

Galaye Ndiaye<sup>1</sup>, Xu Helian<sup>2</sup>

## IMPACT OF CHINA'S FDI ON ECONOMIC GROWTH OF AFRICAN COUNTRIES

*The paper provides the analysis of how China's FDI affect African countries' economic growth through transfer of management skills, intellectual property and technology. The research focuses on 20 African countries in the period from 2004 till 2013. Panel data method is used to get the empirical results and the latter prove that China's FDI is an important element in economic growth of African countries.*

*Keywords:* foreign direct investments; economic growth; China; African countries.

*Peer-reviewed, approved and placed:* 21.10.2016.

Галайє Ндайє, Ксу Хеліань

## ВПЛИВ КИТАЙСЬКИХ ПІ НА ЕКОНОМІЧНЕ ЗРОСТАННЯ АФРИКАНСЬКИХ КРАЇН

*У статті здійснено аналіз впливу китайських ПІІ на економічне зростання країн Африки через трансфер управлінських навичок, інтелектуальної власності та технологій. Дослідження проведене на матеріалах 20 країн Африки в період з 2004 по 2013 роки. Використано метод панельних даних, в результаті чого отримано докази тому, що китайські інвестиції є суттєвим елементом впливу на економічний розвиток африканських країн.*

*Ключові слова:* прями іноземні інвестиції; економічне зростання; Китай; країни Африки.

*Форм. 5. Табл. 6. Літ. 20.*

Галайє Ндайє, Ксу Хеліань

## ВЛИЯНИЕ КИТАЙСКИХ ПИИ НА ЭКОНОМИЧЕСКИЙ РОСТ АФРИКАНСКИХ СТРАН

*В статье осуществлен анализ влияния китайских ПИИ на экономический рост стран Африки через трансфер управленческих навыков, интеллектуальной собственности и технологий. Исследование проведено на материалах 20 стран Африки в период с 2004 по 2013 годы. Использован метод панельных данных, в результате чего получены доказательства того, что китайские инвестиции являются существенным элементом влияния на экономическое развитие африканских стран.*

*Ключевые слова:* прямые иностранные инвестиции; экономический рост; Китай; страны Африки.

**Introduction.** China's foreign direct investments have increased over the last 3 decades. During this period, it has surpassed many developed countries, and should soon catch up with Germany. It increased engagement with Africa and could generate important gains for African economies. Relationship with Africa changed China's economy starting with Deng Xiaoping, a dramatic shift from the policies under Chairman Mao. Relations were no longer dominated by ideological concerns, except for the sensitive issue of Chinese claim over Taiwan. However, the official principles of engagement, equality among partners, mutual benefit, respect for sovereignty, use of interest-free grants and loans, beneficiary capacity building, compliance with obligations, provision of equipment made in China, and the same living conditions for both Chinese and local experts, did not change (Larkin, 1971; Chaponniere, 2009).

<sup>1</sup> College of Economics and Trade, Hunan University, Changsha, China.

<sup>2</sup> College of Economics and Trade, Hunan University, Changsha, China.

More recently, China's investment has increased due to of the dependence on energy, Africa is gaining prominence on China's agenda.

China's trade with Africa was minimal until 1954 when trade then grew steadily, but did not rise significantly until 1974, when China opened up. Gradual liberalization of Chinese economy since 1978 was then accompanied by strong growth in trade with Africa.

The objective of this paper is to identify how China's FDI impact economic growth of African countries. Our paper presents the analysis of China's FDI in African countries, and projects the policies necessary to maximize the development of China – Africa trade investments. This rest of the paper is organized as follows: Section 2 provides literature review, the third section introduces the methodology and data used. Section 4 discusses the empirical results, and finally, the last section, 5 concludes.

**Literature review.** Many researchers are discussing FDI to Africa, namely, Chinese investments in Africa, and the potential effects of these investments. There is empirical evidence from different countries such as Botswana, Niger and Cameroon suggesting that China's FDI plays an important role in contributing to economic growth in Africa.

However, most studies generally indicate that the effect of FDI on growth depends on many factors such as the degree of complementarity and substitution between domestic investment, FDI in relation to other countries such as Algeria, Ghana and Angola. Some research works agree that FDI contribution to growth is positive but depends on some factors in a host country. L. Alfaro (2003) concluded that contribution of FDI to growth depends on a sector of the economy where this FDI aims. He also claimed that FDI inflow to the manufacturing sector has a positive effect on growth whereas FDI inflow to the primary sector tends to have negative effects on growth. The impact of FDI on growth also depends on local conditions in a host country. A. Chowdhury and G. Mavrotas (2003) stated that FDI contribution to growth depends on human capital base in a host country, and the degree of openness in the economy. Even when FDI is contributing to economy, its impact might not be easily noticed in the short run. D. Lall (2002) states that FDI inflow affects many factors in the economy and these factors in turn affect economic growth. Therefore, the impact of FDI on growth cannot be measured directly since the impact is through its contributions to these other factors. K.A. Mottaleb (2007) aimed to find the relationship between direct investments and economic growth of a country. The study found that economic growth can be significantly affected by foreign direct investment. According to another study, done by P. Agrawal (2000) on economic impact of foreign direct investment in South Asia, using time series and, cross-section analysis of panel data from 5 South Asian developing countries (India, Pakistan, Bangladesh, Srilanka and Nepal) concludes there exists complementarity and linkage between foreign and national investments. Further, he argues that the impact of FDI inflows on GDP growth was negative prior to 1980, mildly positive in the early 1980s, and strongly positive over the late 80s and early 90s.

Although the impact of FDI on growth seems to have attained the status of what D. Herzer et al. (2007) has called a "stylized fact", a more careful reading of literature may be required. For example, it might be the case that FDI just crowds out domes-

tic investments. In addition, as M. Agosin and R. Machado (2005) argue, different types of FDI, for example, mergers and acquisitions may have no impact on capital stock. It may just transfer resources from domestic to foreign residents, with no resulting impact on domestic productivity via spillovers. Indeed, as H. Gorg and D. Greenaway (2004) have shown in their survey of literature, only 6 out of 25 studies have found a positive relationship between spillovers from foreign-owned to domestic-owned firms.

It is interesting to note about most of these papers that although much of this literature highlights the potential endogeneity problem (countries with greater potential for growth are more likely to attract FDI), it is also fair to say that, because of data limitations, attempts to address this issue have been rather scarce. This, along with a discussion on the importance of institutions at a rather superficial level is one reason why literature is so contradictory. Chinese presence has also permitted the building of a local industry. Chinese investments have helped build local capacity, transfer technology and raise exports levels to several African states. In Zimbabwe, for instance, where tobacco has been among its top exports, Chinese investors have helped Zimbabwe processing of tobacco into cigarettes and export these as finished value-added products. Chinese investors and local companies have also formed joint ventures to establish a large cement factory in Gweru to meet national demand. These Chinese investments can be found in a wide variety of sectors, including the so-called fragile states and projects that Western investors seemingly find too risky (Besada et al., 2008: 11). Such efforts need to be tied to a national development strategy (Ajakaiye et al., 2009) to encourage the development of backwards and forward linkages to African firms. Moreover, certain works have shown that Chinese FDI and trade in Africa are complementary (Mo and Liu, 2008). P. Basu et al. (2003) applied a co-integration technique and Granger causality test on 23 developing countries (1978 to 1996) and exerted a bi-directional causality between the variables. A. Chowdhury and G. Mavrotas (2005) studied on a cross-country case between 1969 and 2000 using a co-integration method and a causality test, and concluded on a bi-directional causality in Malaysia and Thailand, and one-way causality from GDP to FDI for Chili. J. Ericsson and M. Irandoust (2005), and H. Ndambendia and M. Njoupouognigni (2010) exhibited that FDI positively impacted GDP in 5 Sub-Saharan African countries including Zambia by using panel data techniques. X. Li and X. Liu (2005) revealed that FDI positively affected GDP on a panel data of 84 countries over the period 1970 to 1999. A. Ahmed et al. (2007) investigated the causality linkage between the variables in 5 Sub-Saharan African countries including Zambia, and exerted an unidirectional causality running from FDI to GDPGR. K. Bhattarai and S. Ghatak (2010) found FDI to have positive impact on GDPGR in a study on 30 OECD countries. O. Yilmaz et al. (2011) and E. Dogan (2013) applied time-series analyses to examine the causality between FDI and GDPGR for Turkey and showed that both series had a positive long-run relationship. S. Antwi et al. (2013) found that FDI contributed to economic growth in Ghana over the period 1980 to 2010.

The study by E. Borensztein et al. (1998) argue that FDI has a positive growth effect when a country has highly educated workforce that allows it exploit FDI spillovers and argues that FDI can also generate an inflow of physical human capital

to a host country. As the physical size of a host country's capital stock increases, productive capacity of this country also increases. Therefore, we seek to address both of these issues. As discussed above, we examine the importance of institutions to the extent to which they contribute to growth when combined with inward capital flows, and also the extent to which institutions attract those flows.

The papers articles we've read so far have allowed us to formulate the following hypotheses.

**1. Research hypotheses.** We can therefore develop our hypotheses based on the effect of China's FDI in African countries' economic growth. The study seeks to verify the following hypotheses:

*Hypothesis 1:* FDI generates and has a positive effect on economic growth.

*Hypothesis 2:* GDP generates and has positive effect on FDI.

**2. Research questions.** The problem posed here is to establish and determine the impact of China's FDI on economy growth of African countries. We are hopeful that this result will shed more light on FDI/institution relations in the context of African economies' growth.

This study attempts to answer the following questions:

1. How Chinese FDI impact technologies and others channels in African countries?

2. Which factors impact these channels to attract more Chinese investors?

3. What type of investments do African countries receive from China?

**Chinese FDI flows to African countries.** Table 1 presents an overview of 20 African countries that received FDI from China during 2004 to 2013. General Chinese FDI flows to Africa, as well as flows to a specific African country's groups are analyzed. Grouping of African country is based on economic growth performance, level of diversification and regional concentration.

Table 1 represents the countries China is most interested in and the money invested in it. We note that FDI from China to Africa is more focused on the countries with rich resources, more so than in South Africa. Between 2004 and 2013, more than half of all Chinese FDI in Africa has been absorbed by 5 countries. Zambia was the absolute leader because Chinese who have invested 1496.11 mln USD to its sectors of construction and mining. And the North Africa follows with Algeria (1349.46 mln) and Sudan (1392.22 mln) because Chinese are interested mainly in their oil, natural gas and infrastructure work. In fact, the Public Company China National Petroleum Corp is the main foreign investor in Sudan. Democratic Republic of Congo receives a lot of investment from China on the side of exploitation of the mining sector and infrastructure achievements. Zimbabwe has received 1307.52 mln USD and Democratic Republic of Congo dot 1138.94 mln of Chinese investments in the sectors of energy, infrastructure development and trade.

We also found that China expands its presence at an accelerated pace in such African countries as Angola (852.93 mln), where the Chinese invest in oil tankers; Liberia (722.25 mln), Namibia (635.67 mln), Ghana (492.65 mln) and Ethiopia (481.44 mln), both as an important trading partner and more and more as an investor, in all of these countries. This evolution is very explicit in the sectors of energy, infrastructure development and trade, and in the expansion of various goods, including fertilizers, cotton and perishable goods.

Table 1. African countries and their groups in relation to Chinese FDI in Africa, 2004–2013, authors'

Rank	Countries	FDI received	Rank	Country groups	FDI received	%
1	Zambia	1496.11	1	West Africa	1868.63	15.92%
2	Sudan	1392.22	2	East Africa	1308.3	11.15%
3	Algeria	1349.46	3	North Africa	2741.68	23.37%
4	Zimbabwe	1307.52	4	Central Africa	3734.039	31.82%
5	Congo Dem.	1138.94	5	Southern Africa	2081.28	17.74%
6	Angola	852.93	<b>Total</b>		<b>11733.929</b>	<b>100%</b>
7	Liberia	722.25				
8	Namibia	635.67				
9	Ghana	492.65				
10	Ethiopia	481.44				
11	Tanzania	400.28				
12	Senegal	325.85	<b>Based on diversification</b>			
13	Niger	324.4	1	Mining		29%
14	Madagascar	212.53	2	Construction		16%
15	Gabon	148.609	3	Manufacturing		22%
16	Botswana	138.09	4	Financing		14%
17	Kenya	108.1	5	Commercial Services		6%
18	Uganda	105.95	6	Agriculture, forestry, animal and fishery		3%
19	Cameroon	97.45	7	Research		3%
20	Ivory Coast	3.48	8	Other		7%
<b>Total</b>		<b>11733.929</b>	<b>Total</b>			<b>100%</b>

China has become the first commercial partner to contribute to the development of sub-Saharan Africa, the swaps totaling to 170 bln USD. From 2004 to 2013 FDI of China were diversified by commercial exchanges with many of these African countries such as the United Republic of Tanzania (400.28 mln), Senegal (325.85 mln), Madagascar (212.53 mln), Gabon (148.609 mln), and Botswana (138.09 mln). These countries have received a lot of investment from China in the areas of infrastructure and processing of agricultural products. The transaction on mining signed between China and Niger has made it so the country received 324.4 mln from Chinese investors. Kenya from 2004 to 2013 received 108.1 mln mainly due to their deposits of diamonds and precious stones. Chinese investors are present in Uganda (105.95 mln) and Cameroon (97.45 mln) in forestry, mining, infrastructure construction and also food sector. Ivory Coast (with its 3.48 mln) is the #1 exporter of cocoa at the global level, it also has other agricultural products that will benefit from the advantages from attracting more Chinese investors.

Table 1 represents 5 groups of 20 African countries and the money invested by China. We are trying to measure the countries in terms of the most or least amount of investments made by China as well as the sector that was most or least interesting in Africa. However, these countries are grouped by geographical belonging: West Africa (Senegal, Niger, Liberia, Ghana, Ivory Coast), East Africa (Ethiopia, Tanzania, Kenya, Madagascar, Uganda), North Africa (Algeria, Sudan), Central Africa (Angola, Zambia, Gabon, Cameroon, Democratic Congo), and finally the countries in Southern Africa (Botswana, Zimbabwe, Namibia). Central Africa represents more

than 31% share and with the amount of 3734.039 mln USD followed by the North Africa with the share of 23.37% and investments of 2741.68 mln USD.

A separate block in Table 1 shows the sectors of Chinese investments in Africa as well as their percentages. We note that mining resources are the sector most invested by China in Africa with 29%, followed by manufacturing (22%), construction with 16% and finance with 14%. While trade, agriculture, research and other' sectors represent only 19% of the overall investments of China into Africa since 2004 till 2013.

**Methodology & data.** There have been many studies with different specifications regarding the effect of *FDI* on developing countries. The model we are going to use is based on the endogenous growth theory, where *FDI* contributes to economic growth through new technologies and other inputs. *Y* is output, *A* is the technology or the efficiency of production, *K* is capital and *L* is labor. The starting point of our model formulation is:

$$Y = F(A, FDI, K). \quad (1)$$

The formula captures the total factor productivity of growth in output (not accounting for increases in factor input). The effect of trade liberalization on economic growth is operates through total export and import, and *GDP*. We employ two equations for our model because we want to extend our research, and new explanatory variables are included. We specify the basic formulation of our equations to be estimated:

$$FDI = (GDP, Trade - Op, IR, Lab, Gov - cons); \quad (2)$$

$$GDP = (FDI, Trade - Op, IR, Lab, Gov - cons). \quad (3)$$

The model we used has two different equations, in our first equation *FDI* is the dependent variable and *GDP*, tradeopenness, inflation rate, labor and government consumption are the independent variable. Equation (4) indicates that *Y* is output, *A* is technology or the efficiency of production, *K* is the capital and *L* is labor. In the extended model, 3 explanatory variables have been included

$$\begin{aligned} \log FDI_t = & \beta_0 + \beta_1(GDP) + \beta_2(Trade - Op) + \\ & + \beta_3(IR) + \beta_4(Lab) + \beta_5(Gov - Cons) + \varepsilon_{it}, \end{aligned} \quad (4)$$

where China outward *FDI* is the dependent variable, and all others variables are the independent variables such as Gross domestic Product (*GDP*), trade openness is export plus import relative to *GDP* (*Trade-Op*), inflation rate (*IR*), labor (*Lab*) and government Consumption (*Gov-Cons*).

In our second equation the dependent variable will be *GDP*:

$$\begin{aligned} \log GDP_t = & \beta_0 + \beta_1(FDI) + \beta_2(Trade - Op) + \\ & + \beta_3(IR) + \beta_4(Lab) + \beta_5(Gov - Cons) + \varepsilon_{it}, \end{aligned} \quad (5)$$

where independent variables are the same as above.

Our model is based on the endogenous growth theory. We used estimators developed for dynamic panel data on 20 African countries (2004 to 2013). 2004 is the starting year for the sample data because it's easy to get the data from that year since many African countries have more significant trade relationship in business with China since 2004. This year indicates the first full year when China got engaged in foreign investment in so many African countries.

For the ease of comparison with past studies, the data for this study is taken from the World Development Indicators (WDI) database, published by the World Bank and the International Monetary Fund (IMF).

Before proceeding with the regression analysis using dynamic panel data, the results of single regressions are examined and possible country groups which share common growth elasticity to macroeconomic variables, are captured.

Our methodology and the data obtained in our paper helped us to get the following results.

**Empirical results.** This study estimates the effect of China's FDI inflows on African economic growth. Table 2 presents the descriptive statistics for the data of 2004–2013. The summary statistics are calculated using one observation per country. There are considerable cross-country variations in the data.

*Table 2. Summary of descriptive statistics, authors'*

Variable	Obs	Mean	Std.Dev	Min	Max
Cnfdi	200	58.66965	108.2647	-195.94	911.86
Tradeopeness	200	1.01e+10	1.66e+10	1.24e08	8.20e+10
IR	200	10.56679	10.95424	-16.70459	80.75094
Labor	200	1.01e+07	9084879	481514	4.51e+07
Govcons	200	3.10e+11	1.68e+12	5.16+07	1.2413

Table 2 presents summary statistics for all the variables used in this study and the data averaged over the 2004 to 2013 period, with one observation per country. For instance the mean of Chinese FDI (cnfdi) for the sample is 58.66 per annum, with the standard deviation of 108.26, it varies significantly, ranging from -195.2647 to 911.86 in the sample.

The lowest value of tradeopeness is (1.24e+08) and the highest value is (8.20e+10). The average is 1.01e+10 and the standard deviation 1.66e+10 is large, so we can assert it exhibits more dispersion from the mean, which to our expectation might be a positive sign for economic growth.

Inflation has the minimum of -16.0459 and the maximum of 80.75094. The average is 10.56 and the standard deviation is 10.95, which is large, meaning more dispersion from the mean. Inflation, as expected, has a negative effect on attracting FDI but statistically less important. As to inflation, it may have dual information content due to; macroeconomic instability and high economic activity as in the case of economic over-heating. Most African countries have not recorded sustainable economic growth let alone overheating, so it can be argued that the informational content of inflation leans more towards economic instability.

Labor has the minimum of 481514 and the maximum is 4.51e+07. The mean is 1.01e+07, the standard deviation is 9084879, meaning it exhibits less dispersion from the mean. We can say our expectation result for labor the sign is positive because labor is cheap in African countries. Labor quantity, population growth rate, is found to have a positive but statistically insignificant effect on our annual data. Labor quality is one of the significant factors, at 99% confidence interval, to determine FDI inflows. Poor countries have considerable discretion over how much to invest on education and training. The more an African country spends on human capital; that, the more FDI flows to that country.

Finally, government consumption is measured as the ratio of government consumption to GDP. It is expected to bear a direct relationship to economic growth. This is because higher level of government consumption should translate into provision of more social capital that should encourage production and growth. The results for government consumption: the minimum is  $5.16e+07$ ; it means government consumption had increased by  $5.16e+07$ ; while the maximum is  $1.24e+13$ . The mean of government consumption is  $3.10e+11$ , and the standard deviation is  $1.68e+12$  which is less than the average and means it exhibit less dispersion from the mean.

After the results of the descriptive statistics, we will follow to our regressions. The econometric result for the first regression model, where GDP is the dependent variable and others are independent variables is presented in Table 3.

Table 3. Simple regression, authors'

GDP	coef	Std.Err	t	P >  t/
Cnfdi	2.13e+07	8652608	2.46	0.015
Tradeopeness	1.958178	.0557639	35.12	0.000
IR	3.71e+07	8.28e+07	0.45	0.655
Labor	577.2604	100.5637	5.74	0.000
Govcon	-.0001588	-.0005448	-0.29	0.771
-cons	4.56e+08	1.63e+09	0.28	0.781
Prob > F = 0.0000				
R-squared = 0.8765				

In Table 3, the coefficient of determination  $R^2$  has a high value which is 87.96%, it indicates that 87.96% of the variance in GDP can be explained by cnfdi, trade openness, inflation labor and government consumption. However, the good fit is most likely due to highly linear relationship between GDP and the other variables.

The coefficient estimate for cnfdi is significant because the p-value is less than 0.05. This means the coefficient estimate indicates that if cnfdi increases by 1 USD, GDP will increase  $2.13e+07$  USD, ceteris paribus. Furthermore, Table 3 shows that the coefficient estimate for the independent variable of interest, trade openness the P-value is less than 5%, so it is significant if tradeopeness increase by 1 USD – GDP will increase by 1.958178. The p-value of inflation and government consumption are more than 5%, so these variables are not significant for the dependent variable GDP. According to our results the variables (cnfdi, trade openness, labor) all are significant and influence GDP variable; so these variables are meaningful and have their impact on FDI. These variables have a positive impact on economic growth: if they increase by one unit – GDP will increase by one unit and the expectation for exchange rate and political instability will be satisfied.

Our result for simple regression will help us analyze further the random effect test (Table 4). In Table 4 we have random effects generalized least square (GLS) regression for the dependent variable GDP on independent variables (cnfdi, tradeopeness, inflation, labor and government consumption). The random effects assume that the entity error term is not correlated with the predictors which allows for time-invariant variables to play the role of explanatory variables.

In our Table 4 the estimated value for  $R^2$  is 0.7870, showing that the regression is overall good fit at the 1% level of significance. Our variables cnfdi (0.017), trade open-

ness (0.000) and labor (0.000) are less than the p-value 0.05. This means they are significant. We can state that these variables have significant influence on our dependent variable GDP. Inflation has 0.29 and government consumption – 0.721, their p-values are more than 5%, so we can conclude that these variables have no significant impact on GDP.

Table 4. Random effect (GDP), authors'

GDP	Coef	Std.Err	z	P >  z
Cnfdi	1.26e+07	5285465	2.38	0.017
Tradeopenness	1.912818	.0799553	23.92	0.000
IR	5.28e+07	5.03e+07	1.05	0.295
Labor	1348.068	255.659	5.27	0.000
Govcon	.000167	.0004679	0.36	0.721
-cons	-6.59e+09	3.84e+09	-1.72	0.086
Prob > F = 0.0000				
R-squared = 0.7870				

The random effects estimates suggests that FDI to African countries has been an important element in explaining growth performance.

According to our interpretation, the coefficients signs can change. They include both the within-entity and between-entity effects. In the case of time series cross section (TSCS) data represents the average effect of  $X$  over  $Y$ , when  $X$  changes across time and between countries by one unit. Finally, we can say the differences across units are uncorrelated with the regressors because  $\text{cor}(u_i, x) = 0$ .

#### 1. Hausman test:

Ho: Random effect is appropriate.

H1: Fixed effect is appropriate.

Table 5. Hausman test, authors'

	Coefficient (b) Fixed	Coefficient (B) Random	(b – B) Difference	Sqrt(diag(V_b – V_B)) S.E.
Cnfdi	7861086	1.26e-07	-4707712	-
Tradeopenness	1.810246	1.912818	-.1025722	.0346649
Inflation	4.76e+07	5.28e+07	-5127143	-
Labor	2919.505	1348.068	1571.437	333.9059
Gov-cons	.00019	.000167	.000023	

b – consistent under Ho and Ha; obtained from xtreg.

B – inconsistent under Ha, efficient under Ho, obtained from xtreg.

Test: Ho: Difference in coefficient not systematic:

$\text{Chi2}(2) = (b - B)' \{ (V_b - V_B)^{-1} \} (V_B) = -24.58$ .

Note: The rank of the differenced variance matrix (2) does not equal the number of coefficient being tested (5), be sure this is what you expect, or there may be problems with computing the test. We examine the output of estimators for anything unexpected and possibly consider scaling of variables so that the coefficients are on a similar scale.

According to our results of Hausman test (Table 5), p-value is less than 5%, so we can reject the null hypothesis and accept the alternative hypothesis which means random effect is appropriate. Hausman test have shown us the random effect model is more appropriate and is the best model in this particular case.

## 2. Breusch Pagan test:

Ho: Pooled regression is appropriate.

H1: Random effect is appropriate.

Table 6. Breusch Pagan test, authors'

Xttest 0		
Breusch and Pagan Lagrangian multiplier test for random effects		
Gdp [countrycode,t] = xb + u [countrycode] + e [countrycode,t]		
Estimated results	Var	sd = sqrt(Var)
Gdp	1.28e+21	3.58e+10
e	4.32e+19	6.57e+09
u	1.43e+20	1.20e+10
Test: Var(u) = 0		
Chibar2(01) = 409.43		
Prob > chibar2 = 0.000		

The result of Breusch Pagan test (Table 6) shows the P-value is 0.000. Mean is less than 5%, so we can reject the null hypothesis and accept H1. The analysis of Breusch Pagan test shows that FDI is affecting GDP significantly through inflation, labour force, trade openness, government consumption. This means we are satisfied with our model.

Our Hausman and Breusch Pagan tests are both telling random effect is the best model to represent this particular case.

**Conclusion.** This paper explores the impact of China's FDI on economic growth of African countries (the case of 20 African countries, the period is 2004 to 2013). Chinese investments to African economies have huge current and potential benefits to all the countries and specially for Africa as a continent as it further creates more favorable environment for business connections between China and Africa.

Our results show that China's investment has positive impact on 20 African countries' economic growth. There is a strong, positive relationship between FDI and economic growth. FDI is often the main channel through which advanced technology is transferred to developing countries.

According to our hypothesis, FDI and GDP have a positive relationship in African countries because they promote the policies to attract investments. FDI increases GDP and GDP attracts more investments, both variables can improve domestic competitiveness and therefore, have a positive impact on job creation, market size, tax revenues and export volumes in African countries. However, we consider it is necessary for African countries to pay attention volumes political stability, corruption and other risks associated with economy so that to encourage to the issues transfer management skills, intellectual property, new technology and infrastructure development.

This paper suggests that politicians and economists in African governments should pay more attention to attracting more FDI into African countries to foster GDP growth. Further study can investigate the effects of terrorism on FDI and economic growth of Africa countries, which also a highly influential factor today.

### References:

Agarwal, P. (2000). Policy Regime and Industrial Competitiveness: A Comparative Study of South Asia and India. Hound Mills Macmillan, UK.

- Agosin, M., Machado, R. (2005). Foreign investment in developing countries: Does it crowd in domestic investment? *Oxford Development Studies*, 33(2): 149–162.
- Ahmed, A., Cheng, E., Messinis, G. (2007). Causal links between export, FDI and output: Evidence from sub-Saharan African countries. Centre for Strategic Economic Studies Victoria University, Melbourne Australia, Working Paper No. 35.
- Ajakaiye, O., Kaplinsky, R., Morris, M., N'Zue, F. (2009). Seizing Opportunities and Confronting the Challenges of China – Africa Investment relations: Insights from AERC Scoping Studies. African Economic Research Consortium, Nairobi, Paper No. 2.
- Alfaro, L. (2003). Foreign Direct Investment and Growth: Does the Sector Matter? *Economica* (Harvard Business School, America), May: 113–170.
- Antwi, S., Mills, E.F.E.A., Mills, G.A., Zhao, X. (2013). Impact of foreign direct investment on economic growth: Empirical evidence from Ghana. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 3(1): 18–25.
- Basu, P., Chakraborty, C., Reagle, D. (2003). Liberalization, FDI, and Growth in developing Countries: A Panel co integration Approach. *Economic Inquiry*, 41(3): 510–516. Bhattarai, K., Ghatak, S. (2010). FDI, investment and growth in OECD countries. *Economics Discussion*, Kingston, Paper 2010/5.
- Borensztein, E., De Gregorio, J., Lee, J.-W. (1998). How does foreign direct investment affect economic growth? *Journal of International Economics*, 45(1): 115–135.
- Chowdhury, A., Mavrotas, G. (2003). FDI and growth: what causes what? WIDER conference on Sharing global prosperity, WIDER, Helsinki, Setembro, 2003, (pp. 1–18).
- Chowdhury, A., Mavrotas, G. (2005). FDI and Growth: A Causal Relationship. United Nations University, WIDER, Research Paper 2005/25.
- Dogan, E. (2013). Foreign direct investment and economic growth: A time series analysis of Turkey, 1979–2011. *Cankiri Karatekin Universitesi Iktisadi ve Idari Bilimler Fakultesi Dergisi*, 3(2): 239–252.
- Ericsson, J., Irاندoust, M. (2005). Foreign aid, domestic savings, and growth in LDCs: An application of likelihood-based panel cointegration. *Economic Modeling*, 22: 616–627 = <http://dx.doi.org/10.1016/j.econmod.2004.03.004>.
- Gorg, H., Greenaway, D. (2004). Much ado about nothing? Do domestic firms really benefit from foreign direct investment? *World Bank Research Observer*, 19(2): 171–197/
- Herzer, D., Klasen, S., Nowak-Lehmann, F. (2007). In search of FDI-Led growth in developing countries. *Economic Modeling*, 25(5): 793–810.
- Lall, D. (2002). *Foreign investment transactional and development countries*. Macmillan Press Ltd, London.
- Li, X., Liu, X. (2005). Foreign direct investment and economic growth: An increasingly endogenous relationship. *World Development*, 33(3): 393–407 = <http://dx.doi.org/10.1016/j.worlddev.2004.11.001>.
- Liu, F., Mo, S. (2008). Study of the Relationship between Chinese Direct Investment and Trade to Africa Based on Panel Data Model. *Finance and Investissement*, 24(8).
- Mottaleb, K.A. (2007). Determinants of foreign direct investment and its impact on economic growth in developing countries. Munich Personal RePEc Archive, Paper No 9547.
- Ndambendia, H., Njoupouognigni, M. (2010). Foreign aid, foreign direct investment and economic growth in Sub-Saharan Africa: Evidence from Pooled Mean Group Estimator (PMG). *International Journal of Economics and Finance*, 2(3).
- Yilmaz, O., Kaya, V., Akinci, M. (2011). The effect of foreign direct investment on economic growth in Turkey (1980–2008). *Journal of Faculty of Economics*, 25(3–4): 13–30.