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# THE EFFECT OF FOREIGN DIRECT INVESTMENTS ON UNEMPLOYMENT: EVIDENCE FROM PANEL DATA FOR SEVEN DEVELOPING COUNTRIES

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**KEYWORDS**

Foreign direct investments, unemployment, panel unit root, panel cointegration, panel causality.

**ABSTRACT**

In this study, the relationship between foreign direct investment and unemployment are investigated for 7 developing countries, namely Argentina, Chile, Colombia, Philippines, Thailand, Turkey and Uruguay by using the panel data analysis. Panel unit root, panel cointegration and panel causality tests performed by using yearly data from 1981 to 2009 for all countries show that foreign direct investment and unemployment move together in the long run but although foreign direct investment increases unemployment in Turkey and Argentina, it reduces unemployment in Thailand. However, causality tests only depict that there is a relationship from foreign direct investment to unemployment in the long run.

## 1. INTRODUCTION

By the acceleration of globalization tendencies, capital movements and their effects have attracted increasing attention in recent years. Most of the developing countries which do not have adequate national savings in order to support economical development try to meet the deficit by foreign resources. It is assumed that especially foreign direct investments among the foreign resources have positive effects on some economic variables of a country such as national income, balance of payments, inflation, productivity and poverty. Moreover, it is expected that unemployment rate will decrease as another result of that type of investments. Unemployment is described as the state of not having a job for some people who are able to and want to work but unable to find a job. The economical and social costs caused by the people who do not take part in the production process are quite high. In the economies having higher unemployment rate, first of all the actual rate of national output falls behind the potential rate of national output since all of the resources cannot be used effectively. Furthermore, unemployment constitutes an important risk factor for poverty.

In the open economies, the solution of the unemployment problem can be ensured by foreign direct investments (FDI). Because FDI creates employment possibilities by assisting the developing process of industries and these developing industries generate additional business spaces by forward and backward linkages. Actually, FDI has some both positive and negative direct or indirect effects on the quantity, quality and location of employment. When the quantity of employment considered, inward FDI adds to net capital and creates jobs in expanding industries (positive direct effect) while it creates jobs through forward and backward linkages and multiplier effects in local economy (positive indirect effect). On the other hand, acquisitions may result in rationalization and job losses (negative direct effect) and reliance on imports or displacement of existing firms may result in job loss (negative indirect effect). When we look at the quality of employment, inward FDI pays higher wages and has higher productivity (positive direct effect)

and there is a spillover of "best practice" work organization to domestic firms (positive indirect effect). However, it can introduce practices in e.g. hiring and promotion that are considered undesirable (negative direct effect) and erode wage levels as domestic firms try to compete (negative indirect effect). Finally in terms of the location of employment, inward FDI adds new and perhaps better jobs in areas with high unemployment (positive direct effect) and encourages migration of supplier firms to areas with available labor supply (positive indirect effect). Nevertheless, when FDI has come to an area, crowds can congest urban areas and it may worsen the regional imbalances (negative direct effect). Moreover, inward FDI may displace the local producers, adding to regional unemployment, if foreign affiliates substitute for local production or rely on imports (negative indirect effect) (Jenkins, 2006).

## 2. LITERATURE REVIEW

There are a lot of studies examining the effects of FDI on both employment and unemployment. Even though an important part of the results shows that FDI decreases the rate of unemployment, some findings could be coincided which show that there is no causal relationship between FDI and unemployment or there is a negative relationship between them.

Craigwell (2006) examined the relationship between employment and foreign direct investment for 20 English and Dutch Speaking Caribbean Countries for the period 1990-2000. He found that an increase in FDI in the entire sample of Caribbean countries leads to an approximate one-to-one increase in employment. Jayaraman and Singh (2007) investigated the relationship between employment and foreign direct investment for Fiji through a multivariate modeling strategy by including GDP. They found unidirectional long run causality running from foreign direct investment to employment and a unidirectional causality running from foreign direct investment to GDP in the short-run. Massoud (2008) studied the empirical evidence on the direct effects of FDI inflows to Egypt throughout the period 1974-2005. The results of the effect of FDI on the demand for labour; where aggregate FDI had an insignificant effect on the demand for labour, except when it interacted with the size of the technology gap, then aggregate FDI had a negative effect impact on the demand for labour. Greenfield and manufacturing FDI had a positive effect when they interacted with the level of human capital and exports, while mergers and acquisitions, agriculture and services FDI had negative direct effect and insignificant interactive effects. Ajaga and Nunnekamp (2008) investigated the long-run relationships between inward FDI and economic outcomes in terms of value added and employment at the level of US states and found a fairly strong evidence of favorable FDI effects on output and employment at the level of US states. At the same time, feedback effects play an important role. In the study for Turkish Economy performed by Hisarcıklılar et. al (2009), they suggested that FDI inflow through mergers and acquisitions did not increase employment. On the other hand, according to the findings of Aktar and Öztürk (2009) there was not any causal relationship between FDI inflow and employment in Turkey. Karlsson et. al (2009) analyzed FDI and employment in China using a large sample of manufacturing firms for the period 1998-2004. The results show that FDI has positive effects on employment growth. Employment growth is also relatively high in private domestic Chinese firms. There also seems to be a positive indirect effect of FDI on employment in private domestically-owned firms, presumably caused by spillovers. In the study for in Mexico's non-maquiladora manufacturing sector Waldkirch et. al (2009) reached a conclusion that FDI has a significantly positive, though quantitatively modest impact on manufacturing employment. Lipsey et. al (2010) examined the employment growth in Indonesia in a large panel of plants between 1975 and 2005, and especially in plants taken over by foreign owners from domestic ones. Employment growth is relatively high in foreign-owned establishments, although foreign firms own relatively large domestic plants, which in general grow more slowly than smaller plants. For plants that change the

nationality of ownership during our period, they found a strong effect of shifts from domestic to foreign ownership in raising the growth rate of employment, but no significant effects of shifts from foreign to domestic ownership. According to Saray (2011), for the data set of 1970-2009 periods, there was not a long term significant relationship between foreign direct investment and employment in Turkey and his findings showed that foreign direct investment did not have any contribution to reduce employment in Turkey. Yaylı and Değer (2012) in their study where dynamic panel causality tests for 27 developing countries had been used setting the 1991-2008 periods as a basis, observed a unidirectional casual relationship from foreign direct investments to employment in the short run. In another study, Habib and Sarwar (2013) focused the impact of foreign direct investment on employment level in Pakistan between 1970 and 2011. The variables in the study were employment level, foreign direct investment, exchange rate and GDP per capita. According to the findings, they determined the existence of a long run relationship. Göçer et. al (2013) analyzed the effect of export and foreign direct investments on unemployment in Turkey by using the data of the period 2000:Q1-2011:Q1. They found that in the long term, export and foreign direct investments have a declining effect on unemployment and the influence of export is higher. In another study for Turkey, Bakkalcı and Argın (2013) investigated the relationship between FDI, growth, productivity, employment and wages using 1991-2011 data and stated that inward FDI affects the employment and firm performances positively and therefore it creates a more productive structure in the Turkish economy.

A summary of the studies investigating the causal relationship between these two variables is demonstrated in Table 1.

**Table 1: Selected Empirical Studies on Foreign Direct Investment – Unemployment Nexus**

| Authors | Country | Period | Methodology | Conclusion |
|---|---|---|---|---|
| Craigwell (2006) | English and Dutch Speaking Caribbean Countries | 1990-2000 | Panel Data Analysis | FDI to unemployment |
| Jayaraman and Singh (2007) | Fiji | 1970-2003 | Cointegration, Granger Causality | FDI to unemployment |
| Massoud (2008) | Egypt | 1974-2005 | TSLS Regression Technique | FDI to unemployment |
| Ajaga and Nunnekamp (2008) | USA | 1977-2001 | Panel Cointegration Approach | FDI to unemployment |
| Hisarcıklılar et. al (2009) | Turkey | 2000-2007 | Generalized Method of Moments (GMM) | FDI to unemployment |
| Aktar and Öztürk (2009) | Turkey | 2000-2007 | VAR Analysis | No causality |
| Karlsson et. al (2009) | China | 1998-2004 | OLS Technique | FDI to unemployment |
| Waldkirch et. al (2009) | Mexico | 1994-2006 | Generalised Method of Moments (GMM) | FDI to unemployment |
| Lipsey et. al (2010) | Indonesia | 1975-2005 | Probit Model | FDI to unemployment |
| Saray (2011) | Turkey | 1970-2009 | ARDL Test, Error Correction Model | No causality |
| Yaylı and Değer (2012) | 27 Developing Countries | 1991-2008 | Dynamic Panel Data | FDI to unemployment |
| Habib and Sarwar (2013) | Pakistan | 1970-2011 | Johansen Co-integration Approach | FDI to unemployment |
| Göçer et. al (2013) | Turkey | 2000-2011 | Boundary Test Approach | FDI to unemployment |
| Bakkalcı and Argın (2013) | Turkey | 1991-2011 | Causality Tests | No causality |

## 3. METHODOLOGY AND DATA

In this study, the relationship between foreign direct investment (FDI) and unemployment (UNEMP) are investigated for 7 developing countries, namely Argentina, Chile, Colombia, Philippines, Thailand, Turkey and Uruguay by using the panel data analysis. Yearly data from 1981 to 2009 for all countries are obtained from the databank of World Bank. The choice of the starting period was constrained by the availability of data. The empirical analysis is performed through three levels:

a. panel unit root tests

b. panel cointegration tests

c. panel causality tests

### 3.1. Panel Unit Root Tests

In the research process of panel cointegration relationship, first of all it is necessary to determine the existence of unit root in the series. There are many kinds of methods of panel unit roots test. In this study, the tests developed by Levin, Lin and Chu (LLC), Im, Peseran and Shin (IPS) and Hadri were used.

#### 3.1.1. LLC Test

LLC (2002) argued that individual unit root tests have limited power against alternative hypotheses with highly persistent deviations from equilibrium. This is particularly severe in small samples. LLC suggest a more powerful panel unit root test than performing individual unit root tests for each cross-section. The null hypothesis is that each individual time series contains a unit root against the alternative that each time series is stationary (Baltagi, 2005: 240). The model used by Levin, Lin and Chu (2002) in their study can be shown as follows:

$$\Delta y_{it} = \rho y_{it-1} + \sum_{L=1}^{p_i} \theta_{iL} \Delta y_{it-L} + \alpha_{mi} d_{mt} + \varepsilon_{it} \qquad \text{m=1,2,3} \qquad (1)$$

where $d_{mt}$ is used to indicate the vector of deterministic variables and $\alpha_m$ is used to indicate the corresponding vector of coefficients for a particular model m=1; 2; 3. Thus, $d_{1t} = \theta$ (the empty set); $d_{2t}$ ={1}and $d_{3t}$ ={1; t}. Since the lag order $p_i$ is unknown, LLC suggest a three-step procedure to implement their test. These steps are (Levin et., 2002: 5):

a. Different ADV regressions are applied for each cross sections.

b. An estimation is made from long-term standard deviations to short-term deviations. Long-term variance of the model is estimated under the unit root null hypothesis.

c. Panel test statistics are calculated and compared with table values of LLC (2002). If $H_0$ hypotheses is rejected it is decided that the series does not include unit root and is stationary.

### 3.1.2. IPS Test

The Levin, Lin and Chu test is restrictive in the sense that it requires $\rho$ to be homogeneous across *i*. IPS allow for a heterogeneous coefficient of $y_{it-1}$ and propose an alternative testing procedure based on averaging individual unit root test statistics. IPS suggest an average of the ADF tests when $u_{it}$ is serially correlated with different serial correlation properties across cross-sectional units (Baltagi, 2005: 242).

The model can be shown as the following equation (N is for cross section and T is for time):

$$\Delta y_{it} = \alpha_i + \beta_i y_{i,t-1} + \varepsilon_{it} \qquad (2)$$

Unit root test is based on zero equation of $\beta$ coefficient just as ADF test. Null hypotheses in IPS test is $H_0 : \beta_i = 0$ for all $i$ and alternative hypotheses is $H_1 : \beta_i < 0$. *t*-bar statistics is used in order to test $H_0$ hypotheses. *t*-bar statistic can be written as follows (Im et. al., 2003: 55):

$$\overline{Z} = \frac{\sqrt{N}\left[\bar{t} - E(\bar{t})\right]}{\sqrt{Var(\bar{t})}} \rightarrow N(0,1) \qquad \bar{t} = \frac{1}{N}\sum_{i=1}^{N} t_{\beta_i} \qquad (3)$$

Where $t = (1/N)\sum_{i=1}^{N} t_{\beta_i}$, $E(\bar{t})$, and $Var(\bar{t})$ are the mean and variance for each $t_{\beta_i}$ respectively. IPS test has more favorable finite sample properties than the LLC test (Zhu and Zhao, 2008: 826).

### 3.1.3. Hadri Test

Contrary to the previous first generation tests, the test proposed by Hadri (2000) is based on the null hypothesis of stationarity. It is an extension of the stationarity test developed by Kwiatkowski et. al. (1992) in the time series context. Hadri proposes a residual-based Lagrance multiplier test for the null hypothesis is that the individual series $y_{it}$ (for $i = (1,...,N)$ are stationary around a deterministic level or around a deterministic trend, against the alternative of a unit root in panel data (Hurlin and Mignon, 2004: 7).

It is based on the following regression (Maeso-Fernandez et. al., 2004: 16):

$$y_{it} = \alpha_i + \gamma_i t + \sum_{t=1}^{T} u_{it} + \varepsilon_{it} \qquad (4)$$

where the deterministic terms are defined as in (4) above, and the error term has two components: $\varepsilon_{it}$, which is white noise, and $\sum_{t=1}^{T} u_{it}$, which is a random walk. The test is based on the fact that under the null hypothesis of stationarity the variance of the random walk component $\left(\sigma_u^2\right)$ is zero.

The test statistic takes the form $\frac{\sigma_u^2}{\sigma_\varepsilon^2}$, which has a standard normal distribution under the null hypothesis.

### 3.2. Panel Cointegration Tests

The cointegration tests are implemented through two main tests, namely Pedroni (1997, 1999 and 2000) and Larrson et.al. (2001). In this study we utilize Pedroni's panel cointegration technique to examine whether there is a long-run relationship between FDI and unemployment. The implementation of Pedroni's cointegration test firstly requires estimating the following long run relationship (Pedroni, 1999: 656):

$$y_{it} = \alpha_i + \delta_i t + \beta_{1i} x_{1,it} + \beta_{2i} x_{2,it} + ... + \beta_{Mi} x_{M,it} + \varepsilon_{it} \quad (5)$$

for $i = 1,...,N$ ; $t = 1,...,T$ ; $m = 1,...,M$

where T refers to the number of observations over time, N refers to the number of individual members in the panel, and M refers to the number of regression variables. The structure of estimated residuals is as follows (Bangake and Eggoh, 2011):

$$\hat{\varepsilon}_{it} = \hat{\rho}_i \hat{\varepsilon}_{it-1} + \hat{u}_{it} \quad (6)$$

Pedroni had developed seven panel cointegration statistics for varying intercepts and varying slopes. Four of them, pooled panel cointegration statistics, are within-dimension based statistics. The other three, group mean panel cointegration statistics, are between-dimension based. The pooled panel cointegration test statistics are as follows (Ho and Huang, 2009):

$$\text{Panel } v \text{ statistics} = \left( \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^2 \right)^{-1} \quad (7)$$

$$\text{Panel rho-statistic} = \left( \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^2 \right)^{-1} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i} \left( \hat{e}_{i,t-1} \Delta \hat{e}_{it} - \hat{\lambda}_i \right) \quad (8)$$

$$\text{Panel PP-statistic} = \left( \sigma^2 \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^2 \right)^{-1/2} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \left( \hat{e}_{i,t-1} \Delta \hat{e}_{it} - \lambda_i \right) \quad (9)$$

$$\text{Panel ADF-statistic} = \left( \hat{s}^{*2} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11}^{-2} \hat{e}_{i,t-1}^{*2} \right)^{-1/2} \left( \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{1,t-1}^{*} \Delta \hat{e}_{i,t}^{*} \right) \quad (10)$$

The group-mean panel cointegration test statistics are as follows:

$$\text{Group rho-statistic} = \sum_{i=1}^{N} \left( \sum_{t=1}^{T} \hat{e}_{i,t-1}^2 \right)^{-1} \sum_{t=1}^{T} \left( \hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \hat{\lambda}_i \right) \quad (11)$$

$$\text{Group PP-statistic} = \sum_{i=1}^{N}\left(\hat{\sigma}_i^{\,2}\sum_{t=1}^{T}\hat{e}_{i,t-1}^{2}\right)^{-1/2}\sum_{t=1}^{T}\left(\hat{e}_{i,t-1}\Delta\hat{e}_{i,t}-\hat{\lambda}_i\right) \quad (12)$$

$$\text{Group ADF statistic} = \sum_{i=1}^{N}\left(\sum_{t=1}^{T}\hat{S}_i^{-2}\hat{e}_{i,t-1}^{*2}\right)^{-1/2}\sum_{t=1}^{T}\hat{e}_{i,t-1}^{*}\Delta\hat{e}_{i,t}^{*} \quad (13)$$

Large positive values reject the null hypothesis that means there is no cointegration in the panel ν-statistic which is a one-sided test. However, the other statistics diverge to negative infinitely meaning that large negative values reject the null hypothesis. The critical values are also depicted by Pedroni (1999). These tests are able to accommodate individual specific short-run dynamics, individual specific fixed effects and deterministic trends as well as individual specific slope coefficients (Pedroni, 2004).

### 3.3. Panel Causality Tests

Panel causality test is used in order to examine the direction of causality between the variables in a panel context. The fact that if two non-stationary variables are cointegrated, a vector autoregression (VAR) in first differences will be mis-specified was first suggested by Engle and Granger (1987). If there exists a long-term equilibrium relationship between FDI and unemployment when we test it for Granger causality, we need to bring out a model with a dynamic error correction representation meaning that the traditional VAR model is augmented with a one period lagged error correction term. The Granger causality test is based on the following regressions:

$$\Delta FDI_{it} = \alpha_{1i} + \sum_{k}\theta_{11ik}\Delta FDI_{it-k} + \sum_{k}\theta_{12ik}\Delta UNEMP_{it-k} + \lambda_{1i}ECT_{it-1} + u_{1it} \quad (14)$$

$$\Delta UNEMP_{it} = \alpha_{2i} + \sum_{k}\theta_{21ik}\Delta UNEMP_{it-k} + \sum_{k}\theta_{22ik}\Delta FDI_{it-k} + \lambda_{2i}ECT_{it-1} + u_{2it} \quad (15)$$

where $\Delta$ denotes the first difference of the variable, $ECT$ is the error –correction term, and k denotes the lag length. From the system, the panel Granger-causality tests are examined by testing whether all the coefficients of $\Delta FDI_{it-k}$ or $\Delta UNEMP_{it-k}$ are statistically different from zero as a group based on a standard F-test and/or the $\lambda_{i,i}$ coefficient of the error correction is also significant (denoting long run causation). The coefficients of the ECTs measure how fast the values of the variables of the system come back to the long-run equilibrium levels when they deviate from it.

### 3.4. Empirical Results

As in the time series analysis, variables are needed to be stationary in order to prevent spurious regressions between variables in the panel data analysis which performs both time and cross section analysis together. LLC, IPS and Hadri were used among panel unit root tests for the stationarity testing[1]. The findings about unit root test are demonstrated in Table 2.

**Table 2: Results of Panel Unit Tests**

| | **Levin, Lin & Chu** | | **Im, Pesaran and Shin** | | **Hadri** | |
|---|---|---|---|---|---|---|
| FDI | -0.90929 | 0.1816 | -0.26902 | 0.6060 | 6.32380 | 0.0000 |
| UNEMP | 0.20204 | 0.5801 | -0.36314 | 0.3582 | 2.46312 | 0.0069 |
| $\Delta$ FDI | -15.8483 | 0.0000 | -15.2585 | 0.0000 | 0.14826 | 0.4411 |
| $\Delta$ UNEMP | -4.09629 | 0.0000 | -6.45714 | 0.0000 | 0.14994 | 0.4404 |

Note: Automatic lag length selection based on Modified Schwarz Criteria and Bartlett kernel.

Since the probability values calculated in LLC and IPS are bigger than the critic value 0.05, the null hypothesis accepting that series involve unit root is not rejected. However, as the probability values calculated in Hadri are smaller than 0.05, the null hypothesis accepting that series do not involve unit root is rejected. Therefore, the findings of three tests support each other. According to these results, it is seen that series are not stationary in level but in the unit root tests after their first difference are taken they seem to become stationary. The stationarity of the series at their first difference shows that there may be a relationship between them in the long run.

The Pedroni Panel Cointegration Approach was used for determining the long-term relationship between the series in our study. Pedroni developed 7 tests in order to determine the cointegration in the panel data models. In these tests, $H_0$ null hypothesis shows that there is no cointegration. The results of Pedroni panel cointegration tests are demonstrated in Table 3.

[1]All estimation was done using EViews 5.1.

**Table 3: Panel Cointegration Tests: Pedroni**

| **Within-dimension** | **Constant** | **Constant and Trend** |
|---|---|---|
| Panel v-Statistic | 1.96308** | -0.09306 |
| Panel rho-Statistic | -2.28360** | 0.09879 |
| Panel PP-Statistic | -1.93431** | -0.08523 |
| Panel ADF-Statistic | -2.08167** | -0.51904 |
| **Between-dimension** | | |
| Group rho-Statistic | -0.89396 | 1.08438 |
| Group PP-Statistic | -1.36132 | 0.63992 |
| Group ADF-Statistic | -1.81333** | 0.06257 |

*Note:* All statistics are from Pedroni's procedure (1999) where the adjusted values can be compared to the N(0,1) distribution. The Pedroni (2004) statistics are one-sided tests with a critical value of -1.64 ($k < -1.64$ implies rejection of the null), except the *v*-statistic that has a critical value of 1.64 ($k > 1.64$ suggests rejection of the null). ** indicates rejection of the null hypothesis of no-co-integration at 5%, level of significance.

In constant level, panel v statistical value is bigger than the critical value 1.64 and four of the other six statistics are smaller than the critical value 1.64. In this context, the Pedroni's tests indicate that there is a long-run relationship between foreign direct investment and unemployment. Since there is a long-term relationship in the panel group, Dynamic Ordinary Least Squares (DOLS) and Fully Modified Ordinary Least Squares (FMOLS) estimators were used in order to estimate the panel cointegration vector in our study[2]. Spurious regression -when the series are nonstationary- is a result of the use of normal OLS techniques. In this situation, specific panel cointegration techniques have to be used. Phillips and Moon (2000) show that in the case of homogeneous and near-homogeneous panels, the coefficient of cointegration can be estimated by a fully modified (FM) estimator. This method is non-parametric as it employs kernel estimators of the nuisance parameters affecting the asymptotic distribution of the OLS estimator. It overcomes the possible problem of endogeneity of the regressors as well as the autocorrelation of residuals. Alternatively, Kao and Chiang (2000) and Mark and Sul (2003) proposed a dynamic least square estimator (DOLS). This estimation procedure is parametric and has the advantage of computing convenience (Bodart, et. al., 2011: 10). DOLS and FMOLS estimators were developed since the cointegrated regression model which was composed of series having a long-term relationship between each other showed deviated results when it was estimated by least squares method. The results for the panel DOLS and FMOLS estimations are reported in Table 4.

[2] DOLS and FMOLS were estimated using the software program RATS 7.0

**Table 4: Individual Panel DOLS and FMOLS Estimators**

| Country | DOLS | | FMOLS | |
|---|---|---|---|---|
| | Coefficient | t-statistic | Coefficient | t-statistic |
| Argentina | 2.79** | 3.55 | 1.15 | 1.48 |
| Chile | -0.24 | -0.74 | -0.22 | -0.59 |
| Colombia | 0.76 | 1.20 | 0.43 | 0.79 |
| Phillippines | 1.11 | 1.75 | 0.52 | 0.99 |
| Thailand | -0.43** | -2.09 | -0.14 | -0.68 |
| Turkey | 1.40** | 4.05 | 0.92** | 2.80 |
| Uruguay | -0.12 | -0.42 | -0.23 | -0.84 |
| **Panel group** | 0.75** | 2.76 | 0.35 | 1.49 |

*Note*:** denotes statistical significance at 5 percent level of significance.

The results of DOLS estimates confirm the existence of a long run relationship between FDI and unemployment. According to the results of DOLS panel cointegration, while the sign of coefficient belonging to FDI variable for Argentina and Turkey is positive, the sign of the coefficient for Thailand is negative and it is statistically significant. However, there is not any similar relationship for Chile, Colombia, Philippines and Uruguay. On the other hand, the results of FMOLS demonstrated that there is not a strong relationship for the panel group. Only the finding that FDI has a positive effect on unemployment was reached as parallel to the finding obtained in DOLS for Turkey. This situation can be explained through the fact that FDI inflow to Turkey is mainly brownfield investments which is generally composed of mergers and acquisitions instead of greenfield investments which create new employment opportunities. Moreover, the rationalization process in the companies in which foreign investors gain the power of control has a negative effect on employment.

**Table 5: Panel Granger Causality**

| | Short-run causality | | Long-run causality |
|---|---|---|---|
| | $\Delta$ UNEMP | $\Delta$ FDI | ECT |
| $\Delta$ UNEMP | | 1.46 [0.4812] | 0.13 (2.90) |
| $\Delta$ FDI | 2.72 [0.2566] | | -0.014 (-0.28) |

The *p*-values and t-ratios are in brackets and parentheses.

Table 5 demonstrates the results of panel causality between FDI and unemployment. In equation 14, as the coefficient of $\Delta FDI_{it-1}$ is statistically insignificant, there is no causality relationship

from FDI to unemployment in the short run. However, $\lambda_{1i}$ -the coefficient of $ECT_{it-1}$- is statistically significant at the level of 10% and there is a causal relationship from FDI to unemployment in the long run. In equation 15, since the t statistical values are insignificant in both short and long run, there is not any causality relationship from unemployment to FDI. This consequence is important in a sense that FDI has an important factor for the employment policies of developing countries.

## 4. CONCLUSION

Unemployment is among the most important problems of all countries whatever their levels of development are. The fundamental factors making this problem so important are its negative effects on both economic and social fields of the society. The most effective and healthy way of eradicating these negative effects is unquestionably economic growth. Ameliorating the investment environment in a country is a determining factor in terms of economic growth which means an increase in the quantity of goods and services manufactured in a specific time period. The capital accumulation which is needed to boost economic growth is tried to be furnished with domestic resources firstly. The capital deficit occurring from low income level and inadequate savings can only be compensated by foreign investment. The investment type which affects the economic growth and accordingly the level of employment in the most efficient way is foreign direct investment. FDI creates important positive externalities in terms of technology and knowhow as much as economic growth and employment. Therefore, developing countries exert very much effort to attract FDI from foreign investors. In this paper, the impact of FDI on unemployment were analyzed for 7 developing countries, namely Argentina, Chile, Colombia, Philippines, Thailand, Turkey and Uruguay through panel data technique by using yearly data from 1981 to 2009 for all countries. The findings disclosed that these two variables are cointegrated in the long run and whilst FDI increases unemployment in Turkey and Argentina, reduces it in Thailand. On the other hand, causality tests displayed that there is only a causal relationship from FDI to unemployment in the long run even though there is no relationship between the variables in the short run.

Consequently, it can be argued that the negative effect of FDI on unemployment is mainly a consequence of brownfield investments which is generally composed of mergers and acquisitions. Therefore, the policymakers should make more emphasis on greenfield investments which are able to create new employment opportunities.

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