BRICS JOURNAL OF ECONOMICS
DOI 10.3897/brics-econ.3.e83129
2022 Volume 3 Number 1

Determinants of FDI inflows to West Africa: Prospects for regional development and globalization

Ololade Mistura Aromasodun[1]

1 *Department of Economics and Development Studies, Kwara State University (Nigeria)*

Corresponding author: Ololade Mistura Aromasodun (meetmistura@gmail.com)

Academic editor: A. Panibratov | Received January 2022 | Accepted January 2022 | Published 16 May 2022

Citation: Aromasodun, O. M. (2022). Determinants of FDI inflows to West Africa: Prospects for regional development and globalization. *BRICS Journal of Economics, 3*(1), 27–51. https://doi.org/10.3897/brics-econ.3.e83129

Abstract

This paper examines the determinants of foreign direct investment (FDI) inflow into West Africa. FDI is regarded as the central engine for growth. Such inflows are not often satisfactory, both in terms of their volume and in terms of their sectoral distribution, particularly in developing countries. The study carried out a unit root test using the Im-Pesaran-shin (IPS) method, which revealed that four out of many variables were stationary at first difference, while other variables were stationary at level. Consequently, the Kao co-integration test methodology was used to analyze the long-run relationship. Thus, the regression analysis was carried out using the Panel ARDL method in an equation with a 50-year observation period. Concerning the remaining seven equations with shorter time series observations, the Pooled OLS estimation method was used to analyze the factors determining the inflow of FDI. The results indicate that financial development has a negative effect on FDI flows (and hence on globalization processes) in West Africa, while trade openness, institutional composite index and control of corruption have positive effects on FDI and hence increase globalization tendency. Based on these findings, the study recommends, among other things, that the authorities in West African countries vigorously pursue trade liberalization policy as an effort to globalize the region through FDI inflows. The study examined the macroeconomic determinants on FDI alongside institutional and socio-political determinants that are difficult to study in the case of West Africa as a region. The use of a composite institutional quality index, which combines multiple indicators of institutional quality, is another novelty of this research. Another unique contribution of the study is the use of the Africa

Infrastructure Development Index (AIDI), which serves as a composite infrastructure index, as an explanatory variable.

Keywords
Foreign direct investment, institutional FDI fitness, panel ARDL, pooled OLS, West Africa.

JEL: F21, F33, F45.

Introduction

Foreign investment is regarded as the central engine for growth. Attracting investment has become the main factor of industrial policy in many countries. Even countries that were formerly inaccessible to foreign investors, such as China, have acknowledged the economic benefits of foreign investment and opened their borders to it.

Regarding West Africa as an FDI recipient region, in 2018, FDI to the region declined by 15 percent to $9.6 billion, the lowest level since 2006. According to UNCTAD (2019), this was mostly owing to a significant decrease in the flow to Nigeria for the second year in a row. Nigeria's inward FDI dropped by 43% to $2 billion, and the country is no longer the largest recipient of FDI in West Africa. UNCTAD (2019) further reports that *Ghana* has become the largest FDI receiver in West Africa, despite FDI inflows falling by 8% to $3 billion (see Figure 1).

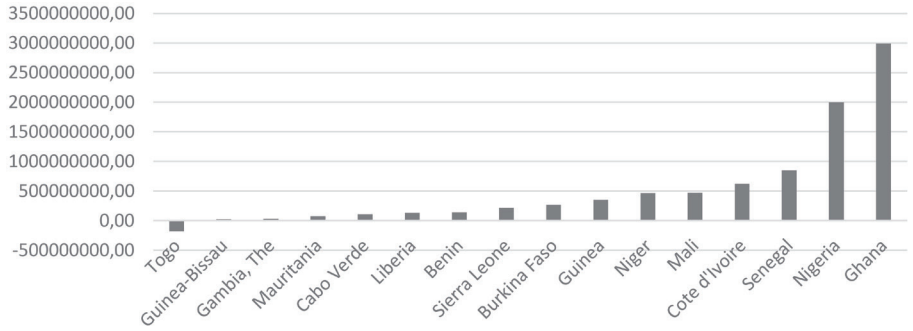

Figure 1. FDI Inflow to West Africa in 2018. *Source*: calculated by the author using data from World Bank Indicators (online database).

Regardless of collective initiatives at the regional and continental levels to improve the flow of FDI to West Africa, the task of attracting FDI that is consistent with individual countries' development goals remains in the hands of the governments, making it critical to identify the major determinants of FDI.

An attempt at assisting policymakers in this regard has been made through various theoretical and, especially, empirical studies on determinants of FDI as reviewed in the next section. However, as also discussed at the end of the next section, such studies at

the empirical level are bedevilled with several methodological gaps and pitfalls. One of the limitations of these studies is that they all test some predictions of their models in an ad hoc econometric model controlling for other possible determinants of FDI as GDP per capita, openness, size, etc.

Given this ad hoc formulation and the fact that they use different institutional variables, it is difficult to determine the source of the qualitative and quantitative differences in their results. It would be enlightening for policymakers to know to what extent macroeconomic factors determine FDI in West Africa. The extent to which socio-political factors determine FDI in West Africa has not been empirically tested. Lastly, there is also the need to shed light on the extent to which institutional factors determine the inflows of FDI in West Africa, for which we adopt the composite institutional quality index in this study since most papers in the literature consider only one aspect of a set of institutional factors.

The present study is an attempt directed at addressing all these issues, which the existing studies have failed to address. It examines the impact of macroeconomic determinants on FDI alongside institutional and socio-political determinants which is difficult to study in the case of West Africa as a region. The use of a composite institutional quality index, which combines multiple indicators of institutional quality, is another novelty of this research. Another unique contribution of this study is using the Africa Infrastructure Development Index (AIDI) as an explanatory variable that serves as a composite infrastructure index.

Literature review

The origins of FDI are not entirely clear. Although various schools of thought have been employed to explain this phenomenon, no superior or general explanation of FDI has emerged.

We can broadly divide theories into two categories: macroeconomic theories and microeconomic theories of FDI. However, for the sake of this study, the theories under review are limited only to macroeconomic ones.

1.1. Macroeconomic theories of foreign direct investment

Lipsey (2004) describes the macroeconomic view as a specific type of capital movement across national boundaries, from home nations to host countries, as reflected in balance-of-payments statistics. These flows generate a specific type of capital stock in host countries: the volume of the home country investment in organizations, generally businesses, controlled by a home-country owner or in which a home-country owner has a specified proportion of voting rights. Various macroeconomic theories are reviewed below.

Capital market theory, commonly known as the Currency Area Theory, is one of the first ideas to explain FDI. It is based on the work of Aliber (1970; 1971), who proposes

that foreign investment, in general, arose as a result of capital market inefficiencies. According to Aliber (1970; 1971), compared to stronger currencies, weaker currencies have a higher ability to attract FDI and are better equipped to take advantage of disparities in market capitalization rate.

Location-based approach to FDI theory. Although a firm's behavior (a microeconomic element) influences FDI location in terms of the motives for its location, whether it be the search for resources, markets, efficiency or strategic assets, the overall economic and geographical decision takes into consideration the macroeconomic decision because of its country-level features (Popovici & Calin, 2014). According to them, the theory explains the effectiveness of FDI among nations based on a country's natural resource endowment, labor availability, local market size, infrastructure, and government policy towards these national resources.

Institutional FDI fitness theory. The term "FDI fitness" was developed by Wilhelms and Witter (1998) and focuses on the capability of a nation to attract, absorb and retain FDI. This country can adapt to or fit in with its investors' internal and external expectations, which allows countries to leverage FDI inflows. The theory seeks to explain the uneven distribution of FDI flows among nations. Wilhelm's institutional FDI fitness thesis is built on four pillars: the government, market, educational and socio-cultural fitness.

1.2. Review of empirical studies

This section covers studies on the determinants of foreign direct investment outside Africa and then proceeds to review the evidence from Africa. The section concludes with a discussion of the gaps in the empirical studies that this paper aims to fill.

Empirical literature on countries outside Africa. In this category, there are a lot of studies but we limit the review to only recent ones, starting in the early 2000s, to focus on modern methodologies, including the latest datasets.

One of the earliest studies is a paper written by Campos & Kinoshita (2003), which estimated a panel data set for 25 transition economies between 1990 and 1998, using GMM and the fixed-effects method. After testing the impacts of market size, labor cost, natural resources and rule of law on FDI (FDI laws?), the study discovers that the primary drivers of inbound FDI are institutions, agglomeration, and trade openness. As a result, the study concludes that natural resources and infrastructure are important in the CIS nations, but agglomeration is important exclusively in Eastern European and the Baltic countries. However, the study employed limited variables in its analysis.

A further test on determinants of inward FDI was carried out by Cuadros et al. (2004), who employed quarterly data for Mexico, Brazil and Argentina, and the vector autoregressive model (VAR) was used to estimate the causal relationship between trade, inward FDI and output from the mid-1970s to 1997. Their empirical study has yielded conflicting findings. They discovered that trade and FDI complemented each other in Mexico, with causation going from FDI to exports. In contrast to this conclusion, their analysis indicated that trade and FDI had a substitute relationship in Brazil,

but there was no evidence of a causal link in Argentina. As a result, the study concludes that the trend of liberalization in developing nations has led to an expansion not only of trade, but also of FDI flows. However, as in the previous study, only adopt two independent variables were used in this analysis.

Unlike the previous study, which used VAR as an estimating approach, Marcelo and Mario (2004) used an econometric model based on panel data analysis. In order to shed light on FDI in developing nations, they analyzed 38 developing countries (including transition economies) from 1975 to 2000. One of the key results was that FDI is correlates with the level of education, the degree of openness of the economy, political risk and variables related to macroeconomic performance, such as inflation, and the average rate of economic growth. The findings also show that FDI is closely related to stock market performance, which leads to the conclusion that a large portion of direct investment in developing countries is directed to relatively knowledge-intensive activities and that policies aimed at increasing the level of education may induce these investments. In this study, only macroeconomic determinants of FDI were used as variables.

In another study using the Granger causality test on data for the period 1969–2000 for three countries (Chile, Malaysia, and Thailand), Chowdhury and Mavrotas (2006) found that GDP causes FDI in Chile, and not vice versa, while in the case of both Malaysia and Thailand, there is strong evidence of bi-directional causality between GDP and FDI. The data consisted of gross inflows of FDI and were taken from various issues of the *Global Development Finance.* According to the study's findings, knowing the direction of causation between the two variables is critical for creating policies that encourage private investment in developing nations. The results cast some doubt on the validity of policy guidelines emphasizing the significance of FDI for growth and stability in developing nations based on the assumption that FDI leads to growth.

Kumari & Sharma (2017) use the fixed effects method to examine the determinants of FDI in 20 developing countries from across South, East and South-East Asia from 1990 through 2012. Such variables as market size, trade openness, infrastructure, inflation, interest rate, research and development, and human capital were used in the estimation, and it was found that market size, trade openness, interest rate, and human capital had a significant effect on FDI. Like any other study, this work also has some limitations. It did not consider controlling variables such as corruption, political risk, rule of law and others.

Empirical literature on Africa. Several studies have been conducted on the determinants of FDI inflow in Africa. Again, this review also covers recent studies for the same reasons as stated above when reviewing the non-African countries.

Morisset (2000) is exclusively focused on Africa and explorea the availability of natural resources. Using panel data for 29 countries from 1990 to 1997, he shows that GDP growth rate and trade openness are positively and substantially linked with the investment climate in Africa. On the other hand, the main business climate drivers of FDI in the region are the illiteracy rate, the number of telephone lines, and the percentage of the urban population (the degree of agglomeration). In the regression equations, the coefficients of political and financial risks, as evaluated by the International Country Risk

Guide (ICRG) and International Investors (3.2) ratings, turned out to be insignificant. The use in this study of the number of telephone lines as a proxy for infrastructure is not accurate as it cannot be said that it reflects the whole effect of infrastructure on FDI.

The results obtained by Anyanwu and Erhijakpor (2004) using pooled Ordinary Least Squares (OLS) for 28 countries of Africa from 1976 to 1996 to determine the inflow of FDI and using such variables as credit to private sector, export processing zones, GDP growth rate, inflation, and financial depth indicate that telecommunications, infrastructure, economic growth and openness increase FDI inflows to Africa, while credit to the private sector, export processing zones, and capital gains tax have a negative effect. However, the adoption of pooled OLS as the estimating technique is inefficient as pooled OLS do not account for unobservable time effects and individual differences.

Using a panel of 69 countries between 1981 and 2005, Ali et al. (2006) analyze the impact of institutions on predicting FDI inflows using such factors as GDP, trade, and national risk indicators. According to the study, 12 institutions are strong predictors of total FDI, and the most important institutional characteristics are related to property rights, the rule of law, and expropriation risk, particularly in the services and manufacturing sectors. According to the analysis, institutional development appears to be as essential as macroeconomic stability, and improved institutions appear to matter even more than infrastructure upgrades or tax cuts. However, the data set lacks such a variable as openness, and the use of the telephone mainline as a proxy for infrastructure is also limited.

Using the same estimation technique as in the previous study by Ali et al. (2006), Asiedu (2006) examines the effects of corruption, rule of law, openness, and inflation on FDI inflows in 22 countries of Sub-Saharan Africa (SSA) from 1984 to 2000 using a fixed-effect panel data. He finds that nations endowed with natural resources or big markets attract more FDI. Furthermore, the report notes that strong infrastructure, an educated labor force, macroeconomic stability, openness to FDI, an effective legal system, less corruption, and political stability — all this encourage inward FDI. The study also shows that FDI in SSA is not entirely driven by external forces and that small and/or resource-poor nations may attract FDI by strengthening their institutions and policy environment. Only two institutional variables are adopted in this study, and the use of the telephone mainline as a proxy for infrastructure is also limited.

Gholami et al. (2006) analyze the influence of such factors as GDP, ICT, and openness on FDI inflows in a sample of 23 industrialized and developing countries observed from 1976 to 1999 using the Least Squares Dummy Variables (LSDV) regression analysis technique. According to the study, the existing ICT infrastructure attracts FDI, and higher levels of ICT investment lead to larger levels of FDI inflows in developed nations, while in developing countries, the direction of causation is shifting from FDI to ICT. The study does not consider some other determinants of FDI, such as institutional variables.

Using a different estimation technique compared to that of Gholami et al. (2006), Moosa and Cardak (2006) conducted an extreme bound analysis of a sample of cross-

sectional data on 18 MENA countries presented by UNCTAD (2002) using such variables as real GDP growth rate, export, energy use per capita, and country risk indicators to determine their impacts on FDI. The analysis discovered that export as a proportion of GDP proved to be a reliable predictor of FDI inflows. According to the findings, nations that were more effective in attracting FDI included those with rising economies, a focus on education and research, minimal national risk, and a good return on capital. The use of telephone lines per 1000 inhabitants as a proxy for infrastructure does not capture the effect of infrastructure on FDI, as expected, and variables such as openness, financial development were also not considered.

Another study on FDI conducted by Musila and Sigue (2006) uses the autoregressive distributed lag (ARDL) method to examine the impact of market size, labor cost, openness, taxes and tariffs, and political instability on FDI and discovers that sound macroeconomic stability and infrastructure development are needed to attract large volumes of FDI, likewise, it is necessary to establish and maintain strong political and macroeconomic stability and an investment-friendly policy environment. Variables such as GDP and real GDP per capita are not considered in the study.

Dupasquier and Osakwe (2006) researched FDI performance using OLS as a method of estimation, utilizing such variables as per capita GDP, percentage of exports in GDP, and telephone lines. The research concludes that the realization of Africa's FDI potentials will be contingent on its leaders' ability to improve the FDI climate and take advantage of the increased global interest in the region's affairs through solid macroeconomic policies and expansion of infrastructure. However, the adoption of OLS as the estimating technique is inefficient as OLS does not account for unobservable time effects and individual differences, and the use of telephone lines for developing the infrastructure will not give the expected effect.

Daude and Stein (2007) use OLS and variables such as GDP per capita and institutional factors to investigate the relevance of a wide variety of institutional characteristics as predictors of FDI placement and discover that better institutions have a positive influence on FDI. The unpredictability of laws, rules, and policies, as well as an excessive regulatory burden, political instability, and a lack of commitment, all play a significant role in discouraging FDI. Although corruption has a detrimental effect on FDI, it depends on an accurate indicator for measuring this institutional component. However, the adoption of OLS as the estimating technology is inefficient as OLS does not account for unobservable time effects and individual differences.

A study carried out by Sekkat and Veganzones-Varoudakis (2007) used fixed and random effects panel data regression equation methods to examine the impact of such variables as GDP, per capita income, and openness on FDI. The equation was estimated from 1990 to 1999 for 36 MENA countries. Their findings suggest that infrastructure availability, openness, and a stable economic and political situation are critical for luring FDI to South Asia, Africa, and the Middle East. Improvements in other aspects of the investment climate are an important complement to liberalization and can increase FDI inflows. The period adopted in the study is small and cannot account for long-term effects.

In addition, Cleeve (2008) uses data on 16 SSA countries, employing a time-wise autoregressive model to examine the impacts of several variables, such as tax holiday, labor quality, infrastructure, GDP growth, GDP per capita, and exchange rate on FDI. According to the report, tax reliefs are essential in attracting foreign investment to Africa, in addition to conventional factors and government policies. Attracting FDI has become the industrial strategy of choice for many SSA nations, with fiscal incentives employed as a competitive tool. The study concludes that financial incentives may be beneficial, but they must be selective in terms of investment motive, the investment source, and the type of project. The study adopts the telephone mainline as a measure of infrastructure; however, this does not give the expected effect.

Hailu (2010) utilized the cross-section fixed effect Least Square Dummy Variable (LSDV) estimate approach to perform an empirical study of the demand-side drivers of FDI influx to African states due to data heterogeneity, non-continuity, and because the Hausman test supports it. According to the study, natural resources, labor quality, trade openness, market access, and infrastructure condition all favorably impact FDI inflows, while stock market availability has no effect. As a result, to attract FDI, African nations should implement a capital allocation system with clear and transparent norms and regulations. They should not, however, exercise undue control over capital account transactions, such as currency rate restrictions and/or foreign ownership. The use of fixed-line and mobile phone subscribers (per 100 people) as a measure of infrastructure does not capture the effect of infrastructure on FDI.

Musonera et al. (2010) conducted a research for the East African Community bloc based on the institutional FDI fitness model, utilizing Kenya, Tanzania, and Uganda as samples from 1995 to 2007. They discovered that FDI inflows to Tanzania and Uganda had been predicted by more than one national risk factor. Population size, economy size, financial market development, trade openness, infrastructure, and other economic, financial, and political risks are all significant variables. The study also refuted the notion that natural resources attracted foreign direct investment to Africa. Tanzania and Uganda, both resource-poor nations, were able to attract FDI on the premise that their governments met three requirements: macroeconomic and political stability, introduction of an effective regulatory framework, and elimination of corruption. The use of telephone communication as a measure of infrastructure does not capture the effect of infrastructure on FDI.

Using a panel dataset for the period from 1970 to 2010, Anyanwu & Nadege (2015) attempted to establish the determinants of FDI inflows to West Africa. The estimations were made using the OLS and GMM methods. The main findings show that: (i) the quadratic element of real per capita GDP, domestic investment, trade openness, first-year lag of FDI, natural resource endowment and exports, and monetary integration all have positive effects on FDI inflows to West Africa; and (ii) there is a negative relationship between FDI inflows to the sub-region and the loan component of ODA, economic growth, and monetary integration. The use of dummy variables to represent oil-exporting countries does not capture the expected effect of natural resources on FDI.

Shah (2016) found that better infrastructure, liberalized investment, and trade regimes have a significant effect on FDI inflows to African developing countries over the period 1990–2015. He used the fixed effects method to estimate data sets such as infrastructure availability, market size, trade liberalization, and economic development. Also, the size of the host market positively affected inward FDI. However, the study did not consider variables such as inflation, which is the determining factor of FDI.

1.3. Gaps in empirical research that this study intends to fill

A large body of empirical literature has been generated to study the determinants of FDI. However, there are few studies on FDI determinants in the context of West Africa as a sub-region. The majority of the previous FDI studies have focused on either Sub-Saharan Africa, Africa as a whole, or a single nation. In addition, there are varying conclusions from existing research on the topic owing to the fact that each studied region has different prevailing economic conditions.

There is a limited amount of research concerning institutional and socio-political determinants of FDI in West African countries. In addition, there is a need for a study based on more recent data to update the existing findings that were based on outdated data sets. The present study meets this need.

The use of a composite institutional quality index, which combines multiple indicators of institutional quality, is another novelty of our research. The majority of the articles in the literature focus on just one or a few institutional variables. In the literature, however, it is suggested that institutional variables are significantly linked to one another (Globerman & Shapiro, 2002). As a result, we use Principal Component Analysis to create a composite index by integrating multiple characteristics of institutions into one component (PCA).

Another unique contribution of the study is the use of the Africa Infrastructure Development Index (AIDI) as an explanatory variable, which serves as a composite infrastructure index. The AIDI data set comprises transport composite index, electricity composite index, ICT composite index, and water supply and sanitation (WSS) composite index.

Methodology

2.1. Theoretical framework

The Institutional FDI Fitness Theory developed by Wilhems and Witter (1998) is adopted for this study. The words "FDI fitness" refer to a country's ability to attract, absorb, and retain FDI by responding quickly to threats and opportunities, as well as by being creative and flexible in carving out a niche in which it can compete. According to this

theory, nations with high institutional fitness get more FDI than countries with low institutional fitness.

2.2. Model specification

A panel data-based regression model to test for the actual effects of the postulated determinants of FDI is presented in Equation 1 below. Equation 1 shows that FDI is a function of control variables without the inclusion of institutional indicators. It will be estimated using a data set dating back to 1970, as it does not include governance indicators whose data set commences from 1996.

In subsequent equations, each of the afore-mentioned seven governance indicators is added, one at a time, to the benchmark Equation 1. They are included one at a time, instead of two or more featuring simultaneously in an equation, to avoid multicollinearity problems in view of the fact that they are highly inter-correlated. By including these governance indicators, the resulting equations can only be estimated with post-1995 (instead of post-1969) data, as a series of governance indicators start from 1996, with each of the seven governance indicators appearing in an equation.

$$FDI_{it} = \beta_0 + \beta_1 GRGDP_{it} + \beta_2 OPN_{it} + \beta_3 RGDPPC_{it} + \beta_4 INF_{it} + \\ + \beta_5 INFRA_{it} + \beta_6 URBANPOP_{it} + \beta_7 FD_{it} + \beta_8 POL_{it} + \beta_9 NAT_{it} + \varepsilon_{it}, \quad (1)$$

$$FDI_{it} = \beta_0 + \beta_1 GRGDP_{it} + \beta_2 OPN_{it} + \beta_3 RGDPPC_{it} + \beta_4 INF_{it} + \beta_5 INFRA_{it} + \\ + \beta_6 URBANPOP_{it} + \beta_7 FD_{it} + \beta_8 POL_{it} + \beta_9 NAT_{it} + \beta_{10} GOV_{it} + \varepsilon_{it}, \quad (2)$$

$$FDI_{it} = \beta_0 + \beta_1 GRGDP_{it} + \beta_2 OPN_{it} + \beta_3 RGDPPC_{it} + \beta_4 INF_{it} + \beta_5 INFRA_{it} + \\ + \beta_6 URBANPOP_{it} + \beta_7 FD_{it} + \beta_8 POL_{it} + \beta_9 NAT_{it} + \beta_{10} ROL_{it} + \varepsilon_{it}, \quad (3)$$

$$FDI_{it} = \beta_0 + \beta_1 GRGDP_{it} + \beta_2 OPN_{it} + \beta_3 RGDPPC_{it} + \beta_4 INF_{it} + \beta_5 INFRA_{it} + \\ + \beta_6 URBANPOP_{it} + \beta_7 FD_{it} + \beta_8 POL_{it} + \beta_9 NAT_{it} + \beta_{10} VAC_{it} + \varepsilon_{it}, \quad (4)$$

$$FDI_{it} = \beta_0 + \beta_1 GRGDP_{it} + \beta_2 OPN_{it} + \beta_3 RGDPPC_{it} + \beta_4 INF_{it} + \beta_5 INFRA_{it} + \\ + \beta_6 URBANPOP_{it} + \beta_7 FD_{it} + \beta_8 POL_{it} + \beta_9 NAT_{it} + \beta_{10} CORR_{it} + \varepsilon_{it}, \quad (5)$$

$$FDI_{it} = \beta_0 + \beta_1 GRGDP_{it} + \beta_2 OPN_{it} + \beta_3 RGDPPC_{it} + \beta_4 INF_{it} + \beta_5 INFRA_{it} + \\ + \beta_6 URBANPOP_{it} + \beta_7 FD_{it} + \beta_8 POL_{it} + \beta_9 NAT_{it} + \beta_{10} REGQ_{it} + \varepsilon_{it}, \quad (6)$$

$$FDI_{it} = \beta_0 + \beta_1 GRGDP_{it} + \beta_2 OPN_{it} + \beta_3 RGDPPC_{it} + \beta_4 INF_{it} + \beta_5 INFRA_{it} + \\ + \beta_6 URBANPOP_{it} + \beta_7 FD_{it} + \beta_8 POL_{it} + \beta_9 NAT_{it} + \beta_{10} NOVIO_{it} + \varepsilon_{it,} \quad (7)$$

$$FDI_{it} = \beta_0 + \beta_1 GRGDP_{it} + \beta_2 OPN_{it} + \beta_3 RGDPPC_{it} + \beta_4 INF_{it} + \beta_5 INFRA_{it} + \\ + \beta_6 URBANPOP_{it} + \beta_7 FD_{it} + \beta_8 POL_{it} + \beta_9 NAT_{it} + \beta_{10} GOVTEFF_{it} + \varepsilon_{it}, \quad (8)$$

where: FDI — foreign direct investment, FD — financial development, GRGDP — growth rate of gross domestic product, RGDPPC — real income per capita, URBANPOP — urban population, OPN — trade openness, INF — inflation, INFRA — infrastructure, GOV — institutional variables, POL — political rights, NAT — natural resource, NOVIO — absence of violence, REGQ — regulatory quality, GOVTEFF — government effectiveness, VAC — voice and accountability, CORR — control of corruption, ROL — rule of law.

2.3. Methods of analysis

The basic features of the variables are highlighted based on the results of the descriptive and correlation analyses of policy makers. The main inferential analyses is carried out in the form of a unit root and co-integration test to properly address the time-series features of the data and provide a guide on the methods of estimating the regression equation to be adopted. The study conducts autocorrelation, heteroskedasticity, multicollinearity, normality of distribution of the residuals and stability tests and adopts remedial measures when a test shows there is a problem to ensure that the results obtained lead to reliable conclusions.

2.4. Data coverage, measurement and sources

The study covers 16 West African countries (Benin, Burkina Faso, Cape Verde, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, and Togo) from 1970 to 2019. The choice of West Africa is due to the fact that limited research was carried out on the region, while the period is chosen based on the availability of data from 1970 onward and also because 2019 is the most recent year of data available at the time of this study.

Foreign direct investment is computed as the % of GDP, the growth rate of real GDP is calculated as the first difference of annual GDP expressed as a percentage of real GDP in the preceding year. The urban population is computed as a percentage of the total population. Gross domestic product per capita is expressed as purchasing power parity, constant for 2010, calculated in US dollars. Trade openness index is computed as total trade, % of GDP, while financial development is expressed as domestic credit to the private sector, % of GDP. The inflation rate is measured in annual percent. The political right is measured in index.

INFRA is an infrastructure composite index that is proxied by Africa Infrastructure Development Index (AIDI). The AIDI data sets comprise of transport composite index, electricity composite index, ICT composite index, and water supply and sanitation (WSS) composite index.

GOV is a composite institutional quality index that combines (through the use of the Principal Component Analysis method) 6 indicators of institutional variables: absence of violence/terrorism, regulatory quality, government effectiveness, voice and accountability, control of corruption, and the rule of law.

The data is obtained from the World Bank database (online), except POL that was obtained from Freedom House.

3. Results and discussion

This section presents and discusses the results of the various analyses conducted in the study. These include descriptive analysis results, unit root results, multicollinearity test, heteroscedasticity test, autocorrelation test, normality test, and the Panel ARDL regression results.

Starting with the descriptive analysis, Table 1 shows the statistics summarizing the values and the distributions of the variables.

Table 1. Descriptive statistics

Variable	Unit of Measurement	Observations	Mean	Median	Standard Deviation	Coefficient of Variation	Min	Max
FDI	% of GDP	470	3.67	1.71	8.83	5.16	–11.64	103
FD	Domestic credit to private sector % of GDP	449	14.56	12.31	11.47	0.93	0.4	65.74
GRGDP	Annual %	468	4.07	4.38	4.81	1.10	–30.15	26.42
RGDPPC	Constant 2010 US Dollars	470	2561	2144	1369	0.64	931	7171
URBANPOP	% of the total population	480	39.11	39.72	11.16	0.28	13.81	66.19
OPN	Total trade % of GDP	468	64.91	58.76	31.07	0.53	20.72	311.35
INF	Annual	427	7.41	4.36	10.96	2.51	–7.8	72.84
INFRA	AIDI Index	176	16.58	14.46	9.30	0.64	3.65	50.43
GOV	Institution Composite Index	335	–0.00	–0.15	1.00	–6.67	–2.13	3.09
POL	An index ranging between 1 and 7	480	4.13	4.00	1.80	0.45	1	7
NAT	Total natural resources	455	228	228	131	0.58	1	455
REGQ	An index ranging between –2.5 and +2.5	336	–0.62	–0.57	0.40	–0.70	–2.02	0.34
NOVIO	An index ranging between –2.5 and +2.5	336	–0.51	–0.35	0.82	–2.34	–2.44	1.22
GOVTEFF	An index ranging between –2.5 and +2.5	335	–0.78	–0.80	0.47	–0.59	–1.88	0.37
CORR	An index ranging between –2.5 and +2.5	336	–0.61	–0.69	0.52	–0.75	–1.7	1.14
ROL	An index ranging between –2.5 and +2.5	336	–0.67	–0.67	0.55	–0.82	–2.01	1.04
VAC	An index ranging between –2.5 and +2.5	336	–0.39	–0.37	0.60	–1.62	–1.55	1.00

Sources: calculated by the author using STATA 14.0.

The mean and median of the variables both measure the central tendency. The result from Table 1 indicates that both the mean and median are not affected by outliers as the values of mean and median for each of the variables are not too far apart.

A higher standard deviation value indicates a greater spread in the data. The standard deviation for RGDPPC is about 1369, which is the sole highest of all the variables in the study. The coefficient of variation is the standard deviation divided by the mean. The lower the value of the coefficient of variation, the less spread and less volatile are the data points. The coefficient of variation for FDI is 5.16, which is the highest of all coefficients for the variables covered in the study.

The minimum is the smallest data value, while the maximum is the largest data value. Comparing both minimum and maximum values for all variables in Table 1 to identify a possible outlier or data value error shows that the variables are free from data error because the result of the minimum and maximum for each of the variables in Table 1 is not far from the observed mean for the variables.

Table 2. Results of the ADF Unit Root tests

	Stationary	T-Statistic	P-values	Order of Integration	Conclusion
FDI	At Level	–4.065	0.000	I(0)	Stationary or I(0)
FD	At Level	1.408	0.920	I(1)	Unit root I(1)
	At First Difference	–8.815	0.000	I(0)	
GRGDP	At Level	–7.052	0.000	I(0)	Stationary or I(0)
RGDPPC	At Level	5.295	1.000	I(1)	Unit root I(1)
	At First Difference	–7.234	0.000	I(0)	
URBANPOP	At Level	6.576	1.000	I(1)	Unit root I(1)
	At First Difference	–4.379	0.000	I(0)	
OPN	At Level	–1.206	0.113	I(1)	Unit root I(1)
	At First Difference	–11.027	0.000	I(0)	
INF	At Level	–7.410	0.000	I(0)	Stationary or I(0)
INFRA	At Level	–2.520	0.005	I(0)	Stationary or I(0)
POL	At Level	–1.598	0.054	I(0)	Stationary or I(0)
NAT	At Level	–6.627	0.000	I(0)	Stationary or I(0)

Note: The decision rule is to reject the null hypothesis that a variable has a unit root if the p-value is less than the chosen 5% significance level.

Source: calculated by the author using STATA 14.0.

As seen from Table 2 above and following the aforementioned decision rule, the results reveal some variables to be stationary at level at the chosen 5% significance level, while others are stationary only at first difference. This means that the variables have a mixture of I(0) and I(1) series, and it also implies that the use of Kao co-integration test methodology is the suitable one to test for the long-run co-integration.

3.2. Panel co-integration test

The Kao co-integration test methodology is used to check for the long-run relationship of the dependent variables with their independent variables. The result of the test shows that the t-statistic value is -3.465 with a probability value of 0.0003, which is less than 0.05 significance level in Equation 1. Hence, the null hypothesis is rejected and it is concluded that there is a long-run relationship between the dependent and independent variables. This implies that the Panel ARDL method will be used to estimate both short-run and long-run relationships in Equation 1.

3.3. Presentation of the estimate

To present and analyze the estimates of Equations 1 to 8 concerning the determinants of FDI in West Africa, two tables of the estimates are first presented. This is followed by an evaluation of the diagnostic statistics and a discussion of the performance of each explanatory variable.

Table 3. Panel ARDL estimates of the regression equations

	Equation 1 (Long Run)								
	PMG			MG			DFE		
Variables	Coefficient	Z-Statisticst	P-value	Coefficient	Z-Statisticst	P-value	Coefficient	Z-Statisticst	P-value
GRGDP	0.045	2.03	0.042	0.341	1.46	0.145	0.271	2.45	0.014
OPN	0.011	1.49	0.137	–0.001	–0.04	0.972	–0.072	–3.17	0.002
RGDPPC	0.001	2.76	0.006	–0.014	–1.12	0.264	0.000	0.15	0.882
INF	–0.010	–0.82	0.412	–1.791	–1.03	0.304	0.000	0.01	0.996
INFRA	0.019	1.91	0.056	0.116	4.25	0.000	0.077	1.10	0.270
Hausman (P-value)						0.179			0.898
R2	0.296								
F(P-value)	0.000								
No of Countries	16			16			16		
No of Observation	693			693			693		

	Equation 1 (Long Run)								
	PMG			MG			DFE		
Variables	Coefficient	Z-Statisticst	P-value	Coefficient	Z-Statisticst	P-value	Coefficient	Z-Statisticst	P-value
URBANPOP	–0.001	–0.02	0.981	–6.811	–1.13	0.259	–0.080	–0.56	0.572
FD	0.001	0.05	0.958	2.841	1.03	0.305	0.068	1.03	0.301
POL	–0.498	–2.42	0.015	18.086	0.92	0.358	–1.320	–1.01	0.310
NAT	–0.002	–1.56	0.118	0.028	0.94	0.347	–0.014	–1.26	0.208
INFRA	0.023	0.95	0.343	2.546	1.12	0.264	0.022	0.16	0.870
Hausman (P-value)						0.962			0.997
R2	0.296								
F(P-value)	0.000								
No of Countries	16			16			16		
No of Observation	693			693			693		

Notes: The decision rule is to reject PMG if the p-value is less than 0.05 significant level. The decision rule of the parameter estimate is to reject its significance if its corresponding *p-value* is greater than 005.

Source: calculated by the author using STATA 14.0.

Table 4. OLS estimates of the regression equations

	Equation 2			Equation 3			Equation 4			Equation 5			Equation 6			Equation 7			Equation 8		
Variables	**Coefficient**	**Z-Statisticst**	**P-value**	**Coefficient**	**Z-Statisticst**	**P-value**	**Coefficient**	**Z-Statisticst**	**P-value**	**Coefficient**	**Z-Statisticst**	**P-value**	**Coefficient**	**Z-Statisticst**	**P-value**	**Coefficient**	**Z-Statisticst**	**P-value**	**Coefficient**	**Z-Statisticst**	**P-value**
FD	–0.315	–2.26	0.024	–0.268	–1.92	0.055	–0.258	–1.86	0.062	–0.315	–2.26	0.024	–0.256	–1.86	0.063	–0.311	–2.24	0.027	–0.271	–1.93	0.053
GRGDP	0.276	1.06	0.296	0.267	1.00	0.319	0.269	1.00	0.316	0.276	1.04	0.296	0.309	1.15	0.250	0.194	0.71	0.480	0.274	1.02	0.306
RGDPPC	–0.001	–0.76	0.447	–0.001	–0.77	0.444	–0.001	–0.78	0.434	–0.001	–0.76	0.447	–0.001	–0.68	0.499	–0.001	–1.61	0.109	–0.001	–0.55	0.579
URBANPOP	0.271	1.67	0.096	0.189	1.19	0.236	0.180	1.10	0.273	0.271	1.67	0.096	0.145	0.93	0.354	0.215	1.32	0.188	0.133	0.79	0.432
OPN	0.231	3.78	0.000	0.256	4.21	0.000	0.252	4.11	0.000	0.231	3.78	0.000	0.240	3.90	0.000	0.276	4.44	0.000	0.255	4.19	0.000
INF	–0.096	–0.38	0.702	–0.147	–0.58	0.565	–1.166	–0.65	0.513	–0.096	–0.38	0.702	–0.214	–0.85	0.397	–0.348	–1.31	0.194	–0.209	–0.81	0.419
INFRA	–0.482	1.74	0.082	–0.260	–0.98	0.325	–0.210	–0.84	0.400	–0.481	–1.74	0.082	–0.108	–0.43	0.665	0.093	0.35	0.730	–0.115	–0.41	0.679
POL	–0.748	0.88	0.377	–1.429	–1.63	0.103	–1.495	–1.01	0.311	–0.748	–0.88	0.377	–2.100	–2.78	0.006	–2.708	–3.17	0.002	–1.978	–2.41	0.016
NAT	0.054	0.31	0.757	0.209	0.18	0.861	0.035	0.20	0.841	0.053	0.31	0.757	0.025	0.14	0.887	0.053	0.29	0.776	0.015	0.08	0.933
GOV	4.344	1.99	0.047	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
ROL	–	–	–	–2.459	–0.56	0.576	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
VAC	–	–	–	–	–	–	0.821	0.18	0.859	–	–	–	–	–	–	–	–	–	–	–	–
CORR	–	–	–	–	–	–	–	–	–	8.542	1.99	0.047	–	–	–	–	–	–	–	–	–
REGQ	–	–	–	–	–	–	–	–	–	–	–	–	–5.100	–1.25	0.212	–	–	–	–	–	–
NOVIO	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–4.163	–1.92	0.057	–	–	–
GOVTEFF	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–2.673	–0.58	0.560

Table 4. Continued

	Equation 2			Equation 3			Equation 4			Equation 5			Equation 6			Equation 7			Equation 8		
Variables	**Coefficient**	**Z-Statisticst**	**P-value**	**Coefficient**	**Z-Statisticst**	**P-value**	**Coefficient**	**Z-Statisticst**	**P-value**	**Coefficient**	**Z-Statisticst**	**P-value**	**Coefficient**	**Z-Statisticst**	**P-value**	**Coefficient**	**Z-Statisticst**	**P-value**	**Coefficient**	**Z-Statisticst**	**P-value**
Hausman (P-Value)	–	–	0.854	–	–	0.772	–	–	0.645	–	–	0.854	–	–	0.581	–	–	1.000	–	–	0.507
LM (P-Value)	–	–	1.000	–	–	1.000	–	–	1.000	–	–	1.000	–	–	1.000	–	–	1.000	–	–	1.000
F-Wald (P-Value)	–	–	0.000	–	–	0.000	–	–	0.000	–	–	0.000	–	–	0.000	–	–	0.000	–	–	0.000
Overall R-squared	0.316	–	–	0.298	–	–	0.297	–	–	0.316	–	–	0.304	–	–	0.299	–	–	0.298	–	–
No of Countries	16	–	–	16	–	–	16	–	–	16	–	–	16	–	–	16	–	–	16	–	–
No of Observation	153	–	–	153	–	–	153	–	–	153	–	–	153	–	–	153	–	–	153	–	–

Note: NOVIO — absence of violence, REGQ — regulatory quality, GOVTEFF — government effectiveness, VAC — voice and accountability, CORR — control of corruption, ROL — rule of law. The decision rule is to reject the probability test if the F-statistic value is greater than 0.05. The decision rule of the Hausman test is to reject fixed effect if the probability value is greater than 0.05. The decision rule of the LM test is to reject random effect if the probability is greater than 0.05. The decision rule of the parameter estimate is to reject its significance if its corresponding p-value is greater than 005.

Source: calculated by the author using STATA 14.0.

a) Statistic for the model explanatory power and R^2 values in the test: The R^2 is 0.297 in Equation 1. The R^2 is 0.316, 0.298, 0.297, 0.316, 0.304, 0.299 and 0.298 in the Equations 2 to 8, respectively, and their respective F-statistic's p-values are 0.000 in each case. Thus, these F-statistic values are statistically significant at the chosen 5% critical level. This also means that the models have fairly good fits.

b) Statistics for choosing the best estimator: From Table 3 above, regarding the test statistics for choosing between the mean group (MG) and pooled mean group (PMG), as well as between dynamic fixed effect (DFE) and PMG methods of panel ARDL estimation, the p-values of the Hausman test statistics in both cases are 0.999 and 0.987, respectively. These F-statistics are statistically significant and it implies that Pooled Mean Group is more appropriate than either of the Mean Group and Dynamic Fixed Effect estimation methods. Accordingly, the discussion of the results below is based solely on the PMG results.

Concerning the test statistics for choosing between the pooled OLS, fixed and random effects methods of panel data estimation, the Hausman test results show that we do not reject the null hypothesis that RE is preferred to FE in Equations 2 to 8 because the p-values are greater than 0.05 level of significance in all cases, being 0.936, 0.851, 0.780, 0.897, 0.214, 0.317 and 0.539. Further testing using the Breusch-Pagan LM method confirms that Pooled OLS is more appropriate than either of Fixed Effects and Random Effects estimation methods in Equations 2 to 8 as the test reports a probability value of 1.000, which, in essence, leads to the rejection of the LM test and confirms pooled OLS as the most suitable method. Accordingly, the evaluation of the results carried out below is based only on the Pooled OLS result for Equation 2 to 8.

c) Multicollinearity test: A multicollinearity test is conducted using the Variance Inflation Factor (VIF) test, and based on the result, there is no high multicollinearity in all 8 Equations as the VIF of all variables is less than 10. Thus, the hypothesis of the absence of multicollinearity in each of the equations is accepted.

d) Heteroscedasticity test: For each of the equations, viz: Equations 1 to 8, White's Test statistic for heteroscedasticity produces a p-value which is less than the chosen significance level at 0.05, except in Equation 8 where the *p-value* is higher than 0.05. This shows that the null hypothesis of constant variance is rejected in Equations 1 to 7. The results, therefore, indicate that there is heteroscedasticity in the residuals of Equations 1 to 7. To correct this in the affected seven equations, the standard errors are adjusted using White's Heteroscedasticity-Corrected Variances and Standard Errors.

e) Test for non-normality of the distribution of the residuals: The Jacque Bera test statistic's p-value is 0 in each of the models, viz: Equations 1 to 8, which means that the test statistics are significant at a 5% significance level. So, the study fails to reject the null hypothesis of normally distributed error terms, which leads to the conclusion that the residuals are normally distributed.

f) Autocorrelation test: A model is devoid of autocorrelation if the F-statistic of the Wooldridge autocorrelation test is higher than the one corresponding to a 5% level of significance. The reported P-value of the F-statistic is greater than the 0.05 critical significance level for each of Equations 1 to 3 and Equations 5 to 8, while it is less than

0.05 in Equation 4. Thus, the study rejects the null hypothesis of the absence of autocorrelation only in Equation 4 and concludes that there is autocorrelation there, since the probability value is less than 0.05. To correct for this observed autocorrelation, the robust fixed effect regression estimation method was used.

After evaluating the overall diagnostic statistics of the equation, we now proceed to examine the performance of each of the explanatory variables based on three 'S' — size, sign, and statistical significance.

a) Financial development (FD): In Equation 1, the coefficient of FD is 0.001 with a *p-value* of 0.958, while in Equations 2 to 8, the coefficients are -0.315, -0.268, -0.258, -0.315, -0.256, -0.311 and -0.271, respectively, with respective p-values of 0.024, 0.055, 0.062, 0.024, 0.063, 0.027 and 0.053, implying that the positive coefficient is statistically insignificant in the first equation and the negative coefficients are either statistically significant or very close to being statistically significant at the chosen 5% level in the last seven equations. Thus, on the whole, and since most of the coefficients are negative, it can be concluded that financial development in West Africa has a negative effect on FDI inflows. It is also contrary to the findings that are commonly reported in the empirical literature, including the study conducted by Anyanwu & Erhijakpor (2004), among others. The unexpected nil effect of financial development might be due to the fact that the effects of the combination of political and economic environments in these countries overwhelm and diminish other considerations, including financial development, in the eyes of the investors.

b) Growth rate of GDP (GRGDP): In Equation 1, the coefficient of GRGDP is 0.045 with a *p-value* of 0.042, while in the Equations 2 to 8, the coefficients are 0.276, 0.267, 0.269, 0.276, 0.309, 0.194 and 0.274, respectively, with respective *p-values* of 0.296, 0.319, 0.316, 0.296, 0.250, 0.480 and 0.390, implying that the coefficients are positive and statistically significant in the first equation and statistically insignificant at the chosen 5% level in the last seven equations. It is therefore concluded that the GDP growth rate does not affect FDI inflows to the region. It is also contrary to the findings that are commonly reported in the empirical literature, including the study conducted by Jensen (2003) and Anyanwu & Yameogo (2015), among others. A possible explanation of this unexpected nil effect of the growth rate of GDP is that investors are looking beyond the income level of these countries to allocate the investible resources.

c) Real GDP per capita (RGDPPC): In Equation 1, the coefficient of RGDPPC is 0.001 with a *p-value* of 0.006, while in Equations 2 to 8, the coefficients are –0.001 in each case, with respective *p-values* of 0.447, 0.444, 0.434, 0.447, 0.499, 0.100 and 0.579, implying that the positive coefficient is statistically significant in the first equation and the negative coefficients are statistically insignificant at the chosen 5% level in the last seven equations. It is therefore concluded that real GDP per capita does not affect FDI. This is also contrary to the findings reported by several previous studies, such as Zejan (1990) and Alsan et al. (2006), where it is reported that real GDP per capita has a positive impact on FDI inflows. A possible explanation of this unexpected nil effect of real GDP per capita is that investors are looking beyond the income level of these countries to allocate the investible resources.

d) Urban population (URBANPOP): In Equation 1, the coefficient of URBANPOP is -0.001 with a *p-value* of 0.981, while in the Equations 2 to 8, the coefficients are 0.271, 0.189, 0.180, 0.271, 0.145, 0.215 and 0.133 with respective *p-values* of 0.096, 0.236, 0.273, 0.096, 0.354, 0.188 and 0.432, implying that the negative coefficient is statistically insignificant in the first equation and the positive coefficients are statistically insignificant at the chosen 5% level in the last seven equations. It is therefore concluded that urban population does not affect FDI. This does not correspond to the findings of Fan et al. (2009) and Root and Ahmed (1979) where it is reported that the urban population has a positive effect on FDI inflows. This can be explained by the same reason adduced in the previous Paragraph (a) that the effects of the combination of political and economic environments of these countries overwhelm and diminish other considerations, including financial development, in the eyes of the portfolio investors.

e) Trade openness (OPN): In Equation 1, the coefficient of the OPN is 0.011 with a *p-value* of 0.137, while in Equations 2 to 8, the coefficients are 0.231, 0.256, 0.252, 0.231, 0.240, 0.276, and 0.255 with respective *p-values* of 0.000 in each case, implying that the positive coefficients is statistically insignificant in the first equation and statistically significant at the chosen 5% level in the last seven equations. It is therefore concluded that trade openness has a positive effect on FDI. It is also in line with the findings commonly reported in the empirical literature, including the study conducted by Neumayor and Spess (2005) and Taylor and Sarno (1997), among others.

f) Inflation (INF): In the Equation 1, the coefficient of the INF is -0.019 with a p-value of 0.056, while in the Equations 2 to 8, the coefficients are -0.096, -0.147, -1.166, -0.096, -0.214, -0.348 and -0.209, with respective *p-values* of 0.702, 0.565, 0.513, 0.702, 0.397, 0.194 and 0.419, implying that the negative coefficients are statistically insignificant at the chosen 5% level in all eight equations. It is therefore concluded that inflation does not affect FDI. It is also contrary to the findings that are commonly reported in the empirical literature, including the study conducted by De Mello (1997), among others. This can be explained by the same reason adduced in the previous Paragraph (a) that the effects of the combination of political and economic environments of these countries overwhelm and diminish other considerations, including financial development, in the eyes of the portfolio investors.

g) Infrastructure (INFRA): In Equation 1, the coefficients of the INFRA are 0.019 and 0.023 with *p-values* of 0.056 and 0.343, respectively, while in Equations 2 to 8, the coefficients are -0.482, -0.260, -0.210, -0.481, -0.108, 0.093 and -0.115 with respective *p-values* of 0.082, 0.325, 0.400, 0.082, 0.665, 0.730 and 0.679, implying that the positive coefficients are statistically insignificant in the first equation and the negative coefficients are statistically insignificant at the chosen 5% level in the last seven equations. Since all the coefficients of infrastructure are insignificant, it is therefore concluded that infrastructure does not affect FDI. This result also contradicts the evidence reported in several previous empirical studies, including Asiedu (2002) and Loree and Guisisnger (1995), wherein infrastructure has a positive effect on FDI. This can be explained by the same reason adduced in the previous Paragraph (a) that the effects of the combination of political and economic environments of these countries overwhelm and diminish

other considerations, including financial development, in the eyes of the portfolio investors.

h) Political rights (POL): In the Equation 1, the coefficient of the POL is -0.498 with a p-value of 0.015, while in the Equations 2 to 8, the coefficients are -0.748, -1.429, -1.495, -0.748, -2.100, -2.708 and -1.978 with respective p-values of 0.377, 0.103, 0.311, 0.372, 0.006, 0.002, 0.016, implying that the coefficients are negative and either statistically significant (Equations 1 and 6 to 8) or statistically insignificant (Equations 2 to 5) at the chosen 5% level. It is therefore concluded that there is no robust evidence concerning the effect of this factor, since the evidence based on Equation 1 contradicts that based on the estimates of Equations 6 to 8. It is also contrary to the findings that are commonly reported in the empirical literature, including the study conducted by Dutta and Osei-Yeboah (2013) and Busse (2004), among others. This can be explained by the same reason adduced in the previous Paragraph that the effects of the combination of political and economic environments of these countries overwhelm and diminish other considerations, including financial development, in the eyes of the portfolio investors.

i) Natural resources (NAT): In Equation 1, the coefficient of the NAT is -0.002 with a p-value of 0.118, while in Equations 2 to 8, the coefficients are 0.058, 0.209, 0.035, 0.053, 0025, 0.053, and 0.015 with respective *p-values* of 0.757, 0.861, 0.841, 0.757, 0.887, 0.776 and 0.933, implying that the negative coefficient is statistically insignificant in the first equation and the positive coefficients are statistically insignificant at the chosen 5% level in the last seven equations. It is therefore concluded that natural resource does not affect FDI. This result also contradicts the evidence reported in several previous empirical studies, including Dupasquier and Osakwe (2006) and Asiedu, (2002) wherein it is reported that natural resources have a positive effect on FDI flow. This can be explained by the same reason adduced in the previous Paragraph that the effects of the combination of political and economic environments of these countries overwhelm and diminish other considerations, including financial development, in the eyes of the portfolio investors.

j) Governance indicators (GOV): In Equation 2, the coefficient of the GOV is 4.344 with a p-value of 0.047, implying that the coefficient is positive and statistically significant at the chosen 5% level. Since the coefficient of governance indicators is significant, it is therefore concluded that governance indicators have a positive effect on FDI.

k) Rule of law (ROL): In Equation 3, the coefficient of the ROL is -2.459 with a p-value of 0.576, implying that the coefficient is negative and statistically insignificant at the chosen 5% level. It is therefore concluded that the rule of law does not affect FDI.

l) Voice and accountability (VAC): In Equation 4, the coefficient of the VAC is 0.821 with a *p-value* of 0.859, implying that the coefficient is positive and statistically insignificant at the chosen 5% level. It is therefore concluded that voice and accountability do not affect FDI.

m) Control of corruption (CORR): In Equation 5, the coefficient of the CORR is 8.542 with a *p-value* of 0.047, implying that the coefficient is positive and statistically significant at the chosen 5% level. It is therefore concluded that control of corruption affects FDI.

n) Regulatory quality (REGQ): In Equation 6, the coefficient of the REGQ is -5.100 with a p-value of 0.212, implying that the coefficient is negative and statistically insignificant at the chosen 5% level. It is therefore concluded that regulatory quality does not affect FDI.

o) Absence of violence (NOVIO): In Equation 7, the coefficient of the NOVIO is -4.163 with a *p-value* of 0.057, implying that the coefficient is negative and statistically insignificant at the chosen 5% level. It is therefore concluded that the absence of violence does not affect FDI.

p) Government effectiveness (GOVTEFF): In Equation 8, the coefficient of the GOVTEFF is -2.673 with a *p-value* of 0.560, implying that the coefficient is negative and statistically insignificant at the chosen 5% level. It is therefore concluded that government effectiveness does not affect FDI.

5. Conclusion and recommendations

Based on the above methodology, the main findings and conclusions relevant to each finding are as follows:

- The coefficients of financial development are negative in all cases, some of them are statistically significant and others insignificant, giving the overall impression that financial development has a negative effect on FDI flows to West Africa, which, in turn, slows down globalization processes in the region.
- In all cases, the coefficients of the growth rate of GDP, though positive, are statistically insignificant in all equations, implying that GDP growth rate does not affect FDI flows to West Africa, which accelerates globalization processes in the region.
- The coefficients of real GDP per capita are negative but statistically insignificant, implying that real GDP per capita does not affect FDI flows to the region.
- The coefficients of the urban population are positive but statistically insignificant, implying that the urban population does not affect FDI flows.
- In all cases, the coefficients of trade openness are positive and statistically significant, implying that trade openness has a positive effect on FDI flows to West Africa.
- The coefficients of inflation, though negative, is statistically insignificant, implying that inflation does not affect FDI flows.
- The coefficients of infrastructure are statistically insignificant in all cases, implying that infrastructure does not affect FDI flows to the region.
- The coefficients of political rights are negative, some of them are significant and others insignificant, implying that there is no robust evidence concerning their effect on FDI flows to West Africa.
- The coefficients of natural resources are positive but statistically insignificant, implying that natural resources do not affect FDI flows.

- The coefficient of composite governance indicator and that of one component of it, which is the extent of control on corruption, are both positive and statistically significant, implying the existence of their expected positive effects on FDI flows to West Africa, which potentially increases globalization processes in the region. On the other hand, the coefficients of the other five components, which are the rule of law, absence of violence, voice and accountability, regulatory quality, and government effectiveness, are all statistically insignificant, implying that their impact on FDI flows is not noticeable.

From the foregoing it can be concluded that the evaluation of the factors that determine foreign direct investment and influence globalization processes in West Africa did not yield all the expected results. It is revealed that financial development has a negative effect on FDI flows, while trade openness, governance indicators, as well as control of corruption, have a positive effect on FDI flows to the region.

Based on the findings of this study, as highlighted above, the following policy recommendations are made.

Based on the conclusion that FDI correlates negatively with financial development, West African nations should enhance the quality (including integration into global financial markets) of domestic financing systems to make their economies more attractive for MNCs to invest in them.

The positive effect of trade openness on FDI shows that West African countries should vigorously pursue trade liberalization policy as a potent and deliberate effort to attract FDI inflows, albeit in a way that does not interfere with the development of the domestic economy.

Authorities should also boost high-quality anti-corruption mechanisms to accelerate the globalization process through inbound FDI due to the positive effect of control of corruption on FDI, as well as the composite governance institution index.

References

Ali, F., Fiess, N., & MacDonald, R. (2006). Do institutions matter for foreign direct investment? *Open Economies Review*, *21*(2), 201–219.

Aliber, R. Z. (1970). A theory of direct foreign investment. In C.P. Kindleberger (Ed.), *The International Corporation, MIT Press* (pp. 17–34).

Aliber, R. Z. (1971). The multinational enterprise in a multiple currency world. In J. Dunning (Ed.), *The Multinational Enterprise* (pp. 49–56).

Alsan, M., Bloom, D. E., & Canning, D. (2006). The effect of population health on foreign direct investment inflows to low- and middle-income countries. *World Development, 34*, 613–630.

Anyanwu, J. C., & Erhijakpor, A. E. O. (2004). Trends and determinants of foreign direct investment in Africa. *West African Journal of Monetary and Economic Integration*, Second Half, 21–44.

Anyanwu, J. C., & Nagede, Y. (2015). What drives foreign direct investments into West Africa? An empirical investigation. *African Development Review, 27*(3), 199–215.

Asiedu, E. (2002). On the determinants of foreign direct investment to developing countries: Is Africa different? *World Development*, *30*(1), 107–119.

Asiedu, E. (2006). Foreign direct investment in Africa: The role of natural resources, market size, government policy, institutions, and political instability. *World Economy, 29*, 63–77.

Busse, M. (2004). Transnational corporations and repression of political rights and civil liberties: An empirical analysis. *Kyklos, 57*, 45–66.

Campos, N. F., & Kinoshita, Y. (2003). *Why does FDI go where it goes?: New evidence from the transition economies.* IMF Working Paper, WP/03/228.

Chowdhury, A., & Mavrotas, G. (2006). FDI and growth: What causes what? *World Economy*, *29*(1), 9–19.

Cleeve, E. (2008). How effective are fiscal incentives to attract FDI to Sub-Saharan Africa? *The Journal of Developing Areas*, *42*(1), 135–153.

Cuadros, A., Orts, V., & Alguacil, M. T. (2004). Openness and growth: Re-examining foreign direct investment, trade and output linkages in Latin America. *Journal of Development Studies*, *40*(4), 167–192.

Daude, C., & Stein, E. O. (2007). The quality of institutions and foreign direct investment. *Economics and Politics*. *19*(3), 317–344.

De Mello Jr, L. R. (1997). Foreign direct investment in developing countries and growth: A selective survey. *The Journal of Development Studies*, *34*(1), 1–34.

Dupasquier, C., & Osakwe, O. N. (2006). Foreign direct investment in Africa: Performance, challenges, and responsibilities. *Journal of Asian Economics*, *17*, 241–260.

Dutta, N., & Osei-Yeboah, K. (2010). Foreign direct investment and human capital: The role of political and civil rights. *Journal of International Development*. http://ssrn.com/abstract=1263038

Fan, J. P. H., Morck, R., Xu, L. C., & Yeung, B. (2009). Institutions and foreign direct investment: China versus the rest of the world. *World Development, 37*(4), 852–865.

Hailu, Z. A. (2010). Demand-side factors affecting the inflow of foreign direct investment to African countries: Does capital market matter. *International Journal of Business and Management*, *5*(5), 104–116.

Jensen, N. (2003). *Global corporations and domestic governance: The political economy of foreign direct investment.* Yale University.

Kumari, R., & Sharma, A. K (2017). Determinants of foreign direct investment in developing countries: A panel data study. *International Journal of Emerging Markets, 12*(4), 658–682.

Loree, D. W., & Guisinger, S. (1995). Policy and nonpolicy determinants of U.S. equity foreign direct investment. *Journal of Business Studies*, *26*, 281– 299.

Moosa, I. A., & Cardak, B. A. (2006). The determinants of foreign direct investment: An extreme bounds analysis. *Journal of Multinational Financial Management*, *16*(2), 199–211.

Morisset, J. (2000). Foreign direct investment in Africa: Policies matter. *Transnational Corporation, 9*(2), 107–125.

Musila, J. W., & Sigue, S. P. (2006). Accelerating foreign direct investment flow to Africa: From policy statements to successful strategies. *Managerial Finance, 32*(7), 577–593.

Musonera, E., Nyamulinda, I. B., & Karuranga, G. E. (2010). FDI fitness in Sub-Saharan Africa-The case of Eastern African Community (EAC*). Journal of International Business Research and Practice*, *4*(1).

Neumayer, E., & Spess, L. (2005). Do bilateral investment treaties increase foreign direct investment to developing countries. *World Development*, *33*, 1567–1585.

Popovici, O. C., & Călin, A. C. (2014). FDI Theories. A Location-Based Approach. *Romanian Economic Journal*, *17*(53), 3–24.

Root, F., & Ahmed, A. (1979). Empirical determinants of manufacturing direct foreign investment in developing countries. *Economic Development and Cultural Change*, *27*, 751–767.

Sekkat, K., & Veganzones-Varoudakis, M. A. (2007). Openness, investment climate, and FDI in developing countries. *Review of Development Economics*, *11*(4), 607–620.

Shah, M. H. (2016). The effect of macroeconomic stability on inward FDI in African developing countries. *International Journal of Business Studies Review*, *1*(1).

Taylor, M. P., & Sarno, L. (1997). Capital flows to developing countries: long- and short-term determinants. *The World Bank Economic Review, 11*(3), 451–470.

UNCTAD. (2019). *World Investment Report.*

Wheeler, D., & Mody, A. (1992). International investment location decisions: the case of US firms. *Journal of International Economics*, *33*, 57–76.

Wilhelms, S. K., & Witter, M. S. D. (1998). *Foreign direct investment and its determinants in emerging economies.* United States Agency for International Development, Bureau for Africa, Office of Sustainable Development.

Zejan, M. (1990). New ventures or acquisitions: The choice of Swedish multinational enterprises. *Journal of Industrial Economics, 38,* 349–355.