THE EFFECT OF FOREIGN DIRECT INVESTMENT ON UNEMPLOYMENT IN SUB-SAHARAN AFRICA

By

GOMEZ Rene Anthony

THESIS

Submitted to
KDI School of Public Policy and Management
In Partial Fulfillment of the Requirements
For the Degree of
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Committee in charge:

Professor Siwook LEE, Supervisor

Professor Dong-Young KIM

Professor Cheol LIU

Approval as of May, 2018
ABSTRACT

This study aims to measure the effect of foreign direct investment on unemployment in Sub-Saharan African region. The empirical approach makes use of longitudinal/panel data sourced from the World Development Indicators (World Bank) and the United Nations Conference on Trade and Development (UNCTAD) data base for the period 1991-2016.

Unemployment as a percentage of total labor force (of the International Labor Organization estimate) was used as an indicator for unemployment. The study used Pooled Ordinary Least Squares, Fixed Effects and Random effects to determine the effect of foreign direct Investment on unemployment.

The study revealed that foreign direct investment and ratio of female to male in labor force participation have both positive and negative effects on unemployment. Gross fixed capital formation also has a strong effect in reducing unemployment while Gross Domestic product per capita and trade have a strong effects in increasing unemployment in Sub-Saharan Africa. These findings confirm related empirical evidence in many countries.

From a policy viewpoint, the results of this study call for a reform in labor market policy makers to be attentive to the ratios of female to male participation in the labor force, foreign direct investment and trade since these are all crucial in reducing unemployment in Sub-Saharan Africa.

Keywords: Unemployment; Foreign Direct Investment; Fixed-Effects, Random-Effects, Longitudinal/Panel estimation and Sub-Saharan Africa.
Dedicated to my Mom and Dad
ACKNOWLEDGEMENTS

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May God reward you all.
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<th>Full Form</th>
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<tbody>
<tr>
<td>CEEC</td>
<td>Committee of European Economic Co-operation</td>
</tr>
<tr>
<td>FDI</td>
<td>Foreign Direct Investment</td>
</tr>
<tr>
<td>FE</td>
<td>Fixed Effects</td>
</tr>
<tr>
<td>MDG</td>
<td>Millennium Development Goals</td>
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<tr>
<td>MNE</td>
<td>Multinational Enterprises</td>
</tr>
<tr>
<td>OLS</td>
<td>Ordinary Least Squares</td>
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<td>RE</td>
<td>Random Effects</td>
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<tr>
<td>SDG</td>
<td>Sustainable Development Goal</td>
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<tr>
<td>SSA</td>
<td>Sub-Saharan Africa</td>
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<tr>
<td>UNCTAD</td>
<td>United Nations Conference on Trade and Development</td>
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<td>WB</td>
<td>World Bank</td>
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<td>WDI</td>
<td>World Development Indicators</td>
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INTRODUCTION

1.1 Background and Overview

The last two decades has witnessed efforts from African governments to promote economic development in Africa. Africa as a continent needed to address development challenges such as hunger, poverty, low literacy level and diseases out-breaks. However due to the partial and fragmented nature of the policies, the effect of these National Development Plans have not been able to fully meet its set targets (Baah-Boateng, 2004).

Seventeen years ago, the United Nations and developing countries including Africa agreed and formulated the MDGs in order to address development challenges faced. The United Nations subsequently adopted a set of Millennium Development Goals (MDGs) with a time line set in 2015.

In order to address the high unemployment in developing countries (including Sub-Saharan Africa), MDG 1; Target B; “achieve full and productive employment and decent work for all, including women and young people” was formulated (United Nations 2008). Though this Target 1.B made some progress, there was still room for improvement. This led to the adaption of the Sustainable Development Goals in 2015, which included Goal 8, to: “Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all” (United Nations 2015a). In addition, SDG Goal 8 Target 3 was aimed to “Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services” (Bloom & McKenna, 2015). Decent work is defined as “opportunities for women and
men to obtain decent and productive work in conditions of freedom, equity, security and human dignity” (ILO, 1999).

1.2 Problem Statement

The unemployment for the African continent as a whole has remained unchanged from its 2016 rate of 8.0 per cent going into 2017, which, when applied to a rapidly growing labour force, corresponds to an increase in total unemployment of 1.2 million. A similar trend has been observed with regard to vulnerable employment, with a slight decrease in the rate but an increase in the number of workers in this form of employment. Meanwhile, despite marginal decreases in extreme working poverty (i.e. individuals who live on less than US$1.90 per day), the region – driven by trends in sub-Saharan Africa – is performing poorly with regard to moderate working poverty (i.e. those living on between US$1.90 and US$3.10 per day) (ILO, 2017).

About 16 percent of those in the labor force have “wage jobs”—jobs that pay a regular wage, sometimes with associated benefits. In low-income countries, these jobs are divided roughly equally between the public and private sectors, although the private share grows with per capita income. The industrial sector (mining, manufacturing, and construction) accounts for less than 20 percent of wage jobs (about 3 percent of total employment). The remaining jobs are either on family farms (62 percent) or in household enterprises (22 percent), which may be collectively described as the informal sector. These kinds of jobs—working a small plot of land are done on a subsistence basis (Agence Francaise de Développement & World Bank, 2014).

While Sub-Saharan Africa is faced with an unprecedented opportunity: a broad based potential workforce, this is still a challenge for policy makers to formulate policies that will help
attract FDI in the hope of drastically reducing unemployment in Sub-Saharan Africa. (UNCTAD, 2017).

Table 1: Unemployment, Vulnerable & working Poverty trends and projections, Africa, 2016-18

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<tbody>
<tr>
<td>Africa</td>
<td>8.0</td>
<td>8.0</td>
<td>8.0</td>
<td>37.1</td>
<td>38.3</td>
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<tr>
<td>Northern Africa</td>
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<td>12.0</td>
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<td>9.0</td>
<td>9.1</td>
<td>9.2</td>
</tr>
<tr>
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<td>7.2</td>
<td>7.2</td>
<td>7.2</td>
<td>28.0</td>
<td>29.1</td>
<td>30.1</td>
</tr>
<tr>
<td>South Africa</td>
<td>25.9</td>
<td>26.0</td>
<td>26.3</td>
<td>5.4</td>
<td>5.5</td>
<td>5.6</td>
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African Republic
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<th></th>
<th>Moderate Working Poverty Rate, 2016-18 (Percentage)</th>
<th>Moderate Working Poverty Rate, 2016-18 (Millions)</th>
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<tr>
<td></td>
<td>2016</td>
<td>2017</td>
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<tr>
<td>Africa</td>
<td>28.3</td>
<td>28.7</td>
</tr>
<tr>
<td>Northern Africa</td>
<td>18.6</td>
<td>18.4</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>30.1</td>
<td>30.5</td>
</tr>
</tbody>
</table>


**FDI in Sub-Saharan Africa**

In strive to obtain sustain economic development by overcoming the challenges of high unemployment, Africa has realized the need for huge levels of investment and foreign exchange reserves. Thus, Sub-Saharan African countries have since then decided to actively take part in international trade in order to attract foreign investments. With international trade, Sub-Saharan African countries continue to not only obtain foreign direct investment but also reduce import bill through import substitution. Foreign Direct Investment (inflows) generate foreign exchange, boost domestic savings and increased investment levels while import substituting investments help reduce these countries’ import bills enabling export industries directly escalate foreign exchange yields.

According to the 2015 World Investment Report by UNCTAD, Sub-Saharan Africa has recorded a continuous decline in FDI inflow with a twelve percent decline from 2014 to 2016 (71% to 59%) in FDI in flows, Africa faces a huge task to recovering such a huge loss (See table 2). While Egypt succeeded in attracting FDI – the largest receiver in North Africa, Sub-Saharan countries on the other hand were upset as relatively low prices of goods drastically reduced
economic outlook and investors’ interest in Sub-Saharan Africa. FDI inflows in Angola decreased consecutively while Nigeria and South Africa both experienced a relatively low remained at relatively low levels FDI inflows. Ironically, the East African countries attracted larger amount of FDI inflows compared to other African countries in 2016, while Ethiopia also succeeded in securing its highest amount of FDI. Despite the progress of Multinational Enterprises (MNEs) from developing economies with a one percent (equivalent to $18 billion) of FDI outflow, which explains Angola’s increase in FDI outflow (35 per cent to $11 billion), which helped to balance the severe decrease in FDI inflows from South Africa (-41 per cent to $3 billion). (See Figure 2 and

Despite this improvement from MNEs from developing countries, investors from developed countries remain as the most influential investors on the global scale (See Table 2 below).

Table 2: FDI Inflow and Outflow Trends (2014 to 2016)

<table>
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<tbody>
<tr>
<td>World</td>
<td>1,324</td>
<td>1,774</td>
<td>1,746</td>
<td>1,253</td>
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<tr>
<td>Developed Economies</td>
<td>563</td>
<td>984</td>
<td>1,032</td>
<td>708</td>
<td>1,173</td>
<td>1,044</td>
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<td>North America</td>
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<td>425</td>
<td>353</td>
<td>370</td>
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<td>Asia</td>
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<td>363</td>
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<tr>
<td>Latin America &amp; the Caribbean</td>
<td>170</td>
<td>165</td>
<td>142</td>
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<tr>
<td>Oceania</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
The gradual decline in FDI inflows is troublesome since enormous investment needs to address the SDGs - basic infrastructure, energy, water and sanitation, climate change mitigation, health and education, as well as investment in employment creation and subsequently income growth (UNCTAD, 2017).

This study will only focus on the effect of Foreign Direct Investment on Unemployment in 34 out of 49 Sub-Saharan African countries due to the absence of time-series data.

1.3 Research Questions

This study aims to answer the following questions:

1. What is the effect of Foreign Direct Investment on unemployment in Sub-Saharan African countries?

1.4 Objectives of the Study

The broad objective of this study is to study whether there is a causal relation between Foreign Direct Investment and unemployment measured by Unemployment, total for Sub-Saharan African countries from 1991 to 2016.

This broad objective is divided into two specific objectives:

1. To investigate whether there exists a causal effect between Foreign Direct Investment and Unemployment, total for Sub-Saharan African countries.
2. To determine the role of economic and non-economic (demographic) variables that affect Unemployment.

1.5 Hypothesis

This study will test the hypothesis that FDI affects unemployment in Sub-Saharan African Countries.

1.6 Significance of the Study

It is very important to know the effect of Foreign Direct Investment on unemployment since the former’s effect on the latter is unknown and the effect may differ in each of Sub-Saharan Countries. This study will also proceed to recommend country specific policies based on statistical results (which are evidence-based) in order to reduce unemployment. This study will assume that selected Sub-Saharan African countries unemployment share similar economic and demographic characteristics. This study will expound the effect of Foreign Direct Investment by examining its relationship with unemployment in Sub-Saharan Africa.

Furthermore, the study will be important to the Sub-Saharan African policy makers by enabling them to formulate the required policy interventions to make sure that job creation is enhanced. Thus, this will eventually lead to the attainment of SDG 8 goal, target 3 of the United Nations Sustainable Development Goals which was adopted in 2015.

1.7 Organization of the Paper
The first chapter has introduced the topic under study and the rest of the paper is organized as follows: chapter two is the literature review subdivided into The Interdependencies: FDI and the Labor market: Asia and Europe and Unemployment in Sub-Saharan Africa.

Chapter includes the methodology used in the study, the fourth and fifth chapters includes the study’s major findings and conclusions respectively.

2 LITERATURE REVIEW

2.1 FDI and the Labor market: Asia and Europe

Several studies such as concentrated on international trade when examining the impact of globalization on employment other scholarly works address FDI affects fluctuations in employment (Pflüger et al. (2013). Furthermore, while employment issues has been only partially dealt with when only studying spillover effects, other research works have been focused on the impact of FDI on labor market fundamentally centered on wages and productivity (Aitken and Harisson, 1999; Girma et al., 2002). Numerous factors may be involved when be at work when examining the effect of FDI on employment. For instance, with FDI inflows, employment can be increased by directing creating new jobs in foreign allies. By creating non-existent employment opportunities, Greenfield Investment for example is thought to have the utmost potential for employment creation. However, according to Dunning (2008), the short-run effects of employment appear insignificant in the case of a merger and acquisitions in entrepreneurship business management strategies. According to Jenkins (2006), when foreign investors venture in labor intensive sectors, direct job creation naturally increases. However, privatized firms in most
cases tend to lay off a lot of jobs in the short-run through restructuring (Hunya & Geishecker, 2005).

Secondly, employment will be reduced when an economy experiences increased amounts of FDI inflows. Since profitability is investors’ main aim, investors will invest and attract technology in order to achieve higher efficiency in labor utilization. Owning valuable intangible assets, multinationals are understood to increase their production capacities. Therefore, when these assets are provided to their associates, these associates are able to enhance their production capacities, requiring less labor for an additional unit of good or service produced (Holland et al., 2000, Conyon et al., 2002; Girma et al., 2002). In this viewpoint, in order to be more profitable, foreign firms would discourage more employment than domestic firms. (Jude, C., & Silaghi, M. I. P. (2016).

Thirdly, apart from the foreign associate perspective, FDI inflow has an impact on domestic firms’ labor demand through productivity spillovers and competition effects. In the case where FDI inflows create a tense competition which eventually crowds-out domestic firms, the labor intensity of the receiving industries might be reduced (Mencinger, 2003). In this case, foreign affiliates will therefore source locally, demand provided to upstream (exploration and production) sectors could rise and therefore accelerate employment (Javorcik, 2004). Spillovers are very essential. For example, while MNEs source locally thus providing a market for local suppliers to provide inputs of superior standard and technical assistance (Uzagalieva et al., 2012).

Finally, productivity spillovers for domestic firms and potential job creation are two possible outcomes of local linkages created by foreign affiliates within the local economy (Aitken and Harisson, 1999; Javorcik, 2004). However, spillovers in downstream (refining, processing and purifying) sectors have frequently been revealed to be negative when spillovers
in upstream sectors are generally positive, (Hanousek et al., 2011). (Jude, C., & Silaghi, M. I. P. (2016).

Since these channels (spillover in upstream and spillover in downstream) may have inverse relationships, the net effect of FDI on employment hinges on the relative importance of the productivity developments, spillovers and the net creation of activity of domestic firms. According to Holland et al. (2000), FDI inflows in the 1990s with the main help of productivity improvements within the foreign associates, has enhanced the general growth potential of the beneficiary economies. Heavy investment in capital goods and technology spillovers to domestic firms (beneficiaries) are other factors but these are not the main reasons to enhance the general growth potential of the beneficiary economies according to Holland et al. (2000). This argument perhaps clarifies “the mechanism of jobless growth” emphasized by Boeri and Garibaldi (2006) for Committee of European Economic Co-operation (CEEC) and Schadler et al. (2006).

Empirical studies on the employment effects of FDI in host countries have provided divergent findings. While some studies such as Radosevic et al., (2003), Walkkirch et al. (2009), Bandick and Karpaty (2011) and Villa (2010) discovered a positive relationship between FDI inflows and employment, Jenkins, (2006) and Girma (2005) on the other hand discovered negative effects or even the lack of any significant impact of FDI on employment (Onaran,2008) (Jude & Silaghi, (2016).

Radosevic et al. (2003) revealed that foreign affiliates act as buffer to reductions in overall employment during transition since they (foreign affiliates) have greater employment capacity than their domestic counterparts. Zooming in on six CEEC’s manufacturing industry during 1993-1999, Radosevic et al. (2003) discovered that during this early transition, employment has reduced due to FDI. At the later parts of transition, the manufacturing industries
of these six CEECs witnessed FDI having a positive effect on employment. Furthermore, Radosevic et al. (2003) argue that in manufacturing industries where foreign associates were unable to or not interested in increasing employment, domestic firms could not increase employment.

Contrary to Radosevic et al. (2003), Onaran (2008) discovered contradicting results on the impact of FDI on employment, thus established that FDI has an overall insignificant impact on employment. Onaran (2008) focusing on eight CEEC’s manufacturing industries during the period 1997–2004 established that FDI had a substantial progressive impact on employment only in Lithuania and in some low and medium skill sectors in Slovakia. Dissimilar to traditional knowledge, Onaran (2008) discovered that labor demand is insensitive to wage dynamics.

Radosevic et al. (2003)’s concept of “a two stage effect” of FDI on employment has been alluded to numerous scholars. Hunya and Geishecker (2005) favored the hypothesis that FDI reduces job creation in CEEC in the beginning of transition. These scholars emphasized that due to the relative fast restructuring procedure compared to domestic firms, multinational laid off workers at an earlier stage than their domestic counterparts. Hunya and Geishecker (2005) argued that privatization was replaced by Greenfield investment when the transition procedure developed. With Greenfield investment substituted for privatization, new jobs and innovative production capacities were created.

The concept of “creative destruction” was also favored by De Loecker and Konings (2004) for Slovenia. De Loecker and Konings (2004) advocated that less productive jobs have been substituted for more productive jobs at the later stage by privatization. On the contrary, Villa (2010) established that FDI in Moldova led to short run job creation effect and was

In other special cases, studies have concluded that FDI has an overall adverse impact on employment. Pfaffermayr (2001) and Jenkins (2006) for Austria and Vietnam respectively revealed FDI’s ability to promote employment has been decreased by so-called “laborsaving techniques”. Additionally, Pfaffermayr (2001) and Jenkins (2006) discovered proof of negative or little amount of spillover effects on domestic firms’ employment. (Jude, C., & Silaghi, M. I. P. (2016).

In studying FDI, the codependence between FDI and the labor market related facets are vital. Numerous studies have analyze the codependencies between FDI inflows into a country and the macroeconomic stability of that respective country. Botric and Skuflic, (2006) for instance, used employment or unemployment as a proxy for macroeconomic stability (which sometimes it is also used as a proxy for labour market related fascets) of a country. Obtained results have not clearly clarified the relationship between FDI and a decrease in unemployment rate despite majority of published researches in this area. Despite this, it visible that the codependencies between employment rate and FDI inflows differ based on the structure, from time to time, type FDI received. This is because, in the long run, an economy’s structure and nature/type of FDI received may significantly vary.

It is very important to note that other scholarly works have established that there are no causal relation between FDI and unemployment. According to Blanchard (2011), numerous experts have advocated that foreign investors see two opportunities to exploit in economies with higher unemployment rate: abundant available labor force and high likelihood of employing workers at lower wages. On the contrary, other schools of thoughts argued that, too high
Existing literature provide proof to uphold this theory. The Greenfield investments have been discovered to meaningfully have higher positive impacts on employment rate than the Brownfield ones which had no effect or even negative effects on employment rate. The findings of Hisarciklilar et al (2009) about the Turkish economy is proof of this theory. Similarly, Bakkalci and Argin (2013) established a direct impact of FDI inflows on employment rate by examining the relationships between FDI inflows and employment rate in the Turkish economy using a set of three-month (quarterly) data from period 2000 to 2011.

In addition, Aktar and Öztürk (2009) argued that there is no causal relationship between FDI inflows and unemployment rate in the Turkish economy. Furthermore, Saray (2011) also arrived at the same conclusion as Aktar and Öztürk (2009); having conducted data analysis from 1970 to 2009, also pertaining to the Turkish economy.

Using data spanning from 1998 to 2004 focusing on a selected group of manufacturing companies in China, Karlsson et al (2009) reported that FDI has a positive impact on employment growth. Similarly, Craigwell (2006)’s study on twenty Caribbean countries between the periods 1990 to 2000 reaffirms Karlsson et al (2009)’s conclusion about FDI and employment growth. In the case study of the USA, which focused on the long run effects of FDI inflows on employment revealed that the former has a positive impact on the latter (Ajaga & Nunnekamp, 2009). In another setting; in Fijian economy, a one way direction causality relationship was found between FDI inflows and employment (Jayaraman & Singh, 2007). In the same field of study, Lipsey et al (2010) with a selected Indonesian industries spanning from 1975
to 2005. In this research study, it was discovered that changes in ownership from a domestic to
foreign had a huge impact on employment rate after examining employment growth rate.

Yayli and Deger (2012) using the dynamic panel causality tests, found out that there exist
a causal short run association from FDI inflows on employment. Similarly, Adam P. et al (2011)
study (using VAR approach) on the Polish economy between years 1995 to 2009 also agreed to
Yayli and Deger (2012)'s findings. On the contrary, Habib and Sarwar (2013) in the Pakistani
economy, found out that there exists a long run relationship between FDI inflows and
employment.

Upon conducting studies in India, Pakistan and China, Rizvi and Nishat (2009) disputed
that FDI inflows do not have a direct impact on unemployment countries (China, India and
Pakistan for the time period 1985 - 2008).

2.2 Unemployment in Sub-Saharan Africa

In a research with a sample of 220 individuals to find out the determinants of
unemployment in Umuahia; a city in Nigeria with similar features with regions where similar
studies have been previously conducted in the developing world. Echebiri (2005) studied
whether job experience and education have a direct relation with unemployment. This study
discovered that Education and job preference have a direct relation with unemployment. Most of
the unemployed and those who were seeking jobs for the first time favored paid employment to
self-employment. The research study participants revealed that they did want to live in the rural
areas where job opportunities are little or no development. Furthermore, the study discovered
that Umuahia has a relative rapid population growth rate as a result majority of its labor force are jobless (Maqbool et. al 2013).

In Nigeria, Bakare (2011) examined the determinants of urban unemployment crisis in Nigeria. The major thrust of his findings is that unemployment has become a major socio-economic problem in Nigeria and that it has reached a crisis proportion. The results indicated that unemployment is a serious problem in the labor force. In this respect, it is recommended that programs of integrated rural development and re-orientation of economic activity and social investments towards the rural areas need to be embarked upon to create an appropriate rural urban economic balance. Furthermore, these foreign exchange generating industries were able to expand production scales to and provide inputs to the newly established plants. This signifies an overall increase in domestic demand; elevating incomes and, in form of taxation, the transference of labor, state revenues; and (together with management) skills and technology.

Schoeman et al. (2008) using cointegration methodology and short-run dynamic data, reviewed the determinants of unemployment in South Africa. Schoeman et al. (2008) used macroeconomic variables; real exchange rate and unionization as a percentage of formal employment, crude oil prices, capital stock and banker's acceptance rate. The results showed that there is an inverse relationship between investment and unemployment, a positive relation between unemployment and unionization, crude oil prices, appreciation of real exchange rate and strict monetary policy (Maqbool et. al 2013).

Eita and Ashipala (2010) worked on determinants of unemployment in Namibia for the period of 1971-2007. They used macroeconomic variables for unemployment model. They used Engle and Granger approach to estimate the model. The results showed that unemployment responds positively if actual output is below potential output, and if wages increase. An increase
in investment causes unemployment to decrease significantly. The results provide evidence that the Phillips curve holds for Namibia and unemployment can be reduced by increasing aggregate demand (Maqbool et. al 2013).

Similarly, in a study done on Pakistan from 1973 to 2010 on the “economic determinants of unemployment”, Cheema and Atta (2014) after using Co-integration Analysis (ARDL) found out that output gap, Productivity and Economic Uncertainty has a statistically significant positive relationships with unemployment while Openness of Trade and Gross Fixed Investment have a statistically significant negative relationships with unemployment (Oniore & Bernard, 2015).

The terms of trade shock variable is expected to have a negative sign and is supposed to operate through real wage resistance. If there is a fall in terms of trade and the real wage does not adjust downwardly due to real wage resistance, unemployment rises. Vice versa, if terms of trade rise and real wages fail to follow suit, unemployment falls (see Nickell et al., 2001: 5).

3 METHODOLOGY

This study will use Ordinary Least Squares (OLS), Random Effects (RE) and Fixed Effects (FE) techniques. The RE technique will be conducted in response to the Hausmann test, the Fixed-Effects and Ordinary Least Squares (OLS) will be conducted for comparison purposes in this study.

Ordinary Least Squares (OLS) gives us the best description of a linear relationship between two variables. This is known as the regression equation, and it takes the following form:
\[ y = a + bx, \] where “y” is dependent or explained variable (because it depends on other factors); “a” is the y-intercept of the line (the value for y when \( x = 0 \)) which has no particular meaning on its own; b is the slope of the line; and x is explanatory or independent variable since they explain “x” explains “y” that we care about. In addition, b-the regression coefficient gives us the best estimate of the relationship between x and y. The slope of the line we've fitted, b, describes the "best" linear relationship between height and weight for this sample, as defined by ordinary least squares.

### 3.1 Multiple linear regression with Dummy variables

In addition, Ordinary Least Squares (OLS) gives us the best description of a linear relationship between more than two variables. Often called multiple regression analysis when more than one explanatory variable is involved, or multivariate regression analysis) will give us a coefficient for each explanatory variable included in the regression equation. Regression analysis allows us to unravel complex relationships in which multiple factors (in this study such as FDI, Trade, Gross Fixed Capital Formation, Gross Domestic Product Per Capita, Ratio of Female to Male among the employed, urbanization affect the dependent our outcome variable; unemployment. When we include multiple variables mentioned above in the regression equation, the analysis gives us an estimate of the linear association between each dependent variable and the dependent variable while holding other independent variables constant, or "controlling for" these other factors (Wheelan, 2013).

Fixed Effects (FE) models control for all time-invariant differences among predictor variables and removes the effect of those time-invariant characteristics. With fixed-effects (FE) this study is interested in analyzing the impact of variables such as FDI, Trade, Gross Fixed Capital Formation, Gross Domestic Per Capita, Ratio of Female to Male among the employed,
urbanization on Unemployment over time from 1991 to 2016 with a time-trend dummy; TPeriod covering years 1991 to 2016. Fixed Effects technique explores the relationship between independent variables mentioned above and Unemployment. Each Sub-Saharan African country has its own individual characteristics that may or may not influence the independent variables (for example, being a male or female could influence the opinion towards employment opportunities; or the other independent variables of any particular Sub-Saharan African country could have some effect on unemployment (Nickell, 1981).

Another important assumption of the FE model is that those time-invariant characteristics are unique to the individual and should not be correlated with other individual characteristics. Each entity is different therefore the entity’s error term and the constant (which captures individual characteristics) should not be correlated with the others. If the error terms are correlated, then FE is no suitable since inferences may not be correct and you need to model that relationship (probably using random-effects), this is the main rationale for the Hausman test (presented later on in this document (Nickell, 1981).

Random effects technique unlike the fixed effects model, shows that the variation across entities is assumed to be random and uncorrelated with the predictor or independent variables included in the model in this study (Laird & Ware, 1982).

If this study has reason to believe that differences across Sub-Saharan African countries have some influence on the dependent variable Unemployment then this study should use random effects. The lead of random effects is that this study can include time invariant variables (i.e. gender; in this case- “female to male” and urbanization) while in the fixed effects model this “female to male” variables are absorbed by the intercept (Laird & Ware, 1982).
Random effects assume that the Sub-Saharan African countries’ error term is not correlated with the independent variables which allows for time-invariant variables to play a role as explanatory variables. Furthermore, this study will need to specify those individual characteristics that may or may not influence the independent variables. The problem with this is that some variables may not be available therefore leading to omitted variable Bias in the model. RE allows to generalize the inferences beyond the sample used in this study’s model (Laird & Ware, 1982).

3.2 Model Specification

Based on this theoretical background and on data availability, and Hausman test results (RE) The study uses a RE equation model:

\[
UN_{it} = \alpha_i + \beta_1 FDIt + \beta_2 GFCFC_{it} + \beta_3 GFCF_{it} + \beta_4 TRADE_{it} + \beta_5 LnGDPPA_{it} + \beta_6 Fem2male_{it} + \beta_7 TPeriod_{it} + U_{it}
\]

Where:

- \( \alpha_i \) (i=1…n) is the unknown intercept for each entity (n entity-specific intercepts).
- \( UN_{it} \) is the dependent variable (DV) where i = entity and t = time.
- \( X_{it} \) represents each independent variable (Ind. V), – \( \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6 \) and \( \beta_7 \) are the coefficient for the independent variables and – \( U_{it} \) is the error term

Simplifying the dummy TPeriod spanning from 1991 to 2016.

The key insight is that if the unobserved variable does not change over time, then any changes in the dependent variable must be attributed to effects other than these fixed characteristics.” (Stock & Watson, 2003, p.289-290).
3.3 Definition of Variables

**Unemployment total (UNR):** Unemployment (% of total labor force) (ILO estimate) is the dependent variable in this model and defined as the share of the labor force that is without work but available for and seeking employment in the selected 35 Sub-Saharan African Countries (WDI, 2017).

**Foreign direct investment, net inflows (FDI) (% of GDP):** Foreign direct investment (also the policy variable) are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP (UNCTAD, 2017).

**GCFC (% of GDP):** Gross fixed capital formation (formerly gross domestic fixed investment) includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. According to the 1993 SNA, net acquisitions of valuables are also considered capital formation (WDI, 2017).
**TRADE, (% of GDP) (TR):** Used in this study to measure the Degree of economic openness of countries, this is the sum of exports and imports of goods and services measured as a share of gross domestic product (WDI, 2017).

**Ln (GDPPCA):** GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2010 U.S. dollars (WDI, 2017).

**Time Dummy variable:** Dummy Variable; TPeriod spanning from 1991 to 2016 in Sub-Saharan Africa.

**Fem 2 Male:** 'Ratio of female to male labor force participation rate (%) (Modeled ILO estimate). Estimates of women in the labor force and employment are reflecting that demographic, social, legal, and cultural trends and norms; whether women's activities are regarded as economic. In many low-income countries women often work on farms or in other family enterprises without pay, and others work in or near their homes, mixing work and family activities during the day. In many high-income economies, women have been increasingly acquiring higher education that has led to better-compensated, longer-term careers rather than lower-skilled, shorter-term jobs. However, access to good-paying occupations for women remains unequal in many occupations.
and countries around the world. This variable is chosen to monitor gender disparities in employment and unemployment patterns (WDI, 2017).

Table 3: Expected Signs / A 'priori' expectations

Based on economic theory and refer to the expected relationship between the independent variables and the dependent variable(s). It is expected that:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDI (% of GDP)</td>
<td>-</td>
</tr>
<tr>
<td>GCFC (% of GDP)</td>
<td>+</td>
</tr>
<tr>
<td>Urbanization</td>
<td>+</td>
</tr>
<tr>
<td>TRADE, (% of GDP)</td>
<td>-</td>
</tr>
<tr>
<td>Ln(GDPPCA)</td>
<td>-</td>
</tr>
<tr>
<td>Time Dummy variable (TPeriod)</td>
<td>-</td>
</tr>
<tr>
<td>Fem 2 Male</td>
<td>-</td>
</tr>
</tbody>
</table>

3.3.1 Data Sources

This study will use secondary longitudinal/panel data collected from the World Development Indicators published by World Bank data website and the UNCTAD database. Selected data covers 34 Sub-Saharan African countries, from the period 1991 – 2016.
This section will provide a detailed account of the findings obtained from employing pooled OLS, FE/RE estimators from equation 1. Table 3 shows general empirical results from regression established on a sample of 34 Sub-Saharan African Countries.

Table 4: Results of Unemployment- 34 Sub-Saharan African Countries.

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(OLS)</th>
<th>(RE)</th>
<th>(FE)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UN</td>
<td>UN</td>
<td>UN</td>
</tr>
<tr>
<td>FDI</td>
<td>0.024***</td>
<td>-0.0051*</td>
<td>-0.0053*</td>
</tr>
<tr>
<td></td>
<td>(0.00927)</td>
<td>(0.00278)</td>
<td>(0.00277)</td>
</tr>
<tr>
<td>Urban</td>
<td>0.144***</td>
<td>0.0497**</td>
<td>0.0361</td>
</tr>
<tr>
<td></td>
<td>(0.0208)</td>
<td>(0.0237)</td>
<td>(0.0244)</td>
</tr>
<tr>
<td>GFCF</td>
<td>-0.123***</td>
<td>-0.0130*</td>
<td>-0.0123</td>
</tr>
<tr>
<td></td>
<td>(0.0217)</td>
<td>(0.00771)</td>
<td>(0.00769)</td>
</tr>
<tr>
<td>TRADE</td>
<td>0.0281***</td>
<td>0.00334</td>
<td>0.00280</td>
</tr>
<tr>
<td></td>
<td>(0.00950)</td>
<td>(0.00343)</td>
<td>(0.00343)</td>
</tr>
</tbody>
</table>
In general, the results are consistent with the literature, FDI is significant in the 1% in the Pool OLS and 10% level in FE and RE results respectively. The FDI coefficients in the OLS, RE and FE are 0.0240, -0.00519 and -0.00527 respectively, meaning that a 1% increase in FDI will lead to a 0.0240% increase in Unemployment in the OLS results, a 0.00519% reduction in unemployment in RE and a 0.00527% reduction in unemployment in the FE results.

Urbanization is significant at 1% level in the Pooled OLS result and 5% level in the RE results. The Urbanization coefficients are 0.144 in the OLS and 0.0497 in RE results mean that a 1% increase in Urbanization will lead to a 0.144% and 0.0497% increase in Unemployment.

Gross Fixed Capital Formation is also significant at 1% level in both the Pooled OLS and 10% level in RE results. The Gross Fixed Capital Formation is -0.123 in the OLS and -0.0130 in the in RE results, meaning that a 1% increase in Gross Fixed Capital Formation will lead to a 0.123 % decrease and a further 0.0130% reduction in Unemployment.
Trade is significant at 1% level in only the Pooled OLS result. The Trade coefficient is 0.0281 in the OLS meaning that a 1% increase in Trade will lead to a 0.0281% increase in Unemployment.

LnGDPPCA is significant at 1% level in only the Pooled OLS result. The LnGDPPCA coefficient is 1.486 in the OLS meaning that a 1% increase in LnGDPPCA will lead to a 1.486% increase in Unemployment.

Ratio of Female to Male in Labor Force Participation is significant in the 5% level in the Pool OLS, 1% level in the FE results and 10% level RE results. The Ratio of Female to Male in Labor Force Participation coefficients in the OLS, RE and FE are -0.0330, 0.0806 and 0.0889 respectively, meaning that a 1% increase in Ratio of Female to Male in Labor Force Participation will lead to a 0.0330% decrease in Unemployment in the OLS results, a 0.0806% increase in unemployment in RE and a 0.0889% increase in unemployment in the FE results.

Time dummy (Time trend) is significant in the 5% level in the Pool OLS, FE and RE results. The Time coefficients in the OLS, RE and FE are -1.144, -0.403 and -0.357 respectively, meaning that for every additional year Unemployment will decrease by 1.144% in the OLS results, by 0.403% in RE and by 0.357% in the FE results.

5 CONCLUSIONS

5.1 Summary and Motivation of the Paper

Using OLS, Random Effects and Fixed Effects, this study has revealed proof of FDI having significant impact on unemployment in Sub-Saharan Africa. FDI has been revealed to
have the effect of “creative destruction” (as per De Loecker and Konings in 2004) on the labor markets in SSA with the effect becoming negative in the long run, controlling for the effects of Trade, Gross Fixed Capital Formation, Gross Domestic Per Capita, Ratio of Female to Male among the employed, urbanization.

5.2 Policy Implications

Based on the findings above, we can interpret that Foreign Direct Investment is effective in reducing unemployment in the long-run. This is line with De Loecker and Konings’ concept of “creative destruction”. In 2004, De Loecker and Konings discovered that FDI increases unemployment in the short run due to firm restructuring. This according to De Loecker and Konings, “less productive jobs have been substituted for more productive jobs at the later stage by privatization. The competition pressure and the introduction of labor saving techniques by new investors lead to an increase in unemployment in the short run. Unemployment decreases in the long run, as foreign affiliates progressively create linkages with domestic firms and increase the local content of their production”.

Sub-Saharan African governments should develop sound financial system to encourage FDI and also enact labor laws that will cater for domestic unemployment. By facilitating Public Private Partnerships and the development of a capital market in countries where capital markets do not exist and implementing favorable policies to strengthen capital markets are essential for leveraging foreign direct investments.

In addition, there is a great need for Vocational training institutions to promote entrepreneurship which will reduce unemployment for Sub-Saharan Africa’s rapidly the growing population. Vocational training institutions will increase employability and life-long learning
opportunities for all. With emphasis on apprenticeship and hands-on education and training and regular curricular review, Technical and Vocational Education and Training (TVET) will increase the number of people with relevant skills (including technical vocational skills) for employment, decent jobs and entrepreneurship; eliminating disparities in education and vocational training for the vulnerable; and achieving literacy and numeracy for a substantial proportion of adults.

These above recommendations will enable Sub-Saharan African countries’ to make full use of its demographic dividend with the majority of the population now dominated by youth; and also attract FDI.

5.3 Limitations

This study is not without limitations. First, we could not include some of the key determinants of unemployment such as tertiary education rate, type of economic industry, real wage, coverage of unemployment benefits and ALMP (% of population), new business density, Informal employment into the research regression models due to the absence of time-series data.

Second, we certainly acknowledge the fact that some other changes have since taken place in Sub-Saharan Africa region that might have influenced our estimates. Yet, we try to control for these changes by including country and time-fixed effects. Thus our estimates may still display little biases as a result of these changes.
Finally, this study uses annual data at the macroeconomic level. Microeconomics data such as individual job experience, job preferences and job motivation to critically observe the disaggregated impact of unemployment on different segments of the population. This is a possible extension for future research in Sub-Saharan Africa. A study in Ancient West Germany revealed that micro factors such as the motivation of the individual, wrong decisions or misfortune at youthful stage may also stimulate the amount of lifetime unemployment (Schmillen & Möller, 2010).

Even with the above mentioned limitations, this study greatly strengthens our understanding of how foreign direct investment affects unemployment in Sub-Saharan Africa.

5.4 Possible Areas for Further Research

For the purpose of future studies, it is recommended that considerable attempts should be made to disaggregate foreign direct investment into the equity capital, reinvestment of earnings, other long-term capital, and short-term capital. Disaggregating FDI will attempt to size up the different sensitivity towards foreign direct investment.

It will also be very interesting to analyze the type of industries and good labor market laws in relation to foreign direct investment.

Lastly, understanding the effects of Foreign Direct Investment at the regional levels is very important for policy formulation, implementation and evaluation. This will to a large extent address mass rural-urban migration caused by high unemployment in Sub-Saharan African countries.
6 APPENDICES

Appendix 1: List of Selected Sub-Saharan African Countries included in the Study

<table>
<thead>
<tr>
<th>No.</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Angola</td>
</tr>
<tr>
<td>2</td>
<td>Botswana</td>
</tr>
<tr>
<td>3</td>
<td>Burkina Faso</td>
</tr>
<tr>
<td>4</td>
<td>Burundi</td>
</tr>
<tr>
<td>5</td>
<td>Cameroon</td>
</tr>
<tr>
<td>6</td>
<td>Central African Republic</td>
</tr>
<tr>
<td>7</td>
<td>Chad</td>
</tr>
<tr>
<td>8</td>
<td>Comoros</td>
</tr>
<tr>
<td>9</td>
<td>Congo (Brazzaville)</td>
</tr>
<tr>
<td>10</td>
<td>Congo (Democratic Republic)</td>
</tr>
<tr>
<td>11</td>
<td>Côte d'Ivoire</td>
</tr>
<tr>
<td>12</td>
<td>Equatorial Guinea</td>
</tr>
<tr>
<td>13</td>
<td>Gabon</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>14</td>
<td>The Gambia</td>
</tr>
<tr>
<td>15</td>
<td>Ghana</td>
</tr>
<tr>
<td>16</td>
<td>Guinea</td>
</tr>
<tr>
<td>17</td>
<td>Guinea-Bissau</td>
</tr>
<tr>
<td>18</td>
<td>Kenya</td>
</tr>
<tr>
<td>19</td>
<td>Madagascar</td>
</tr>
<tr>
<td>20</td>
<td>Malawi</td>
</tr>
<tr>
<td>21</td>
<td>Mali</td>
</tr>
<tr>
<td>22</td>
<td>Mauritania</td>
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<tr>
<td>23</td>
<td>Mauritius</td>
</tr>
<tr>
<td>24</td>
<td>Mozambique</td>
</tr>
<tr>
<td>25</td>
<td>Namibia</td>
</tr>
<tr>
<td>26</td>
<td>Niger</td>
</tr>
<tr>
<td>27</td>
<td>Nigeria</td>
</tr>
<tr>
<td>28</td>
<td>Rwanda</td>
</tr>
<tr>
<td>29</td>
<td>Senegal</td>
</tr>
<tr>
<td>30</td>
<td>South Africa</td>
</tr>
<tr>
<td>31</td>
<td>Tanzania</td>
</tr>
<tr>
<td>32</td>
<td>Togo</td>
</tr>
<tr>
<td>33</td>
<td>Uganda</td>
</tr>
<tr>
<td>34</td>
<td>Zambia</td>
</tr>
</tbody>
</table>

**Appendix 2: HAUSMAN TEST RESULTS**
Appendix 3: SUMMARY OF STATISTICS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN</td>
<td>884</td>
<td>10.04937</td>
<td>7.741001</td>
<td>.3</td>
<td>37.6</td>
</tr>
<tr>
<td>FDI</td>
<td>884</td>
<td>26.65555</td>
<td>30.13343</td>
<td>.1991945</td>
<td>289.4712</td>
</tr>
<tr>
<td>Urban</td>
<td>884</td>
<td>34.32582</td>
<td>13.59444</td>
<td>5.491</td>
<td>65.798</td>
</tr>
<tr>
<td>GFCF</td>
<td>884</td>
<td>20.34243</td>
<td>17.3947</td>
<td>0</td>
<td>219.0694</td>
</tr>
<tr>
<td>TRADE</td>
<td>884</td>
<td>72.69549</td>
<td>46.20381</td>
<td>0</td>
<td>531.7374</td>
</tr>
<tr>
<td>lnGDPPCA</td>
<td>884</td>
<td>6.866949</td>
<td>1.002833</td>
<td>5.08657</td>
<td>9.920047</td>
</tr>
<tr>
<td>FemtomaleL-t</td>
<td>884</td>
<td>79.12874</td>
<td>18.74846</td>
<td>27.92086</td>
<td>109.7935</td>
</tr>
</tbody>
</table>

Appendix 4: FIXED EFFECTS RESULTS:

\[
\text{Prob}\text{>}\chi^2 = 0.1629
\]

\[
\chi^2(7) = (b-B)'[(V_b-V_B)^{-1}](b-B)
\]

\[
\text{Test: Ho: difference in coefficients not systematic}
\]

\[
\text{b = consistent under Ho and Ha; obtained from xtreg}
\]

\[
\text{B = inconsistent under Ha, efficient under Ho; obtained from xtreg}
\]

\[
\begin{align*}
\text{TPeriod} & \quad -.0386491 \quad -.0440225 \quad .0053734 \quad .0035167 \\
\text{FemtomaleL} & \quad .0888785 \quad .0806334 \quad .0082451 \quad .0041138 \\
\text{lnGDPPCA} & \quad .1740264 \quad .2736672 \quad -.096408 \quad .0463175 \\
\text{UN} & \quad -.005268 \quad -.0051869 \quad -.0000812 \quad .
\end{align*}
\]
Fixed-effects (within) regression
Group variable: ID

Number of obs = 884
Number of groups = 34

R-sq: within = 0.0434
between = 0.0019
overall = 0.0011

F(7,843) = 5.46
Prob > F = 0.0000

| UN                | Coef.    | Std. Err. | t     | P>|t| | [95% Conf. Interval] |
|-------------------|----------|-----------|-------|------|----------------------|
| FDI               | -.005268 | .0027703  | -1.90 | 0.058| -.0107055 .0001694  |
| Urban             | .036149  | .0243909  | 1.48  | 0.139| -.0117249 .084023   |
| GFCF              | -.0122779| .0076944  | -1.60 | 0.111| -.0273804 .0028245  |
| TRADE             | .0028035 | .0034288  | 0.82  | 0.414| -.0039265 .0095335  |
| lnGDPPCA          | .1740264 | .2531229  | 0.69  | 0.492| -.3227986 .6708514  |
| FemtomaleLabForcePart| .0888785| .0177266  | 5.01  | 0.000| .054085 .1236719    |
| TPeriod           | -.0386491| .0158922  | -2.43 | 0.015| -.069842 -.0074563  |
| _cons             | 78.20059 | 29.88179  | 2.62  | 0.009| 19.54914 136.852    |
| sigma_u           | 7.9098546|           |       |      |                      |
| sigma_e           | 1.6255848|           |       |      |                      |
| rho               | .9594756 | (fraction of variance due to u_i) |       |      |                      |

F test that all u_i=0: F(33, 843) = 432.46 Prob > F = 0.0000

Appendix 5: RANDOM EFFECTS RESULTS
```
Random-effects GLS regression                          Number of obs = 884
Group variable: ID                                    Number of groups = 34

R-sq: within = 0.0425                                  Obs per group: min = 26
            between = 0.0030                             avg = 26.0
            overall = 0.0030                             max = 26
corr(u_i, X) = 0 (assumed)                            Wald chi2(7) = 36.47

Wald chi2(7) = 36.47
Prob > chi2 = 0.0000

corr(u_i, X) = 0 (assumed)

|                | Coef.  | Std. Err. | z     | P>|z|    | [95% Conf. Interval] |
|----------------|--------|-----------|-------|--------|----------------------|
| FDI            | -.0051869 | .002779  | -1.87 | 0.062  | -.0106336 .002599    |
| Urban          | .0497489  | .0236842  | 2.10  | 0.036  | .0033287 .096169     |
| GFCF           | -.0130214 | .0077145  | -1.69 | 0.091  | -.0281415 .0020987   |
| TRADE          | .0033385  | .0034344  | 0.97  | 0.331  | -.0033929 .0100699   |
| lnGDPPCA       | .2736672  | .2488491  | 1.10  | 0.271  | -.2140681 .7614025   |
| FemtomaleLabForcePart | .0806334 | .0172427  | 4.68  | 0.000  | .0468384 .1144283    |
| TPeriod        | -.0440225 | .0154982  | 2.84  | 0.005  | -.0743984 -.0136466  |
| _cons          | 88.44155  | 29.20377  | 3.03  | 0.002  | 31.2032 145.6799     |

sigma_u 7.0722045
sigma_e 1.6255848
rho .94981777 (fraction of variance due to u_i)
```

REFERENCE

33


