

## **Determinants of Inward Foreign Direct Investment Flow to Africa**

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### **ABSTRACT**

This paper investigates the trend of inward foreign direct investment (IFDI) flow to African countries in aspect of types of natural resources and economic growth from 2008 to 2012 . The official data collected from United Nations, World Investment Report and U.S. Government Energy Information Administration (EIA) and International Monetary fund (IMF). The findings suggest that IFDI flow to Africa is driven by natural resources in the recipient countries. Oil and natural gas supply is identified as the primary determinant of IFDI flow to African countries. Strong correlation is found between natural resources and IFDI flow to African countries. The implication of research results is discussed. Further research on countries generated IFDI flow to African countries is explored.

Key Words: Africa, Foreign direct investment, Energy and Economics

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## **1. INTRODUCTION**

The recent research indicates that the world inward foreign direct investment (IFDI) flow to African countries have increased rapidly in the recent decade as indicated in Figure 1. The cumulative value of foreign direct investment (FDI) to Africa was estimated to be US \$ 453 Billion (\$453, 395, Million) between 2000 -2012. Most of the increase in the world inward foreign direct investment (IFDI) flow to African countries is in 2008 and 2012 as indicated in Figure 1.

The increasingly significant role of inward foreign direct investment (IFDI) flow to African countries has created much research interest among scholars. The literature indicates that the increase is driven by energy resources and the economy of the African recipient countries. But most recent research revealed that one of the main motives for enterprises to invest in Africa is resource-seeking (OECD Report, 2008). World inward foreign direct investment (IFDI) flow to Africa are significantly and positively correlated with a range of factors of energy resources, but not GDP growth (Asiedu 2002, 2004, 2005; Dupasquier and Osakwe, 2006; Kandiero and Chitiga, 2006; Lydon and Williams, 2005; UNECA, 2006).

This paper investigates the key determinants of inward foreign direct investment (IFDI) flow to 41 African countries in aspects of types of energy resources from 2008 to 2012. The paper is organized as follows. Section 2 presents the background of the study. Section 3 presents the research design, models and hypotheses that are developed to investigate the key determinants of IFDI flow to African countries in aspects of types of energy resources. The Model tests whether IFDI flow to Africa is determined by types of energy resources of the African recipient countries based on two hypotheses. Section 4 provides the research methodology and data collection. The Section 5 details data analysis, findings of the hypotheses and the multiple regression model. The last section concludes the research findings, the implications of results and future research.

## **2. BACKGROUND**

Inward foreign direct investment (IFDI) flow is investment made in the business interests of the investor in a company, in a different nation distinct from the investor's country of origin. Foreign direct investment reflects the objective of obtaining a lasting interest by a resident entity in one economy (“direct investor”) in an entity resident in an economy other than that of the investor (“direct investment enterprise”). The lasting interest implies the existence of a long-term relationship between the direct investor and the enterprise and a significant degree of influence on the management of the enterprise. Direct investment involves both the initial transaction between the two entities and all subsequent capital transactions between them and among affiliated enterprises, both incorporated and unincorporated.

There are different ways to measure inward FDI: either net inward FDI flow or inward FDI stocks. In the studies focusing on inward FDI, scholars used different measurements and obtained varying statistical results. The earliest debate about inward FDI measurement is Firebaugh (1992)'s argument against Bornschier and Chase-Dunn's methodology to put flow of inward FDI and inward FDI stock in a same equation. He showed that different methodologies

could lead to completely different results. The difference between inward FDI flow and inward FDI stock is that inward FDI flow is generally volatile and measures the short-term, while IFDI stocks is generally more reliable and measures the long term (Sun 2008).

IFDI flows consist of the net sales of shares and loans including non-cash acquisitions made against equipment, manufacturing rights, etc. to the investment enterprise in another economy attributable to a parent enterprise resident in the economy. This paper investigates the key determinants of IFDI flow to African countries separately based on the definition of measurements.

### 3. HYPOTHESES

Based on the results of the literature review, two hypotheses have been developed to test two research models. A research model is specified with the predictions on how IFDI Flow is affected African energy supplies. Hypothesis I and Hypothesis II and Model 1 are proposed since it is generally predicted that IFDI flow is affected by energy resources of the African recipient countries.

#### Research design

Hypothesis I: *As the amount of oil supply of an African recipient country increases, the world Inward FDI flow will increase.*

Hypothesis II: *As the amount of natural gas supply of an African recipient country increases, the world Inward FDI flow will increase.*

Model 1 is generated from hypothesis I and hypothesis II.

Research Model:  $IFDI\ Flow = \beta_0 + \beta_1(Oil) + \beta_2(Natural\ Gas)$

Model 1 proposes that the amount of oil and natural gas of African recipient countries determines the amount of world IFDI Flow to African countries. The population partial regression coefficients are indicated with the Greek letter  $\beta$ .

### 4. RESEARCH METHODOLOGY

Statistical linear multiple regression method is utilized to test the hypotheses and specifies the research model. Correlation analysis is utilized to investigate the relationships between IFDI flow to African countries and energy resources of African countries.

#### Data Collection

Data of energy resources of African countries from 2008 to 2012 were collected from U.S. Government Energy Information Administration (EIA). IFDI flow data from 1970 to 2012 were collected from the official statistical bulletin released from UNCTAD, Statistics 2012.

#### Dependent variables

Inward FDI flow to Africa is defined as a dependent variable which means that IFDI flow increases when the value of independent variable increases. IFDI flow to Africa is measured in millions of U.S. dollars

#### Independent variables

- Data on oil supply are defined as independent variable. Oil supply data were taken from the U.S. Government Energy Information Administration official statistics. Oil supply is measured in thousands of barrels per day.
- Data on gross natural gas supply are defined as independent variable. Natural gas supply data were taken from the U.S. Government Energy Information Administration official statistics. Natural gas is measured in billions of cubic feet.
- Data on GDP per capita are defined as independent variable. GDP per capita means GDP at market or government official exchange rates per inhabitant. GDP per capita data were measured in millions of U.S. Dollars.

## 5. DATA ANALYSIS AND RESULTS

This section presents data analysis and discusses the findings of the research models. The research model generated from Hypothesis I and Hypothesis II was tested using a multiple regression statistical method reflecting the relationship between the increasing IFDI flow to Africa and its types of natural resources. Pearson correlation analysis was used to investigate the relationship between IFDI flow and types of natural resources in Africa from 2008 to 2012. Descriptive statistics was utilized to generate graphs to visually demonstrate the research results. The scope of the study is on the most significant increase 5 years 2008 and 2012.

### Data Analysis

R is the correlation co-efficient between the observed value of the dependent variable and the predicted value based on the regression model. For Model 1,  $R = .84$  indicates the dependent variable can be predicted from the independent variables.  $R^2 = .706$  indicates that 70.6% of the observed variability in IFDI flow to African countries is explained by the two independent variables. The analysis-of-variance shows there is a linear relationship between in the population between the dependent variable and independent variables since the observed significance level is less than 0.0005. Thus, the Null hypothesis that there is no linear relationship between IFDI flow and the two independent variables is rejected. The estimated regression equation is built as follows.

**Research Model: IFDI Flow = 4.97+ .029(Oil) + 0.003(Natural Gas)**

In response to Hypothesis 1, the regression coefficient is used to test whether the IFDI flow amount will increase as the amount of oil supply of an African recipient country increases. Hypothesis 1 is kept since the  $t$  statistic significant level for the oil coefficient less than 0.05. The

coefficient for oil supply indicates that predicted IFDI flow increases .029 for a change of 1 in the value of the oil variable. Oil is a relative larger predictor for IFDI flow comparing to gas and coal in Model 1.

In response to Hypothesis II, the regression coefficient is used to test whether the IFDI flow amount will increase as the amount of natural gas supply of an African recipient country increases. Hypothesis II is rejected since the gas coefficient is not significant ( $p > 0.05$ ).

The Pearson correlation analysis shows there is a positive correlation ( $r = 0.9$ ) between IFDI flow and Oil at the significant level ( $p < .0001$ ). Two African top oil supply countries have received the highest IFDI flow from 2008-2012.

Table 1 Two countries with top 2 natural resources received highest IFDI Flow 2008-2012

Country	IFDI	Oil	Gas
South Africa	\$5,235.38	12.4	12.16
Nigeria	\$7,788.19	4.05	4.08

## 6. CONCLUSION

The results of the study provide evidence to support the previous research that IFDI to Africa are significantly and positively correlated with a range of factors such as energy resources. Oil supply has been identified as the primary determinant of IFDI Flow to African countries. The finding indicates there is the positive relationship between the IFDI flow amount and African top oil supply countries. IFDI flow is invested to African recipient countries with rich oil supply such as Nigeria, Algeria and South Africa as shown in Figure 2. The expanding demand for oil and other energy resources are essential to sustain economic growth of many countries.

Multiple regression and correlation analysis is conducted on African countries based on the IFDI flow data (2008-2012) released from UNECA, comparing to type of natural resources of African countries through EIA. Further study need to be done to identify the driven factors of specific countries. Meanwhile, the study on the world inward FDI stock to Africa is should be conducted since IFDI flow is generally volatile and measures the short-term while inward FDI stock is more reliable and measures the long term. Therefore, the two different approaches may lead to different results.

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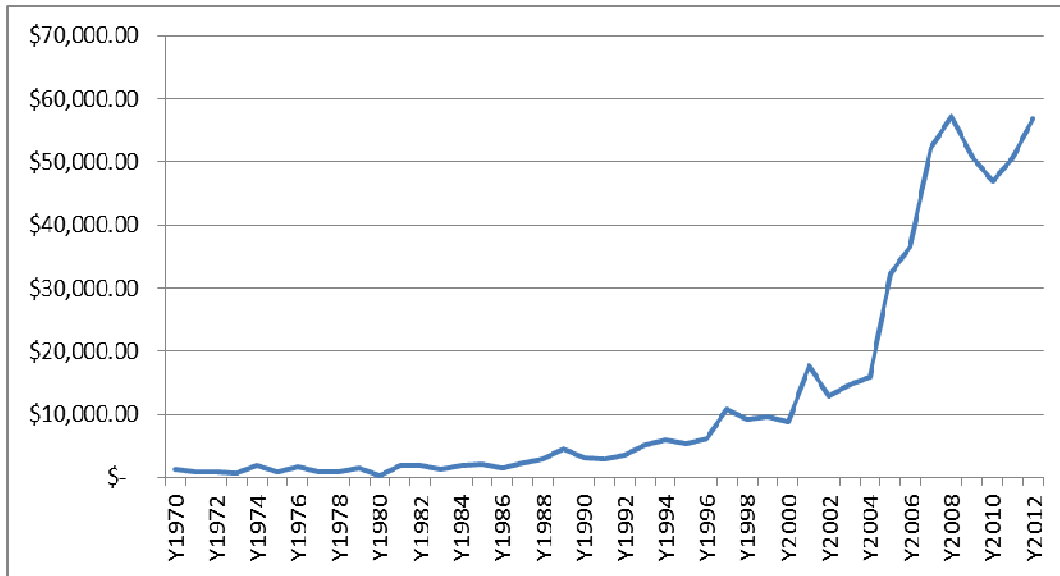


Figure 1 Trend of the World IFDI Flow 1970-2012  
Source: UNCTAD, Statistics 2012

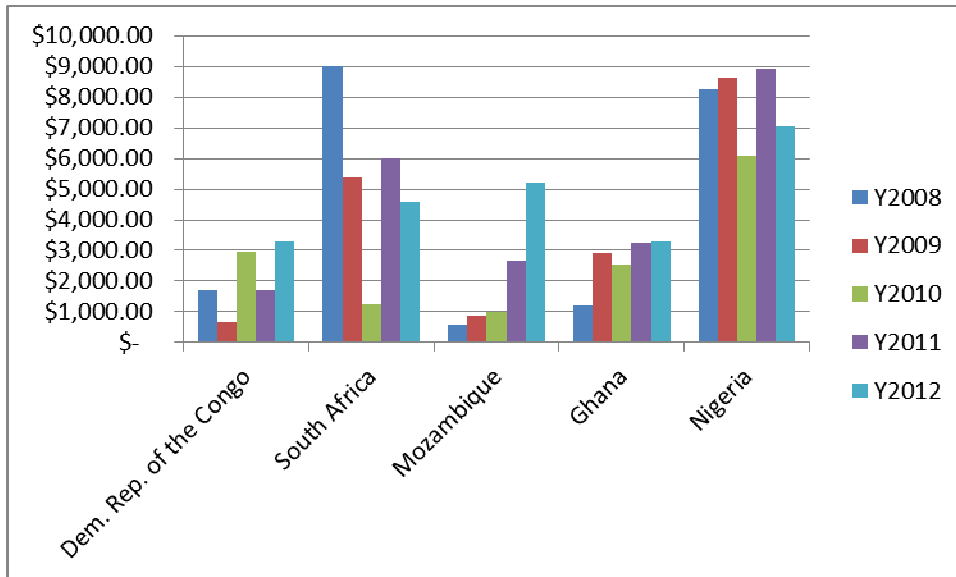


Figure 2 Top 5 African countries received highest FDI flow 2008-2012