FOREIGN DIRECT INVESTMENT AND THE UNEMPLOYMENT: A CAUSALITY ANALYSIS FOR THE BRICS COUNTRIES

DOĞRUDAN YABANCI YATIRIMLAR VE İŞSİZLİK: BRICS ÜLKELERİ İÇİN BİR NEDENSELLİK ANALİZİ

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ABSTRACT

The paper examines the FDI-Unemployment nexus for BRICS countries using annual time series data covering the period of (1992-2018). The variables in the analysis were checked using Augmented Dickey Fuller test statistics. The results obtained indicated that all variables were stationary at first difference for all countries except South Africa which was found to be stationary at level. The results reveal that there is a co-integration relationship between the variables only for India. In other words, there is not a relationship between unemployment and FDI inflows for Brazil, China and Russia. According to Granger Causality Test results, there is a unidirectional causality link flowing from unemployment to FDI inflows for India. This finding is in line with the theory which states that foreign direct investments are attracted in countries where they observe the existence of available work force. The paper recommends that India should focus on designing policies for attracting the foreign investors due to the fact that India has an important potential in this domain.

Keywords: Unemployment, FDI, BRICS, international trade, causality.

ÖZ

Bu makale BRICS ülkeleri için (1992-2018) yıllık zaman serileri verilerini kullanarak DYY-İşsizlik ilişkisini incelemektedir. Analizdeki değişkenler Augmented Dickey Fuller test istatistikleri kullanılarak kontrol edilmiştir. Elde edilen sonuçlar, Güney Afrika dışındaki tüm ülkelerde sabit düzeyde bulunan tüm değişkenlerin ilk farkta sabit olduğunu göstermiştir. Sonuçlar, değişkenler arasında sadece Hindistan için bir eş-bütünleşme ilişkisinin olduğunu ortaya koymaktadır. Diğer bir deyişle, Brezilya, Çin ve Rusya için işsizlik ve doğrudan yabancı yatırım girişleri arasında bir ilişki yoktur. Granger Nedensellik Testi sonuçlarına göre, Hindistan için işsizlikten DYY girişlerine akan tek yönlü bir nedensellik bağlantısı vardır. Bu bulgu, mevcut iş gücünün varlığını gözlemledikleri ülkelerde doğrudan yabancı yatırımların etkilendiğini belirten teori ile uyumludur. Çalışma, Hindistan'ın bu alanda önemli bir potansiyele sahip olması nedeniyle yabancı yatırımcıları cezbetmek için politikalar tasarlamaya odaklanmasını önermektedir.

Anahtar Sözcükler: İşsizlik, DYY, BRICS, uluslararası ticaret, nedensellik

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1. Introduction

Foreign direct investment (FDI) is defined as an investment expressing a long-term interest and control by a foreign direct investor based in one economy in an entity based in another (foreign affiliate) (UNCTAD, 2019). For the development and growth of developing countries one of the biggest problems they face is that they cannot find enough capital for investment. Therefore, by the help of globalization, countries started to compete to attract foreign capital to themselves. It is the foreign direct investment (FDI) that will provide the most benefit to the countries among the various types of capital investment (Korkmaz and Daştan, 2019: 165). FDI is also one approach for introducing new technology and 'know-how,' facilitating access to international markets, and hastening firm restructuring, all of which might possibly contribute to the same growth (Vukmirovic et al., 2021: 122).

Creating employment and increasing the quality of workforce is the biggest gain of FDI to the labor market of developing countries. The effect of foreign direct investment on employment in developing countries is expected to be positive (Bülbül and Emirmahmutoğlu, 2010: 208). According to Peric (2019), the benefits of FDI differs worldwide. For developing countries, these are technology and knowledge, while for developed countries these are increase in average wage and in employment.

Regardless of the level of economic development, it is evident that the unemployment problem escalated by capital insufficiency has become a global issue for each group of countries. Especially with the 2008 economic crisis, the fact that developed countries reduced their investments in emerging economies and even they attempted to withdraw their capital, supports the view that the unemployment problem has deepened (Canbay and Kırca, 2020: 155).

As a contribution to the literature, this study aims to test the FDI inflows and unemployment relationship in the biggest and the most important emerging economies in the world, namely BRICS (Brazil, Russia, India, China and South Africa) countries. In this context, this paper tries to make policy recommendations based on the empirical findings of the study.

The remainder parts of the paper are organized as follows: Section 2 reviews the sytlised facts regarding FDIs in BRICS countries and the literature about the relationship between unemployment and FDI. Section 3 discusses the methodology including sources of data, model specification and tools of analysis. Section 4 presents the data characteristics and the results from ADF Unit Root Test, Johansen Co-integration Test and Granger Causality Test. Finally section 5 contains the conclusion and policy recommendations

2. Stylised Facts and Literature Review

2.1 Stylised Facts Regarding FDIs Amongst BRICS Countries

The size and relative stability of FDI makes it to the most important source of external finance for developing countries (UNCTAD, 2019) (Figure 1). The FDI is considered as an important catalyst for economic development can prove to be a significant asset for adapting to global competition, market requirements, etc. In the present circumstances, BRICS can evolve with the help of FDI to reach developed economies (Nistor, 2015). The BRICS countries offers to foreign investors a number of benefits such as young labor force, cheap labor force, natural resources and big markets. In these emerging economies FDI seem to have a positive impact by contributing to

their development (Subramanian et al., 2018: 1).

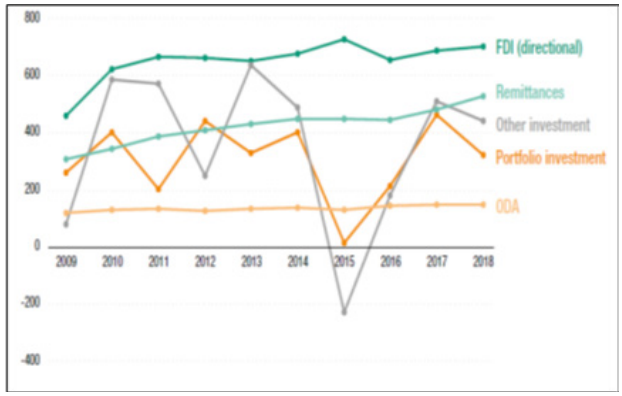

Figure 1. Developing Economies: Sources of External Finance, 2009-2018
Source: UNCTAD, 2019

Looking at the Figure 2, it can be seen that China got the highest share of FDI inflows in the last two decades followed by Brazil and Russia. Although India gained its FDI momentum after 2002, it still has a long way to reach China's FDI share. Among the BRICS nations, South Africa is lagging behind in terms of FDI inflows received between 1990 and 2015. FDI inflows to BRICS occupied 9 % of the world's total FDI in 2015 (Bose and Kohli, 2018: 92).

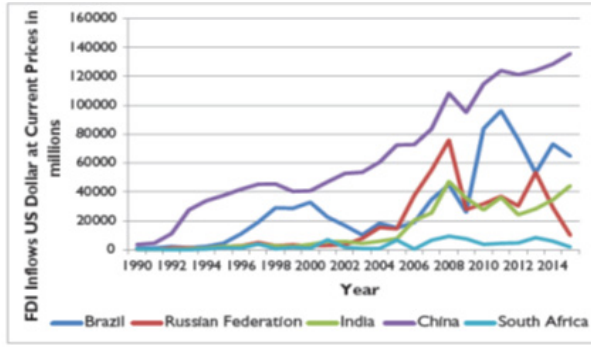

Figure 2: Foreign Direct Investments to BRICS: Inward Flows and Stock, 1990-2015
Source: UNCTAD FDI Statistics

Due to trade wars between China and USA, intervention in exchange rates and withdrawal of FDI adversely affected FDI inflows in BRICS countries, primarily in China. (Chong and Li, 2019: 20). FDI inflows to BRICS fell to 261 billions of US dollars in 2018 compared to 273 billions US dollars in 2013 (UNCTAD Handbook of Statistics, 2019: 54).

2.2 Literature Review

The theoretical background on FDI- employment nexus has its roots from three integrative theories: the theory of the international capital market, the firm theory and the theory of international trade. It is the consequence of seeing FDI in terms of firm behaviour that decides to get involved in international activity. In the 1960s, Raymond Vernon and also in the 1970s, John Dunning had an important role in the highlighting the location advantages in the foreign companies' decision making process. Starting with the 1990s, the multinational company activity starts to be explained by clearly taking into account the location theories and a special attention is directed to institutional variables (Popovici and Calin, 2014: 4).

Many empirical studies show a positive FDI inflows- employment nexus, while some of them provide reverse evidence in the literature. Among the studies in which FDIs have a positive impact on employment, Shaari et al. (2012) analyzed the relationship between foreign direct investment and unemployment and economic growth in Malaysia for the period 1980-2010 by using the least squares method. Findings show that foreign direct investments reduce the unemployment rate and increase GDP. Şahin (2016), investigated the impact of FDI on unemployment rates of some SADC countries (South Africa, Madagascar, Lesotho, Tanzania, Zambia, Namibia, Zimbabwe, Mozambique). In the study, panel dynamic least squares and "Vent for Surplus Theory" was examined for the period 1992-2013. Şahin concluded that there is a positive relation between FDI and the employment in SADC countries. Çolak and Alakbarov (2017), examined the impact of FDI on employment by macro-level perspective for CIS countries (Russia, Belarus, Azerbaijan, Kazakhstan, Kyrgyzstan, Uzbekistan, Tajikistan, Moldova and Armenia). By utilizing the panel data of nine CIS countries over the period 1995-2013, they explored the nexus between FDI and employment by performing Pedroni's (1999,2004) and Kao's (1999) cointegration tests. The authors found not only a long-run positive relationship between FDI and employment, but also the limited employment generated effect of FDI.

Among the studies in which, FDIs have a negative or no certain impact on employment, Vergil and Ayaş (2009) investigated the effect of employment in Turkey by employing panel data techniques and using annual data for the period 1992-2006 for four sectors. The result of panel co-integration model revealed that FDI negatively affects employment fort he sectors and in the period considered. Onimisi (2014) examined the relationship between FDI and employment generation in Nigeria using multiple linear regression model for the period from 2002 to 2012. The author identified employment generation as a dependent variable while FDI, GDP and the nominal interest rate as explanatory variable. Onimisi found that FDI exhibits negative relationship with the level of employment in Nigeria, while GDP and interest rate are positively related with the employment. Djambaska and Lozanoska (2015), investigated the relationship between unemployment and FDI for Macedonia for the period 1999-2013 by employing multiple linear regression analysis. Corruption and population inflation were used in this analysis as an explanatory variable for FDIs. According to empirical results, FDIs did not have a statistically significant effect on reducing unemployment. Inflation's impact on unemployment is counterproductive, which will lead to higher inflation and unemployment. Also, since corruption has a significant impact on unemployment, reducing corruption will contribute to reducing unemployment.

Among the studies on causality relationship between the variables, Stamatio and Dritsakis (2014), examined the relationship between unemployment rate, FDIs and economic growth in

Greece using annual time series data for the period 1970-2012. They applied several economic models including ARDL approach and ECM-ARDL model. The results confirmed a strong unidirectional relationship among the examined variables both in the short and long run. Strat et al. (2015), analyzed the short term causal relationship between FDI inflows and unemployment in the latest EU countries for the period 1991-2012. They found that there is a one direction causality relation from FDI inflows to unemployment for Hungary, Malta, Bulgaria and Estonia. They also found a causality from unemployment to FDI inflows for Romania, Czechia and Slovakia. Finally, Canbay and Kırca (2020) analyzed the impact of FDI on unemployment rate in Turkey using ARDL bound test and Granger causality test based on 1991-2016 period. They found no statistically significant relationship between FDI and unemployment in the short term. In addition, according to the results of the Granger causality analysis based on the error correction model, they found a causality from FDI to unemployment in the long run.

3. Data and Methodology

The data is made up annual time series data of net FDI inflows and the unemployment rate in 5 BRICS countries: Brazil, Russia, India, China and South Africa respectively. The data ranges from 1992 to 2018. Due to comparability reasons the net FDI inflows are presented as a percentage from the GDP of the country. By doing so, we don't need to pay special attention to the size difference between these five countries. Both FDI inflows as a percentage of GDP and the unemployment rate of five countries are obtained from KNOEMA website.

The unit root test is formally conducted on the natural logs of the variables (FDI inflows and unemployment) for BRICS countries. In testing for the stationary of the variables, Augmented Dickey Fuller (ADF) (1981) test was used. The test was carried out using on both constant (intercept) only and constant with trend in order to see how robust the outcome will be. In order to determine whether there is a long-term relationship between the two variables of the study, Johansen Cointegration Analysis was employed.

In the study, the causality relationship between variables was examined with Granger causality test. Granger equations are modeled as follows:

$$\Delta \mathrm{UEMP}_t = \alpha_0 + \sum_{n=i}^{k} \alpha_{1n} \Delta \mathrm{UEMP}_{t-n} + \sum_{n=1}^{k} \alpha_{2n} \Delta FDI_{t-n} + \varepsilon_{1t} \quad (1)$$

$$\Delta \mathrm{FDI}_t = \beta_0 + \sum_{n=i}^{k} \beta_{1n} \Delta \mathrm{FDI}_{t-n} + \sum_{n=1}^{k} \beta_{2n} \Delta \mathrm{UEMP}_{t-n} + \varepsilon_{2t} \quad (2)$$

UEMP shows the unemployment rate for BRICS countries, while FDI shows the net FDI inflows to BRICS countries in the models for (1) and (2) above. Two different hypotheses will be tested within the two-variable VAR model. Hypotheses are as follows:

H_0 : Unemployment is not the Granger cause of FDI inflows.

H_0 : FDI inflows are not the Granger cause of unemployment.

4. Empirical Results and Analysis

In this analysis, unemployment variable and FDI inflows were indicated "UEMP" and "FDI", respectively. ADF Unit Root Test results shown in Table 1. For both two variables, unit root test results in their levels showed that variables were not stationary except for South Africa (Table 1). The non-stationary series were tested again by taking their first difference in order to make them stationary. In this respect, we took the first difference of both series of Brazil, Russia, India and China. Both FDI and UEMP variables became stationary at the first difference for Brazil, Russia, India and China using ADF test.

Table 1. Results of ADF Unit Root Test

Unit Root Test	**Augmented Dickey-Fuller**		
Country		**Level**	**1st Difference**
Brazil	**FDI**	-1.91	-4.91*
	UEMP	-0.20	-3.53*
Russia	**FDI**	-1.02	-5.45*
	UEMP	-0.38	-3.44*
India	**FDI**	-0.66	-5.87*
	UEMP	-0.23	-3.40*
China	**FDI**	-0.71	-7.79*
	UEMP	0.29	-3.03*
South Africa	**FDI**	-4.82*	-
	UEMP	-3.97**	-

Note: Significance at 1 % is denoted by * and significance at 5 % is denoted by **.
Source: Computed by author using E-views 10.0

According to the result of ADF Unit Root Test, Brazil's, Russia's, India's and China's FDI and unemployment series became stationary at first difference so they are adequate and sufficient for Johansen Cointegration Analysis. The precondition of the Johansen test is that the variables must be integrated in the same degree or all variables must not become stationary at the level. Both FDI and UEMP of South Africa became stationery at the level. Thus, Johansen Cointegration test is not possible for South Africa.

For Johansen Cointegration Analysis, it is useful to determine the appropriate lag length. Forthis purpose, the VAR model was established for two variables. For this purpose, all the five available lag length criteria (LR, FPE, AIC, SC, HQ) were used. Table 2 shows the appropriate lag lengths according to different information criteria.

Table 2. Results of ADF Unit Root Test

Country	**VAR Model**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
Brazil	**FDI & UEMP**	1	2	2	1	2
Russia	**FDI & UEMP**	1	1	1	1	1
India	**FDI & UEMP**	2	2	2	1	2
China	**FDI & UEMP**	1	3	3	1	1

Source: Computed by author using E-views 10.0

Maximum length was taken as 4 while determining the appropriate lag length. For each model, I have decided to use as optimal lag identified by the most of the employed criteria. Table 3,4,5,6 show the results of the Johansen Cointegration Tests, where the lag length was taken as 1 for China and Russia and 2 for India and Brazil.

Table 3. Johansen Cointegration Test (Brazil)

	Trace Statistics		
	Statistics	**0.05 Critical Value**	**Probability**
H_0: r=0, H_1: r=1	15.86832	20.26184	0.1806
H_0:r=1, H_1: r=2	2.460039	9.164546	0.6855
	Max- Eigen Statistics		
	Statistics	**0.05 Critical Value**	**Probability**
H_0: r=0, H_1: r=1	13.40828	15.89210	0.1182
H_0: r=1, H_1: r=2	2.460039	9.164546	0.6855

Source: Computed by author using E-views 10.0

Table 4. Johansen Cointegration Test (Russia)

	Trace Statistics		
	Statistics	**0.05 Critical Value**	**Probability**
H_0: r=0, H_1: r=1	6.845396	20.26184	0.9068
H_0: r=1, H_1: r=2	3.378427	9.164546	0.5125
	Max- Eigen Statistics		
	Statistics	**0.05 Critical Value**	**Probability**
H_0: r=0, H_1: r=1	3.466970	15.89210	0.9792
H_0: r=1, H_1: r=2	3.378427	9.164546	0.5125

Source: Computed by author using E-views 10.0

Table 5. Johansen Cointegration Test (India)

	Trace Statistics		
	Statistics	**0.05 Critical Value**	**Probability**
H_0: r=0, H_1: r=1	21.12076	20.26184	0.0380
H_0:r=1, H_1: r=2	6.632970	9.164546	0.1472
	Max- Eigen Statistics		
	Statistics	**0.05 Critical Value**	**Probability**
H_0: r=0, H_1: r=1	14.48779	15.89210	0.0820
H_0: r=1, H_1: r=2	0.241471	6.632970	0.1472

Source: Computed by author using E-views 10.0

Table 6. Johansen Cointegration Test (China)

	Trace Statistics		
	Statistics	**0.05 Critical Value**	**Probability**
H_0: r=0, H_1: r=1	13.83012	18.39771	0.1938
H_0:r=1, H_1: r=2	1.622541	3.841466	0.2027
	Max- Eigen Statistics		
	Statistics	**0.05 Critical Value**	**Probability**
H_0: r=0, H_1: r=1	12.20758	17.14769	0.2269
H_0: r=1, H_1: r=2	1.622541	3.841466	0.2027

Source: Computed by author using E-views 10.0

When the results of Johansen test of Brazil, Russia, India and China are examined, we can say that the null hypothesis is not rejected except India. In the case of India, there is a co-integration relationship among the variables, according to trace statistics values. According to max-eigen statistics values, there is not a co-integration relationship among variables since the critical value at 5% is higher than the maximum Eigen values. Nevertheless, it can be accepted that there is a co-integration among variables at 10% for India. This tells us that there is a cointegration relationship between the variables, in other words, the series move together in the long term.

On the other hand, the fact that the series are moving together does not allow us to provide an inference about the causality and causality between the variables. For this reason, Granger causality analysis was used between FDI inflows to India and unemployment of India. Table 7 shows the results of the Granger test.

Table 7. Johansen Cointegration Test (India)

DEPENDENT VARIABLE: UEMP (India)			
	Chi-sq	**df**	**Prob.**
FDI (India)	0.724879	2	0.6960
DEPENDENT VARIABLE: FDI (India)			
	Chi-sq	**df**	**Prob.**
UEMP (India)	11.38534	2	0.0034

Source: Computed by author using E-views 10.0

"H_0 : Unemployment is not the Granger cause of FDI." hypothesis is rejected. That means unemployment is the Granger cause of FDI for India. However, "H_0 : FDI is not the Granger cause of remittances." hypothesis is accepted since probability value is greater than 5%. In the case of India, there is a unidirectional causality link flowing from unemployment to FDI inflows. Unemployment leads to the flow of FDI into India but FDI flows into India do not cause unemployment. Therefore higher unemployment will cause higher inflow of FDI.

5. Conclusion

The study used an annual time series data for the period of 1992-2018 on BRICS countries. The relationship between FDI inflows and unemployment was analyzed by employing Johansen co-integration and Granger Causality tests in the study. Due to comparability reasons the net

FDI inflows are presented as a percentage from the GDP of the country. Both FDI inflows as a percentage of GDP and the unemployment rate of five countries are obtained from KNOEMA website. In the econometric analysis of the data, Eviews10 econometric package program was used.

According to results of ADF Unit Root Test, UEMP and FDI variables of South Africa became stationery at the level. Thus, Johansen Cointegration test is not possible for South Africa. Variables became stationery at first difference for Brazil, India, China and Russia. When Johansen Co-integration test was employed for these four countries, I identified that there is a co-integration relationship between the variables only for India. In other words, there is not a relationship between unemployment and FDI inflows for Brazil, China and Russia. According to Granger Causality Test results, there is a unidirectional causality link flowing from unemployment to FDI inflows for India. Unemployment leads to the flow of FDI into India but FDI flows into India do not cause unemployment. Therefore higher unemployment will cause higher inflow of FDI. This finding is in line with the theory which states that foreign direct investments are attracted in countries where they observe the existence of available work force. Therefore Indian goverment should focus on designing policies for attracting the foreign investors due to the fact that India has an important potential in this domain. However, a huge increase at the unemployment rate may be an evidence of macroeconomic instability and this may cause foreign investors do not invest in the future.

Because this paper examines the FDI-unemployment nexus in a macro-level and can be explained with international trade theories, it does not deal with home country effects or industry specific effects of FDI in BRICS countries. In other words this study is not relevant with micro-level thoeries like firm theory. Therefore the future research for the BRICS countries should lean into this domain as well to observe the impact of FDI flows on employment in a micro-level perspective.

Ethics Statement

No human studies are presented in this manuscript.

Author Contributions

The author confirms being the sole contributor of this work and has approved it for publication.

Conflict of Interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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