p	Fixed capital investment	GDP (%)	UNCTAD
i_f	Foreign direct investment	GDP (%)	UNCTAD

Source: UNCTAD, World Bank

Table 2 shows the details of the two GDP variables and the two investment variables used in the analysis.

Table 2. *Descriptive Statistics*

Variable	Obs.	Mean	Maximum	Minimum	Std. Dev.
$ln\, y$	50	8.7240	9.3940	8.1426	0.3783
$\Delta ln\, y$	50	0.0256	0.0908	-0.0742	0.0398
i_p	50	22.9052	29.8572	15.1540	4.1265
i_f	50	0.7723	3.6234	0.0136	0.8723

Source: Author's calculations

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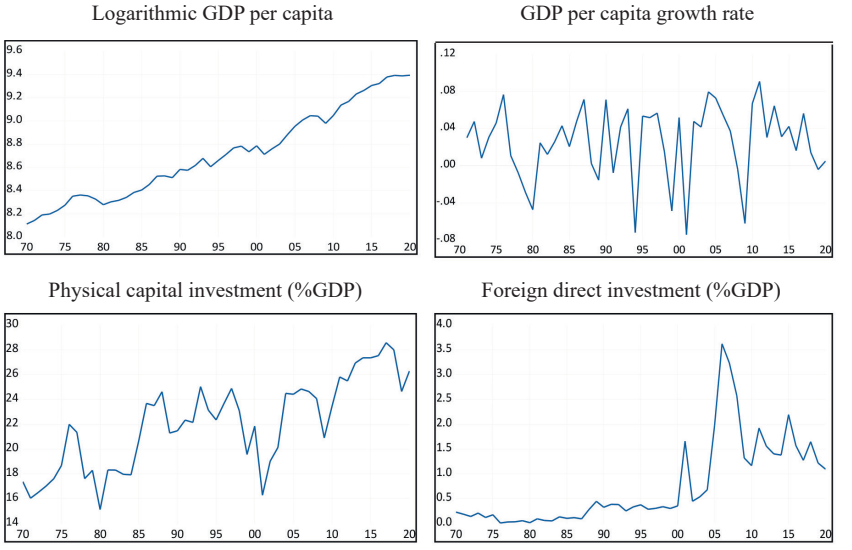
Table 2 shows descriptive statistics providing a summary of the data. It reveals that Türkiye has grown on average by 0.02, at the highest of 0.09 and the lowest of -0.07 in the 1970-2020 period. It is seen that the growth rate is negative in the crisis periods experienced in the Turkish Economy. The minimum value in the descriptive statistics calculated for the growth rate shows the economic contraction. When compared with the physical capital investment rate as a share in the GDP in Türkiye, it is seen that the foreign direct investment rate is low in this period. In fact, while the physical capital investment rate reached the highest 29.85% in this period, the FDI rate remained at 3.62%.

Figure 1. *Development of Growth and Investment Rates in Türkiye for 1970-2020*



Source: Author's calculations

Figure 1 shows the development of GDP per capita growth, fixed capital investment, and FDI rates over the 1970-2020 period. It is observed that the investment rates of physical capital investment and foreign capital investment tend to increase throughout the period, and it is determined that these investment rates always take positive values.

Theoretical Specification

In this study, in the light of Romer (1986), Lucas (1988), and Rebelo (1991), the relationship between fixed capital investment, foreign direct investment, and economic growth is estimated using an endogenous growth model which is represented by a Cobb-Douglas type production function with the constant return to all accumulated capital inputs and each input depends on decreasing productivity. In this context, the representation of the optimization problem based on Jones (1995) and Ates (2013) is as follows:

Objective function:

$$\max_{i_{p,t}, i_{f,t}, i_{h,t}} \int_{t=0}^{\infty} u(c_t)\, e^{-rt} dt \qquad (1)$$

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Constraint function:

$$c_t = \left(1 - i_{p,t} - i_{f,t} - i_{h,t}\right) y_t \quad (2)$$

$$y_t = A k_{p,t}^{\alpha} k_{f,t}^{\beta} k_{h,t}^{1-\alpha-\beta}, \quad 0 < \alpha + \beta < 1 \quad (3)$$

$$\dot{k}_{p,t} = i_{p,t} y_t - \delta k_{p,t} \quad (4)$$

$$\dot{k}_{f,t} = i_{f,t} y_t - \delta k_{f,t} \quad (5)$$

$$\dot{k}_{h,t} = i_{h,t} y_t - \delta k_{h,t} \quad (6)$$

In this model, u is the household utility function with multi-period and fixed elasticity of substitution; r is the subjective discount rate; y is GDP per capita; c is the household consumption; k_p is the fixed capital stock per capita; k_f is the foreign capital stock per capita; k_h is the stock of human capital per capita; i_d is the rate of fixed capital investment to GDP; i_f is the rate of foreign direct investment to GDP; i_h is the rate of human capital investment to GDP; δ shows the depreciation rate assumed to be the same for all forms of capital. If Equation (1) is solved and rearranged, Equation (7) is obtained:

$$\Delta ln\, y_t = \alpha_0 + \alpha_1 i_{p,t-1} + \alpha_2 i_{f,t-1} \quad (7)$$

In this equation, *t* is the time; $\Delta ln\, y_t$ is the GDP growth rate per worker; i_1 is the ratio of fixed capital investment to GDP; i_2 represents the ratio of foreign direct investment to GDP. Accordingly, ICT and non-ICT capital investment rates can affect the GDP growth rate per worker simultaneously and with a delay.

Empirical Specification

In this study, empirical specification is an econometric representation of the linear and non-linear relationship between FDI and economic growth in the context of short-run and long-run dynamics. In this context, ARDL (Autoregressive distributed lag) bounds test approach which was developed by Pesaran et al. (2001) was used to estimate the long-run and short-run relationship between the FDI rate and GDP per capita growth rate. Based on Equation (7), the ARDL model estimates the effect of fixed capital investment and FDI rate on the GDP per capita growth rate within the framework of short-run and long-run dynamics as follows:

$$y_t = \alpha_0 + \sum_{i=1}^{p} \lambda_t \Delta \ln y_{t-i} + \sum_{i=0}^{q1} \delta_{1i} \Delta i_{p,t-i} + \sum_{i=0}^{q2} \delta_{2i} \Delta i_{f,t-i} + \beta_1 \ln y_{t-1} + \beta_2 i_{p,t-1} + \beta_3 i_{f,t-1} + \varepsilon_t \quad (8)$$

Equation (8) gives the ARDL model that consists of two parts. Here are the long-run coefficients: β_1, β_2, and β_3 and short-term coefficients are expressed with symbols λ_i, δ_1, and δ_2. If a cointegration relationship is established between GDP per capita growth rate and the explanatory variables, the linear model is expressed in ECM form as follows:

$$\Delta \ln y_t = \alpha_0 + \sum_{i=1}^{p} \lambda_t \Delta \ln y_{t-i} + \sum_{i=0}^{q1} \delta_{1i} \Delta i_{p,t-i} + \sum_{i=0}^{q2} \delta_{2i} \Delta i_{f,t-i} + \theta ECT_{t-1} + \varepsilon_t \quad (9)$$

Here, ECT_{t-1} represents the error correction part of the ARDL model and θ

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represents the rate of adjustment from short-run dynamics to long-run equilibrium. For a long-term balance between the GDP per capita growth rate and the explanatory variables, θ is expected to be negative and statistically significant.

NARDL (Nonlinear ARDL) method is developed by Shin et al. (2014). The NARDL model is advantageous in terms of capturing short-run and long-term asymmetries. For example, it provides more flexibility in loosening the assumptions that time series should be integrated in the same order (Apergis, 2015: 2). The NARL model estimates the short-run and long-run effects of positive and negative shocks in the FDI rate on the GDP per capita growth rate. The nonlinear relationship between FDI and GDP per capita growth rate can be expressed in NARDL form as:

$$\Delta \ln y_t = \beta_0 + \sum_{i=1}^{p-1} \lambda_i \Delta \ln y_{t-i} + \sum_{i=0}^{q} \delta_i \Delta i_{p,t-i} + \sum_{i=0}^{q_2} \lambda_i^{+} \Delta i_{f,t-i}^{+} + \sum_{i=0}^{q_3} \lambda_i^{-} \Delta i_{f,t-i}^{-} + \rho \ln y_{t-1} + \vartheta_1 i_{p,t-i} + \vartheta_2^{+} i_{f,t-i}^{+} + \vartheta_3^{-} i_{f,t-i}^{-} + v_t \quad (10)$$

Equation (8) represents the NARDL model which consists of two parts short and long term dynamics. Here are the long-run coefficients ρ, ϑ_1, ϑ_2^{+} and ϑ_3^{-}, and short-run coefficients are expressed with symbols λ, δ_i, λ_i^{+}, and λ_i^{-}. If a cointegration relationship is established between GDP per capita growth rate and explanatory variables, the nonlinear model is expressed in ECM form as follows:

$$\Delta \ln y_t = \beta_0 + \sum_{i=1}^{p-1} \lambda_i \Delta \ln y_{t-i} + \sum_{i=0}^{q} \delta_i \Delta i_{p,t-i} + \sum_{i=0}^{q_2} \lambda_i^{+} \Delta i_{f,t-i}^{+} + \sum_{i=0}^{q_3} \lambda_i^{-} \Delta i_{f,t-i}^{-} + \vartheta ECT_{t-1} + v_t \quad (11)$$

Here, ECT_{t-1} represents the error correction part of the NARDL model and ϑ represents the rate of adjustment from short-run dynamics to long-run equilibrium. For a nonlinearly long-term balance between GDP per capita growth rate and FDI rate, ϑ is expected to be negative and statistically significant.

FINDINGS

In the first stage of the empirical analysis, VAR analysis is performed. In this context, firstly, with the VAR Lag Order Selection Criteria, the optimum lag length of the model was determined as "2". Secondly, the Residual Serial Correlation LM Test[2] showed that there is no autocorrelation problem in the model. VAR Residual Heteroskedasticity Test[3] determined that the model has no problem of varying variance. Lastly, the VAR AR Roots test showed that the model satisfies the VAR stability condition. In other words, the model is stable.

In the second stage of the empirical analysis, the degree of integration of the variables was tried to be determined by ADF and PP unit root tests.

2 Lag (1): Rao F-stat (9,87.8): 1.1164, Prob (0.3598). Lag (2): Rao F-stat (9,87.8): 0.4227, Prob (0.9197).
3 Chi-sq (72): 75.88644, Prob (0.3544).

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Table 3. *Results of ADF and PP Unit Root Tests*

Variable	Test in	ADF Test			PP Test		
		t-stat.	p-value	Result	t-stat.	p-value	Result
$ln\ y$	Intercept	0.1432	0.9660	I (1)	0.1649	0.9675	I (1)
	Trend, Intercept	-2.1625	0.4993	I (1)	-2.2412	0.4571	I (1)
$\Delta ln\ y$	Intercept	-6.7921	0.0000	I (0)	-6.7915	0.0000	I (0)
	Trend, Intercept	-6.7625	0.0000	I (0)	-6.7573	0.0000	I (0)
i_p	Intercept	-1.8778	0.3399	I (1)	-2.0300	0.2735	I (1)
	Trend, Intercept	-3.5263	0.0473	I (0)	-3.6603	0.0346	I (0)
Δi_p	Intercept	-7.7124	0.0000	I (0)	-9.7483	0.0000	I (0)
	Trend, Intercept	-7.6418	0.0000	I (0)	-9.6059	0.0000	I (0)
i_f	Intercept	-2.0890	0.2499	I (1)	-1.9801	0.2944	I (1)
	Trend, Intercept	-3.0263	0.1356	I (1)	-2.8908	0.1741	I (1)
Δi_f	Intercept	-6.6343	0.0000	I (0)	-12.0167	0.0000	I (0)
	Trend, Intercept	-6.5649	0.0000	I (0)	-11.8155	0.0000	I (0)

Source: Author's calculations

Table 3 shows the results of ADF (Augmented Dickey-Fuller) and PP (Phillips Perron) unit root tests. The tests show that the variables participating in the model are either I(0) or I(1) integrated. Accordingly, the GDP per capita growth rate and foreign direct investment rate variables are stationary in the first order, but the fixed capital investment rate variable is stationary at the level order.

In the third stage of the empirical analysis, the ARDL and the NARDL bounds tests were performed, and then short-run and long-run estimation results of ARDL and NARDL models are included.

Table 4. *Bounds Test Results of ARDL and NARDL models*

Model	F stat.	k	Critical Value Bounds		
			Significance	Lower Bound	Upper Bound
ARDL	8.1748	2	10%	2.63	3.35
			5%	3.1	3.87
			2.50%	3.55	4.38
			1%	4.13	5
NARDL	5.0115	3	10%	2.37	3.2
			5%	2.79	3.67
			2.50%	3.15	4.08
			1%	3.65	4.66

Source: Author's calculations
Note: Null Hypothesis: No levels relationship.

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Table 4 shows the bounds test results of the ARDL and NARDL models. In both models, as the calculated F statistical value is greater than the critical upper limit values, a long-run relationship is determined between the GDP per capita growth rate and the explanatory variables.

Table 5. *Long-Run and Short-Run Estimates of the ARDL Model*

Long-run Estimates				
Dependent variable: lny				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
i_p	0.1429	0.0747	1.9135	0.0629
i_f	0.1969	0.1767	1.1141	0.2719
c	6.2343	1.0993	5.6710	0.0000
EC = $ln\ y$ - (0.1429*i_p + 0.1969*i_f + 6.2343)				
Short-Run Estimates				
Dependent variable: Δlny				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
$\Delta ln\ y_{(-1)}$	-0.3225	0.1496	-2.1553	0.0372
Δi_p	0.0171	0.0019	9.2193	0.0000
$\Delta i_{p(-1)}$	0.0042	0.0027	1.5682	0.1247
Δi_f	0.0172	0.0081	2.1104	0.0411
$\Delta i_{f(-1)}$	0.0071	0.0076	0.9358	0.3550
ECT (-1)	-0.0355	0.0060	-5.9289	0.0000

Source: Author's calculations
Note: c represents the constant.

Table 5 shows the long-run and short-run estimation results of the ARDL model. The fact that the error correction coefficient obtained is negative and statistically significant means that any deviation in the GDP growth rate per worker in the short run is adjusted to the long-term equilibrium value by 48% per annum. In other words, it returns to the average after 30 periods. This finding shows that the short-term effects of increases in ICT and non-ICT capital investment rates are more dominant. In other words, it shows that the Turkish economy very slowly returned to its long-run growth trend after the increase in investment rates.

According to the estimation results of the linear model, the fixed capital investment rate positively affects the GDP growth rate per capita in the long run at a 90% significance level and at a 99% significance level in the short run. However, while the long-term coefficient of the FDI rate is insignificant, the short-term

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coefficient is significant at the level of 95%. In other words, while the FDI rate affects the per capita GDP growth rate in the short run, it does not in the long run.

Table 6. *Long-Run and Short-Run Estimates of the NARDL Model*

Long-Run Estimates				
Dependent variable: lny				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
i_p	0.0714	0.0367	1.9479	0.0583
i_f^+	0.1125	0.1396	0.8054	0.4252
i_f^-	0.0368	0.1673	0.2198	0.8271
c	7.2551	0.6375	11.3803	0.0000
EC = $ln\ y$ - (0.0714* i_p + 0.1125* i_f^+ + 0.0368* i_f^- +7.2551)				
Short-Run Estimates				
Dependent variable: Δlny				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
Δi_p	0.0159	0.0018	8.8561	0.0000
Δi_f^+	0.0171	0.0103	1.6544	0.1057
Δi_f^-	0.0117	0.0137	0.8538	0.3982
ECT (-1)	-0.0668	0.0127	-5.2443	0.0000

Source: Author's calculations
Note: c represents the constant.

Table 6 shows the long-run and short-run estimation results of the NARDL model. The fact that the error correction coefficient obtained is negative and statistically significant means that any deviation in the GDP growth rate per worker in the short run is adjusted to the long-term equilibrium value by 0.66% per annum. In other words, it returns to the average after 15 periods. This finding shows that the short-term effects of increases in ICT and non-ICT capital investment rates are more dominant. In other words, it shows that the Turkish economy slowly returned to its long-run growth trend after the positive and negative shocks in FDI rates.

According to the estimation results of the non-linear model, the fixed capital investment rate positively affects the per capita GDP growth rate in the long and short run at 95% and 99% significance levels, respectively. However, it is seen that the positive and negative shocks in the FDI investment rate do not significantly affect the per capita GDP growth rate in both the long and short run.

In the fourth stage, diagnostic tests were performed to prove the reliability of the estimations.

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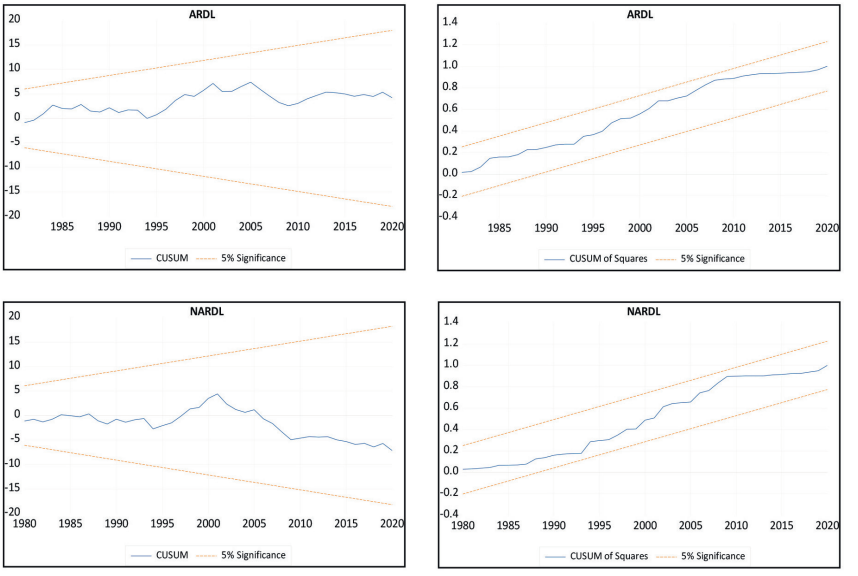
Table 7. *Diagnostic Tests Results for ARDL*

Tests	ARDL Model		NARDL Model	
	F-stat.	**Prob.**	**F-stat.**	**Prob.**
B-G LM Testi	2.7774	0.0749	3.2143	0.0510
ARCH Testi	0.0049	0.9951	0.8152	0.3713
Jarque-Bera Testi	2.6231	0.2693	2.7894	0.2479
Ramsey Reset Testi	0.2271	0.6363	1.0194	0.3187

Source: Author's calculations

Table 7 shows that the models do not have autocorrelation (Breusch-Godfrey LM Test) and varying variance (ARCH Test) problems, and the error term is normally distributed in the models (Jarque-Bera Normality Test) and there are no problems with incorrect determination (Ramsey Reset Test) in the specification.

Figure 2. *CUSUM and CUSUMQ Test Results of ARDL and NARDL Models*



Source: Author's calculations

Figure 2 shows the CUSUM and CUSUMQ statistics of the ARDL and NARDL models. According to these statistics, the models are stable in the 1970-2020 period. In other words, there is no structural break in the coefficients.

In the last stage of the empirical analysis, the Wald Test was applied to detect the long-run asymmetry.

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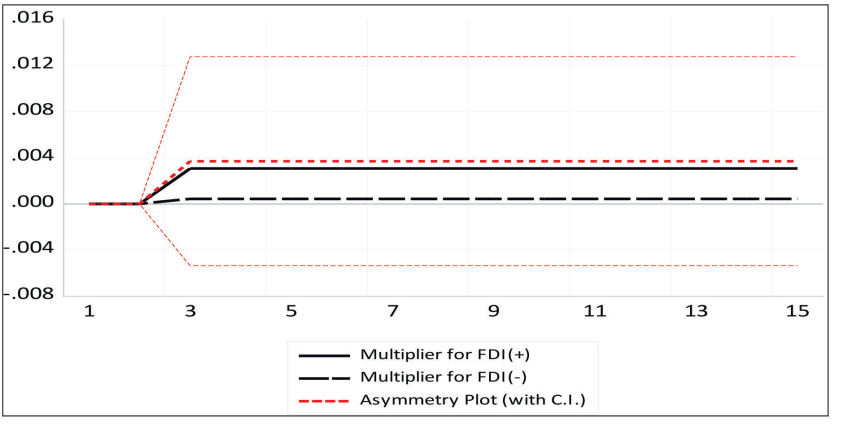
Table 8. *Result of the Wald Test*

Test Statistic	Value	df	Probability
t-statistic	1.0271	43	0.3101
F-statistic	1.0550	(1, 43)	0.3101
Chi-square	1.0550	1	0.3044

Source: Author's calculations
Note: H_0: No long-run asymmetry; H_1: There is long-run asymmetry

Table 8 shows the result of the Wald Test. According to the test, FDI has not an asymmetric effect on the GDP per capita growth rate in the long run.

Figure 3. *NARDL Model Cumulative Dynamic Multipliers*



Source: Author's calculations

Figure 2 shows the cumulative dynamic multiplier effect of a unit change in the direct investment rate (positive or negative) on changes in economic growth. These multipliers show the new long-run equilibrium pattern of economic growth following a positive or negative unitary shock in the FDI rate.

CONCLUSION

In this paper, linear and non-linear long-run economic growth effects of foreign direct investment (FDI) in Türkiye for the period 1970-2020, are investigated by using ARDL & NARDL approach. For this purpose, the linear and non-linear relationship between the FDI rate as a net capital inflow and the GDP per capita growth rate is tested in the context of short-run and long-run dynamics. According to the findings obtained from the ARDL & NARDL analysis, there is both a linear and nonlinear cointegration relationship between the GDP per capita growth rate and the FDI rate. Linearly, fixed capital investment and FDI rates positively and significantly affect the GDP per capita growth rate in the long run at 5% and 10% significance levels, respectively. This finding is consistent with

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the results of Insel and Sungur (2003), Avsar (2007) and Berument et al. (2015) studies in the literature. In the context of nonlinear relationships, positive shocks in the FDI rate affect the GDP per capita growth rate positively and significantly, while negative shocks have a positive but insignificant effect. The Wald Test proved that the long-run nonlinear relationship between the FDI rate and the GDP per capita growth rate does not exhibit an asymmetrical character. These findings show that increases in FDI rates do not have a permanent effect on the per capita GDP growth rate in the long run, or that increases in FDI rates do not sufficiently reflect on the long-term growth rate. Taking this empirical result into consideration, policy measures to increase FDI efficiency in Türkiye can be taken to make a positive contribution to the long-run growth process.

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