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Does Foreign Direct Investment Contribute to Decrease Unemployment in Türkiye? Nonlinear ARDL and Asymmetric Causality Approaches

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Abstract

This study explores the symmetric and asymmetric effects of inward FDI on unemployment by using data from Türkiye from 1988 to 2020. ARDL (Autoregressive Distributed Lag), NARDL (Nonlinear Autoregressive Distributed Lag) and asymmetric causality test are applied to identify impacts of FDI on unemployment. While ARDL findings show no cointegration relationship, the NARDL findings prove the cointegration relationship between the variables. According to NARDL findings, in the long run, while a rise in FDI decreases unemployment, a reduction in FDI increases unemployment. Also, NARDL findings concur with the asymmetric causality test results. Positive shocks in FDI are seen as the cause of negative shocks in unemployment. Moreover, negative shocks in FDI are seen as the cause of positive shocks in unemployment. As a result, the analysis clearly demonstrates that FDI has a crucial impact on unemployment in Türkiye. Considering that Türkiye ranks 29th in the list of countries attracting foreign direct investment, it is understood that rule-based and incentive policies are necessary in order to attract more amount of FDI.

Keywords: Foreign Direct Investment, Unemployment, NARDL, asymmetric causality

Doğrudan Yabancı Sermaye Yatırımları Türkiye'de İşsizliği Düşürmeye Katkı Sağlıyor mu? Doğrusal Olmayan ARDL ve Asimetrik Nedensellik Yaklaşımları

Öz

Bu çalışmada doğrudan yabancı sermaye yatırım girişi ve işsizlik arasındaki ilişkiyi incelemek amaçlanmıştır. Bu doğrultuda, Türkiye'ye ait 1988-2020 dönemini kapsayan yıllık veriler kullanılarak ARDL (gecikmesi dağıtılmış otoregresif model), NARDL (doğrusal olmayan gecikmesi dağıtılmış otoregresif model) ve asimetrik nedensellik testleri uygulanmıştır. ARDL modeli değişkenler arasında eşbütünleşme olmadığı sonucunu verirken, NARDL modelinde değişkenler arasında eşbütünleşme olduğu sonucuna ulaşılmıştır. NARDL modeli bulgularına göre, uzun dönemde doğrudan yabancı sermaye yatırımlarındaki artış işsizliği azaltırken, doğrudan yabancı sermaye yatırımlarındaki azalma işsizliği artırmaktadır. Ayrıca, NARDL bulguları asimetrik nedensellik testi sonuçlarıyla uyumludur. Doğrudan yabancı sermaye yatırımlarındaki negatif şoklar, işsizlikteki negatif şokların nedeni olarak görülmektedir. Ayrıca doğrudan yabancı sermaye yatırımlarındaki negatif şoklar, işsizlikteki pozitif şokların nedeni olarak tespit edilmiştir. Sonuç olarak, analiz, doğrudan yabancı sermaye yatırımlarındaki negatif şoklar, işsizlikteki pozitif şokların nedeni olarak tespit edilmiştir. Sonuç olarak, analiz, doğrudan yabancı sermaye yatırımlarının Türkiye'de işsizlik üzerinde önemli bir etkiye sahip olduğunu açıkça göstermektedir. Doğrudan yabancı yatırım çeken ülkeler sıralamasında Türkiye'nin 29. sırada olduğu göz önünde bulundurulduğunda, daha fazla doğrudan yabancı sermaye yatırımı çekebilmek için kurala dayalı, teşvik edici ve kararlı politikaların gerekli olduğu anlaşılmaktadır.

Anahtar Kelimeler: Doğrudan yabancı sermaye yatırımları, işsizlik, NARDL, asimetrik nedensellik

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Introduction

International capital flows, which began in the late 1800s, have grown to enormous proportions today. In recent years, several transition and developing countries have benefited from substantial inflows of foreign capital. Inside of these flows foreign direct investment (FDI) and portfolio investments have the largest share. FDI is defined by UNCTAD (1999) as an investment that includes a long-term relationship and reflects the long-term interest and control of an entity that resides in one economy over an enterprise that is based in a different economy than the foreign direct investors'. Here the "lasting interest" separates the FDI from portfolio investment since it points out that the FDI is a long-term investment. Compared to other types of investments, FDI might be more appealing as there is typically a direct link between the installation of new plants and machinery and the inflow of financial capital (Hoggarth 6 Sterne, 1997, p. 14) Moreover, when the types of FDI is examined, it will be seen that FDI has mainly two forms: greenfield investments and merger & acquisitions. Greenfield investment is known as the establishment of an entirely new enterprise in a foreign country. On the other hand, mergers and acquisitions necessitate collaboration with an established business in another country (Hill, 2011, p. 232). Inside of these, greenfield investments contribute more to the host countries' growth and employment (see; Wang & Wong, 2009; Harms & Méon, 2011; Lee & Park, 2020).

Moreover, inward FDI has some advantages to the host developing country as increasing production capacity, increase in employment and production, providing new technology and management information, providing foreign currency inflow, increasing export, breaking internal monopolies, creating competition and dynamism, creating scale economy and providing tax income to the treasury. Also, it has some negative effects on the host country, including boosting foreign economic influence, giving foreign firms an unfair competitive edge over domestic ones, monopolizing the local economy, creating a reducing effect on domestic investments, overcoming foreign trade restrictions, creating an increasing effect on foreign exchange expenses, causing currency fluctuations and creating a financial crises environment, restriction of export, technological dependency, and deterioration of economic integrity and increase in unemployment (Seyidoğlu, 2015, p. 667).

The question is how do the positive and negative effects of FDI on unemployment occur? Firstly, FDI increases employment because foreign capital investments lead to an increase in real national production and sets up new facilities which finally brings about the expansion of employment with the new production capacity it provides (Moosa, 2002, p. 77). The use of technologies that require substantial capital by foreign capital companies and the employment of fewer workers may, on the other hand, further increase the unemployment problems of the country. It is necessary to add to this the unemployment caused by local enterprises that withdraw from the market because they cannot compete with foreign enterprises (Seyidoğlu, 2015, p. 670). Moreover, FDI results with some both positive and negative direct or indirect effects on the quantity, quality and location of employment. Table 1 shows the main types of the effects of the FDI on employment:

	D	irect	Indirect		
	Positive	Negative	Positive	Negative	
Quantity	Adds to net capital and creates jobs in expanding industries	Acquisitions may result in rationalization and job losses	Creates jobs through forward and backward linkages and multiplier effects in local economy	Reliance on imports or displacement of existing firms results in job loss	
Quality	Pays higher wages and has higher productivity	Introduces practices in e.g. hiring and promotion that are considered undesirable	Spillover of "best practice" work organization to domestic firms	Erodes wage levels as domestic firms try to compete	
Location	Adds new and perhaps better jobs in areas with high unemployment	Crowds already congested urban areas and worsens regional imbalances	Encourages migration of supplier firms to areas with available labor supply	Displaces local producers, adding to regional unemployment, if foreign affiliates substitute for local production or rely on imports	

Table 1.	The Range	of Potential	'Effects o	of FDI	on the	Ouantity,	Ouality	and I	Location of	f Employment
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Source: UNCTAD, 1994 in Jenkins, 2006: 117.

In addition, depending on the host country's level of development, FDI has various impacts on employment. While the realization route is significant in developed countries, developing countries value the production and management capabilities that FDI brings. In developing countries, the use of labor-intensive production techniques is critical for addressing the problem of unemployment. MNCs, on the other hand, often prefer cutting-edge technology over that of their competitors. Here, the host nation's adaptation of the selected technology is crucial. The degree of employment in the host country is impacted by this adaption as well as the country's ability to advance this technology (Efe, 2002, p. 23). Therefore, FDI's effect on unemployment is a debated topic both in the theoretical and empirical literature (Balcerzak & Zurek, 2011; Bayar, 2014; Irpan et al., 2016; Grahovac & Softic, 2017).

The current study aims to see the FDI's impact on unemployment in the Turkish economy for the period from 1988 to 2020. To test the relationship, both linear and nonlinear autoregressive distributed lag methods (ARDL and NARDL) and asymmetric causality tests are used. The NARDL method was preferred since it allows one to examine how both positive and negative shocks affect the dependent variable and enables revealing the hidden cointegration relationship.

Given the FDI's history in Türkiye, it is seen Türkiye was not an attractive country for foreign investors until the 1980s. With the implementation of liberal economic policies after 1980, it was aimed to encourage foreign investment. After this date, the number of foreign capital companies has dramatically increased. In comparison with the rest of the world, Türkiye's share of FDI in these years shows that in 1980, it only attracted 0.03% of total World FDI. This ratio climbed to 0.33% in 1990 before beginning to decrease in the middle of the decade and tumbling to 0.07% in 1999 and 2000. Further, its proportion in developing nations increased from 0.21% in 1980 to 0.77% in 1995 and 0.68% in 2002. Türkiye was placed 40th in terms of attracting foreign direct investment in the early years of the 1990s, but by 2000 it had dropped to the 50th rank (Sıklar & Kocaman, 2018: 24). In 2003, with the implementation of FDI Law (No. 4875), the more liberal investment climate has been provided and inward FDI and the number of businesses established with foreign capital have both grown. On the other hand, as in the domestically sourced 1994, 2000, and 2001 crises, FDI was significantly affected by the global 2008 crises too. Moreover, the country also took its share from the pandemic as in the whole world. While FDI decreased by 42% in 2020 all over the world compared to 2019, in Türkiye it is also decreased by 19% and realized as \$7.9 billion. Moreover, by 2020, Türkiye is at 29th rank in the world in terms of inward FDI. Given the sectoral distribution of FDI, it is seen that FDI's biggest share was realized in the service sector with 76.2% in 2020. Then manufacturing sector (20.2%), mining (2.3%) energy (0.9%), and agriculture (0.4%) followed it in 2020. In terms of sub-sectors, the finance and insurance sector got the lion's share with 24.1 %, then information and communication technologies (24%), commerce (9.9%), and transportation and storage (9.1%) followed it respectively.

The rest of the study is structured as follows: The coming section presents a short empirical literature review. Section 2 exhibits the used data and the methodology. Section 3 discusses the estimation results and finally, section 5 presents the conclusions of the study.

Empirical Literature

Numerous empirical studies have examined the link between FDI and unemployment in both developing and developed countries. However, since the current study concentrates on the FDI's employment effects on developing countries, only the studies that investigate the issue from the developing countries' side are presented under this heading.

Using a simultaneous panel regression model, Abor and Harvey (2008) looked into how FDI affected wages and employment in Ghana. They discovered that FDI had an insignificant impact on wages but a statistically significant and favorable effect on Ghana's degree of employment. Balcerzak and Zurek (2011) conducted research on the link between FDI and unemployment in the Polish economy for the years 1995–2009 using the VAR method. The results show that the FDI impulse only temporarily decreases unemployment. Zeb, Qiang and Sharif (2014) searched how FDI influenced unemployment in Pakistan from 1995 to 2011. By using OLS method, they concluded that Pakistan's unemployment has been significantly reduced by FDI. Using yearly data from 1980 to 2012, Irpan et al. (2016) carried out research on the influence of FDI on Malaysia's employment rate. In their study, they also used variables including the number of foreign workers, exchange rate, and GDP. Moreover, to detect the long-term relationship among the variables, they employed the ARDL model. They concluded that the unemployment rate is highly influenced by FDI, GDP, and, the number of foreign workers. As a result, as FDI rises, Malaysia's

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unemployment rate falls. Grahovac and Softic (2017) questioned how FDI affected the labor market in the Western Balkan countries between 2000 and 2014. The results of the multiple linear regression model indicate that FDI has no positive impact on employment. Sharma and Cardenas (2018) employed a panel data from the Mexican states between 2005 and 2015 to examine how FDI inflows influenced six labor market outcomes. They addressed potential FDI endogeneity using the system Generalized Method of Moments estimator, and they found that FDI inflows decrease the unemployment rate as a whole. Johnny et al. (2018) questioned how FDI affected Nigeria's unemployment rate between 1980 and 2015. Using the unit root test, co-integration test, and OLS, they reached a weak and negative correlation between Nigeria's unemployment level and foreign direct investment. Garang et al. (2018) investigated the impact of FDI on growth and unemployment in Uganda from 1993 to 2015. They found that FDI had no discernible impact on Uganda's unemployment in the short or long-term using the ARDL method. Using balanced panel data of 54 three-digit sectors from 2008-2009 to 2015-2016, the effect of FDI on employment in India's manufacturing sector was researched by Malik (2019). Based on the study's findings, employment in India's manufacturing sectors has been significantly impacted by FDI.

Studies that focused on Türkiye also have different outcomes: Hisarcıklılar, Karakas, and Asici (2014) conducted sector-level research on the impact of FDI inflows on job creation in Türkiye between 2000 and 2008. Using panel VAR and system GMM analysis, a weak but positive correlation was detected between FDI inflows and employment. Using ARDL approach, Bayar (2014) examined FDI inflows' long-run impact on unemployment between 2000: Q1 and 2013: Q3 and reached that FDI inflows increased unemployment in the long run. Yalman and Koşarolu (2017) researched the effect of FDI on employment and growth in the Turkish economy from 1988 to 2016. In the analysis, they used the Todo-Yamamoto causality test and reached that there is no causal link between FDI and GDP or unemployment. Using annual data from 1980 to 2016, Erçakar and Güvenoğlu (2018) investigated the relationship between FDI and unemployment in the Turkish economy. They found that an increase in FDI decreases unemployment over the long term, employing the Johansen cointegration test. The results of the Granger causality test revealed that there is no short-term relationship between FDI and unemployment. Canbay and Kırca (2020) employed the ARDL and Granger causality tests to see the relationship between FDI and unemployment for the period of 1991-2016. ARDL results show that increase in FDI increases unemployment for the period of 1991-2016. ARDL results show that increase in FDI increases unemployment. However, causality test do not present any causality from FDI to unemployment.

This study aims to add to the body of knowledge by enabling to see the effect of positive and negative shocks of FDI on unemployment in a developing country, Türkiye, via NARDL method and asymmetric causality test. Therefore, this is the first study that researches the asymmetric relationship between these variables.

Data and Methodology

The empirical estimation depends on annual measurements that span from 1988 through 2020. The variables used are the unemployment rate and net inflows of FDI as a percentage of GDP. World Bank database was employed to obtain the relevant data. The summarized statistical information is given below:

			-	-		
Variable	Measure	Mean	Standard Deviation	Min.	Max.	Source
FDI	FDI net inflows as % of GDP	1.16	0.86	0.30	3.62	World Bank database
Unemployment	Unemployment rate in log	2.21	0.18	1.87	2.61	World Bank database

Table 2. Summarized Statistical Information

Previous cointegration tests (Engle and Granger,1987; Johansen and Juselius, 1990; Phillips and Hansen,1990) require that it is necessary for all series to be stationary at the same level. On the other hand, Pesaran et al. (2001) created a technique called the autoregressive distributed lag model (ARDL), which allows variables to be I(0), I(1), or a combination of the two. However, these methods, exclusively examine symmetrical and linear relationships, assuming that both positive and negative shocks inflence the dependent variable in opposing directions and at the same rate. Shin, Yu, Greenwood-Nimmo (2014) developed the ARDL model, that allows for testing symmetrical relationships. The nonlinear autoregressive distributed lag model (NARDL) method, like the ARDL approach, can be applied whether

the series is stationary in level or stationary in first difference or a combination of both of them; however, the series shouldn't be stationary in second dfifference in any case. Furthermore, even in small samples, effective findings can be obtained (Fousekis et al., 2016, p. 500). Moreover, the NARDL method, which demonstrates the existence of cointegration between the positive and negative elements of the two non-cointegrated series, promotes the defining of the dynamic relationships. (Shahzad et al., 2017, p. 215). Furthermore, it is possible to dynamically quantify the dependent variable's response to positive and negative shocks in the independent variables using asymmetric dynamic multipliers (Arize et al., 2017, p. 318). Because of all of these advantages, besides the ARDL method, the NARDL approach is preferred in this study.

By segregating the series' negative and positive components, this technique investigates short- and long-term asymmetric impacts. While the symmetric model to be used is as unemp = (fdi), the model to be employed when analyzing the asymmetric impacts of FDI on unemployment is as follows:

$unemp = (fdi^+, fdi^-)$

Here, while unemp indicates unemployment rate, fdi^+ indicates positive FDI shock and fdi^- indicates negative FDI shock. The NARDL method's unrestricted asymmetric error correction model is as follows.:

$$\Delta unemp_{t} = c_{1} + \sum_{\substack{i=1\\ +\theta_{21}^{-1}fdi_{t-1}^{-} + u_{t}}}^{n1} \Delta unemp_{t-i} + \sum_{i=0}^{n2^{+}} \alpha_{2i}^{+} \Delta fdi_{t-i}^{+} + \sum_{i=0}^{n2^{-}} \alpha_{2i}^{-} \Delta fdi_{t-i}^{-} + \theta_{11}unemp_{t-1} + \theta_{21}^{+}fdi_{t-1}^{+}$$
(1)

 c_1 stands for the drift component, while u_t refers to the white noise error term. The summation sign term represents the error correction dynamics, while the rest of the equation indicates the long-run relationship. The cumulative sums of the variables' increases and reductions make up the components representing positive and negative changes in the independent variables, and are calculated as follows:

$$fdi_{t}^{+} = \sum_{i=1}^{t} \Delta f di_{i}^{+} = \sum_{i=1}^{t} \max(\Delta f di_{i}, 0)$$
(2)

$$fdi_{t}^{-} = \sum_{i=1}^{t} \Delta f di_{i}^{-} = \sum_{i=1}^{t} \min(\Delta f di_{i}, 0)$$
(3)

First, the OLS method is used to estimate the equation in order to determine whether the variables have a long-term relationship (cointegration relationship), after which the F test is performed. The upper bound and lower bound critical values from Pesaran et al. (2001) should be compared to the estimated F statistics. If the estimated F statistic exceeds the upper bound critical value I(1), suggesting that the variables have a cointegration relation, the null hypothesis will be rejected. If the F statistic is less than the lower bound critical value I (0), proving that the variables are not cointegrated, the null hypothesis cannot be rejected. A further cointegration test might be carried out if the F-statistic is within the crucial limits (Peseran et al., 2001). Given this information, the following are the null and alternative hypotheses for the equation identifying whether the variables are cointegrated:

$$H_0: \theta_{11} = \theta_{21}^+ = \theta_{21}^- = 0$$

 $H_1:$ at least one of them is different than zero

The fact that the H_0 hypothesis is rejected suggests that the variables have a long-term cointegration relationship. The long-run coefficients are then calculated as $\beta_{fdi}^+ = \frac{\theta_{21}^+}{\theta_{11}}$, $\beta_{fdi}^- = \frac{\theta_{21}^-}{\theta_{11}}$. Following the detection of the cointegration relationship, the Wald test is employed to test the existence of short and long run asymmetric effects. The long run asymmetric impact of FDI on unemployment is tested with $\theta_{21}^+ = \theta_{21}^-$, as its short run asymmetric effects are tested using $\sum_{i=0}^{n^2+} \alpha_{2i}^+ = \sum_{i=0}^{n^2-} \alpha_{2i}^-$. Then, the following error correction model based on the NARDL approach is formed to examine the relationship between the variables in short-run:

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$$\Delta unemp_{t} = e_{11} + \sum_{i=1}^{n1} e_{1i} \Delta unemp_{t-i} + \sum_{i=0}^{n2^{+}} e_{2i}^{+} \Delta f di_{t-i}^{+} + \sum_{i=0}^{n2^{-}} e_{2i}^{-} \Delta f di_{t-i}^{-} + \lambda_{1}ect_{t-1} + \mu_{1}$$
(4)

Here, the first difference operator is Δ ; the short-run dynamics of the model's convergence to equilibrium are described by the coefficients $e_i s$, and the speed of adjustment is measured by λ_1 . In the final step, to calculate the asymmetric cumulative dynamic multiplier effects of a unit change in positive and negative shocks on the dependent variable, asymmetric error correction model is employed. For instance, the cumulative dynamic multiplier effect of shocks in FDI on unemployment is obtained as follows:

$$m_h^+ = \sum_{j=0}^h \frac{\partial unemp_{t+j}}{\partial f di_t^+} , m_h^- = \sum_{j=0}^h \frac{\partial unemp_{t+j}}{\partial f di_t^-} , \qquad h = 0, 1, 2, \dots$$
(5)

Here, ,
$$h \to \infty$$
, $m_h^+ \to \beta^+$, $m_h^- \to \beta^-$ (Shin et al. 2014, p. 292)

Asymmetric Causality Test

In the previous causality tests as Granger (1969), Toda Yamamoto (1995), Hacker and Hatemi-J (2006), positive and negative shocks both have the same impact (symmetrical). The idea of changing the series into cumulative positive and negative changes was initially put out by Granger and Yoon (2002). On the other hand, they employed this method to test what they call hidden cointegration. Hatemi-J (2012) offered a novel asymmetric causality test based on Granger and Yoon' (2002) technique. Accordingly, the causality relationship modeled between two series such as Y_{1t} and Y_{2t} is expressed as in Equations 1 and 2:

$$Y_{1t} = Y_{1t-1} + \varepsilon_{1t} = Y_{1,0} + \sum_{i=1}^{t} \varepsilon_{1i}$$
(6)

$$Y_{2t} = Y_{2t-1} + \varepsilon_{2t} = Y_{2,0} + \sum_{i=1}^{t} \varepsilon_{2i}$$
(7)

Here, t = 1, 2, ..., T represents time, $Y_{1,0}$ and $Y_{2,0}$ refer to constant terms which are initial values, , ε_{1i} and ε_{2i} represent the error terms. Positive shocks are described as $\varepsilon_{1i}^+ = \max(\varepsilon_{1i}, 0)$ and $\varepsilon_{2i}^+ = \max(\varepsilon_{2i}, 0)$ and negative shocks are described as $\varepsilon_{1i}^- = \min(\varepsilon_{1i}, 0)$ and $\varepsilon_{2i}^- = \min(\varepsilon_{2i}, 0)$. In this case, the error terms for each series can be expressed as $\varepsilon_{1i} = \varepsilon_{1i}^+ + \varepsilon_{1i}^-$ and $\varepsilon_{2i} = \varepsilon_{2i}^+ + \varepsilon_{2i}^-$. Now when equations (1) and (2) are rearranged:

$$Y_{1t} = Y_{1t-1} + \varepsilon_{1t} = Y_{1,0} + \sum_{i=1}^{t} \varepsilon_{1i}^{+} + \sum_{i=1}^{t} \varepsilon_{1i}^{-}$$
(8)

$$Y_{2t} = Y_{2t-1} + \varepsilon_{2t} = Y_{2,0} + \sum_{i=1}^{t} \varepsilon_{2i}^{+} + \sum_{i=1}^{t} \varepsilon_{2i}^{-}$$
(9)

will be obtained. The cumulative positive and negative shocks in each series are; $Y_{1i}^+ = \sum_{i=1}^t \varepsilon_{1i}^+$, $Y_{1i}^- = \sum_{i=1}^t \varepsilon_{1i}^-$, $Y_{2i}^- = \sum_{i=1}^t \varepsilon_{2i}^-$, $Y_{2i}^- = \sum_{i=1}^t \varepsilon_{2i}^-$. It is important to remember that each positive and negative shock has a long-lasting impact on the underlying variable. In the next step, the causality between these components is tested. Considering that only the causality relationship between positive shocks is tested, assuming $y_t = (y_{1t}^+, y_{2t}^+)$ the causality between the components is tested employing the following p-lag VAR model (Hatemi-J, 2012, p. 449):

$$y_t^+ = v + A_1 y_{t-1}^+ + \dots + A_p y_{t-1}^+ + u_t$$
(10)

Here, y_t^+ represents the variable vectors of size 2×1, v represents constant vectors, and u_t represents error term vectors. A_r matrix is a parameter matrix with 2x2 dimensions and lag number r (r = 1,..., p). The proper lag structure is identified using information criteria. The Wald constraint test on the autoregressive coefficients is used to evaluate the hypothesis indicating that there is no causality relationship between the variables (null hypothesis). In Hatemi-J (2006) symmetric causality test, Wald test statistic shows a $\chi 2$

distribution with the number of constraints being degrees of freedom. However, when the error terms of the VAR model are not white noise, the test statistics do not reveal an asymptotic distribution (Yıldırım and Çevik, 2017, p. 46). As a result, the critical values were determined by employing the bootstrap simulation method with 10000 replications in the study. When the estimated MWald statistic is greater than the boostrap critical values the causality relationship between the variables is accepted.

Empirical Results

The ADF, PP, and Zivot and Andrews (2002) unit root test with break was conducted to identify the stationarity levels of series. Table 3 shows the outcomes of the tests, which enables structural breaks to get rid of the false unit root problem.

		ADF		PP	Breakpoir	Breakpoint Unit Root		
Variables	Intercept	Trend and Intercept	Intercept	Trend and Intercept	Intercept	Trend and Intercept		
fdi	-1.5701 (0.4859)	-1.6063 (0.7680)	-1.5658 (0.4880)	-1.6063 (0.7680)	-5.2562 (< 0.01)*	-5.9542 (< 0.01)*		
Δfdi	-5.6767 (0.0001)*	-5.6537 (0.0003)*	-5.7252 (0.0000)*	-5.7072 (0.0003)*				
unemp	-1.3846 (0.5774)	-3.1859 (0.1057)	-1.3006 (0.6171)	-2.1687 (0.4899)	-0.9150 (0.8283)	-2.5502 (0.9348)		
Δunemp	-4.9447 (0.0004)*	-4.9221 (0.0021)*	-6.7546 (0.0000)*	-8.3366 (0.0000)*	-5.3306 (< 0.01)*	-5.2968 (<0.01)*		
Test critical values at 5% level	-2.9571	-3.5577	-2.9571	-3.5577	-4.4436	-5.1757		

Table 3. Results of the Unit Root Tests

The test results indicate that each series is stationary at its first difference but none are stationary at its second difference. This permits the ARDL and NARDL model to be used. Checking the lag length criteria is applied by using the VAR approach depending on the Akaike Information Criteria (AIC) in an effort to identify the proper lag structure of the model and the optimal lag is found as 2 for ARDL model and 5 for NARDL model, which minimizes the lag selection criteria. Then, existence of cointegration between the variables was determined considering the F statistics. Table 4 displays the results of cointegration test:

Table	4.	Cointegration	Test	Results of	of ARDL	and NARDL	Model
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Models	F-statistics	95% lower bounds	95% upper bounds	Decision
ARDL model (1,2)	1.16	3.62	4.16	Not cointegrated
NARDL model (1,5,5)	5.94	3.1	3.87	Cointegrated

The F value is under the critical upper and lower bound values at the 5% significance level in the ARDL model when the acquired F-statistic values are compared to those values. In this case, the zero hypothesis, which asserts that there is no cointegration relationship between the variables, is accepted. However, the F statistic for the NARDL model is over the critical upper bound value at the 5% significance level, which indicates that the zero hypothesis was rejected and leads to the conclusion that the variables have a long-term cointegration relationship. As indicated above, NARDL model allows the "hidden cointegration" relationship to be revealed. Therefore, choosing this method seem to be true for our model. After the existence of cointegration is observed, short and long-term coefficients are obtained with the NARDL model.

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I able 5. <i>Results of NAKDL (1, 5, 5) Model</i>					
Variables	Coefficients	t-stat.	p-value		
	Panel A: Sh	ort run			
$\Delta f di^+$	0.071***	1.924	0.076		
$\Delta f di_{t-1}^+$	0.183**	2.782	0.015		
$\Delta f di_{t-2}^+$	0.201*	3.552	0.003		
$\Delta f di_{t-3}^+$	0.151**	2.836	0.014		
$\Delta f di_{t-4}^+$	0.145**	2.508	0.026		
$\Delta f di^{-}$	-0.298*	-4.596	0.000		
$\Delta f di_{t-1}^{-1}$	0.112	1.678	0.117		
$\Delta f di_{t-2}^{-1}$	0.044	0.788	0.444		
$\Delta f di_{t-3}$	0.085	1.497	0.158		
$\Delta f di_{t-4}$	0.071	1.449	0.170		
ecm	-0.602*	-5.408	0.000		
W _{SR}	8.866*		0.002		
	Panel B: Lo	ong run			
fdi ⁺	-0.360*	-3.248	0.006		
fdi ⁻	-0.502*	-3.723	0.002		
Constant	1.885*	31.288	0.000		
W_{LR}	22.376 *		0.000		
	Panel C: Robus	tness check			
JB	0.105 (0.948)				
Breusch-Godfrey LM test	1.460 (0.273)				
Breusch-Pagan-Godfrey heteroschodasticity test	11.007 (0.610)				
RESET	0.0688 (0.797)				
CUSUM	S				
CUSUMQ	S				

Note: *,**,*** respectively indicate 1%, 5% and 10% significance level. "S" refers to stability.

Table 5 indicates that positive shocks of FDI increase unemployment in the short term, but the effect is reversed in the long term. A 1% increase in foreign direct investment lowers the unemployment rate by 0.36%, whereas a 1% reduction in FDI increases it by 0.50%. Namely, negative effect is more dominant. Short run and long run Wald statistics also prove that effects of positive and negative shocks on unemployment is asymmetrical. Additionally, the error correction term (ecm=-0.60) is negative and less than 1, indicating the cointegration relationship between the variables and proving that the adjustment speed in the shift from the short to the long run is sufficient. Results suggest that FDI has a considerable impact on unemployment.

The results of the diagnostic tests reveal that there is no autocorrelation problem (Breusch-Godfrey LM test's p-value=0.273), no heteroschodasticity problem (Breusch-Pagan-Godfrey heteroschodasticity test's p-value=0.610) and no model-building error in the model (RESET test's p-value=0.797), and the error terms are distributed in a normalway (JB test's p-value=0.948). The stability of the coefficients in the analysis is demonstrated by the CUSUM and CUSUMQ stability test findings, which are both within the 5% significance threshold. The CUSUM test graphs are as follows:





The next step is to compute cumulative multiplier effects in order to better comprehend asymmetric effects. These multipliers represent the process of adjusting to the new long-run equilibrium as well as the dynamic cumulative reactions of the dependent variable following a negative or positive unit shock in the independent variable. (Shahzad et al., 2017, p.226).



Figure 2. Dynamic multipliers

Figure 2 displays the dynamic convergence process to the long-run equilibrium as well as the asymmetric responses in unemployment to a unit positive and negative shock in FDI. Accordingly, alhough a positive shock in FDI initially increases unemployment, it eventually lowers it over time. Moreover, a negative shock in FDI increases unemployment in both the short and long terms. Negative shocks have a stronger long-term and short-term impact, which indicates that a decrease in FDI will have a greater effect on unemployment. In the long term, negative shock has an impact that is roughly 3 times that of positive shock. Furthermore, the short-run and long-run asymmetric effects seem statistically significant at the 5% significance level because the confidence interval is out of the zero line.

Lastly, an asymmetric causality test is conducted to demonstrate how the causality from one shock to another is determined by dividing the series into positive and negative shocks. The test results are given in Table 6:

Causality	D +dmax	MWALD Test Statistic	Bootstrap critical values		
	r+uinax	(prob.)	%1	%5	%10
$fdi^+ \rightarrow unemp^+$	1+1	0.964 (0.32)	13.401	5.626	3.525
$fdi^+ \rightarrow unemp$ -	1+1	34.336* (0.00)	18.988	6.310	3.725
$fdi^- \rightarrow unemp^-$	1+1	0.076 (0.783)	14.196	5.653	3.612
$fdi^- \rightarrow unemp^+$	1+1	10.629* (0.00)	11.077	5.189	3.344

Table 6. Results of Asymmetric Causality Test

Notes: * represents significance at the 1%, level. The AIC criterion was employed to identify the VAR (p) optimal lag lengths. The values in parentheses next to the MWald test statistic show the asymptotic X^2 probability values. Bootstrap critical values were obtained as a result of 10000 replications.

The null hypothesis in the Hatemi J-asymmetric causality test asserts the absence of causality from the first variable to the second variable. The null hypothesis is rejected and it is acknowledged that there is a causal relationship between the variables if the derived Mwald statistical value is higher than the calculated bootstrap critical values. In other words, a positive shock to FDI is a sign of a decrease in unemployment. Moreover, negative shocks in FDI are seen as the cause of positive shocks in unemployment. Significant findings have been reached that support the NARDL results.

Conclusion

The current paper questiones the symmetric and asymmetric effects of FDI on unemployment, using data from Türkiye from 1988 to 2020. To do this, ARDL and NARDL methodologies were employed to define the long and short-run relationships between the study's variables. Moreover, asymmetric causality test is conducted to see causality relationship. In contrast to prior research on Türkiye, this study is the first to analyze the nonlinear relationship between the variables. While ARDL model indicates that there is not a cointegration relationship, non-linear ARDL model proves the cointegration relationship between the variables. The findings of the NARDL model revealed that the rise in FDI decreases unemployment while the decrease in FDI increases unemployment in Türkiye. Moreover, asymmetric causality test results support

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the NARDL findings. Compared our findings with those of other prior studies, we are in line with Zeb et el. (2014), Irpan et al. (2016) and Erçakar and Güvenoğlu (2018) in terms of direction of the relationship between two variables.

The study clearly shows that FDI has a main importance in terms of effecting unemployment in Türkiye. This means that there is need to develop stronger policies to attract more amount of FDI. Considering that Türkiye ranks 33rd out of 190 economies in the Ease of Doing Business Index by 2020, it is understood that there is still a long way to go. In this context, facilitating starting a business, facilitating construction permits, establishing a strong transportation and infrastructure network to help in transporting products and raw materials to marketplaces, providing corporate tax incentives could be some of the steps to take. In addition to these steps, providing a stable macroeconomic environment is also important. By ensuring the stability in the exchange rate, the ongoing increase in both producer and consumer prices should be prevented, and the economy should get rid of its fragile appearance and stabilization should be ensured. Together with internal dynamics, external dynamics are also important. Since geopolitical risks have increased due to the ongoing instability in border countries, FDI inflows are negatively affected. Accordingly, FDI inflows are expected to increase with the establishment of a peaceful and stable environment in the border countries. Moreover, considering that the majority of FDI coming to Türkiye is carried out by EU countries (about 53% of total FDI inflows), the development of negotiations and diplomatic relations with the EU can increase flow of FDI from the EU. Lastly, the problems that pandemic created in production and transportation (problem in finding containers and increases in freight prices) had a negative impact on the export of China, and has provide an opportunity to developing countries such as Türkiye to become a new supplier to European markets. However, in order for Türkiye to use such these opportunity well, it must have sufficient production capacity to meet the demand. At this point, foreign capital owners can take advantage of this opportunity, taking into account Türkiye's logistics advantage and the surplus of young working-age population, and make a positive contribution to both exports and employment of the country by making their direct investments in Türkiye.

Ethical Declaration

During the writing process of the study "Does Foreign Direct Investment Contribute to Decrease Unemployment in Türkiye? Nonlinear ARDL and Asymmetric Causality Approaches" scientific rules, ethical and citation rules were followed. No falsification was made on the collected data and this study was not sent to any other academic publication medium for evaluation.

Declaration of Conflict

There is no potential conflict of interest in the study.

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GENİŞ TÜRKÇE ÖZET

1800'lerin sonlarında başlayan uluslararası sermaye akışları bugün muazzam boyutlara ulaşmıştır. Son yıllarda, pek çok geçiş ve gelişmekte olan ülke ekonomileri, önemli miktarda yabancı sermaye akımlarından faydalanmıştır. Bu akımların içinde doğrudan yabancı sermaye yatırımları (DYY) ve portföy yatırımları en büyük paya sahiptir. Diğer yatırım türleriyle karşılaştırıldığında, doğrudan yabancı yatırımı daha cazip olabilir çünkü yeni tesis ve makinelerin kurulumu ile finansal sermaye girişi arasında genellikle doğrudan bir bağlantı

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vardır (Hoggarth ve Sterne, 1997, s. 14). Ayrıca, doğrudan yabancı sermaye yatırımlarının, ev sahibi gelişmekte olan ülkeye üretim kapasitesini artırma, istihdam ve üretimi artırma, yeni teknoloji ve yönetim bilgisi sağlama, döviz girisi sağlama, ihracatı artırma, ic tekelleri kırma, rekabet ve dinamizm varatma, ölcek ekonomisi yaratma ve hazineye vergi geliri sağlama gibi bazı avantajları vardır. Ayrıca, ev sahibi ülke üzerinde, dış ekonomik etkiyi artırma, yabancı firmalara verli firmalara karşı hakşız rekabet avantajı şağlama, yerel ekonomiyi tekelleştirme, yurtiçi yatırımları azaltıcı etki yaratma, dış ticaret kısıtlamalarını aşma, döviz giderlerini artırıcı etki yaratma, döviz dalgalanmalarına neden olma ve finansal kriz ortamı yaratma, ihracatı sınırlama, teknolojik bağımlılık, ekonomik bütünlüğün bozulması ve işsizliği artırma gibi bazı olumsuz etkileri de vardır (Sevidoğlu, 2015, s. 667). Soru su ki, doğrudan vabancı yatırımların issizlik üzerindeki olumlu ve olumsuz etkileri nasıl ortaya cıkmaktadır? Birincisi, doğrudan yabancı yatırımlar istihdamı artırır çünkü yabancı sermaye yatırımları gerçek ulusal üretimde artışa yol açar ve yeni tesisler kurar, bu da sağladığı yeni üretim kapasitesiyle istihdamın genişlemesini sağlar (Moosa, 2002, s. 77). Öte yandan, yabancı sermayeli şirketler tarafından önemli sermaye gerektiren teknolojilerin kullanılması ve daha az işçinin istihdam edilmesi, ülkenin işsizlik sorunlarını daha da artırabilir. Buna, yabancı işletmelerle rekabet edemedikleri için pazardan cekilen verel isletmelerin neden olduğu issizliği de eklemek gerekir (Sevidoğlu, 2015, s. 670). Ayrıca, ev sahibi ülkenin gelişmişlik düzeyine bağlı olarak, doğrudan yabancı yatırımların istihdam üzerinde çeşitli etkileri vardır. Gelismis ülkelerde gerceklesme rotası önemliyken, gelismekte olan ülkeler doğrudan yabancı yatırımların getirdiği üretim ve yönetim kabiliyetlerine değer verir. Gelişmekte olan ülkelerde, işsizlik sorununu çözmek için emek yoğun üretim tekniklerinin kullanımı kritik öneme sahiptir. Öte yandan, çok uluslu şirketler genellikle rakiplerine göre son teknolojiyi tercih eder. Burada, ev sahibi ülkenin seçilen teknolojiye uyumu kritik öneme sahiptir. Ev sahibi ülkedeki istihdam derecesi, bu uyumun yanı sıra ülkenin bu teknolojiyi ilerletme kabiliyetinden etkilenir (Efe, 2002, s. 23). Bu nedenle, doğrudan yabancı yatırımların işsizlik üzerindeki etkisi hem teorik hem de ampirik literatürde tartışılan bir konudur (Balcerzak ve Zurek, 2011; Bayar, 2014; Irpan vd., 2016; Grahovac ve Softic, 2017). Türkiye'deki DYY geçmişine bakıldığında, Türkiye'nin 1980'lere kadar yabancı yatırımcılar için çazip bir ülke olmadığı görülmektedir. 1980'den sonra liberal ekonomik politikaların uygulanmasıyla yabancı yatırım teşvik edilmeye çalışılmıştır. Bu tarihten sonra vabancı sermayeli sirketlerin sayısı önemli ölcüde artmıstır. Dünyanın geri kalanıyla karsılastırıldığında, Türkiye'nin bu yıllardaki DYY payı, 1980'de toplam Dünya DYY'sinin yalnızca %0,03'ünü çektiğini göstermektedir. Bu oran 1990 yılında %0,33'e çıkmış, on yılın ortasında düşmeye başlayarak 1999 ve 2000 yıllarında %0,07'ye düşmüştür. Ayrıca, gelişmekte olan ülkeler içindeki payı 1980'de %0,21'den 1995'te %0,77'ye ve 2002'de %0,68'e yükselmiştir. Türkiye, 1990'ların başında doğrudan yabancı yatırım çekme açısından 40. sırada yer alırken, 2000 yılına gelindiğinde 50. sıraya gerilemiştir (Şıklar & Kocaman, 2018: 24). 2003 yılında, 4875 sayılı Doğrudan Yabancı Yatırım Kanunu'nun yürürlüğe girmesiyle daha liberal bir yatırım ortamı sağlanmış ve hem DYY hem de yabancı sermaye ile kurulan işletme sayısı artmıştır. Öte yandan, iç dinamiklerden kaynaklı 1994, 2000 ve 2001 krizlerinde olduğu gibi, küresel 2008 krizi ve pandemiden de tüm dünyada olduğu gibi de önemli ölçüde etkilenmiştir. Bu çalışmada doğrudan yabancı sermaye yatırım girişi ve işsizlik arasındaki ilişkiyi incelemek amacıyla, Türkiye'ye ait 1988-2020 dönemini kapsayan yıllık veriler kullanılarak ARDL (gecikmesi dağıtılmış otoregresif model), NARDL (doğrusal olmayan gecikmesi dağıtılmış otoregresif model) ve asimetrik nedensellik testleri uygulanmıştır. ARDL modeli değişkenler arasında eşbütünleşme olmadığını gösterirken NARDL modeli eşbütünleşme olduğu bulgusuna ulaşmıştır. NARDL modeline göre DYY'deki %1'lik artış işsizlik oranını %0,36 oranında düşürürken, DYY'deki %1'lik bir azalma işsizliği %0,50 oranında artırmaktadır. Negatif etki daha baskındır. Kısa vadeli ve uzun vadeli Wald istatistikleri de pozitif ve negatif şokların işsizlik üzerindeki etkilerinin asimetrik olduğunu kanıtlamaktadır. Hatemi-J (2012) asimetrik nedensellik testinden elde edilen bulgulara göre ise DYY'deki pozitif bir şok, işsizlikteki azalmanın nedenidir. Dahası, DYY'deki negatif şoklar, işsizlikteki pozitif şokların nedeni olarak görülmektedir. Nedensellik testi sonuçlarında da NARDL sonuçlarını destekleyen önemli bulgulara ulaşılmıştır. Çalışma, Türkiye'de doğrudan yabancı yatırımların işsizlik üzerinde temel bir öneme sahip olduğunu acıkca göstermektedir. Bu, daha fazla miktarda doğrudan yabancı yatırım cekmek icin daha güçlü politikalar geliştirilmesi gerektiği anlamına gelmektedir. Türkiye'nin 2020 yılı itibarıyla İş Yapma Kolaylığı Endeksi'nde 190 ekonomi arasında 33. sırada yer aldığı düşünüldüğünde, daha gidilecek çok yol olduğu anlaşılmaktadır. Bu bağlamda, bir iş kurmanın kolaylaştırılması, inşaat izinlerinin kolaylaştırılması, ürün ve hammaddelerin pazarlara taşınmasına yardımcı olmak için güçlü bir ulaşım ve altyapı ağının kurulması, kurumlar vergisi teşviklerinin sağlanması atılabilecek adımlardan bazıları olabilir. Bu adımların yanı sıra, istikrarlı bir makroekonomik ortamın sağlanması da önemlidir. Döviz kurunda istikrar sağlanarak, hem üretici hem de tüketici fiyatlarındaki devam eden artışın önüne geçilmeli ve ekonomi kırılgan görünümünden kurtularak istikrar sağlanmalıdır. İç dinamiklerin yanı sıra dış dinamikler de önemlidir. Sınır ülkelerindeki devam eden istikrarsızlık nedeniyle jeopolitik riskler arttığından, doğrudan yabancı yatırım

girişleri olumsuz etkilenmektedir. Buna göre, sınır ülkelerinde barışçıl ve istikrarlı bir ortamın kurulmasıyla DYY girişlerinin artması beklenmektedir. Ayrıca, Türkiye'ye gelen DYY'nin çoğunluğunun AB ülkeleri tarafından gerçekleştirildiği (toplam DYY girişlerinin yaklaşık %53'ü) düşünüldüğünde, AB ile müzakerelerin ve diplomatik ilişkilerin geliştirilmesi AB'den gelen DYY akışını artırabilir. Son olarak, pandeminin üretim ve ulaştırmada yarattığı sorunlar (konteyner bulma sıkıntısı ve navlun fiyatlarındaki artışlar) Çin'in ihracatını olumsuz etkilemiş ve Türkiye gibi gelişmekte olan ülkelere Avrupa pazarlarına yeni tedarikçi olma fırsatı sunmuştur. Ancak Türkiye'nin bu tür fırsatları iyi değerlendirebilmesi için talebi karşılayacak yeterli üretim kapasitesine sahip olması gerekmektedir. Bu noktada yabancı sermaye sahipleri, Türkiye'nin lojistik avantajını ve genç çalışma çağındaki nüfusun fazlalığını göz önünde bulundurarak bu fırsatı değerlendirebilir ve doğrudan yatırımlarını Türkiye'ye yaparak hem ülkenin ihracatına hem de istihdamına olumlu katkı sağlayabilirler.