

An Assessment of the Impact of Foreign Direct Investment on Employment: The Case of Ghana's Economy

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Abstract

The literature is in respect of the fact that foreign direct investment has been a key aspect of the development strategy of most developing countries. The main objective of the study is to examine the extent FDI influence employment creation in the non-mining sector of Ghana for the period 2000 – 2016 using time series (annual) data conducted with the aid of OLS (Multiple Linear Regression) model, Autoregressive Distributed Lag (ARDL-ECM) Bounds Testing Approach and Granger-Causality test in the estimation of level relationship / cointegration and causality (respectively) between the study variables (for robustness checks). The result of this study shows that FDI has a statistically significant and a positive impact on employment growth via jobs creation in Ghana. Again, evidence shows that the study variables are cointegrated and have a long run relationship. Further robust test from Granger-causality shows no causal relationship from FDI to employment growth or from employment growth to FDI (at significance level of 5%). In addition, the study identifies factors such as wage structure, investment freedom and subsectors as important indicators influencing employment in the country. Finally, the study recommends policies to help create enabling political and socio-economic environment for FDI thereby creating more sustainable jobs and tackling the current high rates of unemployment in Ghana.

Keywords: Ghana; FDI; employment; OLS; Cointegration; Granger-causality test.



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1. Introduction

1.1. Background of the Study

With the implementation of Economic Recovery Programme in 1983, the Ghanaian Economy has experienced one of the most comprehensive programs of structural adjustment in Africa. Major policy reforms and market incentives were formulated and implemented by the beginning of 1980s in Ghana (Appiah-Adu, 1999). Africa's share of the total FDI inflows has not increased during the period despite the numerous measures adopted to encourage these flows (Asiedu, 2002; Ngowi, 2001). In order to attain long-term sustained economic growth, these economic reforms included policy measures that attracted more domestic and international capital. Empirical studies show that FDI inflows expand the supply of funds for investment thus promoting capital formation in the host country (Alfaro and Johnson, 2012; Lipsey *et al.*, 1999). Currently, in Ghana, sector allocation of FDI had not been favourable because estimates for individual subsectors may overweight each other and therefore, the effects cancel out when all the sectors are combined. This study I am exploring is very essential in the sense that it establishes how efficient FDI is contributing to Ghana's non-mining sector and also how favourable is the country's labour regulations and investment freedom index to FDI.

Ghana's economic performance during 2016 was mixed. After making solid progress on fiscal consolidation in bringing the fiscal deficit down to 6.3 percent in 2015, the target to narrow it further to 5.3 percent of GDP in 2016 was missed by a wide margin with the deficit widening to 9 percent of GDP. Nevertheless, GDP growth at 3.6 percent was slightly higher than the forecast of 3.3 percent, and inflation, after remaining stubbornly above 17 percent, fell a little to 15.4 percent in December, 2016 and further to 13.3 percent in January 2017, closer to the central bank's target range of 6 – 10 percent. Gross foreign reserves increased marginally from US\$ 4.4 billion in 2015 to an estimated US\$ 4.9 billion, equivalent to 2.8 months of imports at the end of 2016 (Mensah *et al.*, 2017). By definition FDI is the spending by a domestic firm to establish foreign operating units (Melvin and Norrbirn, 2017). In other research, FDI refers to the monetary resources foreigners invest in outside companies or their subsidiaries. This presupposes that foreign investment embrace international capital flows in which a firm in one country expands its subsidiary in another. The International Monetary Fund (IMF) defines foreign investment as direct when the investor has 10 percent or more (equity) in an enterprise (International Monetary Fund (IMF), 1997). As a benchmark this is usually enough to give an investor a say in the management of the enterprise. The investment sectors in Ghana are broadly divided into two, namely: i) mining and mineral sector and ii) non-mining sector.

The mining and mineral Sector of Ghana is Africa's largest producer of gold, for instance, producing 80.5 tonnes in 2008 and also a major producer of diamond, bauxite and manganese. The country main focus on mining and minerals development industry remains on gold. Significantly, the mining sector is grouped into two. These include large scale mining (only Foreigners) and the small scale mining (only Ghanaians). Considering the capital intensive nature of the large scale mining, majority of foreign investors (illegally) engages in small scale mining which is solely meant for Ghanaians. On the other hand, the non-mining sector forms the recurrent and larger (employment) investment area of the economy and contributes over 30 percent of the country's GDP. The non-

mining sectors including building and construction, manufacturing, services, agricultures, tourism, export trade among others are gaining a proportion of the economy which is remarkable as far as tax generation is concerned. Moreover, sectoral distribution of FDI into the non-mining sectors of the economy, namely; Agriculture, Building and Construction, Manufacturing, Services, Tourism, Export Trade and General Trade totalled about US\$ 38,153.02 billion averaging US\$ 1,788.42 billion a year between September 1994 and 2016. From [table 2](#) (below), the building and construction sub-sector dominate in the total flow accounting for 35.03 percent, followed by manufacturing sub-sector with 32.56 percent and then, service sub-sector with 19.47 percent. On the other hand, total projects of about 5,486 were set up over these periods with service sub-sector dominating in the total projects of 1,639 followed by manufacturing sub-sector with 1,265 projects and last on the list is export trade sub-sector with 243 projects ([GIPC, 2017](#)).

Table-1. Sectoral Distribution of FDI in Ghana, (September, 1994 – December, 2016)

Total Investment Cost			
Subsector	No. of Projects	(US\$ Million)	%
Building and Construction	528	13,366.27	35.03
Tourism	428	908.25	2.38
Services	1639	7,428.57	19.47
Agriculture	267	1,738.27	4.56
Manufacturing	1265	12,423.75	32.56
Export Trade	243	143.03	0.38
General Trade	1116	2,144.88	5.62
Total	5486	38,153.02	100.00

Source: Ghana Investment Promotion Centre, GIPC

The key dependent variable considered in this study is employment. Recognizing this, the current government has implemented specific interventions aimed at redressing these challenges. According to [Cho and Cooley \(1994\)](#), employment signifies the state of anyone who is doing what, under the circumstance he most wants to do. By definition, employment-to-population ratio is the proportion of a country's population that is employed. It measures the ability of the economy to provide jobs for the growing population. Currently, the employment-to-population ratio for the country is 75.5 percent. However, the rate is relatively lower for the urban (69.9%) compared to rural (81.7%) areas. This implies that a relatively large proportion of the urban population is without jobs. The ratio for male is relatively higher than females.

1.2. Problem Statement

Universally, economists and policymakers concur that foreign direct investment (FDI) can contribute significantly towards the expected structural transformation and industrialization ([Adenutsi, 2007](#)). Evidence shows that FDI can provide significant economic and social benefits to host countries ([Lall, 1993](#)). In sum, FDI had contributed to the enhancement of productivity in the industrial sector, increase investment in research and development, and create better and stable paid jobs ([Wei and Liu, 2006](#)). It is in this view that this study seeks to examine FDI impact on employment in Ghana.

1.3. Research Objectives

The general objective of the research is to examine the impact of Foreign Direct Investment on employment in Ghana. Other secondary objectives include:

- To analyse the trend of FDI inflows in Ghana from 2000 – 2016.
- To probe into non-mining subsectors attracting FDI.

1.4. Research Question

This study seeks to answer the question:

1. Is FDI promoting employment growth in Ghana?

1.5. Statement of Hypothesis

H0: There is no significant impact of FDI on employment in Ghana?

H1: There is a significant impact of FDI on employment in Ghana?

1.6. Justification and Significance of the Study

Better Doing Business rankings promote jobs and sound business atmosphere to the host economy. Below are some reasons for such study:

- a) The study will enable the Government of Ghana to organize and prioritize the multiple and complex variables affecting the maximization of investment benefits.
- b) It will serve as an information tool for organizations, financial institutions, government, Investors, MNC, TNC, World Bank, IMF, other foreign government and all interested stakeholders about the significant role of such policies in our economy.

- c) Would help explore the pace of integration in the region as a contributor to economic transformation, growth and enhanced results about the FDI-Employment relationship in the country.

1.7. Scope and Limitation of the Study

This study examines whether FDI has contributed positively to employment in Ghana, using time series data ranging from 2000 – 2016. Ghana was chosen as a case study due to its current economic strategy in addressing employment issues and also convenience for data collection. Moreover, Ghana like most Sub-Saharan African (SSA) countries had benefited from an increased inflow of FDI after the liberalization of the economy in the early 1990s.

1.8. Organization of the Study

The present chapter (chapter one) provides a general description of the study which includes the introduction and background of the study, the problem statement, the objectives of the study, research question, hypothesis, importance, scope and limitations, and organization of the study. Chapter two, which is the literature review developed by gathering information from secondary sources both national and international on the study topic. Chapter three presents the research methodology which encompasses the design, model specification, sources (method) of data and definition of variables. Chapter four deals with the data analysis, presentation and discussion of findings. Here, descriptive and inferential statistics were used to present the results of the data analysis. Finally, Chapter five provides a summary of the research findings; outlining relevant conclusions in the light of the literature reviewed and offers appropriate policy recommendations that would be helpful in addressing problems related to the issues discussed.

2. Literature Review

2.1. Introduction

The section discusses extensively both theoretical and empirical literature on the concept particularly the features, determinants/factors influencing FDI into host nation. Also, it continues with a critical examination of employment pattern and the linkage it has on foreign investment in Ghana.

2.2. Theoretical Literature

2.2.1. Theories of FDI

The theory below examines the phenomenon of FDI.

- Internationalization Theory

Famous Economist [Coase \(1937\)](#) argued under key conditions by which firms operate in foreign market. Such conditions are the transaction costs of foreign activities. Many Scholars extended his work in large context ([Williamson, 1981](#)). The theory of internationalization relies on a slow and progressive process during which organizational learning takes place ([Sullivan and Bauerschmidt, 1990](#)). Internationalization researchers consider exporting to be a valuable means of diffusion and expansion. Likewise, [Johanson and Wiedersheim-Paul \(1975\)](#), whom extensively elaborated on the theory where the internationalization of a firm is based on a chain of establishment supported by evidence from a case study of four Swedish firms. In economics, internationalization is the process of increasing firms' involvement on the global market. According to [Melin \(1992\)](#), internationalization is a continuous process of evolution whereby firms increase in international operations thereby improved knowledge, market commitment and create additional employment in the host nation. The impact on the study explains the existence and functionality of foreign firms / investment via fostering and respect of human development, expanding avenues for economic competitiveness and displaying evidence of job creation where many citizens are employed by foreign-owned firms in the host nation like Ghana.

- Dunning's Eclectic Paradigm

In 1988, The British Economist John Dunning championed the eclectic paradigm. Dunning "eclectic" paradigm is popular in the discipline of international economics and deducible from [Dunning \(1973\)](#), and [Dunning \(1988\)](#), theories about FDI. The author was of the view that enterprise will seek cross border activities if it has or can acquire certain assets not available to another country's enterprises. He called this ideology as the OLI paradigm: ownership specific advantages, location endowments and internalization advantages. Ownership specific advantages include capital, technology, marketing, organizational and managerial skills. Location specific variables in a host country include factor endowments, investment incentives, tariffs, government policies, infrastructure, among others. Again, he argued that of Internalization Theory via difficulties a firm faces to license its own unique capabilities and know-how. Nevertheless, combining location-specific assets or resource endowment and the firm's own unique capabilities often require foreign direct investment. In sum, the eclectic paradigm, like its near relative, internalization theory assert that the greater the net benefits of internalizing cross-border intermediate product market, the more likely a firm will prefer to engage in foreign production itself, rather than license the right to do so ([Dunning, 1973](#)). The theory embraces the principle of foreign value added activities of firms in the host nation. The benefits derived from the theory include advantages arising from quantities and qualities of production factors, ready market, affordable telecommunication costs, job creation, intra-firm trade among others. The paradigm provides a strategy for operation expansion via FDI. For instance, most developing countries like Ghana enjoy greater overall value than other national or international choices that may be available for the production of goods or services. The eclectic paradigm

is significant to my study due to the location specific advantages, that's cheap and skilled labour Ghana derived from such investment.

Table-2. The Eclectic Paradigm

The OLI framework
1. Ownership-specific advantages of an enterprise of one nationality over another
*Capital
*Technology
*Management & organisation
*Marketing
*Synergistic economies
2. Location specific variables
*Political stability
*Government policies
*Investment incentives and disincentives
*Infrastructure
*Institutional framework (commercial, legal, bureaucratic)
*Cheap and skilled labour
*Market size and growth
*Macroeconomic conditions
*Natural resources
3. Internalization incentive advantages (i.e. to exploit or circumvent market failure)
*To reduce transaction costs
*To avoid or exploit Government intervention (quotas, price controls, tax differentials, etc)
*To achieve synergistic economies
*To control supplies of inputs
*To control market outlets

2.3. Empirical Literature

2.3.1. Classification of FDI

FDI can be categorized into horizontal, vertical and conglomerate.

Horizontal FDI is an investment operation aimed at the horizontal expansion of the production. This means that an investor operating in the source country decides to produce abroad in a same industrialized country which will host the investment, as ways to avoid trade barriers, gain technical expertise and expand its market.

Vertical FDI occurs when multinationals fragment the production process internationally, locating each stage of production in the country where it can be done at the least cost. Such investment takes the form if a company invests in a business that plays the role of a supplier or a distributor.

Lastly, **Conglomerate FDI** represents a mix of the previous two types (Moosa, 2002).

2.3.2. Advantages of FDI to the Host Country

According to Asafu-Adjaye (2005), the following are list of potential advantages of FDI to the host country. Foreign direct investment is a source of research and development spillover including human capital development. Secondly, to the host nation, FDI create stable and good wage jobs. Furthermore, it leads to faster economic growth and development. In addition, foreign direct investment increases universal market access for export. In sum, FDI offers the most liberal investment climate as a gateway to the rest of the world.

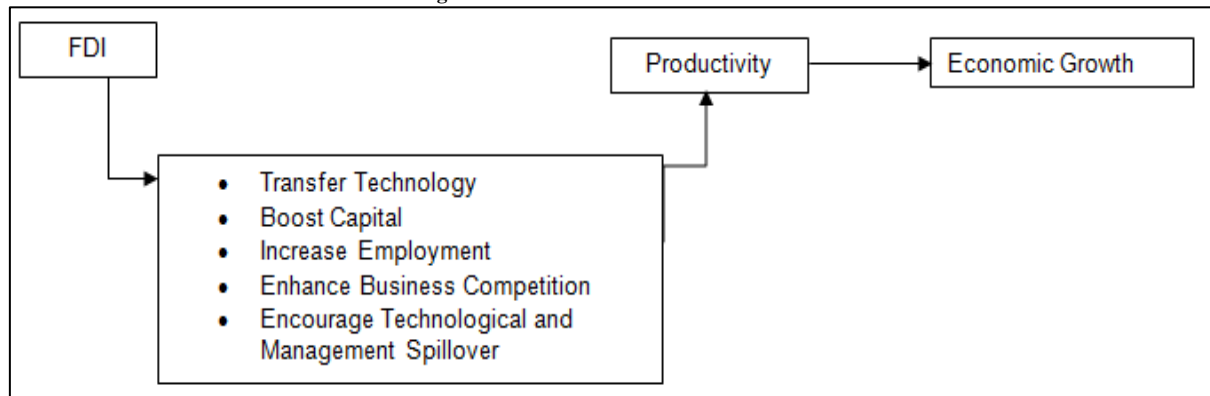
2.3.3. Disadvantages of FDI to the Host Country

Below are the disadvantages of FDI to the host country (Asafu-Adjaye, 2005). Foreign investment hinders domestic investment. Also, FDI affects exchange rates to the benefit of one country and the detriment of another. FDI promotes import intensity and increase the current account deficit. That is a high import content could lead to low domestic value added which could result in limited domestic linkages. Lastly, excessive outflow of FDI (de-capitalization) could have a negative effect on economic growth.

2.4. Investment - Growth Experience

In 1983 Ghana recorded low FDI inflows after the implementation of the Economic Recovery Programme (ERP). Since 1983, the focus of investment policies had shifted towards promoting private investment as part of the economic policy and sectoral reforms which sought to reduce government involvement in direct productive activity and to remove trade barriers and price controls. Ghana started receiving significant FDI inflows after it embarked upon market friendly economic reforms and instituted democratic governance.

Figure-1. The Link between FDI and Growth



Source: Author's research work, 2018

2.5. Investment - Employment Experience

Ghana's Investment policies pursued over the past two decades appear to have benefited the mining sector most relative to the more labour absorbing sectors. According to the Ghana Investment Promotion Centre (GIPC, 2017), FDI has some positive impact on total formal employment as well as the quality and skills level of Ghanaian workers. Data from the GIPC shows that about 86 percent of enterprises registered since its establishment (1994) and that FDI inflows registered from 1994 – 2016 amounted to US\$38.2 billion. These FDI inflows have created a cumulative total of 663,569 jobs for the period 1994 – 2016 (out of which 614,275 were for Ghanaians). Additionally, FDI, net inflows (% of GDP) in Ghana was 8.16 percent as of 2016. Whilst the latest value FDI, net inflows (BoP, current US\$) was \$3.485 billion as of 2016.

Table-3. Linkage between FDI and Employment, September 1994 – December 2016

Subsector	Total Investment Cost		Employed Creation			
	No. of Projects	(US\$ Million)	Ghanaian	%	Foreigners	%
Building and Construction	528	13,366.27	100,141	16.30	16,664	33.81
Tourism	428	908.25	14,200	2.31	2,055	4.17
Services	1639	7,428.57	157,327	25.61	16,779	4.04
Agriculture	267	1,738.27	230,475	37.52	1,891	3.84
Manufacturing	1265	12,423.75	78,886	12.84	7,062	14.33
Export Trade	243	143.03	5,489	0.89	882	1.79
General Trade	1116	2,144.88	27,757	4.52	3,961	8.04
Total	5486	38,153.02	614,275	100.00	49,294	100.00

Source: Ghana Investment Promotion Centre, GIPC

Table 3 (above) suggests that investments by foreign corporations generate stable and new jobs (directly and indirectly) through forward and backward linkages with domestic firms (Asiedu and Gyimah-Brempong, 2005). Empirically, Iyanda (1999), found that two to four jobs are created locally for each worker employed by an MNC. Inekwe (2013), empirical work supports the huge employment trend in the service sector and a minimal employment growth in the manufacturing sector.

3. Methodology

3.1. Introduction

The section focuses on the research methods in order to examine and provide answers to the research question. In order to understand and establish reliable results, the study adopts the quantitative research method using time series data and analyse results via EViews statistical software (analysis) in answering the research question. Stationarity (unit root) tests of variables performed to check serial correlation and three different models were performed in order to obtain reliable results. Namely, OLS, ARDL-ECM Bound Testing Approach and Granger-Causality test in establishing both short-run and long-run relationship among study variables. Lastly, other residuals and/or coefficients diagnostics robust tests such as heteroskedasticity, multicollinearity, Jarque-Bera test among others were performed to better affirm overall empirical results.

3.2. Sources of Data

Time series data were used to analyse the impact of FDI on employment in Ghana for the sample period 2000 – 2016. The main advantage of subject mentioned data is that almost all data used in the real world is based on such data (aiding better analysis and reliable forecast). The study period was chosen because prior to 1990s, the Ghanaian economy was barely liberalized via Economic Recovery Programme (Structural Adjustment Programme). Secondary data was chosen because data collection process is informed by expertise and professionals, valid and accurate data

from the past, helps to improve the understanding of the problem and lastly, economical (time, efforts and expenses). The secondary data used includes labour data (employment rate), flow of inward foreign direct investment (FDI), wage structure, subsectors, investment freedomand real GDP growth statistics of Ghana. The dataset for this study wasobtained from a variety of different sources, namely,World Bank Group, Bank of Ghana (BoG), Ghana Investment Promotion Centre (GIPC), (Ghana Statistical Service, 2017) (GSS) and Ghana Trades Union Congress.

3.3. Model Specification

To be able to answer the research question as well as meet the objectives of the study, OLS (Multiple Linear Regression) Model, ARDL-ECM Bounds Testing approach and Granger-causality test were employed.

3.3.1. OLS (MLR model)

$$\ln EMR_t = \beta_0 + \beta_1 \ln FDI_{t-1} + \beta_2 \ln Wage_{t-1} + \beta_3 \ln SubSt_{t-1} + \beta_4 \ln IvFt_{t-1} + \beta_5 \ln GDP_{t-1} + \xi_t \quad (1)$$

3.3.2. ADF Unit Root Test (Dickey and Fuller, 1979)

As empirically demonstrated below (equations)it is paramount to undertake unit root tests as to ensure the study variables are not $I(2)$ or beyond because the bounds test is based on the assumption that variables are $I(0)$ or $I(1)$. The reason for such test is to eliminate the issue of autocorrelation problem (serial correlation).

$$\text{No trend and no intercept} \quad \Delta \gamma_t = \delta \gamma_{t-1} + \sum_{i=1}^p \beta_1 \Delta \gamma_{t-i} + \xi_t \quad (2)$$

$$\text{Intercept but no trend} \quad \Delta \gamma_t = \alpha_0 + \delta \gamma_{t-1} + \sum_{i=1}^p \beta_1 \Delta \gamma_{t-i} + \xi_t \quad (3)$$

$$\text{Intercept and trend} \quad \Delta \gamma_t = \alpha_0 + \delta \gamma_{t-1} + \alpha_2 t + \sum_{i=1}^p \beta_1 \Delta \gamma_{t-i} + \xi_t \quad (4)$$

On the other hand, **ARDL model** is widely used in the analysis of long run relations when the data generating process underlying is stationary at either integrated at level ($I(0)$) or integrated at order one ($I(1)$) or mixer. This cointegration model was developed by Pesaran and Shin (1999), and Pesaran *et al.* (2001). The model assumes a cointegration test based on bounds testing procedure used to test empirically the long-run relationship between the variables of interest. This test is fairly simple because it allows the cointegration relationship to be estimated by OLS after determining the lag order in the model. Significantly, the ARDL bound testing approach is considered to be more robust and appropriate when dealing with small sample data (Pesaran *et al.*, 2001). The ARDL (p,q) model approach to cointegration testing can be expressed as follows:

$$\Delta \gamma_t = \alpha_0 + \alpha_1 \gamma_{t-1} + \beta_1 x_{t-1} + \sum_{i=1}^p \delta_i \Delta \gamma_{t-i} + \sum_{j=0}^q \theta_j \Delta x_{t-j} + \xi_t \quad (5)$$

Alternatively, the equation (5) can be specified as (6):

$$\Delta \ln EMR_t = \beta_0 + \sum_{i=1}^p \beta_1 \Delta \ln EMR_{t-i} + \sum_{i=1}^p \beta_2 \Delta \ln FDI_{t-i} + \sum_{i=1}^p \beta_3 \Delta \ln Wage_{t-i} + \sum_{i=1}^p \beta_4 \Delta \ln SubSt_{t-i} + \sum_{i=1}^p \beta_5 \Delta \ln IvFt_{t-i} + \sum_{i=1}^p \beta_6 \Delta \ln GDP_{t-i} + \phi_1 \ln EMR_{t-1} + \phi_2 \ln FDI_{t-1} + \phi_3 \ln Wage_{t-1} + \phi_4 \ln SubSt_{t-1} + \phi_5 \ln IvFt_{t-1} + \phi_6 \ln GDP_{t-1} + \xi_t \quad (6)$$

3.3.3. ARDL-ECM Bound Testing Approach (Pesaran *et al.*, 2001)

Pesaran *et al.* (2001), distinguish five cases depending on which deterministic components are included in the model specification and whether we disregard the implied restrictions on their coefficients or not:

Case 1: no intercepts; no trends, $c_0 = c_1 = 0$,

Case 2: restricted intercepts; no trends, $c_0 = -\sum \beta_0$ and $c_1 = 0$,

Case 3: unrestricted intercepts; no trends, $c_0 \neq 0$ and $c_1 = 0$,

Case 4: unrestricted intercepts; restricted trends, $c_0 \neq 0$ and $c_1 = -\sum \beta_1$,

Case 5: unrestricted intercepts; unrestricted trends, $c_0 \neq 0$ and $c_1 \neq 0$.

Using case 3 above, the null hypothesis of no long run relationship ($H_0: a_1 = a_2 = 0$) against the alternative hypothesis of long run relationship ($H_A: a_1 \neq a_2 \neq 0$) using the F-statistic (Wald Test) (Pesaran *et al.*, 2001).

Test decisions:

- If the Wald F-statistics fall above the upper critical value – cointegrated.
- If the Wald F-statistics falls between the lower bound and upper bound critical value – inconclusive.
- If the Wald F-statistics falls below the lower critical value – no cointegration.
- In addition, I estimated the unrestricted Error Correction Model associated with ARDL (p,q) model (reparameterization of ARDL Model). With the specification of ECM, both long-run and short-run information are incorporated (in a single model).

$$\Delta \gamma_t = \beta_0 + \beta_1 t + \alpha (\gamma_{t-1} - \theta x_{t-1}) + \sum_{i=1}^{p-1} \psi_i \Delta \gamma_{t-i} + w' \Delta x_t + \sum_{i=1}^{q-1} \psi' x_i \Delta x_{t-i} + \xi_t \quad (7)$$

Alternatively, the equation (7) can be specified as (8):

$$\Delta \ln EMR_t = \beta_0 + \sum_{i=1}^1 \beta_1 \Delta \ln EMR_{t-i} + \sum_{i=1}^1 \beta_2 \Delta \ln FDI_{t-i} + \sum_{i=1}^1 \beta_3 \Delta \ln Wage_{t-i} + \sum_{i=1}^1 \beta_4 \Delta \ln SubSt_{t-i} + \sum_{i=1}^1 \beta_5 \Delta \ln IvF_{t-i} + \sum_{i=1}^1 \beta_6 \Delta \ln GDP_{t-i} + \alpha ECT_{t-1} + \zeta_t \tag{8}$$

3.3.4. Granger Causality Test (1969)

Granger (1969), proposed a time series data based approach in order to determine causality. The rule of thumb is that in the Granger-sense x is a cause of y if it is useful in forecasting y and vice versa. The three different situations in which a Granger-causality test can be applied are:

- In a simple Granger-causality test with two variables and their lags.
- In a multivariate Granger-causality test where more than two variables are included because it is supposed that more than one variable can influence the results.
- Finally, Granger-causality can also be tested in a VAR framework, where the multivariate model is extended in order to test for the simultaneity of all included variables.

The empirical results presented in this paper are calculated within a simple Granger-causality test in order to test whether FDI “Granger cause” employment and vice versa. The following two equations can be specified below.

$$y_t = \beta_0 + \sum_{i=1}^m \beta_i y_{t-i} + \sum_{j=1}^n \psi_j x_{t-j} + \zeta_t \tag{9}$$

$$x_t = \beta_0 + \sum_{i=1}^m \beta_i y_{t-i} + \sum_{j=1}^n \theta_j x_{t-j} + \zeta_t \tag{10}$$

Based on the estimated OLS coefficients for the equations (9) and (10), four different hypotheses about the relationship between y_t and x_t can be formulated: (i) $y_t \rightarrow x_t$ (y_t causes x_t , unilateral causality); (ii) $x_t \rightarrow y_t$ (x_t causes y_t , unilateral causality); (iii) $y_t \leftrightarrow x_t$ (feedback or bilateral causality); and (v) $y_t \not\leftrightarrow x_t$ (Independence).



The null hypothesis is $H_0: \sum_{j=0}^n$, that is lagged x_t and y_t terms do not belong to equations 9 and 10 respectively. The test of significance of the overall fit can be carried out with an F-test while the number of lags can be chosen with Akaike Information Criterion (AIC, (Akaike, 1974) or Bayesian Information Criterion (BIC, (Haycock et al., 1978).

Where:

EMR = EmploymentRate (fdiemployment/active population as a percentage)

FDI = Foreign Direct Investment (% of GDP)

Wage = Wage Structure (ratio of nominal average earning/consumer price index)

IvF = Investment Freedom Index (annual %)

SubS = Value added by activity (% of GDP)

GDP = Real Gross Domestic Product Growth (annual %)

β_0 = Constant Coefficient

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ = Short-run Coefficients

ζ_t = Error Term

α = Coefficient of Error Correction (with the speed of adjustment coefficient = $1 - \sum_{i=1}^p \delta_i$). The larger the value, the quicker the convergence to the long-run equilibrium. For stability, we require that $\alpha < 0$.

3.4. Definition of Variables

3.4.1. Dependent Variable

a) Employment Rate

Employment is said to be the main bridge between economic growth and opportunities for human development. The quality and quantity of employment and the access which the poor have to decent earnings opportunities will be crucial determinants of poverty reduction (Hull, 2009). Employment refers to the total annual employment growth rate created at a particular time due to inflow foreign direct investment. It is measured with reference to the total FDI employment to active population (growth rate annually). It is the dependent variable in the regression model. Data on Labour were obtained from the Ghana Statistical Service (GSS).

3.4.2. Independent Variables

b) Foreign Direct Investment

According to Fernandez-Arias and Hausmann (2001), FDI is seen as a safer form of finance. It is an investment in the form of a controlling ownership in a business in one country by an entity based in another country. FDI (% of

GDP) was used because it reflects the proportion of economic growth and also the investment flow into the country. Data on foreign Investment were obtained from the Ghana Investment Promotion Centre (GIPC).

c) Wage

Labour cost plays a major role in the functioning of an economy. As far as employees are concerned the compensation received for their work, more commonly called wages or earning, generally represents their main sources of income and therefore has a major impact on their ability to spend and/or save. On the other hand, consumer price index (CPI) can relate to wage directly/indirectly in various form of transaction. By definition, CPI regulates the price changes of a basket of consumption goods purchased by households. Data were obtained from the Bank of Ghana and Trade Union Congress (TUC) of Ghana.

d) Subsectors

The non-mining subsectors are very important and sensitive to the overall economy and accounting for a total weight of 26 percent of overall economic output. The subsectors value added by activity divides the total value added by sector, namely agriculture, industry, utilities, and other service activities. Most of these job losses occurred in the industrial sector, agricultural and few in services. Data on the subsectors were obtained from Bank of Ghana (BoG).

e) Investment Freedom

One key indicator for measuring economic and regulatory flexibility of every country is investment freedom. Government regulation may interfere with daily routine decision-making, limiting both inflows and outflows of capital, shrinking markets and reducing opportunities for growth. Adverse government action is an imposition on both the freedom of the investor and the people seeking capital. Data on investment freedom index were obtained from The World Bank Group.

f) Gross Domestic Product

This refers to the monetary value of goods and services that are produced and consumed within the country. Real GDP growth was used because it captures the salient aspect of economic growth and it is often used to measure a nation's well-being. It is an independent variable in the regression. Real GDP growth data were obtained from the Bank of Ghana (BoG).

3.5. Validity and Reliability

The validity of a measure depends on how we have defined the concept it is designed to measure. In research methodology, measuring the validity is very paramount for every study (Amaratunga *et al.*, 2002; Yin, 1994). On the other hand, reliability is a measurement procedure to which a test produces similar results under constant conditions on all occasions (Yin, 1994). Considering the goal of reliability is to minimize the errors and biases in a study (Simon, 1989). The empirical result of the study shows that there exist uneven distribution of foreign investment into key sectors and this resulted in huge unemployment in the Ghanaian economy.

3.6. Data Analysis

The data analysis was done using E Views statistical software. Again, the analysis was based on the research question, objectives and other significant purposes of the study. Data analysis carried out includes descriptive statistics, regression and correlation analysis, ARDL-ECM Bound Testing approach and a Granger-Causality test.

4. Analysis and Discussion of Results

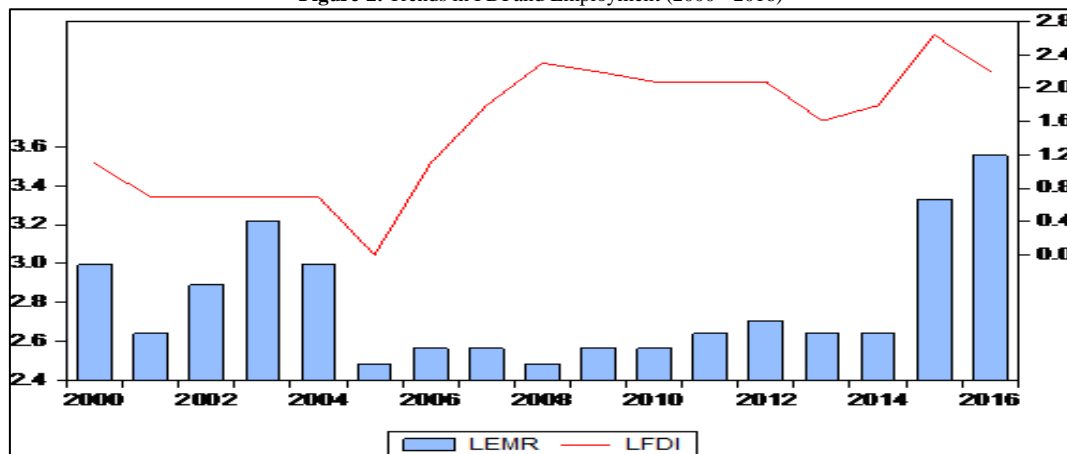
4.1. Introduction

This section presents descriptive analysis of FDI impact on employment through OLS model, ARDL-ECM Bound Testing Approach and Granger-Causality test using the above mentioned data. Empirical result analyses presented are based on the study objectives and/or research question, which examine the impact of Foreign Direct Investment on employment in Ghana.

4.2. Presentation of Data

Empirically, figure 2 (below) shows the trend of FDI impact on employment in Ghana. FDI is the line graph (units in inches) and is to the right side whilst employment is the bar chart (units in inches) and is to the left side. Foreign investment took a sharp decline from 2000 to 2004 after the implementation of the Economic Recovery Program in 1983. But FDI and employment increased proportionately from 2005 to 2008 and also from 2014 to 2015 (as per attached figure) indicating sound and flexibility investment policies (regulation) in the country.

Figure-2. Trends in FDI and Employment (2000 - 2016)



Source: Author's computations (2018)

4.3. Impact of FDI on Employment in Ghana

4.3.1. Descriptive Statistics

The descriptive summary of the raw data presented in Table 4 (below) shows that the mean level of 3.093068 and 4.513952 suggesting an average rate of about 3 percent employment growth and 4.5 percent FDI (respectively) to the economy whilst wage represents approximately 7 percent of the overall wage structure in the country. All other things been equal, Subsectors contributed 4.1 percent to national output and investment freedom experienced less rigidity / mostly free regulation of approximately 79 percent in the country. Also, real GDP saw a growth rate of averagely 3.2 percent (approximately). Furthermore, the coefficients of skewness for all variables are positively low near zero and the kurtosis of each variable is below the benchmark for normal distribution of 3 which confirms near normality.

Table-4. Descriptive Statistics

Variable	Mean	SD	Min	Max	Skew	Kurt
lnEMR	3.093068	0.320629	2.484907	3.555348	0.120287	0.459717
lnFDI	4.513952	0.061425	0.702584	4.839057	0.392041	0.277925
lnWage	0.074873	0.010905	0.016737	0.730662	0.978404	0.026541
lnSubS	4.128059	0.181102	3.912023	4.442651	0.346867	0.117560
lnIvF	0.791045	0.062841	0	0.921994	0.330512	0.357886
lnGDP	3.247862	0.364391	0.693147	3.945910	0.006873	0.815865

Source: Author's computations (2018)

Table-5. Regression Summary Output (Dependent Variable: ln EMR)

	Coefficients	Std. Error	P-value
lnFDI	0.350868	0.051801	0.0000***
lnWage	0.290155	0.063288	0.0000***
lnSubS	-0.665410	0.182512	0.0038***
lnIvF	0.725603	0.185098	0.0024***
lnGDP	0.256755	0.105979	0.2120
Constant	5.866479	0.765516	0.0000***
Prob> F	0.000000		
R-Squared	0.896811		
Adjusted R-Squared	0.863543		
Observation	17		

***, **, and * denote significance at 1%, 5%, and 10% respectively

Source: Author's computations (2018)

4.3.2. Empirical Regression Results

The model is in the form: $\ln EMR_t = \beta_0 + \beta_1 \ln FDI_{t-1} + \beta_2 \ln Wage_{t-1} + \beta_3 \ln SubS_{t-1} + \beta_4 \ln IvF_{t-1} + \beta_5 \ln GDP_{t-1} + \xi_t$

The above model helped to ascertain the impact of FDI on employment in Ghana. The summary regression result (Table 5 below) shows that the proposed model is significant at level of p-value 0.000000. In addition, the model has R-squared and adjusted R-squared of 0.896811 and 0.863543 (respectively). The former (0.896811) which is of higher value suggests that 89percent of the variations in employment growth is explained by the independent variables whilst only 11 percent is unexplained, suggesting that the above equation is an ideal model in answering our research question. The coefficient for FDI is positive and significant at 0.01 level. In addition, employment showed a growth rate of about 29percent as a result of an increment in wage. This means that employment is very responsive to wage in some key sectors and vice versa (Bhorat *et al.*, 2013). Subsectors had a

negative but significant impact on employment growth by 67percent (approximately) whilst Investment freedom had a significant coefficient of 73 percent (approximately). Meaning for every 1 percent increase in investment freedom regulation, employment grows at a rate of 73 percent (Garrett and Rhine, 2010). Lastly, the coefficient on GDP showed a positive coefficient of about 26percent on employment growth. The result is consistent with the empirical work by Asiedu (2002), who found a positive link among FDI flows, GDP growth and employment (Africa).

4.3.3. Correlation Analysis

Table 6 (below) shows that FDI is positively correlated with employment by approximately 9percent in Ghana. This outcome supports Harding and Javorcik (2012) who observed foreign direct investment impact in job creation. Both wage and investment freedom flexibility had a high positive correlation of 73 percent and 67 percent (respectively) to employment growth. These positive trends in employment growth are consistent with Romer (1997); Schultz and Mwabu (1998), work on the distribution of wages and employment in South Africa. But subsectors recorded a low negative correlation of 25 percent on employment growth. The outcome supports Inekwe (2013), empirical work on youth employment in Namibia and Zimbabwe. Lastly, table 5 further shows a positive correlation between employment and GDP in the country.

Table-6. Pearson Correlation Analysis

Variable	ln EMR	lnFDI	lnWage	lnSubS	lnIvF	lnGDP
lnEMR	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000
lnFDI	0.089938	-0.100161	-0.057556	0.283397	0.511891**	
lnWage	0.726968***	0.568564**	0.620182***	0.279091		
lnSubS	-0.249062	0.500028**	0.215403			
lnIvF	0.668563***	0.622628***				
lnGDP	0.029509					

***, **, and * denote significance at 1%, 5%, and 10% respectively.

Source: Author's computations (2018)

4.4. ARDL Model

After testing the stationarity and determining the optimal lag structure of the variables, the output of ARDL model was derived. This was under the null hypothesis of no long run relationship ($H_0: a_1 = a_2 = 0$) against the alternative hypothesis of long run relationship ($H_A: a_1 \neq a_2 \neq 0$) using the F-statistic (Wald Test). If the computed F-statistics is greater than the upper ($I(1)$) critical value as indicated below (Table A4, Appendix), then the null hypothesis can be rejected, suggesting cointegration. On the other hand, if the computed F-statistics is less than the lower ($I(0)$) critical value (Table A4, Appendix), the test fails to reject the null hypothesis and concludes that there is no cointegration. Lastly, if the t-statistics lies within the lower ($I(0)$) and upper ($I(1)$) critical bounds, a conclusive inference can only be made once the order of the integration of the underlying regressors is known (Pesaran *et al.*, 2001). Empirically, as conducted by Bahmani-Oskooee and Brooks (1999), if the lagged error correction term turns out to be negative and significant, cointegration is supported.

4.5. Model Results: Bound Testing, ECM and Granger-Causality Test

As suggested by the lag length selection criteria, the OLS estimates of ARDL-ECM shows a VAR (1) as suggested by Pesaran *et al.* (2001) in Table A2 (Appendix). The regression for the underlying ARDL model (Equation 6) fits very well and significant at 5% level. Also, the model passes all the diagnostic tests against serial correlation (Breusch-Godfrey test), heteroscedasticity (Breusch-Pagan Godfrey and White test), normality of errors (Jacque-Bera test), Ramsey reset test (log likelihood ratio) and Variance Inflation Factor (see Appendix: Tables A7 and A8). Further diagnostic test results suggest that the stability of the model is largely stable as shown below (Figures A1 and A2, Appendix). ARDL model test reveals a significant p-value (0.046624) indicating no evidence of model misspecification in Equation 6 (above). Again, the cointegration analysis shows that when optimal lag (1) is used, the null hypothesis of no cointegration between lnEMR and lnFDI is rejected at 5% level. This test is used to represent the long run equilibrium relationship among the variables. The bound testing statistics (F-statistics) for equation 6 as shown in Table A4 (Appendix) is 9.444398 which is above the lower and the upper bound critical values (2.62 and 3.79 respectively; see Pesaran critical value table). Nevertheless, as cited by Bahmani-Oskooee and Brooks (1999), and Bahmani-Oskooee and Rehman (2005), no final conclusion can be formed about a cointegrating relationship among the study variables without going further to perform other test based on the error correction term. The estimated coefficients and p-values for the ECT in Equation 8 is indicated in Table A5 (Appendix) showing estimated statistically significant (5% level of significance). The estimation has the correct sign with considerable variation in the speed of adjustment (that's, how the model is getting adjusted towards long run equilibrium at the speed of 76%). The results reinforce that there is cointegration among the variables specified in the model. This empirically supports that in a long run FDI impact on employment in Ghana. Again, the result from Granger causality test (Table A6, Appendix) shows that there is no causality relationship from FDI inflows to employment growth or from employment growth to FDI in the short run. Furthermore, there is no significant Granger causality from employment rate to wage or from wage to employment growth. Subsectors, investment freedom or GDP at 5% significance level does not Granger cause employment growth in the short run (see Appendix, Table A6).

4.6. Conclusion

We conclude by confirming the presence of both short and long-run relationship/cointegration between the study variables whilst further robust findings show no evidence of short-run causality running from FDI inflows to employment growth or from employment growth to FDI.

5. Summary, Conclusions and Recommendations

5.1. Introduction

This final section presents the summary, conclusions and recommendations on the study.

5.2. Summary of the Study

The study examined FDI impact on employment in Ghana. The specific objective is to establish and analyse the linkages between FDI and employment as well as the trend of employment in Ghana. Time series data were used to determine the impact of FDI on employment during the sample period 2000 – 2016. The period 2000 – 2016 was used because prior to the 1990s era, the Ghanaian economy was barely liberalized via Economic Recovery Programme (Structural Adjustment Programme). The dataset was obtained from a variety of different sources. It includes the World Bank, Bank of Ghana (BoG), Ghana Investment Promotion Centre (GIPC), Ghana Statistical Service (GSS) and Ghana Trades Union Congress. OLS, ARDL-ECM Bound Testing Approach and Granger-Causality Test were applied to ascertain the impact of FDI on employment in Ghana. The study discovered key challenges facing foreign investors ease of doing business in Ghana, namely, challenges in starting a business, property registration, dealing with construction permits, access to electricity, protecting investors interest, domestic taxes and trading across borders, enforcing and resolving of contracts and insolvency respectively. Also, the study found that FDI had not contributed above the conventional average score of 50 percent to employment, considering the fact that 1 percent increase in FDI led to 3 percent growth in employment during the study period. In addition, the negligence of labour absorption subsectors causing the increasing rate of unemployment and underemployment in Ghana is worth noting. Last but not least, foreign investment channelled towards the non-mining had been unfavourably distributed among the various sub-sectors. Considering the limited investment inflows in some sub-sectors such as export trade had negatively affected employment, trade performance and overall trade deficit.

5.3. Conclusions of the Study

As reiterated earlier Ghana continues to uphold its reputation as one of Africa's few politically stable democracies and provides foreign investors with reliable information on the continent. As a result, Ghana outweighed most countries in West Africa and on the continent on measures of civil liberty, political rights and stability. The results of the OLS test indicated that there exists a positive relationship between FDI and employment. Again, the study found other key controlling factors that equally influence employment in the country. In sum, further robust test showed that the main effect of FDI on employment is positive and significant in the country.

Recommendations

Firstly, the Government of Ghana must critically take a second look at the current Investment Policies. Majority of existing investment policies are in favour of the mining sector compared to the non-mining sector. For instance, in 2012 alone, six mining laws and regulations were passed. Secondly, the government should step up efforts against corruption and enhancing policy/regulatory frameworks, for instance, competition, financial reporting and intellectual property protection, to help foster a dynamic and well-functioning business sector. Thirdly, the study proposes the implementation of Electronic Point of Registration Project. Thus, moving all processes from manual to an electronic platform and accelerating the shift to a functional form of administration in all public (state) offices. Another recommendation is the restructuring of land administration and property registration systems. This will facilitate foreign firms ability to secure land, property and other permits. An Integrated Rural Development Program (IRDP) should be introduced in the rural areas. The program should comprise infrastructural development such as accessible road, provision of electricity, basic education and health care facilities, and other social amenities to help promote and absorb the majority of the youth unemployment in the country. The introduction of FDI promotion strategy. This policy aims at attracting adequate foreign investment within the specific industry rather than to attempt to get FDI into a large number of heterogeneous industries. Lastly, the Government of Ghana should restructure the mining sector by making room for individual foreign investors/corperations with limited financial resources who want to venture into the mining industry. Considering the country's natural resources, stable political stability and geographical location on the continent, Ghana is a suitable destination for foreign investors.

Limitations of the Study

Although there are two broad sectors where foreign investors operates, namely, i) mineral and mining sector and ii) non-mining sector, this study was limited to only the non-mining sector in Ghana. Considering this limitation, the study cannot be directly generalized to include the other sector (mineral and mining sector). In this regard, there is the need for future studies in minerals and mining sector in order to make well-informed conclusions on the subject matter. In spite of the above limitations the results of the study give credible information with respect to FDI impact on employment in Ghana.

Dedication

To my Supervisor, Professor HE Liping and my Loving Mother, Madam Theresa Acheampong.

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Appendices

Table-A1. Results of ADF Unit Root Test (stationary test)

Unit Root Test: Intercept but no trend					
	Level	1 st Difference			
Variable	t-Stat	P-value	t-Stat	P-value	AIC Lag
lnEMR	-1.034223	0.7104	-3.575772	0.0216**	1
lnFDI	-1.166439	0.6613	-3.743037	0.0149**	1
lnWage	-1.349574	0.8965	-3.183362	0.0210**	1
lnSubS	-1.822389	0.3563	-3.461471	0.0090***	1
lnIvF	-2.115889	0.2415	-4.426775	0.0067***	1
lnGDP	-2.183043	0.2188	-5.222707	0.0010***	1

***, ** and * denote significance at 1%, 5% and 10% respectively.

Intercept but no trend (equation 3): 1%, 5% and 10% significance level is given as -4.004425, -3.098896 and -2.690439 respectively.

Table-A1. Continuation

Unit Root Test: Intercept and trend					
	Level	1 st Difference			
Variable	t-Stat	P-value	t-Stat	P-value	AIC Lag
lnEMR	-0.890471	0.9318	-4.608252	0.0136**	1
lnFDI	-2.325307	0.3990	-4.493587	0.0159**	1
lnWage	-0.174772	0.9870	-3.807712	0.0276**	1
lnSubS	-3.455569	0.0792	-6.313896	0.0008** *	1
lnIvF	-1.612223	0.7383	-3.956755	0.0217**	1
lnGDP	-3.018030	0.1576	-6.084952	0.0001***	1

***, ** and * denote significance at 1%, 5% and 10% respectively.

Intercept and trend (equation 4): 1%, 5% and 10% significance level is given as -4.800080, -3.791172 and -3.342253 respectively.

Source: Author's computations (2018)

Table-A2. VAR Lag Order Selection Criteria

Lag	LR	FPE	AIC	SC	HQ
0	NA*	0.017265	-1.268475	-0.985254	-1.271491
1	1.853967	0.016139*	-1.366887*	-1.036464*	-1.370407*
2	0.000206	0.019283	-1.233583	-0.855956	-1.237606

* indicates lag order selected by the criterion; LR: sequential modified LR test statistic (each test at 5% level), FPE: Final Prediction Error, AIC: Akaike Information Criterion, SC: Schwarz Information Criterion and HQ: Hannan-Quinn Information Criterion.

Source: Author's computations (2018)

Table-A3. Estimated long run coefficients using ARDL model

Variable	Coefficient	Std. Error	Prob.
lnEMRt-1	-1.233754	5.292784	0.0284**
lnFDIt-1	-0.129316	2.156213	0.0916*
lnWaget-1	1.711274	5.527001	0.4761
lnSubst-1	2.098242	3.467331	0.1686
lnIvFt-1	-0.088385	1.691701	0.0021***
lnGDPT-1	0.805817	2.047109	0.4039
ΔlnEMRt-1	0.842069	3.333685	0.2123
ΔlnFDIt-1	0.038849	1.266050	0.2832
ΔlnWaget-1	-0.193771	5.452380	0.5090
ΔlnSubst-1	-0.767829	2.384523	0.0939*
ΔlnIvFt-1	0.143398	0.726755	0.7508
ΔlnGDPT-1	-0.333316	1.530558	0.7780
Constant	1.343801	0.422027	0.0197**
R-squared	0.881876		
Adjusted R-squared	0.758433		
F-statistic	2.244281		
Prob(F-statistic)	0.046624		

***, ** and * denote 1%, 5% and 10% respectively.

Source: Author's computations (2018)

Table-A4. Cointegration Test (Bound testing)

Dependent Variable:	ΔlnEMR
F-statistic	9.444398
5 percent critical value	I(0) 2.62
(Pesaran et al., 2001; n=17 and k=5)	I(1) 3.79

Computed F-statistic: 9.444398(Significant at 0.05). Critical Values are cited from Pesaran et al. (2001). Table: (Pesaran et al., 2001); critical value table: Case III: Unrestricted intercept and no trend. n is observation/sample size and k is the number of non-deterministic regressors in the long-run relationship.

Source: Author's computations (2018)

Table-A5. Results of Unrestricted Error Correction Model (ECM)

Variable	Coefficient	Std Error	Prob.
ΔlnEMRt-1	0.601339	0.932140	0.0057***
ΔlnFDIt-1	0.967627	0.481158	0.0020***
ΔlnWaget-1	0.844221	1.884340	0.0041***
ΔlnSubst-1	-0.232253	0.292911	0.0548*
ΔlnIvFt-1	0.467787	0.383569	0.0395**
ΔlnGDPT-1	0.909149	0.140318	0.2011
ECT(-1)	-0.761932	0.052814	0.0095***
Constant	0.486786	0.150705	0.0434**
R-squared	0.618874		
Adjusted R-squared	0.252828		
F-statistic	0.444955		
Prob(F-statistic)	0.001073		

The error correction term (ECT) is the speed of adjustment towards long-run equilibrium.

***, **, and * denote 1%, 5%, and 10% respectively.

Source: Author's computations (2018)

Table-A6. Results of Short run Granger Causality Test

Sample: 2000-2016			
Lag 1			
Null Hypothesis	Observation	F-statistics	P-value
lnFDI does not Granger Cause lnEMR	16	0.03493	0.8549
lnEMR does not Granger Cause lnFDI		2.68572	0.1272
lnWage does not Granger Cause lnEMR	16	1.88997	0.2763
lnEMR does not Granger Cause lnWage		3.95701	0.1057
lnSubS does not Granger Cause lnEMR	16	0.72852	0.4101
lnEMR does not Granger Cause lnSubS		0.47496	0.5038
lnIvF does not Granger Cause lnEMR	16	0.36984	0.8207
lnEMR does not Granger Cause lnIvF		5.73652	0.0596
lnGDP does not Granger Cause lnEMR	16	0.49258	0.4962
lnEMR does not Granger Cause lnGDP		0.13164	0.7230

Using the AIC information, the lag length for the data is 1.

Source: Author's computations (2018)

Residuals Diagnostic Tests

Table-A7. Results of Residuals Diagnostic Tests

	F-statistic	Prob.
Breusch-Godfrey Serial Correlation test	1.406817	0.2382
Heteroskedasticity Test: Breusch-Pagan-Godfrey	0.574792	0.5848
White	1.830988	0.1872
Jarque-Bera test	0.031950	0.9842
Ramsey RESET Test (log likelihood ratio)	2.553202	0.1101

Source: Author's computations (2018)

Coefficient Diagnostics Test

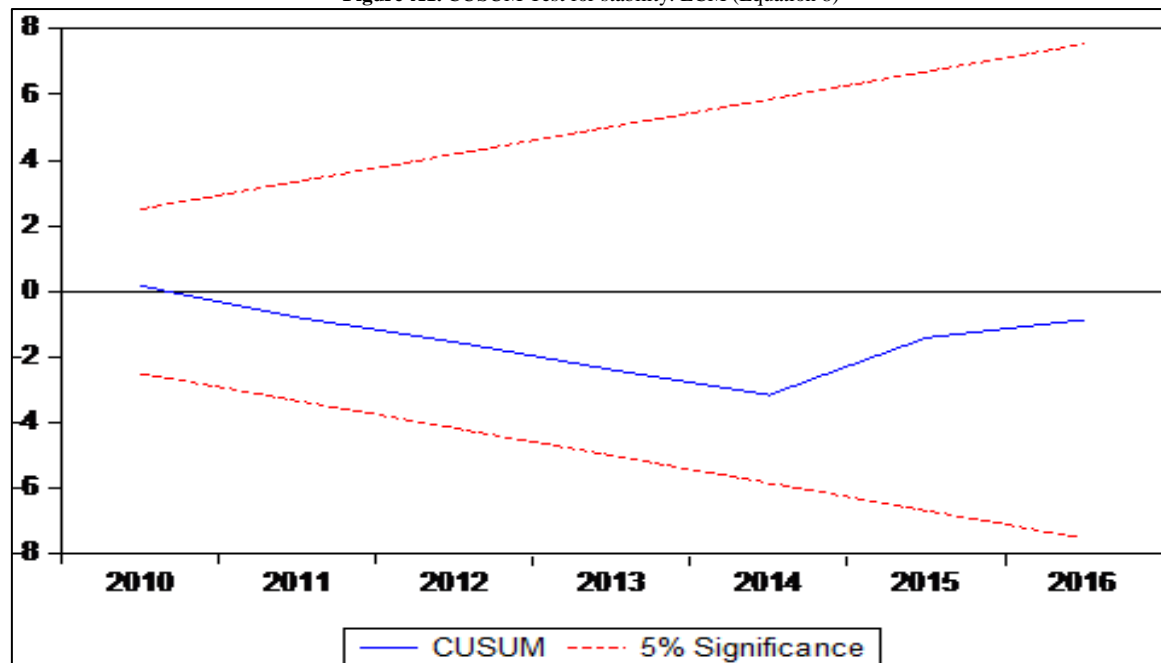
Table-A8. Result of Coefficient Diagnostics Test: Variance Inflation Factors (Multicollinearity)

Variable	Centered VIF
lnFDI	2.274445
lnWage	2.249185
lnSubS	1.597240
lnIvF	2.572783
lnGDP	2.180287

Source: Author's computations (2018)

Stability Test

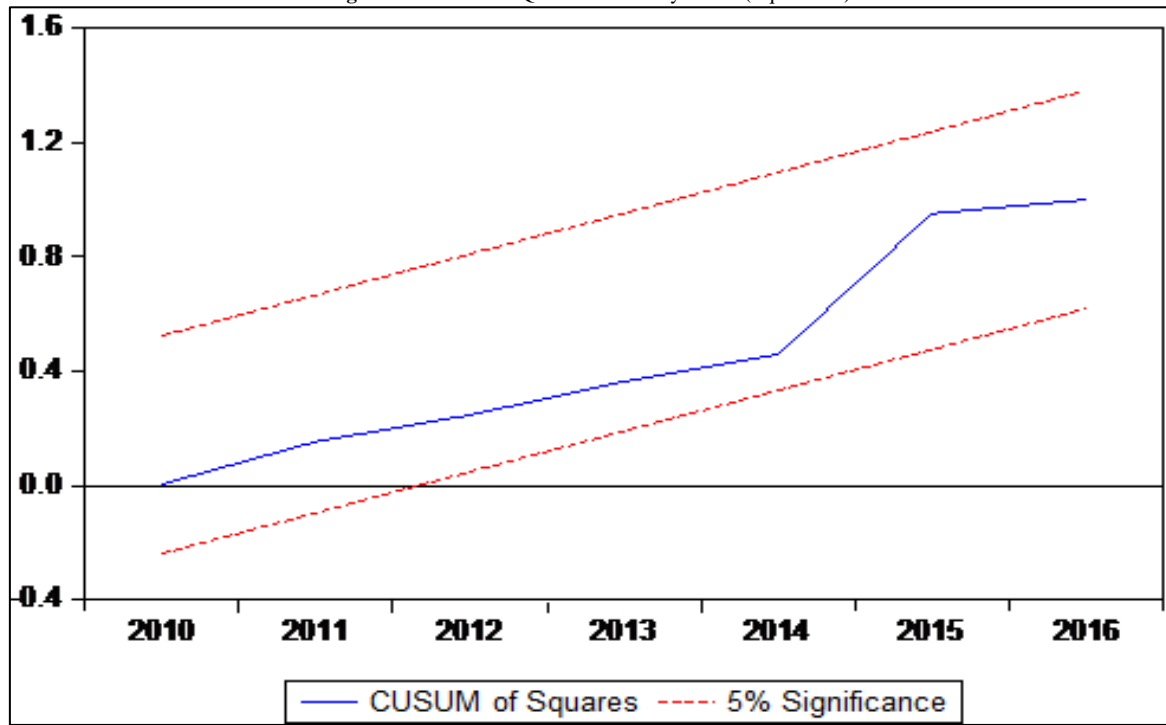
Figure-A1. CUSUM Test for stability: ECM (Equation 8)



The straight lines represent critical bounds at 5% significance level.

Source: Author's computations (2018)

Figure-A2. CUSUMSQ Test for stability: ECM (Equation 8)



The straight lines represent critical bounds at 5% significance level.

Source: Author's computations (2018)