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Market Size and Foreign Direct Investment in Selected African Economies

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Abstract:

This study investigates the relationship between market size and foreign direct investment (FDI) in some African countries from 2005 to 2020 using a panel data of 4 countries (Egypt, Tunisia, Morocco, Algeria). Following the application of the fixed effect and random effect models, the Hausman test was used to choose which model to adopt. According to the findings, there is a substantial and positive relationship between market size and FDI inflow in countries under study. Generally, the results of statistical testing show that the fixed effects model is the best model, and that the estimates of the suggested model parameters do not contradict economic theory assumptions. It was discovered that 65.8% of the changes that occur in FDI inflows in the countries under study are due to market size.

Keywords: African economies; FDI; Market size; Panel data.

حجم السوق والاستثمار الأجنبي المباشر في اقتصادات أفريقية مختارة

الملخص:

هدفت هذه الدراسة إلى فحص العلاقة بين حجم السوق وتدفقات الاستثمار الأجنبي المباشر في أربع اقتصاديات افريقية (مصر، تونس، المغرب، الجزائر) باستخدام نماذج البيانات المقطعية عبر الزمن للفترة من 2005-2020. بعد تطبيق نماذج التأثير الثابت والتأثير العشوائي، تم استخدام اختبار Hausman لاختيار النموذج المناسب الذي سيتم اعتماده. ووفقاً لنتائج الدراسة تأكد وجود علاقة إيجابية ذات تأثير معنوي بين حجم السوق كمتغير مستقل وتدفقات الاستثمار الأجنبي المباشر كمتغير تابع في الدول قيد الدراسة. وبشكل عام أشارت نتائج الاختبارات الإحصائية بأن النموذج المناسب هو النموذج الثابت للبيانات المتاحة وأن تقديرات معلمات النموذج المقترحة لا تتعارض مع افتراضات النظرية الاقتصادية. تم اكتشاف أن 65.8٪ من التغيرات التي تحدث في تدفقات الاستثمار الأجنبي المباشر في البلدان قيد الدراسة ترجع إلى حجم السوق.

كلمات مفتاحية: الاقتصادات الإفريقية، الاستثمار الأجنبي المباشر، حجم السوق، البيانات المقطعية عبر الزمن.

1. Introduction:

Foreign Direct Investment (FDI) has become increasingly important in supporting the economic development of countries in the contemporary globalization period. As countries grow their economies, they rely on FDI to fund development initiatives and boost economic productivity. When looking at worldwide patterns, it is clear that the volume of international FDI expanded dramatically in the second half of the twentieth century. This could be explained by market globalization and the shifting global economic and political environment, for example. Globally, the average FDI inflows increased by 8002.49% from 1970–1980 (USD 26.182 bn) to 2011–2020 (USD 2121.393 bn) (UNCTAD, 2021).

A number of intrinsic factors that make a country a desired destination or not for FDIs ('pull-factor' theory) are described in FDI literature. These factors include the quality of socio-economic infrastructure, the market size, human capital development level, the gap between countries and main international markets, the cost of labor, openness to international trade, foreign exchange policy, fiscal and non-fiscal incentives, political stability, monetary policy and the level of financial liberalization (Sane, 2016: 1524).

The goal of FDI inflows to emerging countries is to access the domestic market, and thus market size does matter for domestic market-oriented FDI (Sahoo, Nataraj and Dash, 2014: 168), for three reasons: the "larger potential for local sales", the "greater profitability of local sales than export sales", and the "relatively diverse resources which make local sourcing more feasible" (Oxelheim, 1993: 182).

Market-seeking FDI host market characteristics, such as market size, is widely acknowledged as a fundamental factor of FDI flows: as markets grow in size, so do chances for efficient resource utilization and the exploitation of economies of scale and scope via FDI (UNCTAD, 1998).

Thus, FDI will transfer to countries with larger and expanding markets and greater purchasing power, where firms can potentially gain a better return on their capital and generate higher returns from their investments (Jordaan, 2004: 29)

According to Charkrabarti (2001) the market-size theory supports the concept that the effective use of resources and the utilization of economies of scale requires a large market: as the market-size rises to a certain critical value, FDI will start to increase thereafter with its further expansion.

According to theory, market-oriented, horizontal FDI is favorably related to demand growth. so, economies that grow quickly have greater profit prospects than those that grow slowly or not at all (Lim, 1983: 2010)

The market size theory, proposed by Balassa in 1966, (Ranđelović, Milić and Kostadinović, 2017: 97) and later "The significance of market size has been generally acknowledged by Scaperlanda and Mauer, 1969; Caves, 1982; Torrisi, 1985; Culem, 1988; Artisien et al., 1991; Moore, 1993; Clegg, 1995; and Clegg and Scott-Green, 1998"(Akhtar, 2001: 4).

Market size is generally measured by real GDP, real GDP growth, GDP per capita (Sichei, Kinyondo, 2012: 88), or size of the middle class (Sahoo, Nataraj and Dash, 2014: 168).

The growth rate of GDP is one of the most important indicators used by investor in taking his investment decision because the investor always looks for growth and access to new markets, or to increase his share in the markets of the host country. Countries with large GDP are suitable for many local and foreign companies, and especially those operating in non-tradable services because the only way to present it to the markets of the host countries is through establishing branches in those countries, and the reason for the emergence of emerging economies group was to increase their ability to attract high rates of FDI flow. Given that the growth rate of GDP represents a manifestation of

economic stability and its increase means an increase in aggregate demand, FDI investors are lured by these attractions (Sahnoun, 2010: 96-97).

In light of this theory and the work from previous writers, who argue that the market size influences FDI inflows, we pose a central question in this study: Does the market size affect the FDI inflow in following states: Egypt, Tunisia, Morocco, and Algeria?

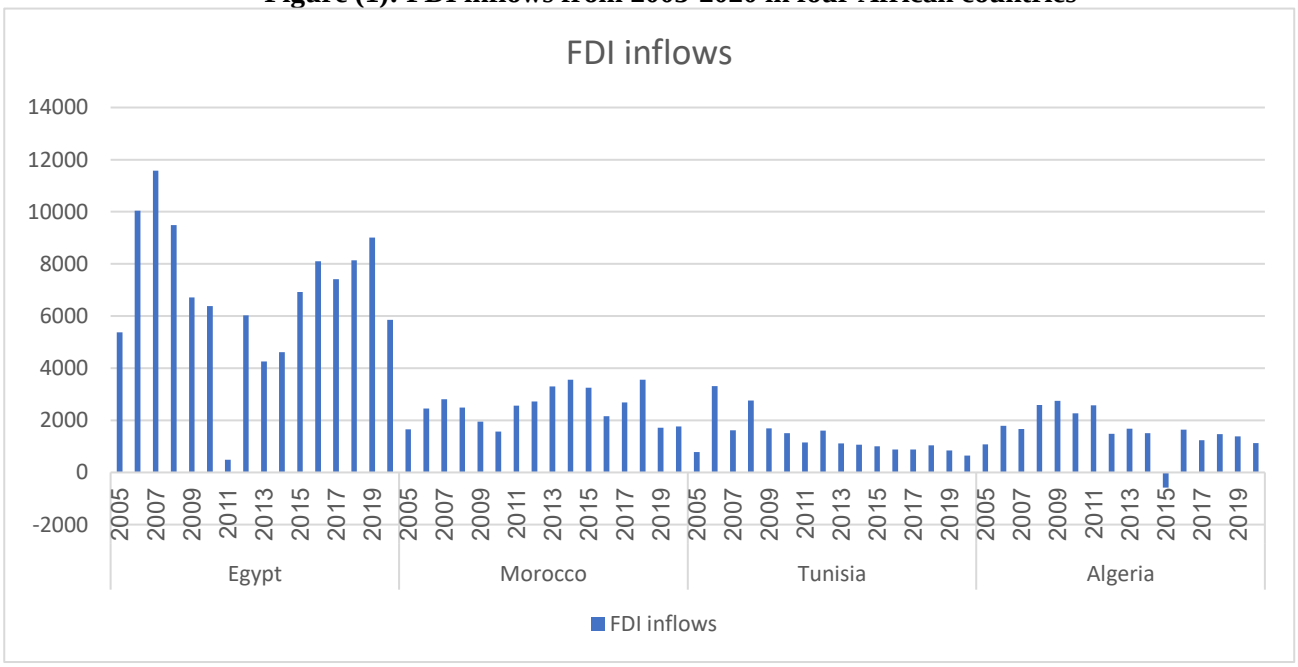
This study aims to investigate the relation between market size and FDI in four African countries (Egypt, Tunisia, Morocco, Algeria) on the period from 2005 to 2020.

Based on the foregoing, the main hypothesis of the study can be derived as follows:

Main hypothesis: Market size in the four countries is associated positively with FDI inflows.

FDI flows to Africa declined by 16 per cent in 2020 to $40 billion – a level last seen 15 years ago. Egypt remained the largest recipient in the region (Unctad, 2021: 6). Was the market size in the four African countries a prominent role in attracting foreign direct investment?

Figure (1): FDI inflows from 2005-2020 in four African countries



Source: Designed by the researcher based on UNCTAD data

2. Literature review:

In one way or another, most empirical research on the determinants of FDI involve the relationship between market size and FDI flow, for example:

Raeskyesa & Suryandaru (2020) explore the empirical relationship between competitiveness and FDI inflow in Asean states from 2007 to 2017. The results show that the size of market had a big impact on the region's ability to attract foreign direct investment.

Sodik et al. (2019) examine the factors that influence foreign direct investment across 26 provinces in Indonesia over the period (1990- 2014). The results show that market size is statistically significant in incentivizing FDI during the prior to the regional autonomy (1990-2000), and for the period after autonomy (2001-2014).

Elnamrouty (2019) explore the trade and investment opportunities between Palestine and the BRIC countries. The results show that an increasingly important trade growth between Palestine and BRIC throughout the study period, particularly with China and India.

Olayemi & Temitope (2018) in their research on the relationship between foreign direct investment and market size in Sub-Saharan African countries, discovered that education and market size have a positive and significant impact on FDI.

Asongu et al. (2018) investigate the factors that influence the flow of foreign direct investment to the fast-growing BRICS (Brazil, Russia, India, China, and South Africa) and MINT (Mexico, Indonesia, Nigeria, and Turkey) countries. The results show that market size, infrastructure availability, and trade openness are the most important factors in attracting foreign direct investment to BRICS and MINT.

Ranđelović et al. (2017) found that market size, market growth and population size had a significant positive impact on foreign direct investment inflows.

Nasir (2016) showed that, in Malaysia market size is positively correlated to foreign direct investment whereas trade and exchange rate are negatively correlate with foreign direct investment.

Gabriel et al. (2016) analyzed the influence of market size on foreign direct investment to Nigeria for the period 1970-2011, and observed that economy size has a positive and significant effect on foreign direct investment to Nigeria.

Economou & Hassapis (2015) while studying the determinants of FDI in four European economies (Greece, Italy, Portugal and Spain) from 1995 to 2013. The empirical findings show that market size has a considerable impact on FDI inflows in the countries studied in South Europe.

Ho (2013) in her study in fast emerging countries including Brazil, China, India, Russia, South Africa (BRICS) and Malaysia found that market size, interest rate and infrastructure quality are critical factors that determine FDI inflows for this group of emerging countries.

Kinyondo & Sichei (2012) confirmed the positive and catalytic relationship played by the market size and macroeconomic stability. This means that market seeking FDI is located in countries where the real GDP growth potential is high since it guarantees profitability of the projects.

Faustino & Leitão (2010) found market size and trade openness as important factors in explaining FDI flows into Portuguese economy.

Aken (2009) found that FDI is concerned with market size in developing countries, not on a per capita basis but rather on an aggregate basis. More specifically, FDI will most probably concentrate on regional areas rather than a national expansion.

Duanmu & Guney (2009) discovered that FDI from China and India is positively related to the market size of the host country and concluded that FDI of both countries is drawn to places with large market size.

Demirhan & Masca (2008) while examining the relationship between foreign direct investment and a set of independent variables in 38 developing countries, found that market size, trade openness rate, and telephone main lines have a positive impact on FDI inflows.

According to Chakrabarti (2001), a host country's market size, as measured by per-capita GDP, has a significant explanatory power in terms of FDI.

Lim (2001) found that the size of the market, the quality of the infrastructure, political/economic stability, and the presence of free trade zones are all factors that influence FDI.

Amongst the literature provided, this study enriches the literature by focusing on the empirical effect between the market size and FDI inflow exclusively in countries within the African region.

The current study's analysis is restricted to some African countries for two reasons.

First, rigorous empirical literature on the link between FDI and market size in Africa is scarcity, particularly when compared to the abundant studies undertaken in other parts of the world.

Second, African economies are distinct from those of other developing regions in terms of structure and attributes.

3. Data, Methodology and Empirical Results:

3.1. Data:

This study set the amount of FDI inflow for African countries as the dependent variable. For the independent variable, this study uses market size. Market size measured by real gross domestic product (GDP).

GDP data for the period 2005-2020 produced by the World Bank, and UNCTAD indicators provided the statistics for FDI.

Data selected from international sources because it is precise, comprehensive, compatible, and available for a wide range of countries and historical periods. It is also highly reliable and unbiased.

GDP is made up of the gross value added and created by all resident producers in a country's economy, as well as product taxes, from which any subsidies not represented in the value of products are subtracted.

The GDP was calculated at constant prices (Million USD) for countries under examination, 2010 is the base year.

FDI inflows comprise capital provided by a foreign direct investor to a foreign affiliate, or capital received by a foreign direct investor from a foreign affiliate.

Based on the theories and previous literature review, especially with reference to market size theory, we hypothesize that the sign of independent variable (GDP) is positive to attract FDI inflow.

3.2. Methodology:

For the period 2005-2020, panel data were utilized to examine the relationship between market size and foreign direct investment in four African countries (Egypt, Tunisia, Morocco, Algeria).

Panel data or longitudinal data are "multi-dimensional data involving measurements over time. Panel data contain observations of multiple phenomena obtained over multiple time periods for the same firms or individuals".

A panel data set, while having both a cross-sectional and a time series dimension, differs in some important respects from an independently pooled cross section. To collect panel data—sometimes called longitudinal data—we follow (or attempt to follow) the same individuals, families, firms, cities, states, or whatever, across time. For example, a panel data set on individual wages, hours, education, and other factors is collected by randomly selecting people from a population at a given point in time. Then, these same people are reinterviewed at several subsequent points in time.

3.2.1 Basic models for analyzing Panel data:

Generally, the panel data model can be classified into three categories:

1- Pooled regression model (PRM)
2- Fixed effect model.
3- Random effect model.

Let us have N of the cross-sectional observations measured in T of time periods, so the longitudinal data model is thus defined as:

$$\boldsymbol{y_{it} = B_{0(i)} + \sum_{i=1}^{k} B_j X_{j(it)} + \varepsilon_{it} \quad , i = 1, 2, \dots, N \quad t = 1, 2, \dots, T \dots\dots (1)}$$

3.2.2 Study analysis tests:

To analyze this study, we follow these steps:

A. Determine the appropriate model tests:

In order to find the appropriate model when using panel data we will use determination tests, as mentioned earlier, there are three main models of longitudinal models. On this basis, the question arises: Which model is most appropriate for a study's data?

To answer this question, we perform the following tests:

1. Chow Test

Chow test is a test to determine the model of whether Common Effect (CE) or Fixed Effect (FE) is most appropriately used in estimating panel data.

The hypotheses are as follows:

H0: The Pooled regression model is the appropriate model.

H1: The fixed effects model is appropriate.

The test shall be judged as follows:

If the calculated value of LM is greater than the value of Chi-squared, we reject the null hypothesis and support the alternative hypothesis, It can also be judged by McKinnon, If P value is less than 5%, we reject the null hypothesis.

2. Lagrange multiplier test:

This test was proposed by Breusch and Pagan (1980), and it follows Chi-squared distribution with one degree of freedom, This test is also based on Lagrange multiplier related to errors caused by OLS method, It given by the following relationship:

$$LM = \frac{nT}{2(T-1)}\, x \left(\frac{\sum_{t=1}^{n} (\sum_{t=1}^{T} \hat{u}_{it})^2}{\sum_{t=1}^{n} \sum_{t=1}^{T} \hat{u}_{it}^2} - 1 \right)^2 \rightarrow {x_1}^2$$

The hypotheses are as follows:

H0: The Pooled regression model is the appropriate model.

H1: The random effects model is appropriate.

The test shall be judged as follows:

If the calculated value of LM is greater than the value of Chi-squared (one degree of freedom), we reject the null hypothesis and support the alternative hypothesis, It can also be judged by McKinnon, If P value is less than 5%, we reject the null hypothesis.

3. Hausman Test (1978):

Hausman test is used in the case of a fundamental difference between fixed and random effects, the extent to which the individual effect is correlated with independent variables, so the null hypothesis is based on the absence of that correlation, and then both the static and random effects estimators are consistent, but the random effects estimator is the most efficient, and follows Chi-squared distribution with K degree of freedom.

Hausman test is given by the following relationship:

$$W = (\hat{b}_{lsdv} - \beta_{GLS})[Var(\hat{b}_{lsdv}) - Var(\hat{\beta}_{GLS})]^{-1}(\hat{b}_{lsdv} - \hat{\beta}_{GLS})$$

Where $(\hat{b}_{lsdv} - \hat{\beta}_{GLS})$ is difference between fixed and random effects estimators, and $Var(\hat{b}_{lsdv}) - Var(\hat{\beta}_{GLS})$ is difference between the covariance matrix of both fixed and random effects estimators.

The hypotheses are as follows:

H0: The random effects model is appropriate.

H1: The fixed effects model is appropriate.

The test shall be judged as follows:

If the calculated value is greater than the value of Chi-squared (K), we reject the null hypothesis and support the alternative hypothesis, It can also be judged by McKinnon, If P value is less than 5%, we reject the null hypothesis.

The current study relied on the results of Hausman Test (1978) to determine which of the previous models is the best.

B. Estimation of Cross-Sectional Time Series Models:

After we have identified the relationship between the independent variable and the dependent variable, the estimation is made using longitudinal data models:

- **Pooled regression model (PRM)**

This is one of the simplest longitudinal data models where all transactions B_i and $B_0(i)$ are constant for all time periods, by rewriting the model in equation (1), we get pooled regression model, it's written in the following form:

$$\boldsymbol{y_{it} = B_0 + \sum_{i=1}^{k} B_j X_{j(it)} + \varepsilon_{it} \quad , i = 1, 2, \dots, N \quad t = 1, 2, \dots, T \dots \dots (2)}$$

Where $E(\varepsilon_{it}) = 0$, $var(\varepsilon_{it}) = \sigma_\varepsilon^2$, the Ordinary least squares (OLS) is used to estimate model parameters in the equation.

- **Fixed Effects Model (FEM)**

Its purpose is to know the behavior of each cross-sectional data set by making the parameter B_0 vary from one group to another with the slope coefficients B_i remaining constant for each cross-sectional dataset, and therefore the Fixed Effects model is the following formula:

$$y_{it} = B_{0(i)} + \sum_{i=1}^{k} B_j X_{j(it)} + \varepsilon_{it} \quad , i = 1, 2, \dots, N \quad t = 1, 2, \dots, T \dots\dots (3)$$

Where $E(\varepsilon_{it}) = 0$, $var(\varepsilon_{it}) = \sigma_\varepsilon^2$.

Fixed effects mean that parameter B_0 for each cross-sectional dataset does not change over time, but is the only change in the cross-sectional data sets for the purpose of estimating the model parameters in the equation (3) and allowing parameter B_0 to change between cross-sectional datasets usually use dummy variables in order to avoid Multicollinearity and then use Ordinary Least Squares (OLS) to estimate the model.

Fixed Effects Model is also called Least Squares Dummy Variable Model, and after adding Dummy Variables D in the equation (3), the model becomes as following:

$$y_{it} = a_1 + \sum_{d=2}^{N} a_d D_d + \sum_{i=1}^{k} B_j X_{j(it)} + \varepsilon_{it} \quad , i = 1, 2, \dots, N \quad t = 1, 2, \dots, T \dots (4)$$

Where $a_1 + \sum_{d=2}^{N} a_d D_d$ is the change in cross-sectional datasets of Parameter B, the model as following:

$$y_{it} = \sum_{d=1}^{N} a_d D_d + \sum_{i=1}^{k} B_j X_{j(it)} + \varepsilon_{it} \quad , i = 1, 2, \dots, N \quad t = 1, 2, \dots, T \dots (5)$$

- **Random Effects Model (REM).**

In Random effects model, the error term ε_{it} has a normal distribution with a mean of zero and a variation equal to ($\sigma\varepsilon^2$), in order for the random effects model parameters to be correct and unbiased, it is usually assumed that the error variance is constant for all cross sectional observations and that there is no Autocorrelation during time between each group of cross sectional observations in a given time period.

The random effects model is appropriate in the case of a defect in one of the assumptions described above

In the random effects model, the parameter $B_{0(i)}$ will be treated as a random variable with average μ:

$$B_{0(i)} = \mu + V_i \quad , i = 1, 2, \dots, N \quad \dots\dots (6)$$

By substituting equation (5) in equation (2), we get the random effects model as following form:

$$y_{it} = \mu + V_i + \sum_{i=1}^{k} B_j X_{j(it)} + \varepsilon_{it} \quad , i = 1, 2, \dots, N \quad t = 1, 2, \dots, T \dots\dots (7)$$

Since V_i is error term in the cross-sectional data set i, Random Effects Model is sometimes called Error Components Model, because the model in equation (6) contains two error components ε_{it} and Vi, Random Effects Model Mathematical has properties such $E(\varepsilon_{it}) = 0$, $var(\varepsilon_{it}) = \sigma\varepsilon^2$.

Let us have the following compounded error term:

$Wit = Vi + \varepsilon_{it}$

Where $E(W_{it}) = 0$, $var(W_{it}) = \sigma_v^2 + \sigma_\varepsilon^2$

Ordinary least squares (OLS) fails to estimate the parameters of Random Effects Model because it gives inefficient estimators and has incorrect standard errors which affects the parameter test since the common variance between Wit and Wis is not equal to zero, Which: $t \neq 0$, cov (W_{it} , W_{is}) = $\sigma v^2 \neq 0$.

To correctly estimate the parameters of this model, Generalized Least Squares (GLS) is used.

3.3. Empirical results:

3.3.1. Descriptive statistics

Table (1) shows some descriptive statistics about the dataset used, organized by country.

Tunisia clearly displays the lowest average FDI inflows among the countries under examination for the period 2005-2020 accompanied by the lowest GDP. The low level of foreign direct investment and tourism owing to political uncertainty placed the Tunisian economy under further foreign exchange constraints in 2013.

FDI inflows in Egypt are quite volatile (display the highest standard deviation) due to economic and political crises after 2011.

Table (1): Descriptive statistics:

	FDI				GDP			
	Egypt	**Morocco**	**Tunisia**	**Algeria**	**Egypt**	**Morocco**	**Tunisia**	**Algeria**
Mean	6901	2513.5	1368.813	1602.688	309115.2	90881.5	40259.4	152042.1
Std deviation	2833.1	749.5542	694.5713	771.7999	79137.3	19600.0	20528.2	16964.2
Max	11578	3561	2759	2746	412246.0	112681.9	126495.3	177004.3
Min	483	783	652	-585	309115.2	90881.5	40259.4	152042.1

Designed by the researcher based on the outputs of E-Views

All of the analysis are done using Eviews 10. Pooled regression model, random effects and fixed effects are run before performing Hausman test. Hausman test indicates which model is more suitable.

3.3.2. Pooled Regression Model (PRM)

Table (2): Pooled Model based on the E-Views 10 program

Dependent Variable: FDI
Method: Panel Least Squares
Date: 01/18/22 Time: 12:00
Sample: 2005 2020
Periods included: 16
Cross-sections included: 4
Total panel (balanced) observations: 64

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	408.1224	399.4362	1.021746	0.3109
GDP	0.018156	0.002196	8.266184	0.0000

R-squared	0.524284	Mean dependent var	3096.500
Adjusted R-squared	0.516611	S.D. dependent var	2668.341
S.E. of regression	1855.196	Akaike info criterion	17.92012
Sum squared resid	2.13E+08	Schwarz criterion	17.98758
Log likelihood	-571.4438	Hannan-Quinn criter.	17.94670
F-statistic	68.32979	Durbin-Watson stat	1.787912
Prob(F-statistic)	0.000000		

The pooled model shows that the variable of market size has a positive coefficient and is statistically significant toward FDI inflows.

The value of R^2 is 0.52 and adjusted R^2 is 0.51, it shows that the variable used in the estimation has accounted for more than 52% of the variance of FDI inflows.

3.3.3. Fixed Effect Least Squares Dummy Variable Model (LSDV)

Table (3): Fixed Effect Model based on the E-Views 10 program

Dependent Variable: FDI
Method: Panel Least Squares
Date: 01/18/22 Time: 12:02
Sample: 2005 2020
Periods included: 16
Cross-sections included: 4
Total panel (balanced) observations: 64

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	208.1541	395.0126	0.526955	0.6007
GDP	0.019506	0.002190	8.908567	0.0000

Effects Specification

Period fixed (dummy variables)

R-squared	0.658567	Mean dependent var	3096.500
Adjusted R-squared	0.542335	S.D. dependent var	2668.341
S.E. of regression	1805.159	Akaike info criterion	18.05720
Sum squared resid	1.53E+08	Schwarz criterion	18.63065
Log likelihood	-560.8304	Hannan-Quinn criter.	18.28311
F-statistic	5.665948	Durbin-Watson stat	1.975432
Prob(F-statistic)	0.000002		

The fixed effect model shows that the variable of market size has a positive coefficient and is statistically significant toward FDI inflows.

The value of R^2 is 0.65 and adjusted R^2 is 0.54, it shows that the variable used in the estimation has accounted for more than 65.8% of the variance of FDI inflows.

3.3.4. Random Effect Model

Table (4): Random Effect Model based on the E-Views 10 program

Dependent Variable: FDI
Method: Panel EGLS (Period random effects)
Date: 01/18/22 Time: 12:03
Sample: 2005 2020
Periods included: 16
Cross-sections included: 4
Total panel (balanced) observations: 64
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	408.1224	388.6629	1.050068	0.2978
GDP	0.018156	0.002137	8.495314	0.0000

Effects Specification	S.D.	Rho
Period random	0.000000	0.0000
Idiosyncratic random	1805.159	1.0000

Weighted Statistics			
R-squared	0.524284	Mean dependent var	3096.500
Adjusted R-squared	0.516611	S.D. dependent var	2668.341
S.E. of regression	1855.196	Sum squared resid	2.13E+08
F-statistic	68.32979	Durbin-Watson stat	1.98873
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.524284	Mean dependent var	3096.500
Sum squared resid	2.13E+08	Durbin-Watson stat	198873.

The random effect model shows that the variable of market size has a positive coefficient and is statistically significant toward FDI inflows.

The value of R^2 is 0.52 and adjusted R^2 is 0.51, it shows that the variable used in the estimation has accounted for more than 52% of the variance of FDI inflows.

3.3.5. The comparison between fixed and random by Hausman Test

Table (5): Hausman Test results based on the E-Views 10 program

Correlated Random Effects - Hausman Test
Equation: Untitled
Test period random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	8.035840	1	0.0046

** WARNING: estimated period random effects variance is zero.

Period random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
GDP	0.019506	0.018156	0.000000	0.0046

4. Discussing the results:

In this study, the coefficient of market size was positive and significant, pointing to the better opportunities presented in large markets.

According to the results in table (5) which related to Husman test, as the probability value (P- value) smaller than 0.05, this means that there is a differences between random effect and Fixed effect in favor of fixed effect.

Because the fixed effects model is appropriate for the study, the analysis of the results of the fixed effects model is as follows:

1- The probability of the variable is significant, where the probability value for GDP variable is 0.000, which is less than the significant level of 0.05 (P-vale < 0.05).
2- The result of the constant term (C = 208.1541) refers to the common denominator between the state of the studied community, where it represents the estimated value of foreign investment when the GDP indicator is zero.
3- The positive sign of the GDP coefficient (GDP = 0.0195) indicates the direct relationship between foreign investment and GDP.
4- The coefficient of determining the value of R^2 is 0.6585, as the domestic gross domestic product explains foreign investment by 65.85%. It is a high percentage and fulfills the main hypothesis of the study.

Raeskyesa & Suryandaru (2020), Sodik et al. (2019), Olayemi & Temitope (2018), Asongu et al. (2018), Ranđelović et al. (2017), Nasir (2016), Gabriel et al. (2016), Economou & Hassapis (2015), Ho (2013), Kinyondo & Sichei (2012), Faustino & Leitão (2010), Aken (2009), Duanmu & Guney (2009), Demirhan & Masca (2008), Lim (2001), Chakrabarti (2001) also found that the size of the market has a significant positive impact on FDI.

The argument is that the host country's higher market size allows the investor to make more effective use of resources and take advantage of economies of scale.

5. Conclusion:

The objective of this study is to examine the relationship between a market size and the foreign direct investment inflow by employing annual panel data from four African countries from year 2005 to 2020. In order to choose the right model, we did the Hausman test which led us to use fixed effects as the best model in this study.

The study found positive and significant effect between market size and FDI inflows in the countries mentioned, this corresponds to the logic of economic theory. As higher GDP leads to larger market size, maintaining the momentum in GDP is necessary for these countries to attract FDI inflows.

Thus, the recommendation, from this study, is that for future FDI policy planning and implementation; the four countries governments has to consider developing policies to improve the market size, through the following actions:

1. Continued attention in creating the appropriate investment climate to attract foreign direct investment that provide the necessary financing for economic development in the mentioned countries that suffer from lack of domestic financing in general.
2. Revitalization of the economy and a higher rate of economic growth through appropriate macroeconomic policies will play an important role in increasing the size of the market and thus increasing the flow rates of foreign direct investment in mentioned countries.
3. Favourable tax treatment to attract foreign direct investment.
4. Establishing a mechanism to monitor remittances in order to preserve foreign exchange.

5. Calling for the expansion of business within the financial markets and the multiplicity of its products.
6. Promoting intra-African and international trade by eliminating constraints and improving market access.
7. Making economic agreements with major countries to invest in the mentioned countries.

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