An Empirical Analysis of the Relationship between Foreign Direct Investment and Unemployment Rate: Evidence from Turkey

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Abstract:

Purpose: This paper is aimed to analyze the impact of Foreign Direct Investment inflows in Turkey on macroeconomic variables among them the unemployment rate.

Design/methodology/approach: The time series datasets (FDI, UEMP), were obtained from the World Bank database, which covers the time period 1980-2017 were utilized in employed statistical models as the ADF Unit Root, Philips–Perron Unit Root, Johansen co-integration, and the Granger causality tests, to accomplish the empirical part of the paper.

Findings: Based on the results, it was confirmed that there was at most one presence of the co-integration among the analyzed series. Additionally, the results of Granger causality test had showed that there is unidirectional causality from FDI to UEMP.

Originality: Thus, this paper can be a proof that Foreign Direct Investment inflows have a crucial impact on decreasing the unemployment rate in Turkey.

Keywords: FDI, unemployment, unit root test, Johansen co-integration test, Granger Causality test.

JEL codes: C22, E24, F21.

Paper type: Research study.

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1. Introduction

According to the developing level of the invested countries, the FDI can play crucial role on stabilizing and developing the economy of the host countries. The foreign investors can bring new management, new or more advanced green technologies etc., which can develop the economy of countries which are being invested. Through the realization of the liberalization process since the 1980s, the Turkish economy has experienced a period of significant growth. We can mention several crucial milestones in this development process. For instance, Turkey has become a member of the World Trade Organization (WTO) since 1995; afterwards Turkey had signed agreements with European Union on the Custom Union. Following this step, it continued in an agreement with the European Union about candidate country status in 1999 in Helsinki conference.

Therefore, the country's commitment to integrate regional and international trade norms can be seen in its participation in and membership of various organizations, including the Economic Cooperation Organization (ECO), the United Nations' Conference on Trade and Development (UNCTAD), the Organization of the Black Sea Economic Cooperation (BSEC), the World Customs Organization (WCO), the International Chamber of Commerce (ICC), D-8, and other various organizations. In addition to the Customs Union with the EU, Turkey has signed Free Trade Agreements (FTA) with Albania, Bosnia-Herzegovina, Chile, Egypt, Faroe Islands*, Georgia, Ghana*, Iceland, Israel, Jordan, Kosovo*, Lebanon*, Macedonia, Malaysia, Mauritius, Montenegro, Moldova*, Morocco, Norway, Palestine, Serbia, Singapore*, South Korea, Switzerland and Lichtenstein, Syria (pending), Tunisia. (*to be ratified)[4].

It has been experienced that FDIs have solved many major problems in the economy of the host countries, especially in developing countries. In the case of solving issues in labor market of the host country, we can itemize various scenarios. For instance, FDIs can bring their own management, advanced technologies etc., in this case they will increase unemployment rate, due to not hiring additional employees. On the other hand, they can bring labor-intensive technologies and they can utilize domestic labor, in this case, they will create additional employment for following business.

Therefore, FDIs can be classified in two types, one of them is as if they can establish new companies in which they supposed to hire new employees, in this case it will have positive effect on labor market of the host country, and thus they will create employment. Another type is merging with an existing domestic company or if the domestic company is fully purchased, it will not be possible to create additional employment because it already exists. Therefore, it could be possible to reduce unemployment if the foreign investment is concentrated in sectors that use intense

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labor, such as services and food. It can be considered that the FDI coming to the industrial sector can make a positive impact on employment of the host country. According to Figure 1 a number of companies have been established by foreign investors in Turkey increased from 5,600 in 2002 to 58,400 in 2017, therefore we can consider a significant development by decreasing unemployment rate with establishing huge amount of new companies.

Figure 1. *Number of Companies with International Capital in Turkey (in thousands)*
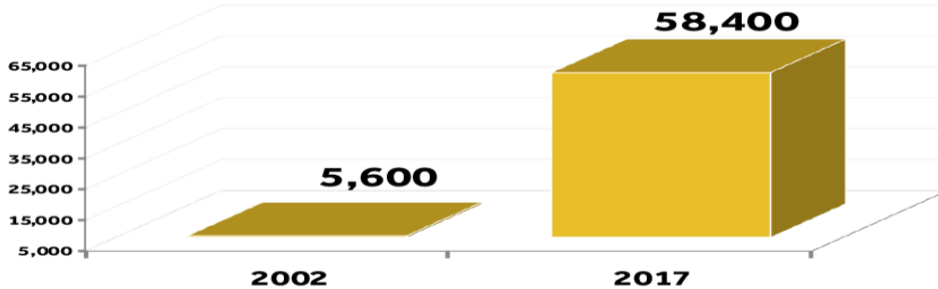
Source: *Ministry of Trade (Republic of Turkey)[5]*

This study devotes to analyze the impact of FDI on the unemployment rate in Turkey. The content of this paper will be structured as follows: In section 2 literature review will be expounded, in section 3 empirical studies will be shown, in section 4 data description will be disclosed, in section 5 methodology will be expounded, in section 6 empirical results from employed statistical analysis will be shown and finally in section 7 conclusion will be described.

2. Literature Review

2.1 Theories about Relationship FDI and Unemployment Rate

The relationship between Foreign Direct Investment flows and the unemployment rate have been intensely analyzed during the last decades, but mixed findings have been reached by theorists. The two theories will be enumerated according to this topic.

2.1.1 The Neo-liberal school (Pro-Foreign Investment School)
The neo-liberal school, which is known as Pro-foreign investment school, argues that FDI can have a crucial impact on economic development of the host counties. They believe that the FDI brings crucial western knowledge and value in the form of management qualities, business ethics, entrepreneurial attitudes, better labor to capital ratio, and production techniques. Therefore, the FDI leads to the growth of enterprises by providing access to Western markets. Thus, this growth in turn

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[5]*Ministry of Trade (Turkey Republic)*
https://www.trade.gov.tr/

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provides a source of new jobs and stimulates demand for input from domestic suppliers. And so, FDI introduces new market entrant beyond the domestic economies hosting TNCs affiliates. According to pro-foreign investment school, the FDI is able to create new jobs and decrease unemployment rate in the developing countries (Ugochukwu, Amah and Onoh, 2013).

2.1.2 Dependency theory

In contrast to this submission by the pro-foreign investment school, the dependency theory advocates see FDI as the advanced guard for a new diplomacy of economic imperialism. To them, foreign investors' penetration into a host economy would result in 'disarticulated development'. They also believe that the integration of developing countries' economy into the world of capitalist system result in their underdevelopment in a sort of what Wolf (1974) referred to as "dependence causes underdevelopment" (Ugochukwu *et al.,* 2013). According to Aremu (2005), the dependency theory maintains that developing countries are poor because they have been systematically exploited through:

➢ imperial neglect;
➢ overdependence upon primary products as exports to developed countries;
➢ foreign investors' malpractices, particularly through transfer of price mechanics;
➢ foreign firm control of key economic sectors with crowding-out effect of domestic firms;
➢ implantation of inappropriate technology in developing countries;
➢ introduction of international division of labor to the disadvantage of developing counties;
➢ prevention of independent development strategy fashioned around domestic technology and indigenous investors;
➢ distortion of the domestic labor force through discriminatory remuneration and reliance on foreign capital in form of aid that usually aggravated corruption and dependency syndrome (Ugochukwu *et al.,* 2013).

In the same vein, the dependency theorists have also focused on how FDIs of multinational corporations distort developing nation economy. In the view of these scholars, distortions include the crowding out of national firms, rising unemployment related to the use of capital-intensive technology, and a marked loss of political sovereignty. It is also argued that the FDIs are exploitative and imperialistic in nature, thus ensuring that the host country absolutely depends on the home country and her capital. From the forgoing, dependency theories believe that the participation of the developed countries into developing nations via their FDIs or any other means cannot be expected to produce beneficial result on the developing economies neither in the taxation regime (Liapis *et al.,* 2014; 2012; Galanos *et al.,* 2014).

3. Empirical Studies

The relationship between Foreign Direct Investment (FDI) and unemployment rate (UEMP) has been a topic of discerning researches in the last years. The empirical studies gave the various results due to analyzed country, amount of series and applied empirical models. Thus, in some research it has been found that FDI has a positive impact on decreasing the unemployment rate and vice versa. For instance, Brincikova and Darmo (2014) analyzed the impact of FDI inflows on employment of V4 countries by using panel data for a time period from 1993 to 2012 through panel regression analysis. According to the results, it has been found that there is the positive effect of FDI inflows on employment in V4 Countries. Djambaska and Lozanoska (n.d.), examined the relationship between unemployment and foreign direct investment (FDI) in the Republic of Macedonia for the period 1999-2013. The multiple linear regression analysis has been employed in the statistical part of the paper.

According to the empirical results, it is concluded that FDI did not have statistically significant impact on the decrease of the unemployment. The impact of the inflation on unemployment is inverse, which means that increased inflation will reduce the unemployment rate in the economy. Also, reducing the corruption will contribute to the unemployment decrease as corruption had significant impact on the decrease of the unemployment. Zdravković, DJukić and Bradić-Martinović (2017) examined the relationship between FDI inflows per capita and unemployment rates in 17 transitioning countries over the period 2000-2014.

The panel co-integration approach has been applied in the empirical part of the paper. The evidence from seven performed panel co-integration tests provide mixed results, while the Fully Modified and Dynamic OLS panel estimations indicate that FDI and unemployment are most likely not co-integrated. Palát (2011), analyzed the impact of inward FDI flows into Japanese economy and unemployment development for the time span between 1983-2009. The regression and correlation analysis (including testing the statistical significance) were used in the analysis of FDI and unemployment.

The correlation has been approved between FDI and the rate of unemployment. Irpan *et al.* (2016) examined the impact of FDI on the unemployment rate in Malaysia during the period from 1980 to 2012. The autoregressive distributed lag (ARDL) model is used to determine the long run relationship between the variables. The study finds that FDI, number of foreign workers, and GDP significantly influence the unemployment rate in Malaysia (Zeb, Qiang and Sharif, 2014), analyzed the impact of Foreign Direct Investment (FDI) on the unemployment rate in Pakistan for the time span from 1995 to 2011. The multiple regression analysis is used to examine the effect of selected explanatory variables on the unemployment rate in Pakistan. Results reveal that Foreign Direct Investments play a significant role in unemployment reduction in Pakistan. Johnny, Timipere and Krokeme (2018),

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examined the impact of foreign direct investment on unemployment rate in Nigeria from 1980 to 2015. The unit root test, co-integration test, and ordinary least square have been employed to accomplish the empirical part of the paper. The study revealed that there is a negative and an insignificant relationship between Foreign Direct Investment and unemployment rate in Nigeria, there is positive and significant relationship between capital formation and unemployment rate in Nigeria. Grahovac and Softić (2017) examined the relationship between FDI and unemployment rate in Western Balkan countries for a time period 2000-2014. The Multiple Linear Regression model was applied for empirical part of the paper.

According to the results, there was not a positive impact of FDI on unemployment rate in Western Balkan countries. Stamatiou and Dritsakis (2014), analyzed the relationship between unemployment rate, foreign direct investments and economic growth in Greece using annual time series data for the period from 1970 to 2012. Several econometric models are applied including the bounds testing ARDL approach and the ECM-ARDL model. The results confirm a long run relationship among the examined variables. Simionescu and Simionescu (2017), examined the relationship between FDI and unemployment rate in the US for the period from 2000 to 2016. A Vector error correction model was built for checking the long-and the short-term relationship between FDI inflows and the absolute variation of unemployment rate in the current period compared to the previous period. The empirical findings showed that only in the long-term the changes in the US unemployment rate influenced the FDI. There was not any short-run relationship between FDI and variation in unemployment rate.

4. Data Description

This investigation considers the secondary time series dataset, which was obtained from the IMF[6] for the period span from 1980 to 2017. All variables were converted into logarithms namely LnFDI, LnUEMP. The Eviws-8 has been employed for the empirical part of the paper. These two variables were utilized in the model:
- FDI–Foreign Direct Investment: Inward and outward flows and stock, annual (current US$);
- UEMP–Unemployment Rate: The number of unemployed persons as a percentage of the total labor force (%).

5. Methodology

5.1 Augmented Dickey-Fuller Unit Root Test

To avoid the spurious results the level of stationarity of the variables was checked through the Augemented Dickey-Fuller test (ADF). The Augmented Dickey-Fuller

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[6]*IMF – International Monetary Fund*
https://www.imf.org/en/data

test was developed by Dickey and Fuller, the American statistician in 1979. The Dickey-Fuller test is used to determine whether a unit root, a feature that can cause issues in statistical inference, is present in an autoregressive model[7]. ADF test equation is[8] (1):

$$y_t = c + \delta t + \phi y_{t-1} + \beta_1 \Delta y_{t-1} + \ldots + \beta_p \Delta y_{t-p} + \varepsilon_t \tag{1}$$

where: Δ is the differencing operator, such that $\Delta y_t = y_t - y_{t-1}$;
the number of lagged difference terms, p, is user specified;
ε_t is a mean zero innovation process.

The null hypothesis of a unit root is: H0: $\phi = 1$, under the alternative hypothesis, $\phi < 1$. Variants of the model allow for different growth characteristics. The model with $\delta = 0$ has no trend component, and the model with $c = 0$ and $\delta = 0$ has no drift or trend. The test that fails to reject the null hypothesis, fails to reject the possibility of a unit root. To estimate the significance of the coefficients in focus, the modified T (Student)-statistic (known as Dickey-Fuller statistic) is computed and compared with the relevant critical value. If the test statistic is less than the critical value then the null hypothesis is rejected. Each version of the test has its own critical value which depends on the size of the sample[9].

5.2 Philips-Perron Unit Root Test

The Phillips-Perron (PP) unit root test was developed by statisticians, Phillips and Perron (1988). Though the PP unit root test is similar to the ADF test, the primary difference is in how the tests each manage serial correlation. Where the PP test ignores any serial correlation, the ADF uses a parametric autoregression to approximate the structure of errors[10]. The mathematical equation of test is[11] (2):

$$y_t = c + \delta t + a\, y_{t-1} + e(t) \tag{2}$$

where e(t) is the innovations process.
The test assesses the null hypothesis under the model variant appropriate for series with different growth characteristics ($c = 0$ or $\delta = 0$). To estimate the significance of the coefficients in focus, the modified T (student)-statistic (known as Phillips-Perron statistic) is computed and compared with the relevant critical value. If the test statistic is less than the critical value then the null hypothesis is rejected. Each version of the test has its own critical value which depends on the size of the sample.

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[7]*ThoughtCo, The Augmented Dickey-Fuller Test https://www.thoughtco.com*

[8]*MathWorks, The Augmented Dickey-Fuller Test https://www.mathworks.com*

[9]*RTMath, Mathematics experts in quantitative finance https://rtmath.net*

[10]*ThoughtCo, The Augmented Dickey-Fuller Test https://www.thoughtco.com*

[11]*MathWorks, Phillips-Perron test for one unit root https://www.mathworks.com*

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5.3 Johansen Co-integration Test

The Johansen co-integration test was developed by Danish statistician, Soren Johansen, in 1991. It is a statistical model for testing co-integration between several series, those are integrated in order I(1) at 1st difference through trace and Eigenvalue tests. The mathematical equation of test is[12] (3):

$$yt= \mu + A_1y_{t-1} + \ldots + A_py_{t-p} + \varepsilon_t \qquad (3)$$

H0= there is no co-integration between analyzed series.
H1= there is at most 1 co-integration between analyzed series.
Null hypothesis or alternative hypothesis will be accepted if p-value > 0.05.

5.4 Granger Causality Test

The Granger causality test was developed by British statistician, Sir Clive William John Granger in 1969. It is a statistical concept of causality that is based on prediction. According to Granger causality, a variable X is causal to variable Y if X is the cause of Y or Y is the cause of X[13]. The mathematical equation of test is (4):

$$yt = \alpha_0 + \alpha_1 y_{t-1} + \alpha_2 y_{t-2} + \ldots + \alpha_m y_{t-m} + error_t \qquad (4)$$

H0= X doesn`t Granger Cause Y and Y doesn`t Granger Cause X.
Null hypothesis will be accepted if p-values is more than 0.05.

6. Empirical Results

6.1 Augmented Dickey Fuller Unit Root Test

As the pre-condition of Johansen co-integration test proposes, selected time-series must be non-stationary at a level and stationary at the 1st difference. Thus, the ADF test individually has been performed on the variables. According to the result of ADF test, the null hypothesis that series has a unit root at levels should be accepted, because T-statistics are less than the critical values at 1% and 5% level of significance and p-values of both variables are more than 0.05. Thus, after taking the first difference, the series became stationary according to these outputs, T-statistics more than the critical values at 5% level of significance and P-values less than 0.05. Based on results, the null hypothesizes that both series have unit root at 1st difference should be rejected. Thus, ADF results showed that the observed series appeared to be integrated of order one (I(1)) (Table 1).

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[12]*IMF-International Monetary Fund, Testing for Co-integration Using the Johansen Methodology when Variables are Near-Integrated https://www.imf.org*
[13]*Statistics How To, Granger Causality Test https://www.statisticshowto.datasciencecentral.com/*

Table 1. *Augmented Dickey Fuller unit root test results*

Null Hypothesis: (lnUEMP) has a unit root					
Variables	**ADF Test Statistic**	**Level**	**Critical values**	**Prob***	**Conclusion**
Unemployment rate (%) at level: (lnUEMP)	-1.749975	1%	-3.621023	0.3986	Non-stationary
		5%	-2.943427		
		10%	-2.610263		
Null Hypothesis: D(lnUEMP) has a unit root					
Unemployment rate (%) at 1st difference: (lnUEMP)	-5.434094	1%	-3.626784	0.0001	Stationary
		5%	-2.945842		
		10%	-2.611531		
Null Hypothesis: (lnFDI) has a unit root					
Foreign Direct Investment at level: (lnFDI)	-1.998829	1%	-3.621023	0.2861	Non-stationary
		5%	-2.943427		
		10%	-2.610263		
Null Hypothesis: D(lnFDI) has a unit root					
Foreign Direct Investment at 1st difference: (lnFDI)	-7.330605	1%	-3.626784	0.0000	Stationary
		5%	-2.945842		
		10%	-2.611531		

Source: *Author`s own calculations.*

6.2 Philips-Perron Unit Root Test

Additionally, Philips-Perron Unit Root Test was performed for checking stationary level of series. According to the result of PP test, the null hypothesis that series has a unit root at levels should be accepted, because T-statistics are less than the critical values at 1% and 5% level of significance and P-values of variables are more than 0.05. Thus, after taking the first difference, the series became stationary according to these outputs. T-statistics more than the critical values at 5% level of significance and P-values less than 0.05. Based on results, the null hypothesizes that series have unit root at 1st difference should be rejected. Thus, PP results showed that the observed series appeared to be integrated of order one (I (1)) (Table 2).

Table 2. *Philips–Perron Unit Root Test results*

Null Hypothesis: (lnUEMP) has a unit root					
Variables	**PP Test Statistic**	**Level**	**Critical values**	**Prob***	**Conclusion**
Unemployment rate (%) at level: (lnUEMP)	-1.618519	1%	-3.621023	0.4633	Non-stationary
		5%	-2.943427		
		10%	-2.610263		
Null Hypothesis: D(lnUEMP) has a unit root					
Unemployment rate (%) at 1st difference: (lnUEMP)	-8.705047	1%	-3.626784	0.0000	Stationary
		5%	-2.945842		
		10%	-2.611531		
Null Hypothesis: (lnFDI) has a unit root					

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Foreign Direct Investment at level: (lnFDI)	-2.101981	1%	-3.621023	0.2451	Non-stationary
		5%	-2.943427		
		10%	-2.610263		
Null Hypothesis: D(lnFDI) has a unit root					
Foreign Direct Investment at 1st difference: (lnFDI)	-7.611755	1%	-3.626784	0.0000	Stationary
		5%	-2.945842		
		10%	-2.611531		

Source: Authors' own calculations.

6.3 Johansen Co-integration Test

Based on ADF and PP unit root test our series are integrated of the same order, I(1) which means the Johansen co-integration test has been allowed to perform. Johansen co-integration test has been employed for LnUEMP and LnFDI to analyze the long-term relationship between the two. According to the obtained Johansen co-integration test results, those based on trace test (p-values = 0.0319 > 0.05), the null hypothesis is that there is no co-integration between LnUEMP and LnFDI has been rejected. It has been confirmed that there are at most one co-integration between analyzed series (p-value = 0.0846 > 0.05) (Table 3). Based on Johansen co-integration test results, those based on maximum Eigenvalue test (p-value = 0.0560 < 0.05), the null hypothesis that there is no co-integration between analyzed series has been accepted. According to Johansen and Juselius (1990) if two statistics (trace and maximum Eigenvalue tests) conflicts each other's then trace test should be taken into consideration. Relying on this information we can tell that there is at most one co-integration between LnUEMP and LnFDI.

Table 3. *Johansen Co-integration test for LnUEMP and LnFDI*

Johansen Co-integration test: Sample (adjusted): 1982-2017, Included obs.: 36, Series: LnUEMP, LnFDI, Lags interval (in first differences):1 to 1.				
Unrestricted Co-integration Rank Test (Trace)				
Hypothesized No. of CE(s)	**Eigenvalue**	**Trace Statistic**	**0.05 Critical Value**	**Prob.**
None*	0.372960	19.77691	18.39771	0.0319
At most 1	0.079294	2.974110	3.841466	0.0846
Unrestricted Co-integration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	**Eigenvalue**	**Trace Statistic**	**0.05 Critical Value**	**Prob.**
None*	0.372960	16.80280	17.14769	0.0560
At most 1	0.079294	2.974110	3.841466	0.0846

Trace test indicates1 co-integrating eqn(s) at the 0.05 level.
Max-eigenvalue test indicates no co-integrating eqn(s) at the 0.05 level.
* denotes rejection of the hypothesis at the 0.05 level.
Note: ***MacKinnon-Haug-Michelis (1999) p-values.*
Source: *Authors. own calculations.*

6.4 Granger Causality Test

As mentioned previously, causal relationship will be checked between UEMP and FDI through the Granger Causality test. The null hypothesis of the test, states the following:

H_0: *LnFDI does not Granger Cause LnUEMP.*
H_0: *LnUEMP does not Granger Cause LnFDI.*
Null hypothesis will be rejected if the probability value is less than 0.05%.

Table 4. *Granger Causality test for LnUEMP and LnFDI*

Pairwise Granger causality test, Lags 2, Sample 1974-2017		
Null Hypothesis	**F-statistic**	**Prob.**
LnFDI does not Granger Cause LnUEMP	5.25358	0.0282
LnUEMP does not Granger Cause LnFDI	2.15554	0.1512

Source: *Authors' own calculations.*

According to the obtained results, from Granger causality test, the null hypothesis of no causal relationship from FDI to UEMP should be rejected (P-value = 0.0282 < 0.05). But based on P-value = 0.1512 > 0.05, the second null hypothesis of no causal relationship from UEMP to FDI should be accepted. Thus, the results of the causality test demonstrated the unidirectional causal relationship from FDI to UEMP (Table 4).

7. Conclusion

Based on findings from the empirical part of the paper, the results can be compiled as follows. The Johansen co-integration test results indicate at most one co-integration between Foreign Direct Investment (FDI) and unemployment rate (UEMP). Therefore, the Granger Causality test results demonstrated the unidirectional causal relationship from Foreign Direct Investment (FDI) and unemployment rate (UEMP). Likewise, considering the facts based on aforementioned information in introduction part about establishing new companies by foreign investors we can realize that the FDI have a crucial impact on reduction of unemployment rate and stabilizing the economy in Turkey. Thus, with this study, it had been proved that Foreign Direct Investment (FDI) decreases the unemployment rate of the host country based on several important factors. And so, the results which have been gained from empirical parts of this paper supports. The Neo-liberal School (Pro-Foreign Investment School) theory in which said that the FDI has a positive impact on unemployment rate of the host country.

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