











“The impact of foreign direct investment on GDP growth: The case of Turkey”

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THE IMPACT OF FOREIGN DIRECT INVESTMENT ON GDP GROWTH: THE CASE OF TURKEY

Abstract

The development of investment processes is significant for a country's economy, economic development, and the expansion of market opportunities. The successful functioning of the national economy in the global economic space requires its integration into the international finance system. The impact of foreign direct investment on the economy of host countries remains relevant. The purpose of this study is to investigate the impact of foreign direct investments on the Gross Domestic Product of Turkey for the years 1990–2021. The data set includes foreign direct investments, exchange rate levels, and the Gross Domestic Product of Turkey and was used in logarithmic form in the empirical assessments. The results show a positive and statistically significant relationship between foreign direct investments and Gross Domestic Product. A long-term integrative relationship exists between the independent variables (foreign direct investments and exchange rate) and the dependent variable (Gross Domestic Product). Consequently, this implies that a 1% increase in foreign direct investment results in a 0.35% increase in Gross Domestic Product, holding other factors constant.

Keywords

foreign direct investment, gross domestic product, exchange rate, autoregressive distributed lag model, Turkey

JEL Classification

E20, F21, O11, O16

INTRODUCTION

Foreign direct investment (FDI) has become an important source of economic growth for many countries around the world. It has been recognized as an important factor in promoting economic growth and development in developing countries (Aitken & Harrison, 1999). FDI can bring new technology, managerial knowledge, and access to the global market, which can increase the host country's economic growth (Borensztein et al., 1998; Al-Faryan, 2022; Prymostka et al., 2023; Ibrahimov et al., 2023).

FDI plays a vital role in transferring technology from more advanced countries to developing ones, encouraging local investments, and fostering the enhancement of human capital and institutional development, and is often linked with new job opportunities. Attracting foreign direct investment has been a top priority for many developing nations, including Turkey.

As a labor-intensive developing country, Turkey's economy has largely followed similar paths to other developing countries in terms of FDI inflows. Latin America and the Caribbean differed significantly from other developing countries in the amount of FDI. From 1970 to 1975, Turkey's net foreign direct investment inflows were almost close to

the world average. During the next five years, because of political instability, the ratio of FDI inflows to GDP backed almost to 0%. Since the late 1980s, the flow of FDI to Turkey has increased due to internal and external factors. However, this increase in net inflows has not been sustained, and FDI has declined since the 1990s, well below the world average, due to domestic economic and political factors. After the global financial crisis, the volatility of FDI inflows increased due to the imbalance and changing risk appetite in the international financial system (Gökmen, 2021; Aden, 2021).

The country's economy has grown rapidly since the global recession due to COVID in 2020. In 2021, according to the world bank, GDP growth (in annual terms) was 11.4%. By comparison, the GDP of Poland, one of the most dynamic economies in Europe, grew by 6.8% in 2021 and by 4.9% in 2022. However, since 2018, the local currency has lost about 80% of its value. This happened mainly due to the reduction of local central bank rates in the context of rising inflation. In 2021, the growth of consumer prices reached 19.6%, and in 2022 – 72.3%. Since the role of FDI in Turkey's economic growth and its impact on GDP is significant, and many foreign investors are leaving the Turkish market, there is a reason to investigate this topic. This topic has become more relevant in recent years due to the decrease in interest rates in the Turkish economy, the devaluation of the Turkish lira and the outflow of some investors.

1. LITERATURE REVIEW

Foreign firms transfer new technology and know-how to their affiliates, providing positive spillovers to the country directly or indirectly. Potential benefits of FDI can be called indirect spillover effects on the overall local economy, including productivity and competitiveness in the manufacturing sectors and export level. These transfer channels work as local companies adapt new methods in production, management, or technology brought in by FDI (Crespo & Fontoura, 2007), or local firms may hire former employees of foreign firms, tapping into their expertise and know-how (Glass & Saggi, 2002) or the presence of FDI can enhance market competitiveness, motivating local enterprises to be innovative and enhance their productivity (Chung, 2001; Melnyk et al., 2021; Piluso, 2023; Wang et al., 2023; Soares & Pinheiro, 2023).

FDI increases technology level, managerial competence, and expertise and know-how, which escalates effectiveness and productivity in the country (Colen et al., 2008; Ayoola et al., 2023; Voznyak et al., 2023; Danylyshyn et al., 2023). Besides, FDI can also create both horizontal and vertical spillovers, which raise productivity of local firms (Blomstrom & Kokko 1998; Majid et al., 2022). Horizontal spillover occurs when an FDI firm enters a specific sector and increases the performance and productivity of other firms in the same

sector. Meanwhile, the vertical spillover effect can manifest in two ways: when a firm offers services to the FDI firm (backward spillover) or when the FDI firm offers services to the local businesses (forward spillover) (Stancik, 2007).

Numerous studies have examined the relationship between FDI and economic growth. Several studies have found a positive effect of FDI on economic growth (Asiedu, 2002; Blomström & Kokko, 1998; Carkovic & Levine, 2002; De Mello, 1997; Ghazouani, 2021, Günay et al., 2021 among others). However, some other researchers (Alfaro et al., 2004; Campos & Kinoshita, 2003; Hansen & Rand, 2006; Vasa & Angeloska, 2020) have concluded that FDI has no significant effect on economic growth. The effect of FDI on economic growth is influenced by several variables, such as the development level in the host country, the quality of institutions, and the type of FDI (Borensztein et al., 1998; Li & Liu, 2005; Oliinyk et al., 2023).

Gharry's study mentions that FDI has a strong impact on industrialization, which means that there is a positive impact of FDI on GDP (M. Abd El Gharry, S2022). Rahaman and Chakraborty (2015) analyzed the causal relationship between foreign direct investment (FDI) and gross domestic product (GDP), in Bangladesh. The researchers concluded confirming the existence of a long-term equilibrium relationship between FDI and GDP (Rahaman & Chakraborty, 2015).

According to Hermes and Lensink's research, the level of financial development of the country receiving is also an effective factor in the influence of FDI on economic growth (Hermes & Lensink, 2003). Another study conducted by Acaravci and Ozturk for European transition countries (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, and Slovenia) concluded that the country's potential to make economic progress will be determined by its FDI promotion policy. Nevertheless, the most efficient strategy to attract FDI is to focus on enhancing the following areas: free trade zones, trade regime, tax incentives, human capital base in the host country, financial market regulation, financial system, and infrastructure quality (Acaravci & Ozturk, 2012). In another study, Ozturk (2007) found that a country's ability to make progress on economic growth will depend on its FDI promotion policy and focus on addressing deficiencies in regional integration arrangements and economic and political stability.

According to Azizov and Mammadov (2010), as a result of globalization, countries' economic dependency on each other is increasing. FDI plays a specific role here, and countries that provide favorable conditions for FDI will positively affect GDP and economic growth.

Certain research studies have reported less or even negative impact of horizontal spillovers (Aitken & Harrison, 1999; Konings, 2001), with vertical spillovers comparatively having more impacts (Girma et al., 2016; Javorcik, 2004; Liu, 2008). However, studies on Indonesian manufacturing companies showed opposite results (Juda & Kudo, 2020; Amani, 2017; Negara & Adam, 2012; Sari et al., 2016).

Juda and Kudo (2020) have found positive spillover effects of FDI on the labor productivity of local firms in the same manufacturing industry in Indonesia for the period 2000–2015. However, the paper also outlined that vertical FDI spillover has not provided comprehensive benefits for local firms as negative effects between foreign buyers and local firms and between foreign firms and local buyers as well.

Ebghaei (2016) found positive horizontal and vertical spillovers of FDI in Turkey for 2003–2011

years. Moreover, the research showed that export-oriented foreign-owned companies generate a greater backward spillover effect than domestically focused foreign-owned firms. This result is also associated with the outcomes of Javorcik (2004). Taymaz and Yilmaz (2008) found positive backward spillover effects as foreign-affiliated firms are more productive than local ones in Turkey for the period 1990–1996.

In his study, Guris (2012) investigated the long-run relationship between FDI and GDP using the Dynamic Ordinary Least Squares method. According to the results of his research, there is a long-term relationship between FDI and GDP, and FDI has a significant positive effect on GDP (Guris, 2012). In another study, Mukhtarov et al. (2019) concluded that there is a long-term relationship between FDI and exports, and FDI has a positive and statistically significant impact on exports in the long term.

Khudari et al. (2021) examined the relationship between FDI and its determinants in Turkey, including "macroeconomic indicators" and "Political Stability (PS)" in the short and long run. A cointegration analysis was conducted between 1974 and 2017 using the ARDL model. The results of this study also confirm the positive correlation between GDP and FDI.

Karish and Tandoghan (2020) evaluated the relationship between foreign direct investment and economic growth in Turkey. Using annual variables for the years 1980–2018, they used the Toda-Yamamoto causality test. According to the results, there is unidirectional causality from economic growth to foreign direct investment. In other words, they concluded that as foreign direct investment increases, economic growth in Turkey will also increase.

Another study conducted by Demir (2022) examined the Cobb-Douglas production function-based simple endogenous growth model to examine the linear and nonlinear effects of FDI on long-run economic growth in Turkey for the years 1970 to 2020. The ARDL and NARDL approaches are used in the study to determine whether changes in fixed capital and FDI rates have a linear or non-linear impact on the GDP per capita growth

rate. According to findings, there is a linear and nonlinear cointegration relationship between the FDI rate and GDP per capita growth rate, but in the long run, this relationship is not particularly significant (Demir, 2022).

Kotil (2020) reviewed the correlation between exports, imports, and foreign direct investment for the period of 2003–2019. This period in Turkey is characterized as a period of increasing openness in foreign trade and making legal regulations for FDI. The results obtained in this study show that there is a close relationship between exports and imports. However, no significant impact of foreign direct investments on exports and imports was found (Kotil, 2020).

Songur (2023) examines a causality relationship between internet penetration, foreign direct investment, foreign trade, and economic growth in the BRICS-T countries (Brazil, Russia, India, China, South Africa, and Turkey) for the period of 1993–2019. For this purpose, the causality test developed by Dumitrescu and Hurlin was used. The results demonstrated that the variables have significant causal relationships. The findings that are related to the research are that there is a causal relationship between economic growth and foreign trade. In addition, FDIs are the cause of economic growth. Foreign direct investments lead to the development of human capital, that is why an increase in productivity and, thus, an increase in aggregate demand can be said to have led to an increase in economic growth. On the other hand, it was concluded that foreign trade is the cause of foreign direct investment. The increase in foreign trade with the removal of trade restrictions during the period under discussion has been cited as supporting the entry of more foreign direct investors into the country (Songur, 2023).

Ozturk and Kalyoncu (2007) examined the influence of Foreign Direct Investment (FDI) on Gross Domestic Product (GDP). They empirically investigated the impact of FDI on the economic growth of Turkey and Pakistan during the period 1975–2004 and analyzed the causal relationship between FDI and economic growth. According to the study, it is GDP that leads to FDI for Pakistan; it is also stated that there is strong evidence of bi-directional causality between the two variables for Turkey (Ozturk & Kalyoncu 2007).

In the example of the economy of Turkey, many studies were conducted in the direction of FDI and GDP growth relations and related issues. As a research topic, it has kept its relevance for the economy of Turkey, especially in recent years. FDI is one of the economic activities most affected by political instability in Turkey, as in all other countries.

The purpose of this study is to investigate the impact of foreign direct investments on the GDP in Turkey for the years 1990–2021.

2. DATA AND METHODOLOGY

The data to be used for this study include the indicators – foreign direct investments, official exchange rate, and gross domestic products, covering the period 1990–2021. The World Bank's World Development Indicators were used in this study. In the research, economic growth is a dependent variable, which is proxied by real GDP, while FDI and official exchange rate are independent variables. In this paper, all the variables are given in the logarithmic form.

During 1991–2021, a sharp increase was observed after the sharp decline in 2002 (-0.94 bln \$) and 2009 (-7.03 bln \$) in FDI. After providing political stability due to the change in power, the sharp decline in 2002 related to political instability was replaced with increased FDI inflow into the country. The 2008 global financial crisis is the reason for the dramatic reductions in 2009.

This study developed a standard model based on traditional economic theory and previous studies to evaluate the impact of foreign direct investment on Turkey's GDP. A linear economic model was utilized. Because the impact of FDI takes a long time to reflect its impact on the economies of the receiving countries, the focus was on the variables' long-term dependence; thus, the standard model was established as follows:

$$LGDP_t = \beta_0 + \beta_1 LFDI_t + \beta_2 LOER_t + \varepsilon_t, \quad (1)$$

where GDP – Gross Domestic Product, FDI – Foreign Direct Investment, OER – Official Exchange Rate, ε – Error term, t – Time period.

It is necessary to check the stationarity of the variable using unit root tests before estimating the model parameters. Augmented Dickey-Fuller (ADF) test was used for this. The ADF test is not discussed here since it is widely employed in empirical analysis and is fairly well-known among researchers. Readers can find a description and discussion of the tests in Dickey and Fuller (1981).

The existence of a coherent integration relationship between the variables was then tested. For this purpose, the single equation-based cointegration method, which is the autoregressive distributed lag bound testing (ARDLBT) approach developed by Pesaran and Shin (1999) is utilized.

3. EMPIRICAL RESULTS AND DISCUSSION

Initially, the non-stationary characteristics of the variables will be examined. For this examination, the augmented Dickey-Fuller unit root test will be utilized (Dickey & Fuller 1981). The test results are shown in Table 1.

Table 1. Unit root test results

Variable	Level	Prob.*	1 st difference	Prob.*	Result
FDI	-1.188	0.666	-5.517 ***	0.001	I(1)
OER	-2.856	0.062	-1.522	0.508	I(1)
GDP	0.510	0.984	-5.507 ***	0.001	I(1)

Note: The maximum lag order is set to two, and the optimal lag order (k) is selected based on the Schwarz criterion in the tests. *, **, and *** indicate rejection of the null hypothesis at 10%, 5%, and 1% significance levels, respectively. Critical values for ADF are taken from MacKinnon (1996). Estimation period 1991–2021.

The ADF sample values shown in Table 1 indicate that FDI and GDP are I(1). The null hypothesis of non-stationarity is accepted in a level form; however, rejected in a difference form. In other words, based on ADF test results, these two variables are non-stationary in their level form but stationary in the differenced form.

The ADF test results presented in show that the OER exhibits a unit root problem at the first difference. However, when analyzing the data of OER (World Bank) starting from the first degree, it becomes clear that during the years 1990–2003, the OER is seen to be stationary around the value of 0.4, and

during the years 2003–2020, it is seen around the value of 0.1. This change in OER’s ADF test results can be explained by the change of political power in Turkey in 2003 and the increase in FDI inflow into the country after those years. Although there is a unit root problem in the ADF test results, it is not reflected in the graph, and it can be concluded that the OER is also stationary. Therefore, the conclusion is that all variables are I(1), which allows to proceed to the cointegration test.

The existence of a long-run relationship between variables has been tested using Bounds tests (Pesaran et al., 2001) and Engle-Granger tests (Engle-Granger, 1987). Test results indicate rejection of the null hypothesis at 1% (10.634) and 5% (-4.196) significance levels, respectively. Both tests confirm an integration relationship among variables in the long term. In other words, the variables move together over a long period. Since the variables are co-integrated, this indicates the long-run equilibrium between these variables, so the ARDL model was used to estimate the long-run relationship, and the results were as follows.

$$LGDP = 8.14 + 0.35 \cdot LFDI + 0.13 \cdot LOER \quad (2)$$

(4.56) (2.23) (1.79)

Values of t-statistics are given in parentheses.

The findings of estimation revealed that there is a positive and statistically significant effect from both foreign direct investment (FDI) and official exchange rate (OER) on the gross domestic product (GDP). The results designate that a 1% increase in FDI and OER increases GDP by 0.35% and 0.13%, respectively. The current study’s findings coincide with the economic theory and correspond with the reality of the Turkish economy during the estimated period. From a theoretical perspective, the results obtained indicate that exports are developing and increasing in the same direction as foreign direct investments. Because foreign companies invest not only to supply the domestic market but also the foreign market. The result of this study allows us to say that foreign direct investments positively affect Turkey’s GDP.

In Table 2, the model’s residuals are tested for Gauss-Markov conditions, and all the results are consistent with the requirements.

Table 2. Diagnostic test results for residuals

Test	F-statistic	p-value
Serial correlation LM ^A	0.086	0.917
Heteroskedasticity (White)	0.752	0.592
Test	Statistic	p-value
Ramsey RESET (T statistics)	0.558	0.582
Ramsey RESET (F statistics)	0.311	0.582
Test	Jarque-Bera	p-value
Normality ^B	1.236	0.538

It is evident from the data presented in Table 2 whether the residuals meet the assumptions in the conducted research. Table 2 shows the results of the “serial correlation LM test”, “residual normal distribution test”, “heteroscedasticity (White) test” and “Ramsey RESET test” during the evaluation. About the significance of these tests, the following should be mentioned. Because time series analysis has a problem with dependence on previous data, the “Breusch-Godfrey serial correlation LM test” can be used to examine the serial correlation problem in the residuals (Breusch, 1978; Godfrey, 1978b). Like the others, this test should examine hypothesis H_0 to see whether there is a serial correlation problem. The H_0 hypothesis of the LM test is “*There is no serial correlation in the residuals.*” Based on Table 2, upon analyzing the result of the LM test, it is observed that the probability value (91%) is greater than 5%, leading to the acceptance of the H_0 hypothesis. So, there is no serial correlation in the residuals.

Another test employed is the Jarque-Bera (Jarque & Bera, 1980) test, utilized for assessing the normal distribution of residuals. The null hypothesis of this test is “*Residuals are normally distributed.*” According to the findings from the Jarque-Bera, the hypothesis is accepted that the residuals are normally distributed because the probability value (53%) is greater than 5%.

White’s test (White, 1980), one of the tests used to examine the problem of heteroskedasticity in the residuals, is another test conducted during evaluation. This test considers the dependence of the variance of the residuals not only on the independent variables but also on the squared and interaction components of the independent variables. The null hypothesis for White’s test is that there is no heteroscedasticity problem in the

residuals. Since the probability value (59%) in the test result is more than 5%, the null hypothesis is accepted. This means that there is no heteroscedasticity problem in the residuals of the independent variables in the model of this study.

Furthermore, it is crucial to ensure that there is no functional misspecification in the regression model. A regression suffers from misspecification of the functional form when the correct functional expression of the dependencies between the independent and dependent variables is not reflected in the regression model. When there is a quadratic dependence between the independent variable and the dependent variable in the estimated model, not including the square of the independent variable in the model is a considerable misspecification error (Aliyev, 2022). To address model misspecification, the “Ramsey RESET” test is employed. The H_0 hypothesis of the test is that there is no functional misspecification problem in the model. Since the probability value (58%) is greater than 5%, the H_0 hypothesis stating that “*There is no misspecification problem in the model*” is accepted.

It is worth noting that the results obtained in this study align with the findings of a prior study that examined the impact of FDI on GDP in the sample of Turkey. So, the result of this study shows that there is a positive and statistically significant relationship between foreign direct investments and gross domestic product. Numerically, a 1% increase in FDI results in a 0.35% increase in GDP, holding other factors constant. It can be stated that the findings are supported by other studies’ results when comparing them. Öztürk and Kalyoncu (2007) studied the impact of FDI on Turkey’s GDP. Based on the empirical evaluation of the impact of FDI on the economic growth of Turkey during the period 1975–2004, they concluded that for Turkey, there was a bidirectional causality between the two variables.

In a study by Songur (2003) examining the causal relationship between internet penetration, foreign direct investment, foreign trade, and economic growth in the BRICS-T (Brazil, Russia, India, China, South Africa, and Turkey) countries for the period 1993–2019, causality between variables was examined using the cau-

sality test developed by Dumitrescu and Hurlin (2012). The conclusion of this study is that there is a causal relationship between economic growth and foreign trade.

Karış and Tandoğan (2020), examining the relationship between foreign direct investments and economic growth in Turkey using the Toda-Yamamoto causality test using annual variables for the years 1980–2018, determined a one-way causality from economic growth to foreign direct investments. In other words, they determined that as economic growth in Turkey increases, direct foreign investments in the country will also increase.

Demir's (2022) study examining the linear and non-linear impacts of foreign direct investment on Turkey's long-term economic growth from 1970 to 2020 determined that both linear and non-linear cointegration relationships exist between foreign direct investment rates and GDP per capita growth rates. However, the researcher concluded that the foreign direct investment ratio does not substantially influence long-term growth.

In his study on Turkey's foreign trade and foreign direct investment from 2003 to 2019, Kotil (2020) observed a growing openness in foreign trade and favorable legal changes for foreign investments in Turkey during that time. The results obtained in this study indicated that there is a close relationship between export and import, but no significant effect of foreign direct investment on export and import was found.

When looking at the conducted studies, the results can confirm the effect of FDI on GDP obtained in Ozturk (2007) and Songur (2023). In Karış and Tandoğan (2020), there is evidence suggesting that GDP influences FDI. According to Demir (2022), FDI does not appear to have a significant long-term impact on economic growth. Additionally, in Kotil's (2020) study on the relationship between FDI, import, and export, it is observed that FDI does not make a substantial contribution to foreign trade. Considering the findings from other conducted studies, it can be asserted that the results hold significance for the Turkish economy.

CONCLUSION

The main objective of this study was to examine the impact of foreign direct investment on gross domestic product in Turkey during the period 1990–2021. World Development Indicators of the World Bank were used in this study. The main variables are FDI and exchange rate, and the dependent variable is gross domestic product. First, the variables' non-stationary characteristics were checked for the empirical analysis. For this purpose, Dickey-Fuller's unit root test was used. The study used a single equation cointegration method, the Autoregressive Distributed Lags Tests (ARDLBT) to analyze the long-run relationship. The study concluded that the variables are $I(1)$ allowed to proceed to the cointegration test.

The existence of a long-run relationship in the study was tested. Cointegration tests showed that there is a cointegration relationship between the variables. In other words, the variables move together over a long period of time. Since the variables show co-integration, this indicates the long-run equilibrium between them, so the ARDL model was used in the study to estimate the long-run relationship. The obtained results show that both FDI and OER have a positive and statistically significant effect on GDP. The results show that numerically, a 1% increase in FDI leads to a 0.35% increase in GDP. A 1% increase in OER leads to a 0.13% increase in GDP.

The infusion of FDI into a nation's economy positively impacts GDP by augmenting real-sector production. An increase in OER positively influences export levels, contributing to GDP growth, as domestic products are more competitively priced in international markets.

Based on the results of the investigation, the following recommendations can be suggested: This study reveals that the influence of Official Exchange Rate (OER) on Gross Domestic Product (GDP) is comparatively less pronounced than its impact on Foreign Direct Investment (FDI). In light of this, it is ad-

visible to consider policies that enhance the accessibility of FDI within the Turkish economic landscape. However, it is suggested that further research is needed in the future, focusing on the issue of increasing the inflow of foreign direct investment into the country.

AUTHOR CONTRIBUTIONS

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