The Impact of Foreign Direct Investments on Unemployment in Turkey: ARDL Bound Test Analysis

Türkiye'de Doğrudan Yabancı Yatırımların İşsizlik Üzerindeki Etkisi: ARDL Sınır Testi Analizi

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Abstract

Foreign direct investment made by multinational companies is of great importance in improving the macroeconomic dynamics of countries. Foreign direct investment is a favourite financing tool in developing economies as it increases competition and efficiency in economies and accelerates economic development. Foreign direct investment increases countries' capital and savings levels and contributes to the countries' employment thanks to the knowledge, skills and technological innovations they bring about. Thanks to these investments, the national income level rises as the quality of labor improves and the amount of labor employed in productive areas increases. The aim of this study is to investigate the impact of foreign direct investments on unemployment in Turkey. Within this context, analysis was made using the ARDL bound test with data for the period 1988-2022. The findings show no correlation between foreign direct investment and unemployment in Turkey in the short-term. It has also been detected that the variables are not cointegrated and foreign direct investments in Turkey do not have an impact on unemployment rates in the long-term.

Keywords: *Foreign Direct Investment, Unemployment, ARDL Bound Test.*

Öz

Çok uluslu firmalar tarafından gerçekleştirilen doğrudan yabancı yatırımlar, ülkelerin makroekonomik dinamiklerinin iyileştirilmesinde büyük öneme sahiptir. Doğrudan yabancı yatırımlar, ekonomilerde rekabeti ve verimliliği yükseltmesi ve iktisadi gelişmeyi hızlandırması nedeniyle bilhassa gelişmekte olan ülkeler için gözde bir finansman aracıdır. Doğrudan yabancı yatırımlar ülkelerin tasarruf ve sermaye düzeylerini artırmakta ve beraberinde getirdiği bilgi, beceri ve teknolojik yenilikler sayesinde ülke istihdamına katkıda bulunmaktadır. Söz konusu yatırımlar sayesinde emeğin niteliği iyileştirildikçe ve üretken alanlarda istihdam edilen emek miktarı arttırıldıkça milli gelir seviyesi de yükselmektedir. Bu çalışma, Türkiye'de doğrudan yabancı yatırımların işsizlik üzerindeki etkisini araştırmayı amaçlamaktadır. Bu kapsamda 1988-2022 dönemine ait veriler ile ARDL sınır testi kullanılarak analizler yapılmıştır. Bulgular, Türkiye'de kısa dönemde değişkenler arasında bir korelasyon olmadığını göstermektedir. Ayrıca değişkenlerin eşbütünleşik olmadığı ve Türkiye'ye yapılan doğrudan yabancı yatırımların uzun dönemde işsizlik oranlarını etkilemediği belirlenmiştir.

Anahtar Kelimeler: *Doğrudan Yabancı Yatırım, İşsizlik, ARDL Sınır Testi.*

JEL Codes: *E00, E24, F21.*

Araştırma Makalesi [Research Paper]

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Introduction

Foreign direct investment (FDI) is one of the leading indicators of macroeconomic performance. Particular importance is attributed to FDI in solving the problem of unemployment arising from the inadequacy of saving and capital in economies. FDI plays a significant role in increasing investments and achieving sustainable growth in an economy. Hence, these investments are of great importance in increasing the social and economic welfare level of countries.

FDI is a long-term investment that provides great advantages to many countries, especially developing ones, in terms of cash capital support, production of new technologies, development of modern management techniques, machinery, know-how, training and marketing (Uğur & Çetin, 2022). Countries aim to increase output, efficiency, export and national income level through these advantages and strive to create new employment areas.

Neo-liberal policies, economic liberalization activities and intensifying foreign trade flows that dominated the world in the 1980s deeply affected the investment climate. During this period, FDI increased significantly on a global scale in particular (Yalman & Koşaroğlu, 2017). Since the 1980s, when financial liberalization accelerated, developing countries have tried to attract the capital they need to their markets by offering more reasonable interest rates or different incentive facilities compared to their competitors. Today, FDI is still considered a highly attractive financing and development tool in developing countries due to its features that increase export, growth and improve the quality of labor (Canbay & Kırca, 2020).

It can be argued that today᾽s unemployment is mostly due to globalization. For instance, the shifting of production and capital to other countries has brought about the problem of high structural unemployment, which has contributed to a significant increase in unemployment in the US economy (Grahovac & Softić, 2017). It is obvious that the problem of unemployment triggered by capital shortage is a global issue for all categories of countries. Indeed, this situation was clearly revealed in the 2008 global crisis. With it, developed countries᾽ attempts to reduce the amount of investment they made in other countries and withdraw their capital have had negative effects on the macroeconomic indicators of both these countries and developing countries such as GDP, inflation and unemployment (Canbay & Kırca, 2020).

Macroeconomic recovery and increase in welfare in a country become possible by increasing the national income level, expanding the employment volume and opportunities and investing in the labor factor in that country. FDI is very important in overcoming recessions in countries, increasing savings and capital accumulation, accelerating and sustaining growth. So, FDI has a great potential in closing the resource gap of developing countries like Turkey. The fact that Turkey has been a country that has been experiencing capital shortage and low investment problems for many years and has internal and external financing difficulties increases the interest and demand for FDI in economic development day by day.

FDI flows into the country bring dynamism to the labor market through the use of advanced technologies in the production process and technical knowledge gains. The existence of various markets and large market networks, the relatively cheap input of labor and low production costs in Turkey increase the importance and attraction of FDI in sectors that assure economic development. When all the production factors are put into production and they are used effectively with these investments, the level of output and employment will increase.

Here, the impact of FDI inflows to Turkey on unemployment is investigated. For this purpose, firstly, theoretical information about the FDI-unemployment relationship is given. Second, foreign and domestic literature investigating the relationships between variables is included. Third, the methodology of the study is introduced and the linkage between FDI and unemployment in Turkey is investigated with the ARDL bound test. Finally, the indications of the analysis are evaluated and policy suggestions are made.

1. Theoretical Framework of the Relationship Between FDI and Unemployment

FDI benefits national economies in various ways. In addition to capital inflows, FDI brings new technologies to economies, improves management techniques in countries, increases the amount of high-quality goods produced at low costs, ensures efficiency and competition in domestic production, facilitates trade in goods, services and information, positively affects export performance, creates tax revenue, accelerates economic growth and therefore contributes positively to employment. The emergence of these positive effects of FDI is possible by increasing the rate of capacity utilization in the country (Peker & Göçer, 2010).

The accumulation of capital is essential for a country᾽s economic development. As a matter of fact, one of the main reasons why many countries fall behind economically is that they do not have sufficient capital. Countries with low per capita income need high amounts of capital to transform their economic structures and reach the level of developed countries (Kar & Tatlısöz, 2008). Having sufficient capital accumulation is a prerequisite for the start of the production

process and the transfer of labor force to this process. In this respect, capital accumulation is of great importance, especially for underdeveloped and developing economies. FDI creates significant positive externalities in the labor markets of underdeveloped and developing countries as it creates employment and leads to a rise in the labor quality (Bülbül & Emirmahmutoğlu, 2010).

The most significant factor of production in an economy is the presence of a workforce with the knowledge and skills required for the job. The increase in the amount of labor employed in productive areas increases the country's output and income level. In addition to the increase in employment, if the quality of labor is increased by investing in human capital, business conditions will improve, wages will increase, and value added per worker will also increase. Besides, policies aimed at creating new employment areas and improving existing jobs play an essential role in ensuring fair income distribution and determining minimum welfare standards in the country (UNCTAD, 1999).

Capital accumulation, quantity of investment and output level in a country play a key role in the economic development and growth of that country. The insufficient capital accumulation of low-income countries causes the investments and output of these nations to remain at low levels. Therefore, economic growth and development do not occur immediately in these countries. Domestic and / or foreign market dynamics are used to solve the problem of capital shortfall (Sandalcılar, 2012). The inadequacy of domestic savings in developing countries to finance rapid economic development causes these countries to turn to FDI. Governments are of the opinion that foreign direct capital flows are a means of economic development in the long-term and therefore positively affect macroeconomic variables such as national income, investments, export, exchange rates, balance of payments, inflation, sustainable growth, interest rate and tax revenues in a country (Akbulut, 2009).

The effects of FDI on employment vary depending on the way these investments are made. FDI which takes the form of purchasing an existing firm or becoming a shareholder in its capital does not increase employment much, but FDI in the form of establishing a new factory, purchasing manufacturing technology, etc. increases employment much more (Göçer et al., 2013). Fixed capital investments made in an economy, on the one hand, affect the aggregate demand and, on the other hand, encourage investments, thus causing economic growth and an increase in employment. Promotion of investments increases income and savings, encourages the entry of additional investments and therefore new FDI into the country, and directly affects employment by increasing national income. Increasing investments in a sector will also stimulate investments in the sub-sectors of that sector. The connection of the current (investee) sector with other sectors will reveal positive external economies, which will affect the production process and increase the amount of commodities and services produced. With the increase in output, labor demand and ultimately employment level will increase (Saray, 2011).

FDI also has risks of reducing employment in various aspects due to their effects on the economy. It is known that especially multinational companies' production activities by utilizing capital-intensive technologies and skilled labor have a reducing effect on employment. In addition, the fact that multinational companies with extremely high competitive power in areas such as technology, management, infrastructure and specialization operate in domestic markets will cause local firms with weak competitive power and therefore cannot withstand competition to be pushed out of the market over time and discourage entrepreneurs from investing. In developing countries where unemployment rates are high, this circumstance will simultaneously stimulate current wages to decline. So, on the one hand, unemployment will increase, and on the other hand, there will be a decrease in the level of welfare (Zhao, 1998; Sandalcılar, 2012).

According to Vergil & Ayaş (2009), when investors in developed countries aiming to reduce labor costs shift the labor-intensive processes of their production to developing countries where labor costs are low, employment and output in these countries will increase. While investments that come to make benefit or gain from broad markets can make a limited contribution to employment, investments made in scarce resources cannot contribute to employment through the use of capital-intensive techniques. Labor-intensive production techniques provide more employment opportunities than capital-intensive production techniques. While these effects occur more in the manufacturing industry, they are limited in the mining and agricultural sectors.

2. Literature Review

There are several studies in the literature on the impacts of FDI on unemployment. Among these, there are studies that find out that FDI affects unemployment positively or negatively, and there are also studies that provide evidence that there is no correlation between the two said variables. The literature review on the subject is presented within the framework of studies conducted in Turkey and other world countries.

Firstly, international studies will be mentioned to determine the correlation between FDI and unemployment. In this context, the first foreign study we will discuss belongs to Blomström et al. (1997). Blomström et al. (1997), in their studies

using the least squares method with 1970-1994 data for the US and Swedish economies, found that FDI whose home country is the USA increases employment in the countries it goes to, while Swedish-origin FDI generally gravitates towards developed countries and increases the amount of skilled labor in those countries. Brady & Wallace (2000) analyzed the relationship between FDI, employment and labor income in the USA with data covering the period 1978-1996. According to the analysis conducted with the panel regression method, it was determined that FDI negatively affects employment and wages. Mariotti et al. (2003) could not find any statistical link between FDI and employment in their studies conducted within the scope of data from Italy for the period 1985-1995. Jayaraman & Singh (2007) examined the long-term connection between FDI and growth and employment in Fiji using cointegration and Granger causality tests for the years 1970-2003. Within the study, indications were obtained that growth with FDI positively affects employment. Additionally, it was detected that there is a one-way causality from FDI to employment in the long-term. Karlsson et al. (2009) investigated the effects of FDI on employment in the Chinese manufacturing sector for the period 1998-2004 using the time series method. The results showed that foreign capital investments increase domestic private sector employment. Rizvi & Nishat (2009) found that FDI does not have an effect on employment in their studies using panel data method for the period 1985-2008 on the economies of Pakistan, India and China. Pinn et al. (2011) investigated the relationship between FDI and employment in Malaysia using ARDL and error correction model through data for the period 1970-2007. Research results have shown that FDI and employment are not connected to each other in the long-term, and that there is a causality from FDI to employment in the short-term. Shaari et al. (2012) analyzed the impact of FDI on unemployment and GDP for the Malaysian economy using the least squares method by annual data from 1980-2010. In the analysis, it was determined that FDI increases the GDP and reduces the unemployment rate. In the study conducted by Mucuk & Demirsel (2013) using panel data method for 7 developing countries including Colombia, Chile, Argentina, Philippines, Uruguay, Turkey and Thailand, with periodic data between 1981 and 2009, it was stated that FDI decreases unemployment in Thailand while it increases unemployment in Turkey and Argentina. No strong correlation has been found between FDI and unemployment in other nations. Strat et al. (2015) analyzed the FDI-unemployment relationship for 13 EU countries using the Granger causality method with data for the period 1991-2012. The indications obtained from the analysis results indicate that there is no causality relationship between FDI and unemployment for six countries while there is causality in the remaining countries. Grahovac & Softić (2017) made a comparative analysis of unemployment rates and FDI flows in the Western Balkan countries. In the study conducted through data for the period 2000-2014, it was determined that FDI does not have positive effects on employment. Çil (2022) investigated the link between FDI and unemployment in transition economies with the Dumitrescu-Hurlin panel causality test for the period 1995-2019. Panel symmetric causality test results reveal that there is a one-way causality relationship from unemployment to FDI while panel asymmetric causality test results reveal the existence of a two-way causality relationship for positive and negative components between unemployment and FDI. Hasbi & Evlimoğlu (2023) tried to determine the effects of FDI on GDP and unemployment in developed and developing countries with the panel data analysis based on annual data from 1993-2018. The analysis results reveal that FDI increases the growth rates and reduces unemployment rates in all countries. Akhisar & Güvel (2024) examined the impacts of FDI on male and female unemployment rates based on European countries. The indications of the panel data analysis conducted for the period 2002-2021 reveal that FDI further reduces the unemployment rate in developing countries. Besides, it has been determined that these investments reduce unemployment for both genders to a greater extent in developing countries, but do not have any impact on the male unemployment rate in developed ones.

Looking at the studies conducted for Turkey, Karagöz (2007) analyzed the employment-FDI relationship in the 1970-2005 period using Johansen cointegration and Granger causality tests. Research results showed that there is a long-term association between FDI and employment, but there is no association in the short-term. Aktar et al. (2009) examined the correlation between FDI, export, growth and unemployment for the period 2000-2007 using the VAR model. The analysis results proved that FDI does not have an employment-increasing effect. Vergil & Ayaş (2009) analyzed the impact of FDI on employment on the basis of four sectors with data from the period 1992-2006 using a panel data test. Test results revealed that FDI negatively impacts employment in the investigated sectors. It has been stated that the sector where this effect is seen the most is the manufacturing industry. Bülbül & Emirmahmutoğlu (2010) tested the impact of FDI on employment in the Turkish banking sector with a panel data model for the period 2001-2009. The result of the study is that such investments positively affect employment, but this effect is not sustainable. Ekinci (2011) analyzed the nexus between employment and FDI by the Johansen cointegration analysis and data for the period 1980-2010. The research results revealed that there is no statistically significant association between FDI and employment in the long-term. Sandalcılar (2012) examined the effect of FDI on employment with time series in his study containing data for the period 1980-2011. According to the results, no statistically significant causal link was detected between employment and FDI inflows. Canbay & Kırca (2020) examined the effects of FDI on unemployment with data from the period 1991-2016 using the ARDL bound test and the Granger causality test based on the error correction model. The indications of the analysis revealed that there is no statistically significant linkage between FDI and unemployment in the short-term while the increase in FDI increases unemployment in the long-term. Besides, the

indications of causality analysis based on the error correction model show that FDI is the cause of unemployment in the long-term. Karimov et al. (2020), in their analysis for the period 1980-2017 through the Granger causality test, claimed that FDI makes a significant contribution to reducing unemployment rate. Kılınç Savrul & Hazar (2020) analyzed the impact of FDI on women employment using the time series method for the period 2006-2018. The indications of the Granger causality analysis applied in the study reveal that FDI inflows positively affect women employment in the long-term. Süt & Yüksel (2022) studied the effect of FDI on unemployment with annual data for the period 1988-2020. ARDL bound test results in the study reveal that the impact of FDI on the unemployment rate is positive in the long-term. In addition, in the Granger causality analysis, it was observed that there is a one-way causality association from unemployment to FDI. Yöyen (2023) investigated the impact of FDI on unemployment in Turkey with the Toda-Yamamoto causality test for the period 1990-2022. Analysis indications show that there is a two-way causality between FDI and unemployment rates.

In the existing literature, the results of studies examining the relationship between FDI and unemployment are not consistent with each other. In addition to studies arguing that FDI reduces the unemployment rate, there are also studies showing that these investments increase unemployment. However, studies suggesting that there is no any connection between the aforementioned variables also stand out. It can be argued that this difference seen in the results of the studies is related to the different development levels and production capacities of the countries investigated, the types and amounts of capital investments made, the way they arrive in the country and the sectors they flow. The fact that FDI creates an increase in the amount of capital in the countries where it flows, particularly the stimulating effect of these investments on effective demand and its role for enhancing productive capacity and thus employment in developing countries, makes it important to examine the short and long-term effects of relevant investments for the Turkish economy. In this regard, the cyclic effects of FDI on unemployment in Turkey were investigated by ARDL model.

3. Methodology

Time series are analyzes with stationarity condition. If time series are non-stationary, there is a risk that the identified relationships are spurious (Sevüktekin & Çınar, 2017). In spurious regression, the results of the estimated models are generally good. However, the estimated parameters are generally insignificant despite the high R^2 value and the parameters are statistically significant. This is not because the variables are connected to one another, but because the non-stable variables move in that vein accidentally. Spurious regression can occur between two non-stationary variables that are completely unrelated to each other, or it can occur in interrelated financial and macroeconomic series (Sevüktekin & Çınar, 2017).

In the study, the stationarity processes of the series were tested using Augmented Dickey-Fuller (ADF) unit root test and Phillips-Perron (PP) unit root tests (Dickey & Fuller, 1979; Phillips & Perron, 1988). Due to the structural breaks seen in the time course graphs of the variables, ADF unit root tests with structural breaks were also applied during the investigation of unit root processes, and the stationarity condition of the variables was decided by comparing the indications of ADF, PP and ADF unit root tests with structural breaks.

A common practice in traditional econometrics for variables that are not stationary at level but become stationary at the first cyclical difference is to use the variables by taking their first-order differences. However, Granger & Newbold (1977) argued that it is not suitable to take non-stationary variables in this manner on the grounds that it annihilates information about the long-term connection.

In modern econometrics, the recommended method to investigate the relationships between non-stationary variables is cointegration test. According to the cointegration analysis, if two or more series are correlated to one another in a way that creates a long-term balance equation; series move closely with one another over time even if they contain a scholastic trend (are not stationary) and the difference between them is stable. In this regard, the term cointegration indicates the convergence of the economic order in time and the existence of a long-term balance association (Harris & Sollis, 2003).

In the context of the research, the relationships between the variables that are found to be non-stationary are examined with the ARDL cointegration analysis.

In the ARDL bound test, the existence of a long-term relationship between variables is first investigated. After determining that the series are cointegrated, short-term and long-term coefficients are calculated. The estimated equation for testing the long-term relationship for a bivariate research model in the bound test approach is given below (Pesaran et al., 2001).

$$\Delta Y_t = \beta_0 + \beta_1 Y_{t-1} + \beta_2 X_{t-1} + \sum_{i=1}^{p} \delta_i \Delta Y_{t-1} + \sum_{i=0}^{q} \lambda_i \Delta X_{t-i} + \mu_t \qquad (1)$$

In the equality; the optimal number of lags is p for the dependent variable and q for the independent variable, the coefficients are λ_i, δ_i, β_0, β_1, β_2 and the variable's difference is denoted by Δ.

The null hypothesis and alternative hypothesis regarding the cointegration link for the variables is as written below:

$$H_0: \beta_1 = \beta_2 = 0 \tag{2}$$
$$H_0: \beta_1 \neq \beta_2 \neq 0$$
$$\tag{3}$$

If the computed test statistic is less than the determined lower critical bound, the null hypothesis stating that there is no cointegration relationship cannot be rejected. If it is higher than the determined upper critical bound, the null hypothesis stating that there is no cointegration relationship is rejected and it is interpreted that there is cointegration. If it is between the lower and upper bound values, no comment can be made about cointegration.

After determining that the series are cointegrated, the ARDL (p, q) model is forecasted. It is included in the equation below:

$$Y_t = \beta_0 + \sum_{i=1}^{p} \delta_i Y_{t-i} + \sum_{i=1}^{p} \lambda_i X_{t-i} + \mu_t \tag{4}$$

In this model, the equation showing the estimation of long-term coefficients for the independent variable is as follows:

$$\theta_i = \frac{\lambda_0 + \lambda_p + \cdots \lambda_p}{1 - \delta_1 + \delta_2 + \cdots \delta_q} \tag{5}$$

After long-term coefficients are estimated, an error correction model is constituted to create short-term coefficients.

$$\Delta Y_t = \beta_0 + \beta_1 EC_{t-1} + \sum_{i=1}^{p} \delta_i \Delta Y_{t-i} + \sum_{i=1}^{q} \lambda_i \Delta X_{t-i} + \mu_t \tag{6}$$

The EC expression in the equation is the error correction term. When it is significant and lies between 0 and -1, the existence of a causal linkage from the independent variables to the dependent variable is tested.

3.1. Research Models

In line with the study objectives, the research model established to determine the association between unemployment rate and FDI is given in equation 7.

$$LNUNEMP_t = \alpha + \beta LNFDI_t + \varepsilon_t \tag{7}$$

The sub-symbol t in the equation refers to the time dimension of the time series and includes 35 annual observations between 1988 and 2022. While α shows the equation's constant terms, ε shows the equation's error terms presumed to be in the pure random walk process (ε~N(μ,σ)). The LN expressions in front of the variables show that the variables are used with their natural logarithms[2].

3.2. Data and Findings

The variables analyzed in the study are defined in Table 1.

Table 1. Variable Definitions

Symbol	Explanation	Source
UNEMP	Unemployment Rate	World Bank
FDI	Foreign Direct Investment Stock Inflow	World Bank

Observations for both variables in Table 1 were obtained from the World Bank Database on an annual basis for the period 1988-2022, and a time series containing T=35 observations was created. Unemployment rate is expressed as a percentage of the total labor force, and FDI stock inflows are stated in current US dollars. The main hypothesis of the study is that FDI inflows reduce unemployment.

Descriptive statistics for the variables used in the research are shown in Table 2.

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[2] Since variables of different sizes are included in the same model, estimation parameters are calculated with very large or very small coefficients. Therefore, the differences between the periods can be expressed as percentage (%) differences, and the calculated parameters can be expressed as percentage (%) changes (Wooldridge, 2013).

Table 2. Variable Descriptive Statistics

Statistics	LNUNEMP	LNFDI
Mean	2.212	22.013
Median	2.175	22.764
Maximum	2.615	23.816
Minimum	1.834	19.685
Standard Deviation	0.205	1.409
Skewness (S)	-0.059	-0.163
Kurtosis (K)	2.352	1.290
Jarque-Bera	$\chi^2(02)=0.632$ [0.729]	$\chi^2(02)=4.419$ [0.110]
Number of observations	35	35

*** (1%), ** (5%), * (10%) represents significance at the significance level, χ^2: Chi-Squared test statistics, (includes test degrees of freedom in parentheses.) [includes test significance values in square bracket.

The LNUNEMP variable is normally distributed between 1.834 and 2.615 with a standard deviation value of 0.205 around the mean of 2.212. ($\chi^2(02)=0.632$, p>0.01) The LNFDI variable is normally distributed between 19.685 and 23.816 with a standard deviation value of 1.409 around the mean of 22.013. ($\chi^2(02)=4.419$, p>0.01) Histogram and Box-Plot Graphs of the variables are presented in the appendices (Appendix 1-2).

The course of the variables over time is as shown in Graph 1.
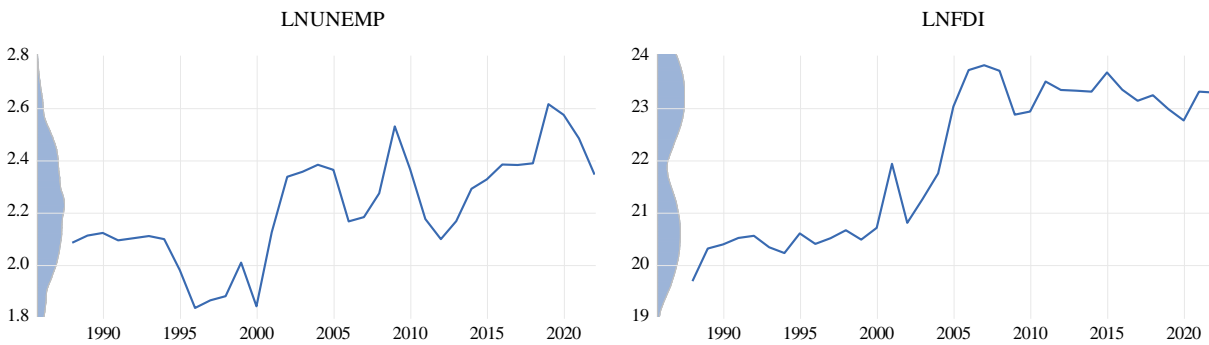
Graph 1. Variable Time Course Graphs

When Graph 1 is examined, it can be stated that the LNUNEMP variable appears to be in an upward trend and has many structural breaking points both on the average and in the trend. Similarly, the LNFDI variable appears as a series with upward trend and structural break characteristics. In order to see the trend structures of the variables more clearly, Hodrick-Prescott trend filter graphs are shared in the appendix (Appendix 3).

The indications of the ADF and PP unit root tests applied to detect the stationarity of the variables are presented in Table 3.

Table 3. ADF and PP Unit Root Test Indications

Variable	ADF		PP	
	Intercept	Intercept and Trend	Intercept	Intercept and Trend
LNUNEMP	-1.785[(0)] [0.397]	-3.329[(1)]* [0.079]	-1.738[{5}] [0.404]	-2.311[{7}] [0.417]
Δ LNUNEMP	-4.836[(0)]*** [0.000]	-4.748[(0)]*** [0.003]	-5.806[{22}]*** [0.000]	-5.586[{22}]*** [0.000]
LNFDI	-1.501[(0)] [0.521]	-1.909[(0)] [0.628]	-1.477[{3}] [0.533]	-1.909[{0}] [0.628]
Δ LNFDI	-6.026[(0)]*** [0.000]	-5.951[(0)]*** [0.000]	-6.121[{4}]*** [0.000]	-6.092[{5}]*** [0.000]

***(1%), **(5%), *(10%) indicates significance at the significance level. H_0 for unit root tests: Series contains unit root (The series is not stationary.) Δ : Refers to the variable᾿s first cyclic difference, [Values in square bracket comprise test significance value], (The values in parentheses include the optimal lag values and were determined in accordance with the Schwarz Information Criterion among the lags to a maximum of 4 lags. {The values in curly braces contain the optimal bandwidth for the PP test and were determined in accordance with the Newey-West Criterion.}

When the Table 3 is examined, it can be stated that both LNUNEMP and LNFDI variables are series that are not stable at the level, but become stable at the first periodic difference in accordance with the unit root tests calculated for ADF and PP test with intercept and intercept and trend models. The indications obtained from the application of the ADF unit root test with structural breaks are as shown in Table 4.

Table 4. ADF Unit Root Test Indications with Structural Breaks

Variable	ADF Unit Root Test with Structural Breaks			
	Specification			
	Intercept	Break Specification		
		Trend ve Intercept		
		Intercept	Trend	Intercept and Trend
LNUNEMP	-5.043(1)***	-4.878(1)**	-3.623(1)	-5.438(1)**
	[0.000]	[0.048]	[0.339]	[0.025]
ΔLNUNEMP	-5.193(0)***	-5.185(0)**	-5.068(0)***	-5.439(1)**
	[0.000]	[0.019]	[0.000]	[0.025]
LNFDI	-5.407(0)***	-5.108(0)**	-2.747(0)	-6.416(0)***
	[0.000]	[0.024]	[0.825]	[0.000]
ΔLNFDI	-6.944(0)***	-6.829(0)***	-6.198(0)***	-6.754(0)***
	[0.000]	[0.000]	[0.000]	[0.000]

***(1%), **(5%), *(10%) indicates significance at the significance level. H_0 for unit root tests: Series contains unit root (The series is not stationary.) Δ : Refers to the variable᾿s first cyclic difference, [Values in Square Bracket comprise the test significance value], (The values in parentheses include the optimal lag values and were determined in accordance with the Schwarz Information Criterion among the lags to a maximum of 4 lags. Break periods are determined internally by the Dickey-Fuller Min-t statistic.

Looking at Table 4, it is seen that the variables are not stationary at the level, but become stationary at the first cyclical difference in accordance with the structural break unit root tests performed for both LNUNEMP and LNFDI variables. These findings are parallel to the ADF and PP unit root test findings. Under these conditions, it can be stated that both variables in the research model are variables that are not stationary at level but become stationary at the first periodic difference. (LNUNEMP, LNFDI~I(1))

The scatter plot and correlation coefficient between the variables are as in Graph 2.
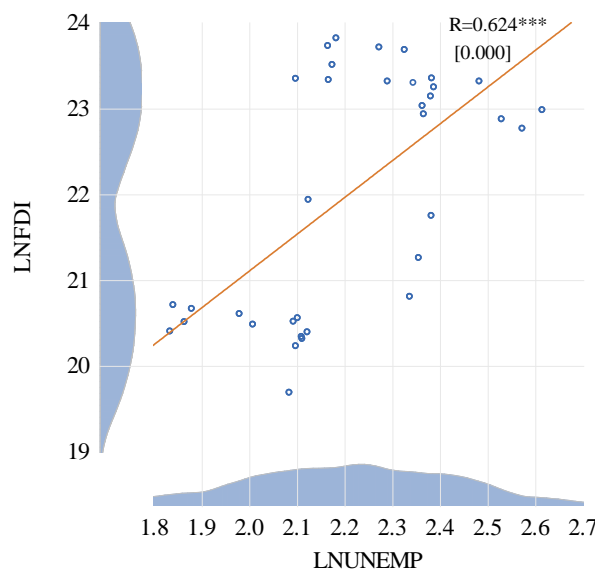
Graph 2. Scatter Plot Between Variables

*** (1%), ** (5%), * (10%) represents significance at the significance level.

When Graph 2 is investigated, it can be stated that LNFDI and LNUNEMP variables move in a positive correlation relationship. Both the location of the data pairs in the scatter plot on the linear regression line and the correlation coefficient between the two variables indicating a statistically significant and positive above-moderate correlation at the 1% significance level show that the variables are positively related (R=0.624, p<0.01).

Since neither of the variables are stationary, the relationships between them need to be investigated with cointegration analysis. Since the number of observations was low and the small sample characteristics were known to be good, it was chosen to investigate the aforesaid relationship by ARDL bound test approach. In order to select the appropriate lags for the ARDL model, the values containing Akaike Information Criterion comparisons for dependent and independent variable lags up to a maximum of 2 are as shown in Graph 3.
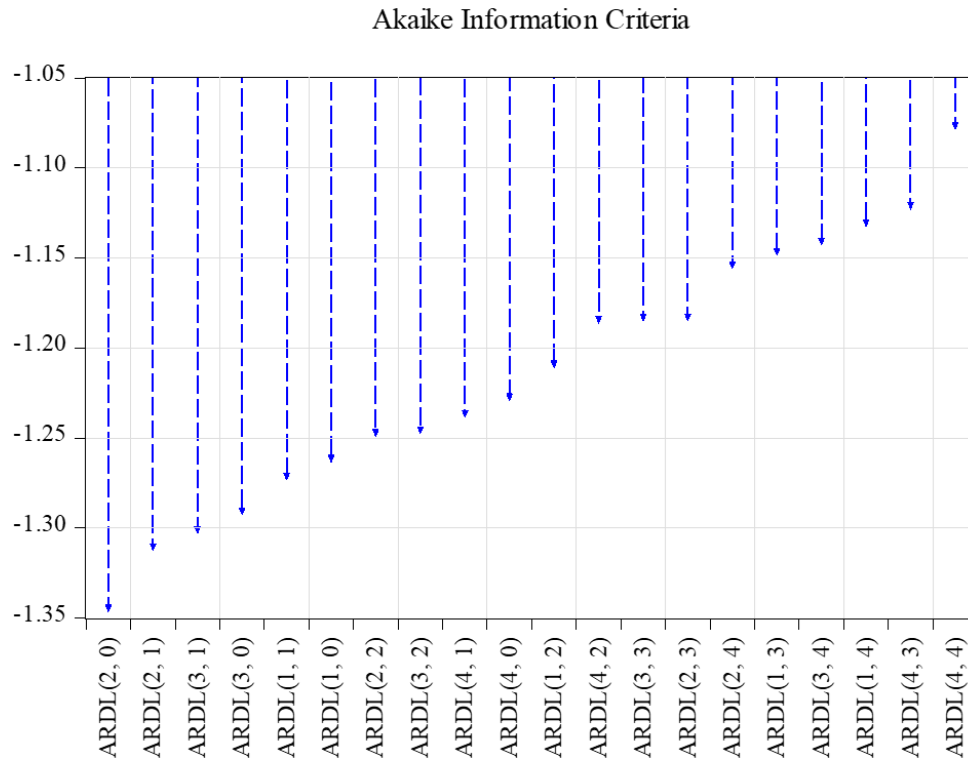
Graph 1. AIC Comparisons for Optimal Lags

Looking at Graph 3, it is seen that the smallest AIC value is calculated for the ARDL (2,0) model. In other words, in this model, the dependent variable is included with lag 2 and the independent variable is included with its level value. The indications of the ARDL (2,0) model are as in Table 5.

Table 5. ARDL (2, 0) Model Estimation Indications

	Panel A: Cointegration Test Findings H_0: There is no cointegration			
	Significance	**I(0)**	**I(0)**	
F=5.591	%1	10.605	11.650	
k=1	%5	7.360	8.265	
	%10	6.010	6.780	
	Panel B: Long-Term Statistics			
Variable	**β**	**S.H.**	**t**	**p**
LNFDI	0.036	0.059	0.604	[0.551]
	Panel C: Error Correction Model and Short-Term Statistics			
Variable	**β**	**S.H.**	**t**	**p**
ECM$_{t-1}$	-0.508	0.149	-3.403***	[0.002]
LNUNEMP$_{t-1}$	-0.508	0.152	-3.336***	[0.002]

LNFDI$_t$	0.018	0.031	0.587	[0.562]
ΔLNUNEMP$_{t-1}$	0.398	0.194	2.055*	[0.049]
Panel D: Diagnostic Statistics				
LM Autocorrelation Test	$\chi^2(02)=1.332$		[0.514]	
White Heteroscedasticity Test	$\chi^2(14)=12.522$		[0.565]	
Ramsey Reset	$F(1, 28)=0.235$		[0.631]	
Error Terms	$\varepsilon \sim N(0,\sigma^2)$			

*** (1%), ** (5%), * (10%) represents significance at the level of significance. [The square brackets include the test significance values.] Δ : Refers to the variable´s first cyclic difference, χ^2: Chi-Squared test statistics, F: F-test statistics (The parentheses include the test degrees of freedom.)

When the diagnostic statistics are investigated in Table 5, it is seen that there is no autocorrelation ($\chi^2(02)=1.332$, p>0.10) and heteroscedasticity ($\chi^2(14)=12.522$, p>0.10) problem in the model, no error was detected in the functional form of the model (F(1, 28)=0.235, p>0.10), and the error terms are normally distributed with a mean of 0. ($\varepsilon \sim N(0,\sigma^2)$) Error terms autocorrelation graph and normal distribution statistics are presented in the appendices (Appendix 4-5).

When the F bound test statistic and critical values for the model are compared, it is seen that no statistically significant cointegration relationship is detected in the model at 1%, 5% and 10% significance levels. (F=5.591<6.010) In other words, a long-term equilibrium association for variables has not been determined. When the long-term coefficient estimated in the model is examined, it is seen that the LNFDI does not have a statistically significant impact on the LNUNEMP variable at 1%, 5% and 10% significance levels. (β=0.036, p>0.10) Both findings reveal that no statistically significant relationship could be detected between the variables during the period covered in the study. The short-term coefficient estimated in the model is also statistically insignificant. (β=0.018, p>0.10) Although the error correction mechanism is functional in the model, the error correction mechanism has no economic significance if the variables are not cointegrated. (ECM$_{t-1}$=-0.508, p<0.01)

Cusum and Cusum Square test findings are presented in Graph 4 in order to investigate the stability conditions of the coefficients estimated in the model.
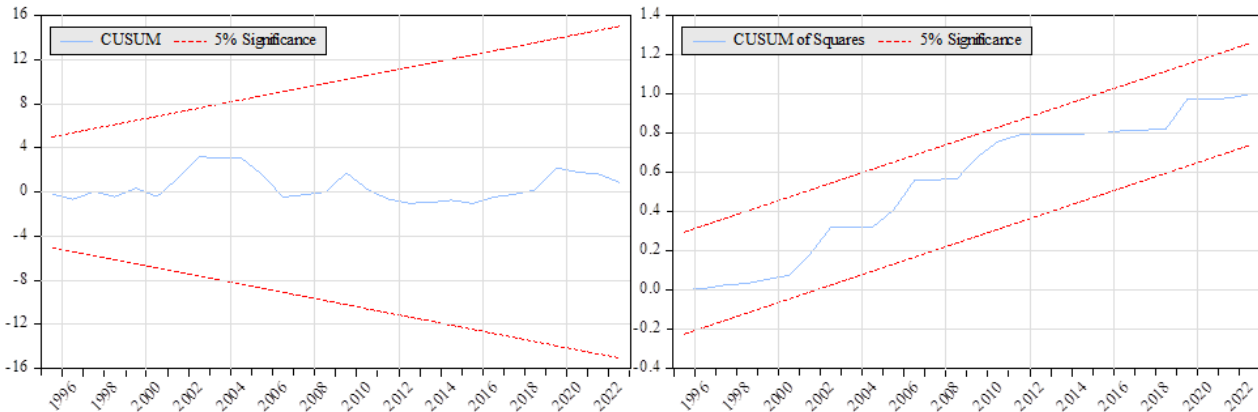
Graph 2. Cusum and Cusum Square Test Indications

When the graphs are examined, it is seen that both test statistics are within the 5% significance band through all years. Here, it is seen that stability conditions are met at the level of 5% significance in accordance with the tests specified in the graph 4 above.

Conclusion

FDI by multinational companies plays a significant role in improving the macroeconomic dynamics of developing countries in particular. FDI which takes the form of providing additional capital from foreign countries, producing new technologies and developing modern management techniques contributes to production, export, employment and economic growth in the host country and increases economic efficiency. These investments are effective in overcoming recessions by increasing capital accumulation and savings. It can be stated that FDI is a very useful financing and development policy tool for the labor markets of less developed and developing countries because it has the potential to create employment and has features that improve the quality of the labor factor.

There are some limitations in this study. In the study on the effect of FDI on unemployment, economic and socio-political determinants of FDI such as market size, economic stability, labor cost, openness of the country, political risk and life

quality and the types of FDI are neglected. Besides, the structural problems in the Turkish economy and their effects on unemployment have not been taken into account and the effects of FDI on unemployment on a sectoral basis have not been considered accordingly.

In this study, the impact of FDI inflows on unemployment in Turkey was analyzed with the ARDL model through 1988-2022 data. Analysis findings showed that there is no cointegration link between unemployment and FDI. It has been detected that there is no statistically significant association between the unemployment rate and FDI in both the short-term and long-term. In this regard, it should be noted that FDI inflows to Turkey do not have an impact on unemployment rates. These indications are similar to the indications in the studies conducted by Mariotti et al. (2003), Karagöz (2007), Rizvi & Nishat (2009), Ekinci (2011), Sandalcılar (2012), Mucuk & Demirsel (2013), Strat et al. (2015). Besides, Bülbül & Emirmahmutoğlu (2010) stated that FDI decreases unemployment, but this effects is not sustainable.

In line with the findings obtained in this study and other studies mentioned above, it can be stated that a significant reason why FDI cannot create the anticipated positive effect on employment in Turkey is that domestic entrepreneurs cannot withstand the competition of foreign investors because the multinational companies that make these investments have good governance, high specialization, high technological infrastructure and high efficiency. In addition, the fact that FDI in Turkey mostly takes the form of purchasing existing firms and mergers restricts the effect of these investments on employment. The concentration of FDI inflows to Turkey in service sub-sectors (like communication, finance, transportation, building and insurance) with relatively limited employment creation capacity poses an obstacle to the creation of new employment opportunities in the productive sectors of the economy. It can be stated that the commerce sector developing with the globalization process and increasing trade liberalization play a role in this circumstance.

FDI should be attracted to sectors with comparative advantages and to sectors with a high degree of forward and backward linkage. In order to alleviate the unemployment problem in Turkey, emphasis should be given to new investments that create output, technology and high added value. In this regard, FDI should be shifted to productive areas that directly increase employment, such as mining, agriculture and manufacturing sector. In addition to efforts to increase foreign capital inflows for economic development and growth, the quality of the labor force working in domestic firms should be increased, and domestic investors should be supported by giving privileges and incentives in certain sectors in order to increase home production. In this way, the profits of domestic entrepreneurs, the country's welfare level and competitiveness can be increased.

FDI increases foreign trade, economic growth and productivity through the capital, knowledge, skills and technical innovations it brings to developing countries and thus contributes to the sectoral improvement and economic development. Considering this situation, researchers are suggested to focus on the impact of these investments on unemployment on the basis of essential economic sectors in other studies to be conducted for the Turkish economy. Since these investments can increase capacity utilization through the positive externalities they spread in the economy, researches can be conducted on their effects on productive sectors such as agriculture and industry. Besides, the effects of these investments on the labor market can also be considered in terms of their contribution to human capital factor and competitive power.
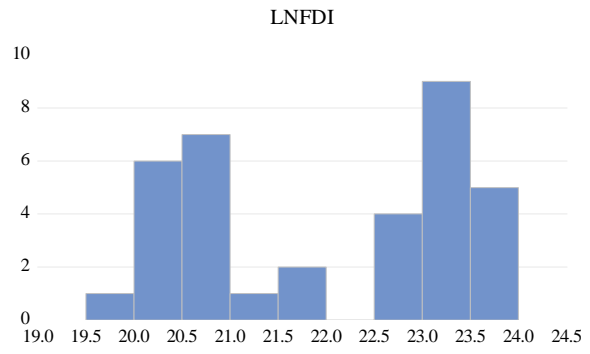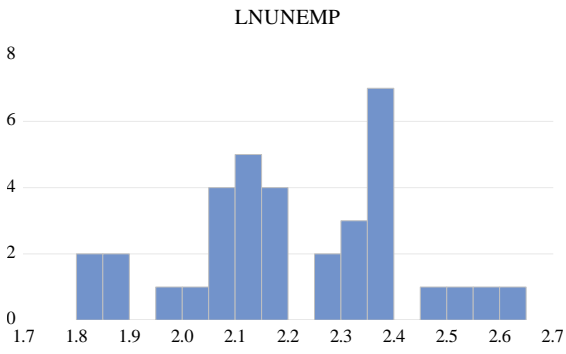
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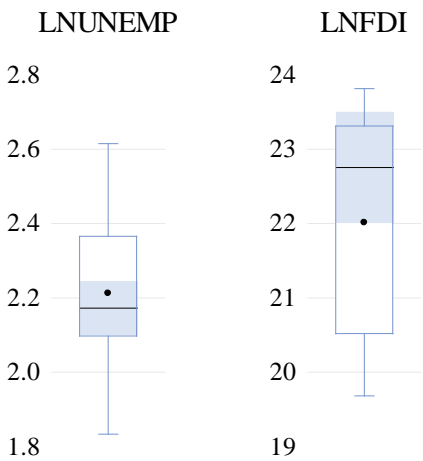
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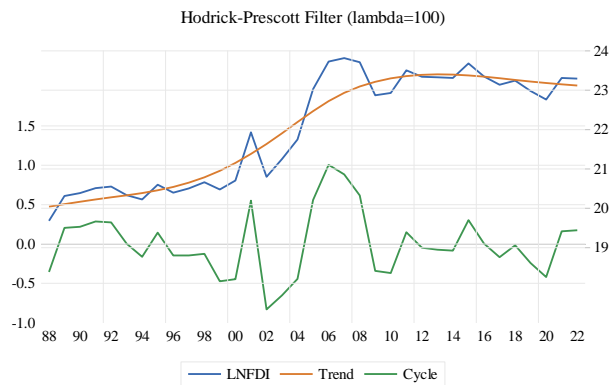Zhao, L. (1998). The impact of foreign direct investment on wages and employment. Oxford Economic Papers, 50(2), 284-301. https://doi.org/10.1093/oxfordjournals.oep.a028646.
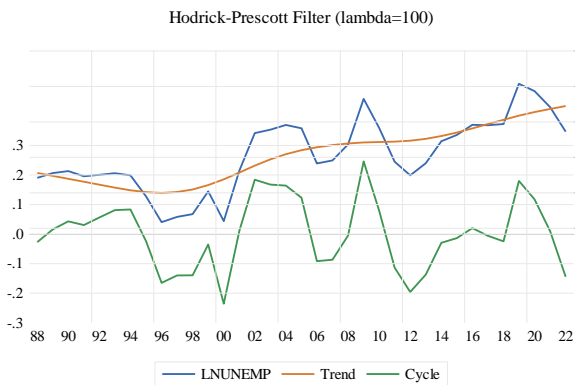
Appendices

Appendix 1. Variable Histogram Graphs

LNUNEMP

LNFDI

Appendix 2. Variable Box-Plot Graphs

LNUNEMP

LNFDI

Appendix 3. Variable Trend Filtered Graphs

Hodrick-Prescott Filter (lambda=100)

Hodrick-Prescott Filter (lambda=100)

Appendix 4. Autocorrelation Graph

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
		1	-0.063	-0.063	0.1418	0.706
		2	0.040	0.036	0.2012	0.904
		3	-0.163	-0.159	1.2274	0.746
		4	-0.042	-0.064	1.2980	0.862
		5	-0.048	-0.045	1.3925	0.925
		6	-0.113	-0.147	1.9372	0.925
		7	-0.111	-0.153	2.4879	0.928
		8	-0.094	-0.141	2.8955	0.941
		9	-0.352	-0.470	8.8429	0.452
		10	0.221	0.046	11.289	0.335
		11	0.067	-0.016	11.525	0.400
		12	0.136	-0.110	12.536	0.404
		13	-0.188	-0.345	14.585	0.334
		14	0.039	-0.191	14.677	0.401
		15	0.217	0.053	17.703	0.279
		16	0.070	-0.105	18.038	0.322

Appendix 5. Error Term Normal Distribution Statistics
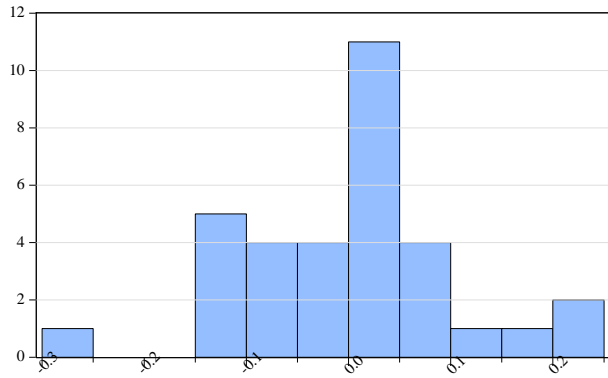
ARDL Model Hata Terimleri	
Örneklem 1990 2022	
Gözlem Sayısı 33	
Ortalama	-1.48e-16
Medyan	0.005904
Maksimum	0.225514
Minimum	-0.266271
Std. Sapma	0.104547
Çarpıklık (S)	0.026030
Basıklık (K)	3.522190
Jarque-Bera	0.378665
P	[0.827511]