

## Exploring the Employment Effect of FDI in BRICS: Does Conditionality Matter?

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**Abstract:** The study investigated the conditions that should exist in the BRICS (Brazil, Russia, India, China, South Africa) countries in order to enhance FDI's influence on employment creation using panel data analysis methods with data ranging from 1994 to 2014. Although literature shows that the positive influence of FDI on employment generation is in the majority, channels through which FDI affects employment is an area which has so far been completely ignored by empirical researchers. To the best of the author's knowledge, this study is the first to investigate channels through which FDI influences employment. The findings according to both pooled ordinary least squares (OLS) and fixed effects shows that high levels of economic growth, human capital and financial development should be available in the BRICS countries in order for FDI's positive influence on employment generation to be accelerated. The study therefore urges BRICS countries to implement policies that enhances financial development, economic growth and human capital development in order to realise employment creation benefits triggered by FDI inflows. Future studies should investigate if there are other conditions apart from these three which must exist in the BRICS countries in order to accelerate the realisation of FDI triggered employment generation advantages.

**Keywords:** Employment; FDI; BRICS; Conditionality

**JEL Classification:** E24; F21; P2

### 1. Introduction

**Background of the study:** Consistent with Boakye-Gyasi and Li (2015), unemployment has been one of the major concerns for most governments in Africa, developing countries and emerging markets. As a result, most governments have been implementing policies which are meant to ease the unemployment rate such as enhancing foreign direct investment (FDI) inflow in line with studies done by Subramaniam (2008) and Kumar and Pradhan (2002). This was substantiated by a UNCTAD (2012) report which noted that FDI has been a major economic growth and employment driver in emerging markets over the years. Empirical research proving or disapproving the assertion by UNCTAD (2012) are very scant especially

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in the case of emerging markets and BRICS countries. Although majority of literature on FDI-growth and FDI-unemployment nexus assumed the existence of a linear relationship between the variables, a study by Rizvi and Nishat (2009) noted a non-linear relationship between FDI and unemployment. It is on the basis of this non-linearity relationship between FDI and unemployment that the current study investigated the conditions that must prevail in BRICS nations before FDI related unemployment reduction advantages are felt.

**Research gap and contribution of the study:** Consistent with Zdravkovic et al (2017), empirical research on the impact of FDI on unemployment have so far produced results that are very divergent. For example, Strat et al (2015, p. 637) observed that the impact of FDI on unemployment depends on the group of countries or a country studied, the type of FDI focused on and the time period of the study. The findings from existing empirical research differ mainly due to the sector of the economy studied, the type of FDI involved and features of the host countries. For example, Prasad (1996) noted that efficiency seeking FDI is most likely to increase unemployment whilst market seeking FDI enhances employment creation. Furthermore, the Chinese FDI inflows into Ghana positively and significantly influenced employment growth rate through its direct effect on the building and construction sectors. (Boakye-Gyasi & Li, 2015, p. 10) Another dimension which have so far been ignored by empirical researchers was put forward by Rizvi and Nishat (2009) whose study argued that FDI reduced unemployment when certain conditions were available in Pakistan, India and China. The author is not aware of any previous study that explored the conditions that must exist in the host country before FDI significantly influence employment creation. It is against this background that the current paper investigated the conditions in BRICS countries that enhances FDI triggered unemployment rate reduction benefits.

**Organization of the paper:** Section 2 briefly discusses the theoretical literature on the impact of FDI on unemployment, section 3 focuses on the empirical perspective of the influence of FDI on unemployment whilst section 4 explains how other factors apart from FDI affects unemployment. Section 5 describes the trend relationship between FDI and unemployment, section 6 is the research methodology (data description, pre-estimation diagnostics, panel root testing, panel co-integration tests and main data analysis) and section 7 concludes the paper. Section 8 is the reference list.

## 2. Link between FDI and Unemployment –Theoretical Perspective

Following Boakye-Hyasi and Li (2015), FDI positively affects employment as long as it is directed towards activities that are beneficial to the economy of the host country. FDI enhances labour productivity and consequently employment creation

due to its ability to ameliorate the allocation of financial resources. (Boakye-Hyasi & Li, 2015, p. 3) According to Kumar and Pradhan (2002), the skills and knowledge which flows alongside FDI enhances the productivity of labour, economic growth and consequently the overall ability of the host countries to generate employment. Subramaniam (2008, p. 39) also supported the view that FDI negatively affect the rate of unemployment. In line with the dependency theory advanced by Amin (1974) and Bornschier and Chase-Dunn (1985), FDI promotes a predominantly monopolistic industrial framework which has a deleterious effect on economic growth and employment creation because it promotes the underutilization of productive resources.

### 3. Empirical Literature on FDI-Unemployment Nexus

Table 1 summarizes the recent empirical studies which investigated the relationship between FDI and unemployment.

**Table 1. A summary of the relationship between FDI and unemployment –Empirical Literature**

| Author                    | Country/Countries of study             | Methodology                             | Findings   |
|---------------------------|--|---|--|
| Palat (2011)              | Japan                                  | Regression and correlation analysis     | FDI was found to have played a positive and significant role in influencing unemployment reduction in Japan.   |
| Zeb et al (2014)          | Pakistan                               | Multiple regression analysis            | Pakistan experienced unemployment rate decrease triggered by FDI inflows.  |
| Iran, et al (2016)        | Malaysia (1980-2012)                   | Auto Regressive Distributive Lag (ARDL) | Unemployment rate of Malaysia was found to have been reduced by the inflow of FDI, economic growth and the number of foreign workers.                |
| Strat et al (2015)        | European Union Members (1991-2012)     | Toda Yamamoto approach                  | In the case of Bulgaria, Hungary, Estonia and Malta, unemployment rate was found to have been significantly decreased by FDI inflows.                |
| Bakkalci and Argin (2013) | Turkey (quarterly data from 2000-2011) | Regression analysis                     | Inward FDI had a significant positive influence on employment growth rate in Turkey.   |
| Saray (2011)              | Turkey (annual data from 1970 to 2009) | Regression analysis                     | No causal relationship was detected between FDI and unemployment.  |
| Aktar and Ozturk (2009)   | Turkey                                 | Regression analysis                     | No causal effect between unemployment and FDI was found in Turkey.   |
| Boakye-Gyasi & Li (2015)  | Ghana                                  | Regression analysis                     | Chinese FDI inflows into Ghana had a significant positive impact on employment growth through its direct effect on construction and building sector. |

|                           |  |                                   |   |
|---------------------------|--|-----------------------------------|---|
| Wei (2013)                | China  | Regression analysis               | A significant influence of FDI on employment in the entire Chinese economy could not be detected. However, the primary sector of China saw FDI positively and significantly influencing employment growth. The significant influence of FDI on unemployment rate in China was absent in the secondary sector whereas FDI was found to have had a negative influence on employment in the tertiary sector. |
| Brincikova & Darmo (2014) | V4 countries   | Panel regression analysis         | The impact of greenfield type of FDI was found to have had a significant positive effect on employment creation whilst privatization linked FDI had a negative influence on employment growth rate in V4 countries.   |
| Yayli & Deger (2012)      | Developing countries (1991-2008)                             | Dynamic panel data analysis       | Short run causality running from FDI towards employment growth was detected in developing countries.  |
| Zdravkovic et al (2017)   | Transition countries (2000-2014)                             | Panel co-integration framework    | A loose relationship between FDI and unemployment was detected in the 17 transition economies studied.  |
| Habib & Sarwar (2013)     | Pakistan (1970-2011)   | Time series analysis              | A long run relationship between FDI and unemployment was observed in the case of Pakistan.  |
| Adam et al (2011)         | Poland (annual time series data: 1995-2009)                  | Vector Auto regression framework. | A unidirectional causality relationship running from FDI towards employment growth rate was detected in Poland in the short run only.   |
| Chella & Phiri (2017)     | South Africa (quarterly data from 1970 to 2014)              | ARDL                              | FDI had no significant influence on unemployment reduction whilst domestic investment was found to have had a significant positive impact on employment growth rates in South Africa.   |
| Garang et al (2018)       | Uganda (annual time series data from 1993 to 2015)           | ARDL                              | No causality was detected between FDI and unemployment both in the short and long run in Uganda.  |
| Banerjee and Nag (2010)   | Pakistan   | Multiple regression analysis      | FDI inflow into the agricultural sector of Pakistan had a significant positive effect on urban unemployment rate reduction.   |
| Seyf (2000)               | European Union (EU) countries                                | Panel data analysis               | The positive impact of FDI on job creation was unsubstantial in the EU countries studied.   |
| Gocer et al (2013)        | Turkey (quarterly annual time series data from 2000 to 2011) | Boundary test approach            | The study detected a co-integrating relationship between FDI, unemployment and exports in Turkey. Unemployment rate was found to have   |

|                          |                          |                                      |  |
|--------------------------|--------------------------|--------------------------------------|--|
|                          |                          |                                      | been separately reduced by exports and FDI.  |
| Mayom (2015)             | Sub-Saharan Africa (SSA) | Panel data analysis                  | The study found out that an increase in FDI inflow into SSA enhanced employment creation capacity.                                       |
| Mucuk & Demirsel (2013)  | Developing countries     | Panel data analysis                  | FDI had a negative effect on unemployment in Thailand whereas FDI was found to have increased unemployment rate in Argentina and Turkey. |
| Balcerzak & Zurek (2011) | Poland (1995-2009)       | Vector Autoregressive (VAR) Approach | FDI was found to have had a positive and significant influence on employment generation in Poland in the short run only.                 |

*Source: Author compilation*

From Table 1, it is clear that there is no consensus on the impact of FDI on unemployment in the literature. The findings are varied and lacks consensus as some promotes the FDI-led employment nexus, others promotes the no relationship hypothesis whilst the remainder are of the view that FDI increases unemployment. Although empirical studies have been so far spread from African, developing, developed to transition economies, none of them focused on BRICS. It is for this reason that the current study explored how unemployment rate of BRICS countries responded to FDI inflows.

#### 4. Other Variables that Influence Unemployment Rate

**Table 2. Theory intuition and a priori expectation**

| Variable                        | Proxy used                              | Theory intuition  | Expected sign |
|---------------------------------|---|---|---------------|
| GROWTH (Economic growth)        | Gross domestic product (GDP) per capita | According to Thirwall (1989), the size of gross national product in the economy positively determines the number of people employed in the economy. A study by Abdul-Khaliq et al (2014) observed that 1% surge in economic growth had a significant negative influence on unemployment in Arab countries.  | -             |
| HCD (Human capital development) | Human capital development index         | Samiullah (2014) observed that human capital development is associated with people acquiring more skills, stock of knowledge, education, innovative ideas, health and training thereby making themselves more employable and productive. Romer (2011) noted that human capital development enhance innovative activities, entrepreneurship, productivity, | -             |

|                             |   |   |     |
|-----------------------------|---|---|-----|
|                             |   | economic growth and consequently increase more employment opportunities.  |     |
| FIN (Financial development) | Stock market turnover (% of GDP)                | Kargbo et al (2016) observed that through credit channels, the provision of education and skills upgrading loans enhances the levels of human capital development and consequently the employability of the people. On the other hand, developed financial markets tend to exclude small to medium scale enterprises, an economic arm which is central to employment creation in the last two decades. (IMF, 2015)  | +/- |
| INFL (Inflation rate)       | Inflation consumer prices (annual %)            | According to Schreft and Smith (1997), high inflation increases interest rates, which pushes up the cost of projects funding in the economy, inefficient allocation of resources and consequently slows down economic growth. The United Nations Report (2010) on the contrary argued that inflation pushes down the real wages and labour costs thereby enabling companies to employ an increased number of people.  | +/- |
| EXCH (Exchange rate)        | Local currency against the United States Dollar | According to Frenkel (2006), an increase in the real exchange rate stimulates economic growth by ensuring that imported inputs for the domestic manufacturing industry are affordable. This allows the domestic manufacturing industry to expand operations and facilitate the creation of new jobs.  | -   |
| SAV (Savings)               | Gross domestic savings (% of GDP)               | Ramudo et al (2011) argued that savings increases investment in the economy, boost economic growth and enhances not only the expansion programmes of the existing firms but also the creation of new companies and job opportunities for the people.  | -   |
| OPEN (Trade openness)       | Total of exports and imports (% of GDP)         | Helpman and Itskhoki (2010) argued that trade openness increases the rate of unemployment in an economy as large corporations now prefer to purchase their inputs from abroad instead of domestically. Such a move by big corporations export jobs to foreign countries at the expense of the locals. On the other hand, Mitra and Ranjan (2010) noted that trade openness (liberalisation) improves the competitiveness of the domestic firms as it allows them to buy inputs from wherever the prices are reasonable and also gives them access to a wider and bigger international market for their products. The improved competitiveness of the domestic firms enhance their capacity to expand operations and | +/- |

|                                   |                                 |  |     |
|-----------------------------------|---------------------------------|--|-----|
|                                   |                                 | generate more employment opportunities for the people.   |     |
| INFR (Infrastructure development) | Electric consumption (% of GDP) | Infrastructure development such as roads building can be achieved through the use of employment intensive ways for construction, maintenance and rehabilitation. In the short run, allocation of financial resources towards infrastructural development by the government starve the private sector of the much needed capital required for expansion projects and employment generation. | +/- |

Source: Author compilation

### 5. FDI and Unemployment in Brics Countries-Trend Analysis

Using World Bank (2017) data, Figure 1 shows that the trends of net FDI inflows (% of GDP) for the BRICS countries during the period from 1994 to 2014 followed a mixed trend. For example, Brazil’s net FDI inflow increased from 0.55% in 1994 to 3.69% in 1998, declined by 0.43 percentage points during the subsequent four-year period before further going down from 3.27% in 2002 to 1.75% in 2006. Net FDI inflow went up from 1.75% in 2006 to 2.42% in 2010 and then experienced a positive growth of 1.59 percentage points during the subsequent four-year period to close the year 2014 at 4.01%.

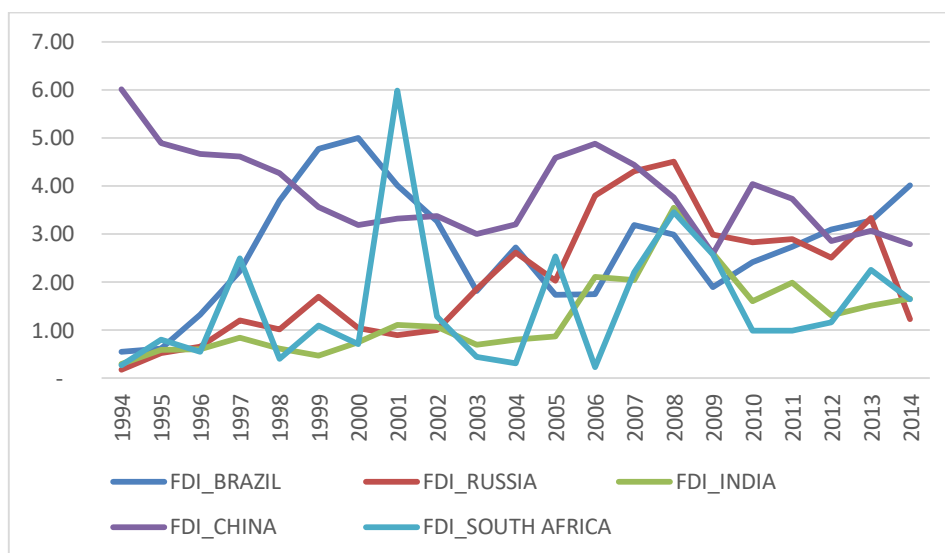
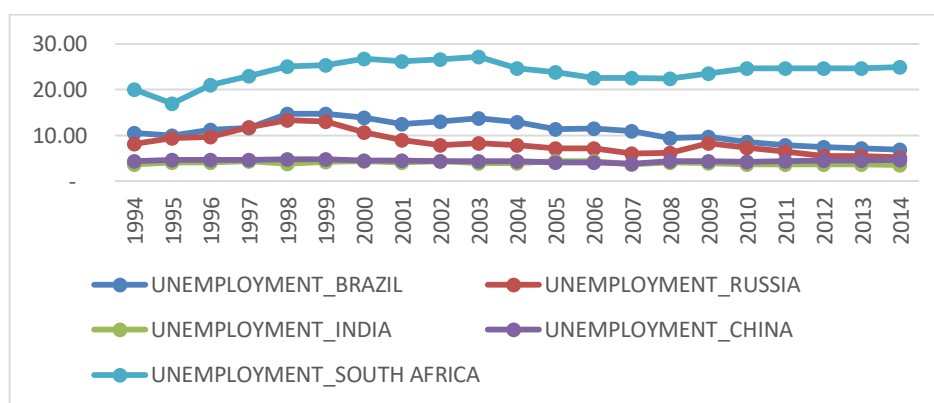


Figure 1. Net FDI inflow (% of GDP) trends in BRICS countries (1994-2014)

Source: Author using World Bank (2017) database

On the other hand, Russia's net FDI inflow went up by 0.84 percentage points, from 0.17% in 1994 to 1.02% in 1998 and then declined by 0.02 percentage points, from 1.02% in 1998 to 1% in 2002 before experiencing a 2.79 percentage points positive growth during the subsequent four-year period to end the year 2006 at 3.80%. Furthermore, net FDI inflow for Russia plummeted from 3.80% in 2006 to 2.83% in 2010 before further declining by 1.60 percentage points to end the year 2014 at 1.23%. India experienced consecutive three-four year periods of positive growth in net FDI inflows, 0.32 percentage points (1994-1998), 0.46 percentage points (1998-2002) and 1.04 percentage points (2002-2006) to close the year 2006 at 2.11%. The four-year period from 2006 to 2010 saw net FDI net inflow going down from 2.11% in 2006 to 1.60% in 2010 before increasing by 0.05 percentage points (1.60% in 2010 to 1.65% in 2014) during the subsequent four-year time period.

China generally experienced a downward trend in net FDI inflow during the period ranging from 1994 to 2014. For example, its net FDI inflow went down by 1.74 percentage points, from 6.01% in 1994 to 4.27% in 1998, declined by 0.89 percentage points during the subsequent four-year period and then increased by 1.51 percentage points, from 3.37% in 2002 to 4.88% in 2006. China's net FDI inflow then plummeted from 4.88% in 2006 to 4.04% in 2010 before further experiencing a negative growth of 1.24 percentage points, from 4.04% in 2010 to 2.79% in 2015. On the other hand, South Africa's net FDI inflow increased from 0.27% in 1994 to 0.40% in 1998, experienced a 0.88 percentage points positive growth during the period from 1998 to 2002 before plummeting from 1.28% in 2002 to 0.23% in 2006. The four-year period from 2006 to 2010 saw net FDI inflow for South Africa increasing by 0.75 percentage points whilst the subsequent four-year period was characterised by another positive growth in net FDI inflow, from 0.98% in 2010 to 1.64% in 2014.



**Figure 2. Unemployment rate trends in BRICS countries (1994-2014)**

*Source: Author using World Bank (2017) database*



As shown in Figure 2 using World Bank (2017) data, the unemployment rates for BRICS countries followed an uneven trend during the period from 1994 to 2014. Brazil's unemployment rate increased from 10.5% in 1994 to 14.7% in 1998 before declining by 1.7 percentage points (from 14.7% in 1998 to 13% in 2002), 1.5 percentage points (13% in 2002 to 11.5% in 2006), 3 percentage points (11.5% in 2006 to 8.5% in 2010) and 1.7 percentage points (8.5% in 2010 to 6.8% in 2014). In summary, Brazil generally followed a downward trend in the unemployment rates during the period from 1994 to 2014. Russia's unemployment rates were characterised by ups and downs but generally followed a downward trend during the period under study.

India's unemployment rates went up from 3.7% in 1994 to 3.8% in 1998, increased by 0.5 percentage points, from 3.8% in 1998 to 4.30% in 2002 and then remaining unchanged at 4.3% during the subsequent four-year period ranging from 2002 to 2006. The period from 2006 to 2010 saw the unemployment rate of India declining from 4.30% in 2006 to 3.6% in 2010 before further experiencing a 0.1 percentage points decrease during the subsequent four-year period to close the year 2014 at 3.5%.

On the other hand, China's unemployment rate increased from 4.3% in 1994 to 4.7% in 1998 whilst the unemployment rate of South Africa increased by 5 percentage points (20% in 1994 to 25% in 1998) during the same period. The four-year period from 1998 to 2002 saw the unemployment rate of China going down by 0.3 percentage points before experiencing a further 0.4 percentage points decline during the subsequent four-year period, from 4.4% in 2002 to 4% in 2006. The unemployment rate for China increased by 0.2 percentage points during the period from 2006 to 2010 before further going up from 4.2% in 2010 to 4.6% in 2014, representing a 0.4 percentage points positive growth. Meanwhile, South Africa's unemployment rate went up by 1.60 percentage points, from 25% in 1998 to 26.6% in 2002, declined by 4 percentage points during the period from 2002 to 2006 before experiencing a 2.1 percentage points positive growth, from 22.6% in 2006 to 24.7% in 2010. South Africa's unemployment rate then went up by 0.2 percentage points to end the year 2014 at 24.9%.

## 6. Empirical Analysis

**Data, Data Sources and Sample:** The study used secondary data (1994-2014) extracted from World Development Indicators, International Monetary Fund, African Development Indicators, International Financial Statistics databases and United Nations Development Programme reports. The unit of analysis for this study is BRICS countries, namely Brazil, Russia, India, China and South Africa. To the best of the author's knowledge, the bloc has been largely excluded in FDI-

unemployment empirical work despite the fact that BRICS countries have been relying more on FDI inflows to ease unemployment woes in the last two decades.

### Pre-estimation diagnostics

**Table 3. Correlation analysis**

|        | UNEMP    | FDI      | FIN      | HCD      | GROWTH   | INFL  | EXCH    | SAV    | OPEN   | INFR |
|--------|----------|----------|----------|----------|----------|-------|---------|--------|--------|------|
| UNEMP  | 1.00     |          |          |          |          |       |         |        |        |      |
| FDI    | -0.24**  | 1.00     |          |          |          |       |         |        |        |      |
| FIN    | -0.54*** | 0.36***  | 1.00     |          |          |       |         |        |        |      |
| HCD    | 0.07     | 0.25***  | -0.27*** | 1.00     |          |       |         |        |        |      |
| GROWTH | 0.16*    | 0.16*    | -0.23**  | 0.46***  | 1.00     |       |         |        |        |      |
| INFL   | -0.001   | -0.16    | -0.04    | 0.13     | -0.04    | 1.00  |         |        |        |      |
| EXCH   | -0.46*** | -0.27*** | 0.12     | -0.53*** | -0.27*** | -0.11 | 1.00    |        |        |      |
| SAV    | -0.61*** | 0.43***  | 0.59***  | 0.06     | -0.19*   | -0.05 | 0.12    | 1.00   |        |      |
| OPEN   | 0.28***  | 0.02     | -0.22**  | 0.09     | 0.04     | -0.14 | 0.12    | 0.33** | 1.00   |      |
| INFR   | 0.48***  | -0.09    | -0.47*** | 0.55***  | 0.58***  | -0.03 | -0.22** | -0.09  | 0.59** | 1.00 |

*Source: Author compilation from E-Views*

Note: \*\*\*/\*\*/\* denotes statistical significance at the 1%/5%/10% level respectively

Table 3 shows that variables such as FDI, financial development, exchange rates and savings are negatively and significantly correlated with unemployment whilst inflation is negatively but non-significantly correlated with unemployment in BRICS countries. The findings resonate with literature as discussed in section 2, 3 and 4. On the other hand, human capital development and unemployment are positively but insignificantly related yet trade openness and infrastructural development are both separately correlated with unemployment in BRICS nations. Such a relationship has been theoretically substantiated in Table 2. Consistent with Stead's (1996) observation, the multi-collinearity problem does not exist in the current study because the maximum correlation between variables (savings and unemployment) is 61%.

**Table 4. Descriptive statistics**

|                    | UNEMP | FDI  | FIN   | HCD   | GROWTH | INFL  | EXCH | SAV  | OPEN  | INFR  |
|--------------------|-------|------|-------|-------|--------|-------|------|------|-------|-------|
| Mean               | 10.3  | 2.29 | 76.2  | 0.69  | 4273   | 33.5  | 17.0 | 28.4 | 43.2  | 2951  |
| Median             | 7.30  | 2.20 | 53.3  | 0.71  | 3288   | 6.64  | 8.28 | 25.0 | 46.9  | 2394  |
| Maximum            | 27.1  | 6.01 | 328.6 | 0.82  | 14487  | 2076  | 61.0 | 51.5 | 72.9  | 6682  |
| Minimum            | 3.50  | 0.17 | 3.45  | 0.45  | 353.3  | 0.26  | 0.66 | 15.1 | 15.6  | 342.3 |
| Standard deviation | 7.52  | 1.45 | 66.5  | 0.08  | 3654   | 204   | 16.8 | 10.2 | 14.8  | 2016  |
| Skewness           | 1.07  | 0.44 | 1.59  | -0.65 | 1.11   | 9.66  | 0.93 | 0.78 | -0.23 | 0.24  |
| Kurtosis           | 2.71  | 2.31 | 5.30  | 2.61  | 3.42   | 96.7  | 2.44 | 2.51 | 1.88  | 1.64  |
| Jarque-Bera        | 20.1  | 5.48 | 67.4  | 8.14  | 22.0   | 40062 | 16.4 | 11.6 | 6.42  | 9.08  |
| Probability        | 0.00  | 0.06 | 0.00  | 0.02  | 0.00   | 0.00  | 0.00 | 0.00 | 0.04  | 0.01  |
| Observations       | 105   | 105  | 105   | 105   | 105    | 105   | 105  | 105  | 105   | 105   |

*Source: Author compilation from E-Views*

The data for all the variables is not normally distributed because their Jarque-Bera criteria's corresponding probabilities are either zero or almost zero. The Kurtosis values which are positive for all the variables shows that the data is positively skewed, further evidence that the data for the current study is not normally distributed. The standard deviation for growth, inflation and infrastructural development data is evidence (above 100) of the existence of abnormal values. Following Hair et al (2014, p. 80), one way to manage the effect of extreme values and abnormally distributed data on the quality of the findings is to transform all the data sets into natural logarithms before using it for data analysis. The current study implemented Hair et al's (2014) recommendation.

### Econometric Model Description

$$UNEMP_{i,t} = \beta_0 + \beta_1 FDI_{i,t} + \beta_2 X_{i,t} + \mu_i + \varepsilon_{it} \quad [1]$$

UNEMP represents unemployment, FDI stands for foreign direct investment and X is a matrix of control variables. In the current study, X is financial development, human capital development, economic growth, inflation, exchange rates, savings, trade openness and infrastructural development. Whilst  $\beta_0$  is intercept term,  $\beta_1$  and  $\beta_2$  are the respective co-efficients of foreign direct investment and a matrix of control variables.  $\mu_i$  is the time invariant and unobserved country specific effect whereas time and country are respectively represented by the subscripts  $t$  and  $i$ .  $\varepsilon_{it}$  is the error term.

To facilitate an investigation of the relationship between the FDI-unemployment nexus and the host countries (BRICS)'s characteristics such as economic growth, financial development and human capital development, the author introduced interacting terms ( $FDI_{i,t} \cdot x_{i,t}$ ). This gave rise to equation 2 below.

$$UNEMP_{i,t} = \beta_0 + \beta_1 FDI_{i,t} + \beta_2 X_{i,t} + \beta_3 (FDI_{i,t} \cdot x_{i,t}) + \mu_i + \varepsilon_{it} \quad [2]$$

$x_{i,t}$  corresponds to the level of economic growth, human capital and financial development in country  $i$  at time  $t$ , consistent with a study done by Goff and Singh (2014). Pooled OLS and fixed effects approaches were the two panel data analysis methods used to estimate equation 2 (see findings in Table 7 and 8). If the co-efficient of the interaction term is positive and significant, it means that the condition under investigation must be available in the host countries (BRICS) before FDI can be able to reduce unemployment.

**Panel stationarity tests:** Gujarati (2003) argued that stationarity is a crucial condition which must be satisfied by the variables studied in order to avoid spurious

results which are not only insignificant but are misleading for decision making purposes. (Green, 2000) Table 5 shows that all the variables under study were stationary at first difference, a condition which was not supported at level.

**Table 5. Panel stationarity tests**

|         | Level    |          |          |          | First difference |          |          |          |
|---------|----------|----------|----------|----------|------------------|----------|----------|----------|
|         | LLC      | IPS      | ADF      | PP       | LLC              | IPS      | ADF      | PP       |
| LUNEMP  | -1.96**  | -0.83    | 19.5**   | 9.70     | -2.15**          | -4.32*** | 37.63*** | 78.24*** |
| LFDI    | -2.47*** | -2.50*** | 23.38*** | 35.37*** | -1.18*           | -3.93*** | 34.1***  | 315.2*** |
| LFIN    | -3.79*** | -2.69*** | 26.12*** | 27.22*** | -4.54***         | -4.82*** | 41.98*** | 70.24*** |
| LHCD    | -4.67*** | -4.04*** | 34.80*** | 48.54*** | -8.25***         | -7.55*** | 65.30*** | 632.4*** |
| LGROWTH | 1.16     | 2.79     | 1.51     | 1.22     | -2.26**          | -2.15**  | 19.82**  | 29.94*** |
| LINFL   | -1.94**  | -3.33*** | 29.66*** | 80.65*** | -5.44***         | -5.67*** | 48.76*** | 182.3*** |
| LEXCH   | -0.61    | 0.11     | 8.93     | 18.2*    | -3.35***         | -2.31**  | 20.96**  | 33.86*** |
| LSAV    | -1.61*   | -1.91**  | 22.86**  | 11.98    | -3.27***         | -4.42*** | 38.5***  | 60.4***  |
| LOPEN   | -1.16    | -0.36    | 9.32     | 8.21     | -2.27**          | -3.30*** | 29.08*** | 64.17*** |
| LINFR   | 0.19     | 1.98     | 8.21     | 4.64     | -3.57***         | -3.09*** | 29.19*** | 40.41*** |

*Source: Author's compilation from E-Views*

Note: LLC, IPS, ADF and PP stands for Levin, Lin and Chu; Im, Pesaran and Shin; ADF Fisher Chi Square and PP Fisher Chi Square tests respectively.

\*, \*\* and \*\*\* denote 1%, 5% and 10% levels of significance, respectively.

The finding that all the variables were integrated of order 1 allowed the study to proceed to panel co-integration tests (Kao-Residual co-integration test), whose results are displayed in Table 6.

### Panel co-integration tests

**Table 6. Kao Residual Co-integration Test - Individual intercept**

|                    |               | T-statistic | Probability |
|--------------------|---------------|-------------|-------------|
| Augmented<br>(ADF) | Dickey-Fuller | -0.3687     | 0.0045      |

*Source: Author's compilation from E-Views*

Since the probability is less than 5%, the null hypothesis that there is no co-integration among the variables being studied is rejected. In other words, a long run relationship exists between the variables under study. The existence of a long run relationship between the variables under study as proved by Kao-Residual co-integration test paved way for fixed effects and pooled OLS panel data analysis (see results in Table 7 and 8).

**Main Data Analysis****Table 7. FDI and unemployment in BRICS countries –Fixed Effects**

|                     | Unemployment |          |          |          |
|---------------------|--------------|----------|----------|----------|
|                     | (1)          | (2)      | (3)      | (4)      |
| FDI                 | 0.03         | 0.16**   | 0.01     | 0.35*    |
| FIN                 | 0.04*        | 0.04     | 0.04     | 0.04     |
| HCD                 | -0.39*       | -0.43**  | -0.38*   | -0.49**  |
| GROWTH              | -<br>0.32*** | -0.30*** | -0.32*** | -0.31*** |
| INFL                | -0.01        | -0.01    | -0.01    | -0.02    |
| EXCH                | -0.08*       | -0.12**  | -0.08    | -0.07*   |
| SAV                 | -0.36**      | -0.29*   | -0.36**  | -0.35**  |
| OPEN                | 0.19**       | 0.20**   | 0.17*    | 0.09     |
| INFR                | 0.41***      | 0.36***  | 0.41***  | 0.48***  |
| FDI*FIN             |              | -0.04*   |          |          |
| FDI*HCD             |              |          | -0.05    |          |
| FDI*GROWTH          |              |          |          | -0.04*   |
| Number of countries | 5            | 5        | 5        | 5        |
| Adjusted R-squared  | 0.97         | 0.97     | 0.97     | 0.97     |
| F-statistic         | 251          | 241      | 230      | 239      |
| Prob(F-statistic)   | 0.00         | 0.00     | 0.00     | 0.00     |

*Source: Author's compilation from E-Views*

\*\*\*, \*\* and \* denote 1%, 5% and 10% levels of significance, respectively

In model 1 under fixed effects, FDI had a non-significant positive impact on unemployment, consistent with the dependency theory of FDI whose proponents (Amin, 1974; Bornschieer & Chase-Dunn, 1985) argue that FDI leads to predominantly monopolistic industrial outlook which promotes the underutilization of resources, slow economic growth and consequently slowdown in the economy's ability to generate jobs. Financial development had a significant positive impact on unemployment in line with IMF (2015) whose report observed that a developed financial market tends to exclude small businesses, a sector which has been proven in recent years to be behind significant employment creation capability. In model 2 under fixed effects, the interaction between FDI and financial development had a significant negative influence on unemployment, consistent with Rizvi and Nishat (2009) whose study observed that FDI decreases unemployment when certain conditions were available in the host countries. The finding also agrees with Kaur et al (2013) who noted that developed financial markets increase the productivity of foreign capital through its ability to allocate financial resources to projects characterised by high rate of return. This consequently leads to high economic growth and increased employment generation capabilities of the host countries.

In model 1 under fixed effects, human capital development had a significant negative influence on unemployment. This means that human capital development reduced unemployment rate in the BRICS countries in line with Samiullah (2014) whose argument is that high levels of human capital development enable the people to acquire skills, knowledge, education and ideas which make them more employable and productive. Model 3 under fixed effects approach also shows that the interaction between FDI and human capital development reduced unemployment in the BRICS countries. The finding resonates with the endogenous growth theory proponents such as Lucas (1988) and Romer (1986) who suggested that human capital development (know-how, skills and labour training) is a channel through which FDI influences economic growth and the ability of the economy to create employment. In model 1 under fixed effects, economic growth was found to have had a significant negative effect on unemployment. Such a finding means that high economic growth in the BRICS countries reduced the rate of unemployment in support of an argument by Thirwall (1989) which says that the higher the size of the gross national product in the economy, the more the number of people employed in that economy. In model 4 under fixed effects framework, the interaction between economic growth and FDI was found to have had a significant negative effect on unemployment in line with Dunning's (1973) eclectic paradigm hypothesis which argued that economic growth is one of the locational advantages of FDI which not only attract foreign capital but enhances its ability to create employment.

**Table 8. FDI and unemployment in BRICS countries –Pooled OLS**

|                     | Unemployment |          |          |          |
|---------------------|--------------|----------|----------|----------|
|                     | (1)          | (2)      | (3)      | (4)      |
| FDI                 | 0.02         | 0.21**   | 0.05     | 0.60**   |
| FIN                 | 0.08**       | 0.08**   | 0.08**   | 0.06*    |
| HCD                 | -0.77***     | -0.86*** | -0.80*** | -0.99*** |
| GROWTH              | -0.30        | -0.30*** | -0.30*** | -0.25*** |
| INFL                | -0.03        | -0.03    | -0.02    | -0.02    |
| EXCH                | -0.23***     | -0.26*** | -0.24*** | -0.19*** |
| SAV                 | -1.56***     | -1.42*** | -1.56*** | -1.51*** |
| OPEN                | 0.64***      | 0.64***  | 0.66***  | 0.46***  |
| INFR                | 0.55***      | 0.55***  | 0.55***  | 0.59***  |
| FDI*FIN             |              | -0.05*   |          |          |
| FDI*HCD             |              |          | 0.08     |          |
| FDI*GROWTH          |              |          |          | -0.07**  |
| Number of countries | 5            | 5        | 5        | 5        |
| Adjusted R-squared  | 0.93         | 0.93     | 0.93     | 0.93     |
| F-statistic         | 156          | 145      | 139      | 148      |
| Prob(F-statistic)   | 0.00         | 0.00     | 0.00     | 0.00     |

Source: Author's compilation from E-Views

\*\*\*, \*\* and \* denote 1%, 5% and 10% levels of significance, respectively

Model 1 under pooled OLS shows that FDI positively but non-significantly affected unemployment rate, financial development had a significant positive impact on unemployment, economic growth negatively but insignificantly affected unemployment whilst human capital development had a significant negative influence on unemployment rate in the BRICS countries. Just like under fixed effects, pooled OLS shows that (1) the interaction between FDI and financial development had a significant negative impact on unemployment, (2) the interaction between FDI and human capital development negatively affected unemployment and (3) the interaction between FDI and economic growth negatively and significantly affected unemployment rate in the BRICS nations. These results from the pooled OLS framework resonate with the existing theoretical predictions as already discussed under fixed effects model. Under both fixed effects and pooled OLS approaches, inflation, exchange rates and savings reduced unemployment whereas trade openness and infrastructural development increased unemployment in the BRICS nations. The theoretical literature which supports these findings is explained in Table 2.

## 7. Conclusion

The study investigated the conditions that should exist in the BRICS countries in order to enhance FDI's influence on employment creation using panel data analysis methods (fixed effects and pooled OLS approaches) with data ranging from 1994 to 2014. In particular, the study explored if financial development, human capital development and economic growth are conditions which must prevail in the BRICS countries to enable FDI to reduce unemployment. There is consensus that FDI is one of the cornerstones for economic growth as espoused by endogenous growth theorists (Kumar & Pradhan, 2002; Romer, 1986; Lucas, 1988) and neoclassical growth theory proponents. (Nath, 2005; Kaur et al., 2013; Solow, 1956; Swan, 1956) Recent empirical work however studied the impact of FDI on unemployment, results of which are mixed, varied and divergent. The FDI-led employment hypothesis, the FDI led unemployment view and the FDI does not have any influence on unemployment are the three groups of findings which are coming out from the literature (see Table 1). In other words, the impact of FDI on unemployment is still far from being a settled matter in literature. Moreover, although literature shows that the positive influence of FDI on employment generation is in the majority, channels through which FDI affects employment is an area which has so far been completely ignored by empirical researchers. To the best of the author's knowledge, this study is the first to investigate channels through which FDI influences employment.

The findings according to both pooled OLS and fixed effects shows that high levels of economic growth, human capital and financial development should be available in the BRICS countries in order for FDI's positive influence on employment

generation to be accelerated. The study therefore urges BRICS countries to implement policies that enhances financial development, economic growth and human capital development in order to realise employment creation benefits triggered by FDI inflows. Future studies should investigate if there are other conditions apart from these three which must exist in the BRICS countries in order to accelerate the realisation of FDI triggered employment generation advantages.

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