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Political Instability and Foreign Direct Investment in PALOP countries

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Abstract

According to several authors, Foreign Direct Investment (FDI) is vital for economic growth, being particularly crucial for the development of regions strongly marked by poverty. Since developing countries are also characterized by environments of political instability, how much does this impact on the attractiveness of FDI inflows?

The purpose of this dissertation is to study the determinants of FDI (inflows), focusing on the relationship between political instability and FDI in Africa and, more specifically, in African Countries of Portuguese Official Language (PALOP) countries.

In the literature, there are several references studying the links between political instability and FDI. Indeed, there are very different approaches, using alternative variables and yielding very different results, although the majority converging to a negative impact from political instability to FDI. In order to answer the question posed above, this research aims to establishing the mechanisms linking political instability and FDI in these countries and reviewing the main results found for Africa. Moreover, since the literature about FDI in PALOP countries is scarce, the objective is to bring new insights to the subject by making an empirical assessment of FDI determinants for the particular case of the PALOP countries (Angola, Cape Verde, Guinea-Bissau, Mozambique, Sao Tome and Principe, Equatorial Guinea), focusing on the role of political instability in raising FDI. A detailed, panel data based analysis for the relationship between political instability and FDI in PALOP countries, is a novelty in the literature.

Keywords: Foreign direct investment, political instability, Africa, PALOP.

JEL Codes: C23, E02, F21

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Abbreviations

Angola (ANG)

Cape Verde (CPV)

Guinea-Bissau (GNB)

Equatorial Guinea (GNQ)

Mozambique (MOZ)

Sao Tome and Principe (STP),

Foreign direct investment (FDI)

International Country Risk Guide (ICRG)

Multinational Enterprises (MNEs)

OLI-Model or OLI-Framework (Ownership, Location, Internalization)

Portuguese-speaking African countries (PALOP)

Sub-Saharan Africa (SSA)

World Investment Report (WIR)

World Governance Indictors (WGI)

Political Stability and Absence of Violence/Terrorism (PSAVT)

Control of corruption (Control.of.Corruption)

Trade Openness (Trade.Openess)

Growth Rate (Growth.Rate)

Total Gross Domestic Product (Total.GDP)

Total Population (T.Population)

GDP per capita (GDP.Per.Capita)

Inflation Consumer Price Index (Inflation.CPI)

Access to Electricity (Access.to.electricity)

Education Expenditure (Education.expenditure)

Natural Resources (Natural.resources)

1. Introduction

The importance of Foreign Direct Investment FDI nowadays and it's roll in enhancing growth all over the word, especially in developing economies, fostered several literatures about FDI, is determinants and impacts.

Although this many literature, the impact of political instability on FDI, and especially in PALOP[1] countries, are an underdeveloped theme. A natural question emerges from this evidence: Does political instability affect FDI inflows, particularly for developing African countries?

According to the UNCTAD (2015) the PALOP countries are a low-income region, struggling with high poverty rate; FDI is crucial as it promotes sustainable growth and welfare emphasizing the importance of understanding his deters. Additionally, the report on doing business published by the WorldBank (2015) shows that political instability is among the top three greatest constraints faced by companies when investing in Africa. The report also shows the increasing degradation of foreign direct investment in the recent years.

Therefore, we intend to contribute to the literature with a detailed analysis of the impact of political instability in FDI; moreover, we will try to assess how relevant this relation is in the PALOP countries, using a panel data methodology (also known as longitudinal or cross sectional time-series data), a dataset in which the behavior of entities (in our case, countries) are observed across time: accounting for individual heterogeneity and including variables at different levels of analysis.

Overviewing the literature on the determinants of FDI in Africa and, in particular, the mechanisms though which political instability affects FDI in chapter 2 of this dissertation, and in order to investigate our main research question, we present in chapter 3 and 4 the empirical methodology, variables and data sources as to estimate the role of political instability on attracting FDI to PALOP countries.

Our main result points to a negative and significant relation between FDI in PALOP countries and political instability (measured by Control of corruption); every time political

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[1] PALOP is a Portuguese abbreviation for the Portuguese-speaking African countries, including Angola, Cape Verde, Guinea Bissau, Mozambique and Sao Tome and Principe. Although it does not formally belong to the PALOP countries, we also consider Equatorial Guinea given that, since 2014, is a full member of CPLP – Community of Portuguese Language Countries.

instability grows, FDI decreases corroborating the initial premises of this study. To conclude, we extract some inferences and establish avenues for future research.

2. Literature review

This section intends to review the literature on the determinants of Foreign Direct Investment (FDI), particularly focusing on the role of political instability as a crucial determinant in limiting FDI inflows to developing economies. After presenting the main determinants of FDI, with emphasis on FDI inflows to developing economies, we will thus detail the main mechanisms through which political instability affects FDI inflows. Given that our analysis will focus the PALOP countries, we will present some evidence on the determinants of FDI specifically for the African region, and briefly analyze records on FDI and political instability trends in those PALOP countries.

The key concepts involved are those of FDI and of political instability. According to UNCTAD (2007, p. 4), FDI is defined as *"(…) an investment involving a long-term relationship and reflecting a lasting interest and control by a resident entity in one economy (foreign direct investor or parent enterprise) in an enterprise resident in an economy other than that of the foreign direct investor (FDI enterprise, affiliate enterprise or foreign affiliate). FDI implies that the investor exerts a significant degree of influence on the management of the enterprise resident in the other economy. Such investment involves both the initial transaction between the two entities and all subsequent transactions between them and among foreign affiliates, both incorporated and unincorporated. FDI may be undertaken by individuals as well as business entities"*. We will focus on the determinants of FDI inflows as we want to measure the most attracting factors for the host-country economy.

Political instability has no homogeneous definition in the literature. It may refer to poor protection of property rights (*e.g.*, Bénassy-Quéré, Coupet, and Mayer (2007)), to frequent turnover of governments (*e.g.*, Carmignani (2003)), to lack of protection against criminal actions or frequent riots Alesina and Perotti (1996), or, for example, corruption and crime Gilroy (2004). Some of generally used measures to capture overall political instability are the World Governance Indicators (WGI)[2] and the International Country Risk Guide (ICRG)[3]. This last indicator aggregate indicators of six broad dimensions of governance: i) Voice and Accountability; ii) Political Stability and Absence of Violence/Terrorism; iii) Government Effectiveness; iv) Regulatory Quality; v) Rule of Law; and vi) Control of Corruption. Therefore, given its diversity and completeness, this indicator is the reference

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[2] http://info.worldbank.org/governance/wgi/#home.
[3] https://www.prsgroup.com/

for political instability that we will use in this dissertation. Considering our study, we are going to focus in two dimensions of this indicator, Political Stability and Control of Corruption.

2.1. Determinants of FDI inflows – which are the factors of attraction or discouragement for investors?

Dunning (1988, 2000) stated that firms invest internationally for three reasons: ownership, location and internalization (OLI). The OLI framework is considered the paradigm of the international trade theories concerning the decision of multinational enterprises (MNEs) to invest in other countries.

Ownership advantages are related to assets or processes that firm possess which provide some advantage over the existing firms in the foreign markets. These advantages can be tangible, for example patents, design or others; or can be intangible like a brand or organization efficiency. MNEs invest in other countries to explore these firm-specific advantages in other markets so they can enhance the chances of success.

Firms can also invest in other markets motivated by location advantages related with transportation costs, for example, when exports involve very high costs to be profitable. It can also be related with the type of product or service which needs to be provided on site, or even related with government incentives or restrictions to FDI. It may also be related with particular conditions of the host country like natural resources endowment or labor costs.

Internalization advantages are the most complex ones: they reflect motivations for a firm choosing to produce in a foreign market instead of licensing for example, while exploring the core competencies of a firm Dunning (1988); Dunning and Archer (1987).

The precise configuration of the OLI parameters will vary according to the firm's origin-country and to the host-country, as well as the reason to proceed with FDI.

Dunning (2000) identifies four types of activities performed by MNEs that can justify foreign investment: i) market-seeking, when is demand oriented; ii) efficiency-seeking, when firms seek to be more competitive or more specialized; iii) resource-seeking, related with natural resources or specific labor skills; iv) strategic asset-seeking, related with firm specific ownership advantages (*e.g.*, organizational structure).

MNEs will have advantages in locating their production where can benefit from value added by investing in a foreign country. Traditional determinants of FDI, like demand factors (*e.g.*, market size, proximity to the local market), economic growth or infrastructures, are important, but nontraditional factors like political factors (*e.g.*, exchange rate controls, repatriation of profits, corruption, legal aspects) are crucial for a complete analysis of the foreign country where to invest Biswas (2002). By affecting investment's profitability, political instability is a very important variable in the decision of investing abroad. For a great number of authors, political instability discourages investment and reduces economic growth (*e.g.*, Alesina, Özler, Roubini, and Swagel (1996)).

Using OLI framework, countries will have country-specific factors that will attract or deter FDI Inflows. Many authors mention that the main reasons for FDI attraction in these countries are related with natural resources seeking, unskilled and low-paid labor or even the market size, therefore location advantages Asiedu (2006). Moreover, according to the WorldBank (2015), political instability is among the top three greatest constraints faced by companies when investing in Africa being, therefore, an additional determinant to be considered. Given our research question, in the next sections we will focus on the FDI determinants with a specific relevance for African countries, and particularly on the relation between political instability and FDI inflows.

2.2. Summary of the empirical studies about the determinants of FDI in African countries

The literature presents some discrepancy regarding variables that are considered to explain FDI patterns worldwide. The objective of this section is to summarize some empirical studies of FDI determinants in Africa, to clarify which are the most relevant and, thus, should be considered in this dissertation.

2.2.1 Empirical Evidence

Asiedu (2002) uses data from 71 developing countries, many of them in Sub-Saharan Africa (SSA), during the years of 1988-97, to analyze whether the determinants of FDI are equally relevant in SSA countries and in developing countries. The author concludes that the determinants of FDI in Africa are different from the determinants in developed countries,

so policies actions applied in other non-African regions may not have the same result in Africa. The variables considered in this study cover the return on investment, trade openness and infrastructure development. Good infrastructures and high marginal product do not have the same impact in SSA countries; FDI to these countries tends to be natural resources based (mainly extractive industries) and so, the development of infrastructures like availability of telephones (*e.g.*) as no relevance on natural resources-based investments. Trade openness, on the other hand has a positive effect on FDI but not the same marginal benefit, is less for SSA. Moreover, Africa as a low connotation concerning investment; these countries are associated with high risk having a negative impact on FDI. The conclusions point three policy implications: i) African countries need more liberal trade regimes and these reforms need to be credible to possible investors; ii) although some policies have already been tested successfully in other regions, they cannot be blindly replicated in Africa; iii) lastly, Africa has to change the perception other countries have of risk to invest, disseminating more information through, for example, international institutions like the World Bank.

Asiedu (2006), assesses the common perception that FDI in African countries is manly driven by natural resources and market size. So, given the importance of FDI in the region, the author uses a panel of 22 SSA countries over the period of 16 years (1984-2000) to explore the impact of natural resources and market size vis-à-vis government policy, institutional quality and political instability in attracting FDI. Results show that SSA countries with more natural resources or larger markets are more likely to attract FDI. In turn, smaller countries, or those without natural resources, can also attract FDI by improving their institutions and policy environment. If a country is economically and politically stable, has good infrastructures, high degree of trade openness, a reliable legal system as well as low levels of corruption, can also successfully attract FDI. It's also important to promote regional cohesion; regional economic collaboration may increase FDI to the region (for example, the Southern African Development Community, SADC). Regionalism can have a positive effect on political stability by enhancing democracy to members as well as providing incentives to the implementation for good practices and policies; otherwise, countries may be subject to sanctions or even to exclusion.

Anyanwu and Yaméogo (2015) study the drivers of FDI among different African regions (Central, East, North, Southern, and West Africa), using data from 1970 to 2010 of 53

countries. The authors focus on the importance of FDI for the development of these regions while, at the same time, evidencing the incapacity to attract FDI, comparing, for example, with Asian countries. Their analysis is done by cross-country time series regressions, using pooled OLS and system-GMM techniques. They use the following variables as the determinants of FDI inflows: past FDI flows, real per capita gross domestic product (GDP) and corresponding growth rate; Polity2 as a political and regime type from the Polity IV Project[4]; trade openness measured as the share of total trade to GDP; infrastructure variables (total landlines and subscribers of mobile phones); human capital with secondary school attendance; aid flows; natural resource endowment; and life expectancy indicators. The results show a positive significant relation between previous levels of FDI and the current level, therefore finding evidence of agglomeration effects, except for the case of Central Africa. Market size has also a positive effect on FDI inflows, except in North-Africa. GDP per capita has a significant negative impact in all regions analyzed with a U-shaped relationship in Central, North, and West Africa. In Central Africa, GDP growth has a positive effect, but its effect is negative in West Africa. In general, FDI flows have the same trend as domestic investment in East, Southern, and West Africa. Infrastructure developments have a constructive impact on FDI inflows in East and North Africa, while higher life expectancy dissuades FDI inflows to Central Africa but stimulates the same to East and North Africa. Economic and political instability has a negative impact on FDI inflows (especially in West Africa). Natural resources also attract FDI but only in the regions where they are abundant. Trade openness, overall, has a positive effect but net foreign aid has a negative relationship with FDI inflows to East, North, and Southern Africa. The authors suggest a great number of changes to improve FDI attractiveness to the region, such as economic and political reforms, promotion of sustainable development and relationship with foreign partners.

Bende-Nabende (2002) procures to provide some insight about the decision-making process of firms investing in SSA, using a co integration or relatively long-term relationship between FDI determinants in this region. The analysis comprehends 19 countries over a period of 30 years (1970-2000); the data are both individual for each country and data panel. This empirical study shows that market growth, a more liberal export tendency and liberal FDI policies are the most significant determinants. Market size and exchange rates

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[4] Polity IV, which includes 161 countries for the period 1800-1999, represents the latest generation in well-known Polity data series that was original designed by Ted Robert Gurr.

are also important followed by the openness of the economy. SSA countries can improve their long-run FDI constrains by having more liberal regimes and fostering better macroeconomic conditions and exportations.

Bokpin *et al.* (2015) investigates the impact of natural resources on FDI in Africa in terms of contribution to GDP, mineral rents, forest rents and export drives considering the effect of trade blocks, trade openness, the development of the financial market and also infrastructure. They study a panel of 49 African countries over a period of 31 years employing the system GMM estimation technique. This study concludes that overall there is a positive relationship between the various measures of natural resources and FDI attraction. It is also pointed out that trade blocs can also have a positive effect and that need to be strengthened so that spillover effects of FDI that might come to a trading bloc.

Dupasquier and Osakwe (2006) dissert about the reasons for poor FDI records in African countries, using an overview of the empirical determinants of FDI in Africa like. The goal is to identify strategies and actions that countries may apply to promote FDI flows to Africa by 1) improving countries image by promoting economic stability, a good legal system (*e.g.*, property rights and profit repatriations laws, privatizations); 2) promoting infrastructure development; 3) investing in marketing and information communication technology and not only relying on Investment Promotion Agencies (IPAs); 4) diversifying the economy; 5) fomenting trade; 6) promoting regional cooperation and integration; 7) enhancing good governance with regional surveillance mechanisms; 8) fostering access to international markets removing trade barriers and subsidies; 9) promoting investment of developed countries by producing truthful information of high importance to investors; 10) procuring help of other countries in such matters as health, education and building.

Fedderke and Romm (2006), focuses research in South Africa during 1956-2003 period, in the impact of growth and FDI determinants. The core drivers of FDI taken under study fall into two classes of determinants; rates of return and risk factors; with positive responses to rates of return, and negative responses to risk. Variables like GDP, employment, corporate tax rates, political risks, political instability, and wage rate (among others) are used in this paper. The results show a positive effect of growth on FDI, also as market size, trade openness, political stability and property rights. Wages have a negative effect on FDI.

Lemi and Asefa (2003), use a panel study for 29 African countries during 1987-99 to address the relationship between economic and political instability in these countries using a Generalized Autoregressive Heteroscedastic (GARCH) model to generate economic uncertainty indicators. They conclude that the impact of uncertainty is insignificant, but political instability and government policy commitment are important. Other economic factors like market size, trade and labor are also significant in affecting FDI inflows.

Mijiyawa (2015) analyses the African sub-region over the period of 1970-2009 and it uses the system-GMM technique. In this paper are used variables like trade openness (sum of exports and imports), infrastructure development (mobile phone and telephone lines), macroeconomic stability (inflation rate), political stability (International Country Risk Guide), return on investment (inverse of real GDP) and size of domestic markets (Population). The main conclusions are that larger countries attract more FDI, but more open and politically stable countries can also attract FDI, being return on investment also important. FDI in Africa register a persistent tendency so their likely to attract FDI also in the future. Regional integration can also enhance these factors.

Yasin (2005) uses a panel data from 11 SSA countries for the period of 1990-2003 focus on the impact of Official Development Assistance (ODA) on FDI attraction, but also the influence of trade openness, labor, market size, exchange rate, country risk level, political rights and civil liberties. It concludes that ODA may remove some obstacles to FDI inflows and improve economic conditions of countries enhancing development and therefore improving the condition that attracts FDI. The results thus indicate that trade openness, labor force, and the exchange rate of the recipient country significantly explain FDI inflows to these countries. GDP per capita is insignificant to explain FDI inflows so,

implying that the type of FDI attracted to these countries is most probably resource or efficient-seeking FDI.

Table 1, below, summarizes the main determinants of FDI inflows in African countries, either with a positive and a negative impact.

Table 1. Determinants of FDI in Africa: summary of empirical results

Author(s)	Sample	Positive Impact on FDI	Negative Impact on FDI
Asiedu (2006)	22 Sub-Saharan Africa (SSA) countries 1984-2000	Natural resources; large markets. Macroeconomic stability; educated labor force; trade openness; efficient legal system.	Corruption; FDI regulations; financial constrains; weak infrastructure; political instability.
Asiedu (2002)	71 countries (half SSA) 1988-1997	High return on assets (non-SSA); trade openness; infrastructure development (non-SSA); natural resources (SSA).	Adverse regional effect for SSA (risk perception); political instability.
Anyanwu and Yaméogo (2015)	53 African countries 1970-2010	Agglomeration; infrastructure development; trade openness; level of urbanization; natural resources.	Gross domestic product (GDP) *per capita*; political instability; inflation; foreign aid.
Bende-Nabende (2002)	19 SSA countries 1970-2000	Market size and growth; FDI liberalization; trade openness; low cost of labor; good infrastructure, technology and manpower.	Real Exchange rates; political risk; negative image of the region; low GDP *per capita*.
Bokpin, Mensah, and Asamoah (2015))	49 African countries 1980-2011	Natural resources, Trade/regional blocks	Infrastructure development, absence of credit expansion and trade openness

Table 1. Determinants of FDI in Africa: summary of empirical results

Dupasquier and Osakwe (2006)	African countries 1970-2003	Rule of law; protection of property rights; macroeconomic stability; investment promotion; good infrastructures; market size.	Political instability; low growth; poor governance.
Fedderke and Romm (2006)	South Africa 1962-96	Labor-capital ratio, market size; trade openness; political institutional structure.	Political instability; increase of corporate tax rates in host countries; low property rights; wage costs.
Lemi and Asefa (2003)	29 African countries 1987-99	Labor, trade connection; market size; size of the export sector.	Political instability; government policy commitment; external debt.
Mijiyawa (2015)	53 African countries 1970–2009	Five-year lagged FDI inflows; trade openness; market size; high return on investment; natural resources.	Political instability; low law and order.
Yasin (2005)	11 SSA countries 1990–2003	Official development assistance; trade openness; labor force growth rate; nominal exchange rate of the recipient country	Unfavorable political and economic conditions, such as limitation of ownership, restriction of repatriation of capital, inefficient financial systems and economic and political instabilities.

2.2.2 Relevant determinants of FDI inflows in Africa

Concerning the studies presented in Table 1, it is possible to remark that the most referenced determinants of FDI inflows in Africa are:

- Market Size;

- Trade Openness;

- Natural Resources;

- Infrastructure Development;

- Macroeconomic stability and economic growth;

- Political Stability.

Market size is important because it represents a greater number of potential consumers that can be interesting to a firm in expansion; it can mean more consumption, hence sales, so it is possible to infer that a country with a large local market tend to attract more investment. African countries are relatively small but they can act like trading blocs or groups, making these countries an attractive destination **Bende-Nabende (2002)**. Most studies find a positive effect of domestic market size and its expected growth on the FDI received by a country considering investment a log-run decision and therefore a growing market is seen as having great potential Asiedu (2002, 2006) is generally measured by Gross Domestic Product (GDP), GDP per capita income and size of the middle class population.

Trade openness is also one important determinant of FDI inflows because a country that has liberal policies concerning trade can foster interest. Host-countries that facilitate trade are more attractive than countries with trade barriers because of lower transaction costs J. C. Anyanwu (2012).The degree of openness can affect investment in many ways, low import barriers can discourse FDI more focus on finding the best tariffs and enhance vertical FDI by promoting importations of machinery (*e.g.*), also low export barriers can promote vertical FDI facilitating the re-exportation of processed good; can stimulate market growth and business climate Jaumotte, (2013)Trade openness has, for many studies, positive effects: however, it also can bring some drawbacks, like the deterioration of the balance of payments, the lack of positive linkages with local communities or an increasing dependence on internationally operating enterprises OCDE (2002).

For African countries, natural resources are also an important determinant of FDI inflows Asiedu (2006). For many authors, natural resources are likewise the drive for economic growth in these countries Bokpin et al. (2015). Natural resources can be raw materials, oil, minerals or other, and they have a crucial role in attracting FDI inflows Asiedu (2002); Bokpin et al. (2015); Dupasquier and Osakwe (2006). The literature indicates various measures of natural resource mainly categorized into natural resources as a contribution to GDP and natural resources as export drive. Accounting for the contribution of natural resources to economic output is important in providing detailed statistics that can help a country manage their economy. In some countries earnings from natural resources,

especially from fossil fuels and minerals, represent a big fee of GDP, and much of these earnings come in the form of economic rents - revenues above the cost of extracting the resources. Natural resources give rise to economic rents because they are not produced. For produced goods and services, competitive forces expand supply until economic profits are driven to zero, but natural resources in fixed supply often command returns well in excess of their cost of production. Rents from nonrenewable resources - fossil fuels and minerals - as well as rents from overharvesting of forests indicate the liquidation of a country's capital stock, and can, in the future be armful for countries development if they cannot find another way to boost their consumption and development.

Infrastructure development refers to basic living conditions but also is an important factor for productivity and, therefore, in attracting FDI Dupasquier and Osakwe (2006); Mijiyawa (2015). A good quantity and quality of infrastructure like roads, ports, water and power supply and telecommunications enhances productivity and facilitates business and so can have a positive effect on FDI Asiedu (2002, 2006). According to Vijayakumar, Sridharan, and Rao (2010), a country with good infrastructure quality attracts more FDI; on the other hand, according to the author, a country that can attract FDI inflows will have an additional induce invest in better and more infrastructures. Therefore, is expect positive relationship between FDI and Infrastructure Asiedu (2006); Infrastructure can be inferred by considering Electricity, Water, Transportation and Telecommunications, public expenditure on capital to acquire fixed capital assets, land, intangible assets and non-financial and non- military assets for Infrastructure Vijayakumar et al. (2010).

Stable macroeconomic conditions, namely economic growth and high development levels are also important determinants in the attraction of FDI for African countries Biswas (2002); Mencinger (2003). Macroeconomic instability is cited as one of the deterrents to FDI in Africa according to various surveys on business environment Asiedu (2006) and high inflation rate is a sign of macroeconomic instability that creates an indeterminate economic situation and reduces the expected return to investment and so volume of investment Barro (1980), so more volatile economy will have less chance in attracting FDI that a country which has a stable macroeconomic condition and sustained growth. Variables like GDP growth rates, Industrial production index, Interest rates, Inflation rates are frequently used in literature as proxies measuring growth rate; GDP growth rate,

Industrial production index, Interest rates would influence FDI flows positively and the Inflation rate can FDI influence in a positive or negative way Vijayakumar et al. (2010).

Finally, as we previously conclude, political stability is also very important for foreign investors, being among the most serious constraints to investment in African countries African_Development_Bank (2012). Political risk, the possibility of damage to property, uncertainty in macroeconomics policies, rule of law, conflict and riot situations, and corruption, discourages investors and deters FDI inflows (*e.g.*, Asiedu (2006); Asiedu and Freeman (2009); Morrissey and Udomkerdmongkol (2012)). Thus, according to existing literature, is expected that a more stable country with lower levels of corruption is more likely to attract FDI. Poor governance and inhospitable regulatory environments and political stability are inversely related to FDI inflows Dupasquier and Osakwe (2006); Mijiyawa (2015). Corruption and low transparency are found to hinder FDI inflows (Fedderke and Romm, 2006).

2.2.2.1 PALOP Countries

Concerning PALOP countries and market size, Angola and Mozambique are the countries with larger population, São Tomé and Principe is the smaller country in terms of population, therefore, it can also enhance or deter investment that relies in large markets to succeed.

Figure 1: PALOP Population

Country	2016
Angola	25830,958
Cape Verde	526,993
Equatorial Guinea	869,587
Guinea-Bissau	1888,429
Mozambique	28751,362
São Tomé & Príncipe	194,39

Population (thousands), own computation, data in:

(http://angola.opendataforafrica.org/baytyl/african-economic-outlook-2017?lang=en, accessed in August 2018)

Trade openness is a key determinant of FDI as represented in the previous literature Vijayakumar et al. (2010),analyzing exports and imports (% of GDP), except for Angola, trade in increasing over the last ten years; Equatorial Guinea had a crescent tendency but in 2015 the tendency inverted.

Figure 2: Trade Openness PALOP Countries
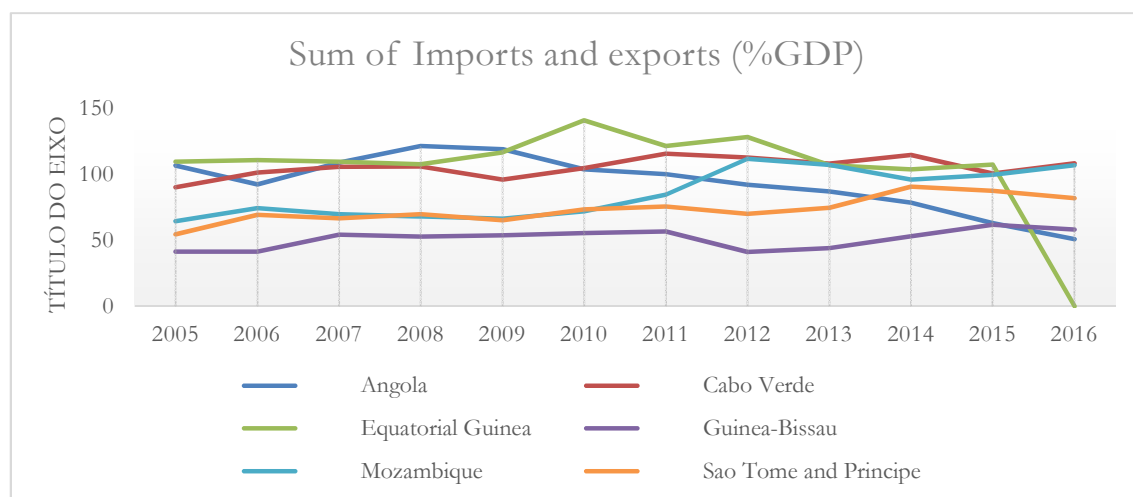
Own computation, data in: Trade openness indicators, UNCTAD, accessed in August 2018)

Concerning natural resources, is possible to see that the weight of natural resources on GDP, in case of Equatorial Guinea and Angola is decreasing, but is also greater than in other countries, oil related. In Cape Verde and São Tomé and Principe the contribution for the GDP is scarcer.

Figure 3: Infrastructure development in PALOP Countries
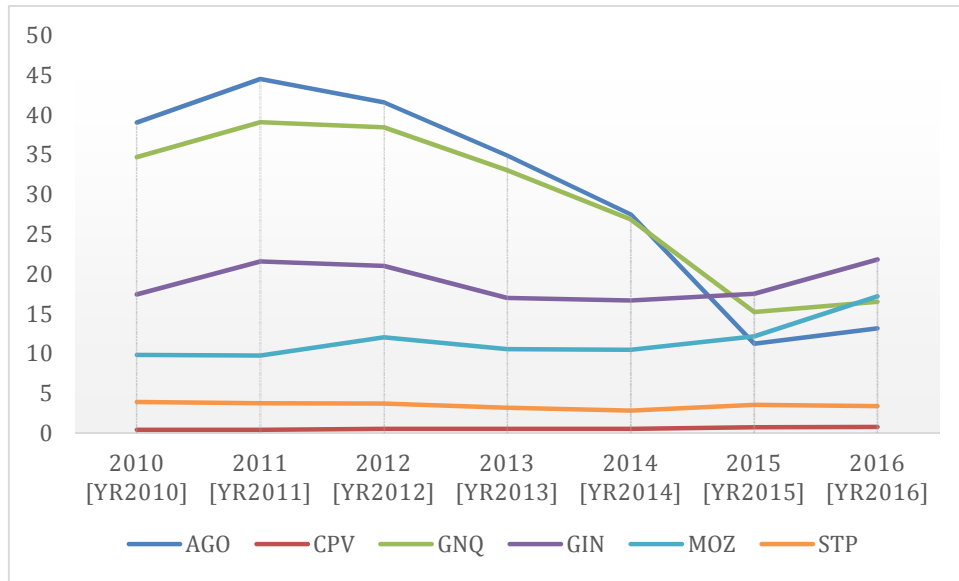
Infrastructure development is also increasing in PALOP countries, is possible to verify a crescent tendency in the considered period, but more accentuated in some countries like Cape Verde and Mozambique. (Dupasquier and Osakwe, 2006) stayted that FDI in Africa is dependent on the development of infrastructure; is a very important indicator in a decision to invest because of the initial costs of doing business, enhancing return on investment.

Figure 4: Access to Electricity in PALOP Countries

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Concerning macroeconomic conditions and analyzing Total GPD in PALOP countries it is possible to verify that Angola is the larger country in terms of GDP and S. Tomé and Principe the smallest, so it's possible to verify many differences among countries.

Figure 5: GPD Evolution in PALOP Countries

GDP US Dollars at constant prices (2010) in millions
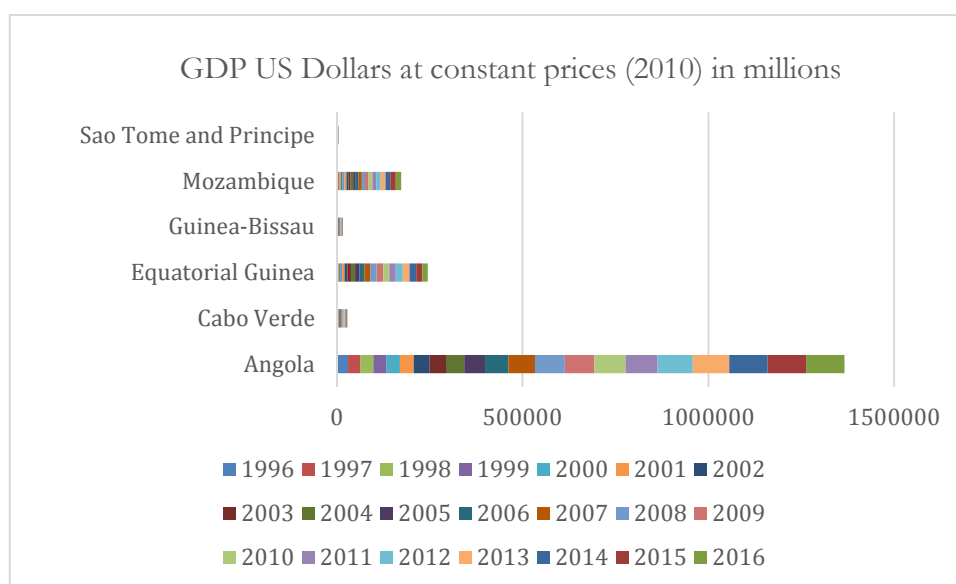
Finally, political stability is a key point in our study to be developed further ahead.

The next section explores in detail this relation between political (in)stability and FDI inflows, which is the aim of this dissertation.

2.3. Political instability and FDI

Political instability can be defined as the propensity to a government to collapse due to absence of good governance or conflict situations (*e.g.*, war, riots) Alesina et al. (1996); this affects the investment climate negatively and reduces FDI inflows. Corruption can also deter FDI inflows: investors avoid countries where corruption is evident because it can be risky and costly for firms Morrissey and Udomkerdmongkol (2012). According to Alesina et al. (1996), political instability can be defined as the propensity for a power change in a legitimate form (constitutional) or other (*e.g.*, military coups). Such changes affect growth because they foster uncertainty and MNEs may decide not to invest in a

country that does not have a stable political environment. The regimes may not be democratic, according to these authors, but they conclude that there is no obvious relation between democracy and growth. Although the definition of political instability is not consensual, it is recognized in the literature that political instability focus tends to have, in general, a negative impact in the economic performance.

In order to capture overall political instability, the literature usually take aggregate indicators like World Governance Indictors (WGI) and the International Country Risk Guide (ICRG), as they include information about political stability, absence of violence/terrorism, perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism, for instance. Corruption, regulatory quality, rule of law, government efficiency, freedom of expression and vote are also considered. Because such indicators are rather encompassing, they are clearly important to capture political instability as explanatory variables to FDI inflows.

Political instability is commonly associated with uncertainty regarding economic policy, so it is probable to have a negative impact on investment Aisen and Veiga (2013). Carmignani (2003) refers that social unrest, volatile governments, poor quality of governance and electoral uncertainty, affect the behavior of economic agents. In general, they affect investment climate negatively which in turn may reduce FDI inflows and a reduction of economic growth. Brada, Kutan, and Yigit (2006) also refer that political instability may be a barrier to FDI: investors expect future return for the investment, so domestic instability and conflict situations represent risky situations that discourage them.

So, it is possible to conclude, by analyzing the existing literature, that there tends to be a negative relation between political instability and FDI inflows.

2.3.1 Political instability and FDI: some empirical evidence

Overviewing the literature focusing on the relation between political instability and FDI, it possible to identify several dimensions of political instability with a negative impact on FDI (for a summary see Table 2, below). These studies show that political instability affects FDI inflows: an unstable country will not attract investment comparing to a country with a more stable political environment. Investors consider political risk as a disincentive to invest because it reflects on a potential reduction of profitability.

Asiedu and Freeman (2009) analyzes the impact of corruption on firm-level investment growth and concludes that, considering all variables under study, corruption is the most important one for investment growth in transition economies and can even prevent many firms to invest in these countries. For some regions like Latin America or Sub-Saharan Africa corruption as no significant effect but it doesn't mean that is less concerning or that doesn't have other impacts like reduction of public investments in healthcare, education, and infrastructure, therefore the overall expected effect FDI should be negative.

Bénassy-Quéré et al. (2007) mesures the impact of institutional quality on bilateral FDI, there findings point to a positive relation between good public intitutions and FDI. Countries with a efficient tax system, good practices of doing business, fare rule of law, lack of corruption, protection on property rights can have a positive effect on FDI, in other hand, the lack of this caracteristics can deter investment.

According to Brada et al. (2006), conflict and instability reduced FDI inflows in Balkan countries, and that the cost of this negative effect can be higher because of benefits FDI bring to economic growth. There is also evidence of the same effects in African countries: conflicts have a strong negative effect on FDI inflows, and African regimes tend to use repression and violence to eradicate opposition, exhibit state fragility in the form of political instability, and armed conflict and weak economic governance is a major constraint for Africa's development (African Development Bank, 2012); investors aim for stable countries where the risk is low. It is possible to conclude that there is a tight relation between political instability and FDI (see Annex 4).

Ezeoha and Ugwu (2015) studied the impact of conflict on FDI; their findings pointed out that conflict had a significant negative effect on FDI. Also, infrastructural development can mitigate the impact of conflicts. The impact of conflicts it's the same for countries that are abundant in natural resources or not. Rebuilding infrastructures can be important in attracting FDI in all countries.

Farazmand and Moradi (2014) identified the factors that explain FDI in five developing economies, finding that democracy effects FDI in a positive way when they are deciding where to invest. FDI (% GDP) is also associated with low corruption, inflation, openness, infrastructure and literacy rate, influencing it significantly; the opposite can deter FDI.

Jensen (2003) disserts about the relation of FDI with democratic regimes, the results points to a positive relation between democracy and FDI as they can attract higher levels of FDI;

even when other factors of economic or political nature are also present, democratic political institutions attract as much as 70% more FDI (% of GDP) than authoritarian regimes.

Mádr and Kouba (2015) also identify and quantify the impact of political environment (quality of democracy, political instability and corruption) on FDI in emerging markets. He's finding point to a significant relation between political instability, violent and non-violent, and FDI. Also, corruption and quality of democracy impact FDI in some cases.

Morrissey and Udomkerdmongkol (2012) refers that the impact on FDI in domestic private investment is negative and that good governance has a positive effect on FDI were corruption and political instability are the governance indicator with greater impact on investment in developing countries. Political stability can also mitigate the impact of FDI in domestic investment, increasing total investment.

Rashid, Looi, and Wong (2017) considered political stability as one of the major FDI determinants in the top 15 most competitive countries in Asia Pacific region, once that investor finds more attractive stable countries and therefore with a positive relation with FDI. To enhance FDI countries should focus on building a good image, work on macroeconomic and political stability, protection of property rights and rule of law to foster interest.

Schneider and Frey (1985) considered 80 less developed countries to test the determinants of FDI and concluded that the higher GDP per capita and lower balance of payment deficit are more FDI is attracted, also political instability, inflation and wage costs reduces investment.

Williams (2017) states that growth responds in a positive way to FDI, but FDI does not respond positively to growth in developing economies. Political instability has differential effect on FDI and growth; political instability reduces growth and protests reduce significantly FDI. Sub-Saharan Africa suffers from a political instability image that is no different from other regions, to do so they have to improve governance and judicial processes.

Table 2. Political instability dimensions as determinants of FDI inflows

Author(s)	Sample	Elements of Political Instability with a negative inpact on FDI
Asiedu and Freeman (2009)	81 countries 1996–98	Corruption
Bénassy-Quéré et al. (2007)	OCDE countries 1985–2000	Poor government efficiency, policy reversals, graft or weak enforcement of property rights and of the legal system
Brada et al. (2006)	Countries in Central Europe and Balkans 1980-2001	Evolution of democracy, the stability and effectiveness of governments, danger of social unrest, warfare and military interventions, economic transition
Ezeoha and Ugwu (2015)	41 African countries 1997-2012	Conflict, armed conflicts
Farazmand and Moradi (2014)	5 developing countries 1990-2012	Corruption, inflation, low openness, literacy rate and infrastructure
Jensen (2003)	114 countries 1970-97	Debt risk, poor governance, nationalization and expropriation, corruption, rule of law and bureaucracy
Mádr and Kouba (2015)	78 countries 1996–2012	Non-violent instability (minority governments, tension related to the holding of elections) and violent forms of instability (civil wars, coups, ethnic and religious riots)
Morrissey and Udomkerdmongkol (2012)	46 developing countries 1996–2009	Corruption, poor governance (e.g., political instability, weak property rights)
Rashid et al. (2017)	15 Asia-Pacific countries 2000-13	Inflation, weak political governance (durability and integraty of governments)

Table 2. Political instability dimensions as determinants of FDI inflows

Schneider and Frey (1985)	67 countries 1967-78	Bilateral and multilateral aid, political instability (internal political troubles, threat of nacionalization, degree of freedom)
Williams (2017)	Sub-Saharan Africa, Latin America and Caribbean countries 1975-79, 1980-84, 1985-89, 1990-94, 1995-99 and 2000-05	Protests, SSA countries image, Regime instability

Corruption and several forms of conflicts or riots are seldom identified in the literature as dimensions of political instability with negative impacts on the attractiveness of FDI inflows.

2.4. FDI and Political Stability in Africa: additional insights

2.4.1 Trends and characteristics of FDI inflows in Africa, in general, and in PALOP countries in particular

Actual global flows of foreign direct investment fell by 23 per cent in 2017. Cross-border investment in developed and transition economies fell brusquely, while growth was near zero in developing economies and expecting a very shy recovery predicted for 2018, this negative trend is a long-term concern for policymakers worldwide UNCTAD (2018). We are in an era of technology and major technologic advances that make production better offering enormous opportunities for economic growth and sustainable development. Cheaper transportation and communication, more efficient logistics contributes to global value chains. These new tendencies are considerable challenges to developing countries in particular due to the lack of adequate infrastructure and scarce access to finance; labor also becomes less relevant in a progressively more automated era UNCTAD (2018).

Challenges are particularly distinct in Africa; FDI flows to Africa fell to $42 billion in 2017, 21 per cent deterioration from 2016. Weak oil prices and detrimental enduring effects from the commodity bust saw flows contract, especially in the larger commodity-exporting economies. Projections for global FDI in 2018 show little growth; global flows are forecast to grow marginally, by up to 10 per cent, but remain below the average over the past 10 years UNCTAD (2018). FDI flows to North Africa decreased 4% ($13 billion), 11% ($11.3

billion) in West Africa, 22% ($5.7 billion) in Central Africa, 28% ($28.5 billion) in sub-Saharan Africa, 66% ($3.8 billion) in Southern Africa and East Africa 3% ($7.6 billion) so the decreasing tendency is installed in all African regions comparing with 2016. The most important highlights concerning African countries are that Egypt continued to be the largest investment recipient although the Continent tendency is also visible; FDI in Morocco was up 23% to $2.7 billion, contribution a large investment in the automotive; Nigeria's economy lasting depression also impacts on FDI, decreasing 21% to $3.5 billion. Ethiopia is second largest recipient of FDI in Africa, located in the fastest-growing region in Africa, was down in 10% ($3.6 billion). Kenya saw FDI increase to $672 million, up 71%, due to strong domestic demand and inflows in information and communication technology sectors. FDI to South Africa fell 41% to $1.3 billion, due to an underperforming commodity sector and political uncertainty and Angola turned negative once again (down to -$2.3 billion from $4.1 billion in 2016) as foreign affiliates in the country transferred funds abroad through intra-company loans. Zambia has positive results in FDI supported by more investment in copper. Concerning the investors in Africa, Multinational enterprises (MNEs) from developed economies such as the United States, United Kingdom and France still hold the largest FDI stock and among the top 10 investors are Developing-economy investors from China and South Africa, followed by Singapore, India and Hong Kong (China).

For 2018, FDI inflows to Africa are forecast to increase by about 20% (to $50 billion). The projection is reinforced by the expectations of a continued modest recovery in commodity prices and strengthened interregional economic cooperation. Yet Africa's commodity dependence will cause FDI to remain cyclical, UNCTAD (2018).

Historically, also in 2015, worldwide FDI decreased by 2% (billions of dollars and per cent (see Annex 1), mainly because of global poor economic growth. In 2016 there was a shy growth expected to continue in 2017, increasing confidence and, therefore, increasing FDI. It's expected global FDI to increase about 5% (almost $1.8 trillion USD) in 2017 but, high geopolitical risks, policy uncertainty, and terrorism, may have an impact on this outcome (see Annex 2) UNCTAD (2017).

For Africa this tendency also prevailed (see Annex 3) through 2016, although commodities' prices are influencing economic growth perspectives in Sub-Saharan Africa, discouraging investors.

In the regional trends of the same report UNCTAD (2017), it is referred that Nigeria and South Africa remained below year 2015 numbers. Ethiopia attracted more inflows in 2016, the best year ever. Egypt also boosted inflows to North Africa due to foreign investment reforms and new gas discoveries. Equatorial Guinea, in turn, experienced a substantial decline in FDI inflows (-77 %).

Among PALOP countries, Angola (the largest FDI recipient in Africa) saw FDI declined by 11%, mainly due to a decline in reinvested earnings, replicating the impact of low prices on profit margins. Flows to Mozambique also declined, by 20%, comparing with the 2015 value, although they remained high. Despite some financial setback, investors remained positive about long-term investment in Mozambique's commodities' sector, with Eni (Italy) investing in offshore gas exploration (2016), and ExxonMobil (United States) buying a stake in Eni (Italy); however, challenging macroeconomic conditions and deteriorating business climate will make 2017 a decisive year in terms of FDI for this country. In turn, FDI inflows to Cabo Verde increased a little (+3%), with Riu Spain making a big investment - a new Hotel & Resort.

Figure 6: FDI inflows across different African regions

Foreign direct investment (% total world): Inward Flows

$y = 1,308\ln(x) + 0,6218$
$R^2 = 0,5688$

Legend:
- Developing economies: Africa
- Developing economies: Middle Africa
- Developing economies: Southern Africa
- Logarítmica (Developing economies: Africa)
- Developing economies: Eastern Africa
- Developing economies: Northern Africa
- Developing economies: Western Africa

On computation http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx, Foreign direct investment: Inward and outward flows and stock, annual, 1970-2016, accessed on November 9, 2017.

According to UNCTAD (2017), and despite all the efforts of African countries to invest in liberalization, promotion and expedition of investment, they are resistant to foreign investment especially when it means acquiring strategic assets or concerning areas of business that influence national security.

There is also an effort for consolidation and harmonization of the international investment policy framework in Africa by reforming, at regional level, several international investment instruments to make FDI more cohesive and focused on sustainable development.

In what follows we analyze, for each PALOP country, FDI trends through using net inflows (% of GDP) data from World Development Indicators (last updated: 30/10/2017).

2.4.2 Characterization of FDI in PALOP countries

Resuming the trends for all the countries, Equatorial Guinea had a greater weight of FDI in country's GDP, and it's been reducing in recent years. S. Tomé and Mozambique exhibit an opposite trend; FDI has been increasing in recent years.

Angola's FDI is been increasing along the years, but currently is decreasing. Cape Verde shows a positive cadency together with Guinea-Bissau.

The investment is more preponderant after 1990, until there is scarce. FDI inflows are mainly decreasing nowadays, reflecting the world economic mood and the recent economic crises; though the recent positivism clime brings new insights and some recovery. In 2016, Foreign direct investment, net inflows (% of GDP) represented on average 4,3% in Angola; 7,1% in Cape Verde; 28,4% Mozambique; 6,5% in São Tomé; 0,5 in Equatorial Guinea and 1,7% in Guinea-Bissau. The FDI inflows in GDP % have a descendent trend but with some recovery from 2013.

Figure 7: FDI inflows in PALOP (% GDP)
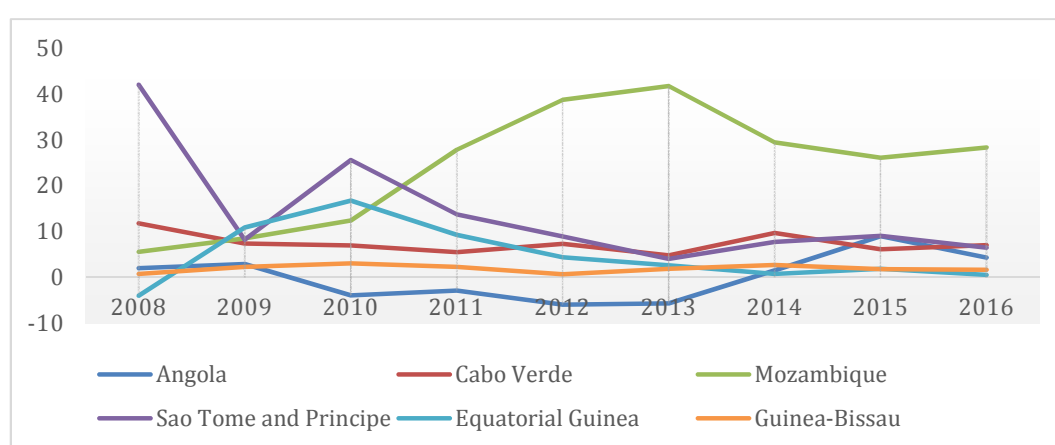
Own computation, source:
http://databank.worldbank.org/data/reports.aspx?source=2&series=BX.KLT.DINV.WD.GD.ZS&country
=#, accessed on 30/10/2017

Considering all sub Sub-Saharan Africa, is possible to verify the distribution of foreign direct investment (% of GDP) in 2016, with different contribution, Mozambique (light blue color) is one of the countries with a higher value. Equatorial Guinea and Guinea Bissau are the PALOP countries with the lowest value (dark blue color).

Figure 8: FDI, net inflows in 2016 (% GDP)

2016-Foreign direct investment, net inflows (% of GDP)

- -2.1 : 0.9
- 0.9 : 2
- 2 : 3
- 3 : 5.7
- 5.7 : 28.4
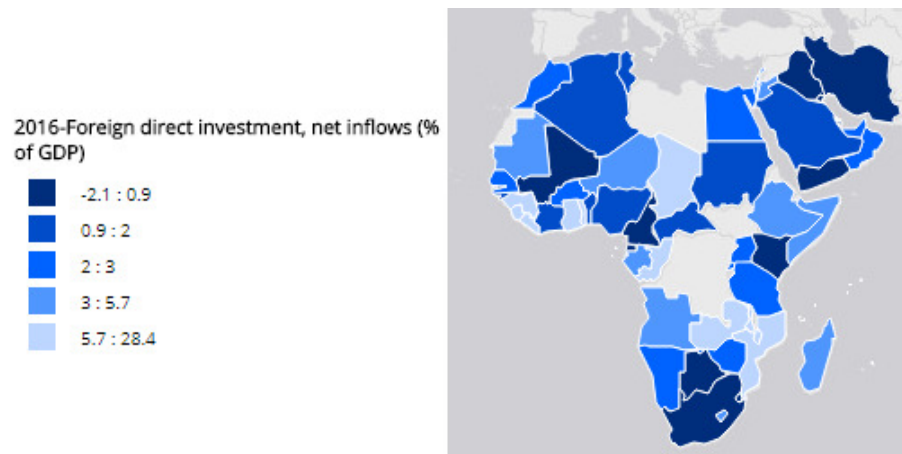
Source:http://databank.worldbank.org/data/reports.aspx?source=2&series=BX.KLT.DINV.WD.GD.ZS&country=#, accessed on 07/01/2018

Considering all sub Sub-Saharan Africa, is possible to verify the distribution of foreign direct investment (% of GDP) in 2016, with different contribution, Mozambique (light blue color) is one of the countries with a higher value. Equatorial Guinea and Guinea Bissau are the PALOP countries with the lowest value (dark blue color).

As said, FDI is a major catalyst of development; even so, the benefits are not equal for every country, or even positive OCDE (2002). Stability, economic prosperity, national policies and the international investment architecture matter for attracting FDI. As an example, in 2016, Sub-Saharan Africa FDI net inflows represented only 8% of the FDI net inflows received by the United States (in USD), but similar in percentage of GDP, 2.6% (see Table 3, below). Except for Equatorial Guinea and Guinea Bissau, PALOP countries get FDI net inflows, in percentage of GDP, even larger than the United States (see Table 3).

Table 3. FDI inflows in SSA and PALOP countries (millions USD and % GDP)

	Foreign direct investment, net inflows $ millions	Foreign direct investment, net inflows % of GDP
	2016	2016
Angola	4,104	4.3
Cabo Verde	114	7.1
Equatorial Guinea	54	0.5
Guinea-Bissau	20	1.7
Mozambique	3,128	28.4
São Tomé and Principe	22	6.5
Sub-Saharan Africa	38,634	2.6
United States	479,415	2.6

Own computation, World Development Indicators, THE WORLD BANK, http://wdi.worldbank.org/table/6.9#

While gross returns on investment can be very high in Africa, the effect is more than compensated by high taxes and a significant risk of capital losses. Risk factors such as macroeconomic instability, loss of assets due to non-enforceability of contracts (*e.g.*, in absence of a transparent judicial system) or physical destruction caused by armed conflicts, are the principal reasons to deter investment OCDE (2002). Other factors holding back FDI inflows in African countries are the sustainability of national economic policies, poor quality of public services and close-trade regimes. A deficit of democracy or political legitimacy makes the system of government prone to sudden changes, fostering political instability, and lack of effective regional trade integration efforts also affects FDI inflows OCDE (2002).

According to the literature reviewed, we can conclude that political instability has a negative effect on FDI, but the effects are measured through different variables to capture political instability. There are divergent components of political instability that lead to different results. Moreover, some studies only consider economic variables; but to the best of our knowledge, FDI inflows depends on both variables so, for a more complete analysis, both type of variables should be considered Schneider and Frey (1985). It is also possible to conclude that a country with more exacerbated political instability (situations of conflict,

riots, corruption) is less attractive to investment than a situation of government changes, *e.g.* Ezeoha and Ugwu (2015). It is also stated that the case of Africa is different: the drive for natural resources has a great impact and, in some cases, can also positively influence FDI trends despite political instability Asiedu (2002, 2006); OCDE (2002). Other measures of political instability such as Alesina and Perotti (1996) indices of severe political crises like military coups, political assassinations, and political violence also indicate influence in other determinants of FDI such as trade openness and growth. Rodrik (1991) also states that political stability is also preponderant for private investment and that it enhances economic stability and growth. So, it is possible to verify in several studies considering that the effects of political instability on FDI may also operate indirectly, through affecting other determinants of FDI.

In the next sub-section we will focus on the more likely political instability phenomena that affect FDI inflows in PALOP countries.

2.4.3 Characterization of political instability in PALOP countries

Using the Worldwide Governance Indicators (WGI), 2017 update, and considering aggregate Governance Indicators from 1996-2016, we will analyze six broad dimensions of governance: Voice and Accountability (VA); Political Stability and Absence of Violence/ Terrorism (PS); Government Effectiveness (GE); Regulatory Quality (RQ); Rule of Law (RL) and Control of Corruption (CC).

Voice and Accountability reflects the extent to which a country's citizens are able to take part in selecting their government, as well as freedom of expression, freedom of association, and free media. Political Stability and Absence of Violence/Terrorism measures the probability of political instability and/or politically-motivated violence, including terrorism. Government Effectiveness reveals perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies; involves institutions, traditions and customs by which the authority in a country is applied. It contains the process by which governments are elected; the capacity of the government to effectively formulate and implement rigorous policies; the respect for citizens and the state, and for the institutions that rule economic and social interactions among them. Regulatory Quality reflects perceptions of the ability

of the government to formulate and implement rigorous policies and regulations that permit and promote private sector development. Rule of Law returns awareness of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the possibility of crime and violence. Control of Corruption, discloses perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests Portugal Ferreira and Gomes Ferreira (2016). Estimated values for each category range from -2.5 (weak) to 2.5 (strong).

Figure 3 shows the average (1996-2016) of the six governance indictors for each PALOP country.

Figure 9: WGI components for PALOP countries, average 1996-2016
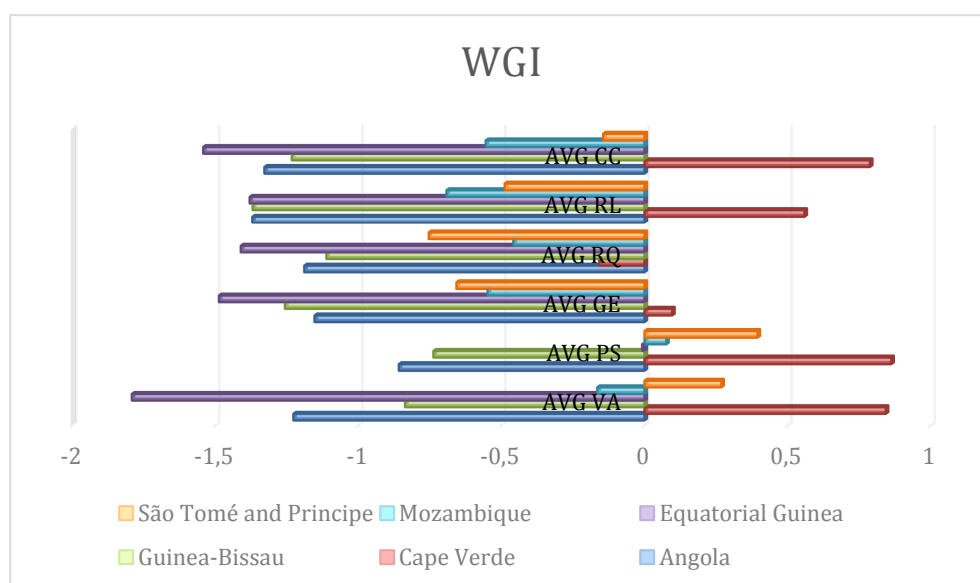
Source: Own computations, data: http://info.worldbank.org/governance/wgi/index.aspx#home, acceded on December 26, 2017

Relying on data depicted in Figure 3 and Annex 5, it is possible to conclude that PALOP countries: have weak average of values for control of corruption, except Cape Verde; exhibit weak average of values for rule of law, also except Cape Verde; in case of regulatory quality, all countries have weak average of values. For government effectiveness, all countries, except Cape Verde, have very weak average of values, but in case of political

stability and absence of violence/terrorism only Guinea-Bissau and Angola have weak average of indicators; Equatorial Guinea has a value near to zero. Regarding voice and accountability, Cape Verde and São Tomé and Principe exhibit higher average values.

In a rank that ranges from 0 (lowest) to 100 (highest), taken from Kaufmann et al. (2010) and presented in Figure 4 and Annex 6, PALOP countries are below 60 for the 2014-16 period and, therefore, exhibiting very low percentile rank compared with other countries. Cape Verde is the country with better position in this ranking (greater than 60 in averages).

Figure 10: Percentile rank in WGI components for PALOP countries, 2014-2016
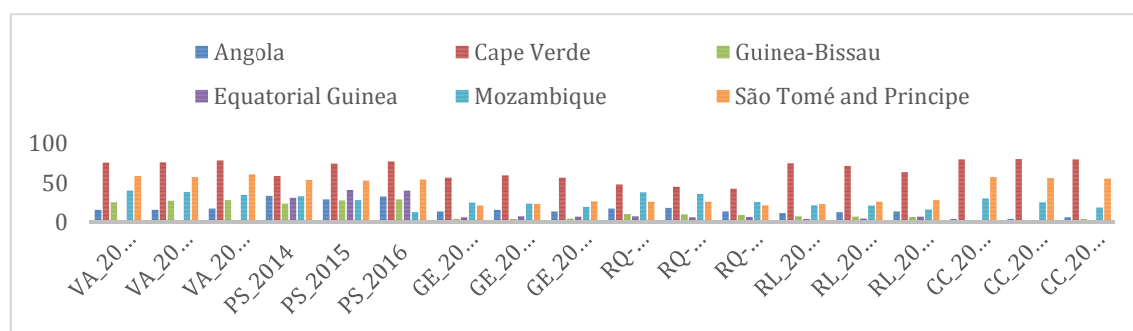
Source: Own computations, data: http://info.worldbank.org/governance/wgi/index.aspx#home, acceded on December 26, 2017

From Figure 4, we can conclude that PALOP countries have low indicators of governance in general and that may influence investors to deter FDI inflows to the region.

3. Data and Methodology

This empirical part of this study will be grounded on a detailed analysis of the mechanisms through which political instability transmits to FDI; moreover, we aim at assessing how relevant this relation is for the PALOP countries (a novelty in the related literature). This section presents the description of the variables and corresponding data sources, as well as an overview of the statistical procedures.

The sample data examines the determinants of FDI inflows in 6 countries of the PALOP (n=6, specifically, Angola, Cape Verde, Guinea Bissau, Equatorial Guinea, Mozambique and S. Tome and Principe) throughout 21 years (T=21, specifically from 1996 to 2016), providing a total of 126 observations (N=126).

Thus a panel data model is employed, combining cross-section and time-series characteristics along time. For each cross-section unit it is possible to find the same number of observations, and so, it is a balanced panel (n=6, T=21, N=126). Data is sourced from the Worldwide Governance Indicators (WGI), Unctadstat and the World Bank (World Development Indicators) web sites, accessed in April, June and August, 2018.

3.1. Description of variables

The dependent variable refers to Foreign Direct Investment (FDI) annual inflows (as percentage of GDP), as presented, *e.g.*, in Mijiyawa (2015). Explanatory, independent, variables were selected from the literature. In particular, to capture political instability, we selected two alternative measures:

Political Stability and Absence of Violence/Terrorism (PSAVT) measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism (data taken from The Worldwide Governance Indicators, WGI). The more politically unstable a country is the riskier is the country concerning investment, constraining decisions to invest. Thus instability is expected to have a negative effect on FDI inflows Asiedu (2002, 2006); Dupasquier and Osakwe (2006); Fedderke and Romm (2006); Mijiyawa (2015).

Control of corruption (Control.of.Corruption) reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of

corruption, as well as "capture" of the state by elites and private interests (WGI indicator). Corruption distorts the economic and financial environment and reduces government efficiency, expecting to have a very negative effect on the economy, for example, through encouraging the development of the black market, popular discontentment, discouraging business; consequently, it can also be taken as a proxy for political instability that deters FDI Asiedu (2006); Asiedu and Freeman (2009); Gour and Samai (2014); Grande and Teixeira (2012). Data was collected from The Worldwide Governance Indicators, 2017.

In addition, several control variables are also considered in the model as determinants of FDI inflows, as considered by the majority of the literature (*e.g.*, Portugal Ferreira and Gomes Ferreira (2016), Bénassy-Quéré, Coupet et al. (2007,) Asiedu (2002)):

1. ***Trade Openness*** **(Trade.Openess)** refers to the sum of imports and exports as percentage of GDP, taken from Unctadstat. Several pieces of literature (*e.g.*, Anyanwu and Yaméogo (2015); Asiedu (2002, 2006); Bende-Nabende (2002); Fedderke and Romm (2006), refer that more open countries receive more FDI flows; therefore, the effect of trade openness on FDI is expected to be positive.

2. ***Growth Rate*** **(Growth.Rate)** stands for real GDP annual average growth rate, taken from Unctadstat. Since growth is a predictor for future outcomes, higher growth rates indicate better market conditions for investors and thus the effect on FDI is expected to be positive Bende-Nabende (2002); Yasin (2005).

3. In order to proxy market size, the literature often uses two proxies: ***Total Gross Domestic Product*** **(Total.GDP)**, here defined in terms of US Dollars at constant prices (data taken from Unctadstat); and ***Total Population*** **(T.Population)** which counts all residents regardless of legal status or citizenship (midyear estimates taken from the World Development Indicators database). A larger market size is expected to have a positive effect on FDI attraction Bende-Nabende (2002); Fedderke and Romm (2006).

4. ***GDP per capita*** **(GDP.Per.Capita**), measured in US Dollars at constant prices, refers to the gross domestic product divided by midyear population (World Bank data). This variable captures the purchase power of consumers and thus high average income has a positive effect on demand and, thus, a positive impact on inward FDI Brada et al. (2006).

5. ***Inflation Consumer Price Index*** **(Inflation.CPI)** measures the change in the weighted average of prices of a basket of consumer goods and services, purchased by consumers (World Bank, national accounts, data). High values of Infaltion.CPI capture macroeconomic instability and, therefore, are expected to have a negative impact on FDI inflows Anyanwu and Yaméogo (2015).

6. ***Access to Electricity*** **(Access.to.electricity)** is the percentage of population with access to electricity. Electrification data is collected from industry, national surveys and international sources, as gathered together by the World Bank, and it is a proxy for infrastructure development. A country well-equipped in terms of infrastructure is more productive, with higher returns on productive factors and thus is expected to foster FDI inflows Asiedu (2006); Mijiyawa (2015).

7. ***Education Expenditure*** **(Education.expenditure)** refers to public education expenditure as percentage of GDP (World Bank data); it covers current operating expenditures in education, including wages and salaries and excluding capital investments in buildings and equipment. As it captures the relative priority given by governments to education, it reflects the importance of human capital accumulation to competitiveness and factor productivity, therefore, expecting to have a positive contribution to inward FDI Asiedu (2006); (Brada et al., 2006).

8. ***Natural Resources*** **(Natural.resources)** refers to total natural resources rents (% of GDP) taken from the World Development Indicators (World Bank). It comprises the sum of oil, natural gas, coal (hard and soft), mineral and forest rents. Countries that are endowed with important natural resources, namely price-inelastic commodities, have advantage in terms of FDI attraction; this is more evident in African countries Asiedu (2002, 2006).

9. ***Lagged FDI*** **(lag(FDI, 1))** as to capture the high correlation between current and past FDI inflows due, *e.g.*, to capital installation costs, to capture an investment trend or, from an econometric point of view, to eliminate serial correlation. Lagged values are commonly used to avoid unwanted biases and auto correlation effects which could weaken the results from regression. For instance, Asiedu (2002, 2006) uses lagged independent variables like market size, infrastructure, openness to FDI or even corruption and number of coups. So, an encompassing measure of lagged FDI may capture the combined effects of theses variables.

3.2. Statistical procedures

All estimations and descriptive statistics were computed using the R software, completed with several packages.[5] The statistical default significance level adopted was of 5% ($\alpha=0.05$).

In particular, exploratory data analysis focuses on the average (x), standard deviation (s), minimum value (Min) e maximum value (Max) of the variables in use. Dispersion is verified by the variation coefficient Pestana and Gageiro (2005).[6] The study of correlation between variables was performed by the correlation coefficient of Pearson (normal-distribution variables) or by the correlation coefficient of Spearman (when non-normal distribution variables apply). The interpretation of the magnitude of the correlation relies on the correlation intervals taken from Pestana and Gageiro (2005).[7]

The simultaneously comparison between countries is achieved using one-way ANOVA tests (independent measures). The determination of pairs with statistically significant differences was made by Games-Howell post-hoc due to that Levene test have showed that some variables displayed a heterogeneity of variances.

As for the estimation of panel data model (PDM), this was performed through the following stages:

1. Estimation of the fixed effects model considering all variables:

$$(FDI)_{it}=\alpha+\beta_1 lag(FDI,1)_{it}+\beta_2 Trade.Openess_{it}+\beta_3 Growth.Rate_{it}+\beta_4 log(Total.GDP)_{it}+\beta_5 Inflation.CPI_{it}+\beta_6 PSAVT_{it}+\beta_7 Control.of.Corruption_{it}+\beta_8 Access.to.electricity_{it}+\beta_9 T.Population_{it}+\beta_{10} GDP.Per.Capita_{it}+\beta_{11} Education.expenditure_{it}+\beta_{12} Natural.resources_{it}+\beta_{tai}+\beta_{tat}$$

2. Test for random and fixed effects models using the Hausman test.

3. Estimation of the fixed effects model considering either Log(Total.GDP) or T.Population, because they both capture market size, according to the existing literature.

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[5] Such as stats (basic R package), fBasics (descriptive analysis), nortest (normality verification), Formula, sandwich e plm (data panel models), car (variance inflation factor), lmtest (Breusch-Pagan test to check the homogeneity), gplots (grafics) and userfriendlyscience (one-way ANOVA and Games-Howell post-hoc).

[6] Variation coefficient (VC) $\leq 15\% \Rightarrow$ weak dispersion; $15\% < VC \leq 30\% \Rightarrow$ moderate dispersion; $VC > 30\% \Rightarrow$ strong dispersion.

[7] Regardless of the sign (+ or –), if: $r \leq 0.19 \Rightarrow$ very weak correlation; $0.20 \leq r \leq 0.39 \Rightarrow$ weak correlation; $0.40 \leq r \leq 0.69 \Rightarrow$ moderated correlation; $0.70 \leq r \leq 0.89 \Rightarrow$ strong correlation, and if $0.90 \leq r \leq 1.0 \Rightarrow$ very strong correlation.

4. Estimation by the fixed effects model considering either PSAVT or Control.of.Corruption, because they are alternative measures to capture political instability, according to the existing literature.

5. Final model analysis of results considering a selected model relying on the overall significance and the economic adequacy of the results.

The level of statistical significance of the model coefficients is verified by the usual t test. Based on the most appropriate model, the following assumptions were verified:

- Normality of residues: Pearson chi-square normality test;

- Homoscedasticity of waste: Breusch-Pagan test and graphical observation;

- Multicollinearity: variance inflation factor (VIF);

- Serial correlation and cross-sectional dependence: Pesaran test for cross-section dependence and average correlation coefficient for cross-sectional dependence, respectively.

The overall significance of the model was assessed by the F test (ANOVA regression). The adjustment of the model was performed by the coefficient of determination, R^2, and by the adjusted coefficient of determination, R_a^2

4. FDI inflows and political instability in PALOP countries – An Empirical Analysis

This section presents the analysis of the results both from descriptive statistics and from panel data estimations in order assess the relationship between political instability and FDI inflows in PALOP countries.

4.1. Descriptive statistics

Average and dispersion indicators

Tables 4, 5, 6 provide a set of descriptive statistics (mean, standard deviation (Stdev), minimum values (Min) and maximum values (Max)) for all variables selected to the model,

for Angola (ANG) and Cape Verde (CPV), Guinea-Bissau (GNB) and Equatorial Guinea (GNQ), and Mozambique (MOZ) and Sao Tome and Principe (STP), respectively.

Table 7 refers to the same set of descriptive statistics, for the full sample comprising all the 6 PALOP countries as a group. It additionally includes, among others, the variation coefficient (VC) of each variable.

It is possible to verify large amplitude on all variables across countries and time (see Tables 4 to 6). ANG has the higher maximum value in FDI and GNB the lowest; the records for the minimum values are alike, lagged FDI has the same behavior. On average, is possible to verify that GNQ has the highest value for trade openness and GNB the lowest; MOZ is the country exhibiting greater growth rate and GNB the lowest. Also considering average values, Total GDP is greater in ANG, GNQ and MOZ, log of Total GDP the tendency is still the same Inflation is, on average, larger in ANG and STP. PSAVAT has, on average, negative values for ANG, GNB e GNQ, so it is possible to conclude that these countries are, on average, more unstable that the remaining. Control of corruption has negative values for all countries (on average) except for CPV, indicating this country to have less problems with corruption that the remaining. Access to electricity is, on average, more widespread in CPV and GNQ, indicating better infrastructures in these countries. MOZ and ANG are the countries with more population density, on average. GDP *per capita* is greater in GNQ, followed by ANG and CPV (average values). Concerning education expenditure, on average, CPV is the country that most invest followed by MOZ and STP, this can indicate a more capable labor force. For natural resources values, on average, the countries with bigger values are ANG and GNQ, indicating the presence of abundancy, CPV is the country with less value for natural resources. So, it is possible to verify large amplitude on all variables across countries and time (see Tables 4 to 6). Concerning control of corruption, the countries with lower control are ANG, GNB and GNQ, also as expected. Inflation is higher in ANG while political stability and absence of violence and terrorism is more evident in CPV; on the other hand, we can observe that ANG and GNB are the countries with more instability. ANG and MOZ are the countries with more population; Guinea Bissau and Mozambique have less access to electricity. GDP per capita is greater in Equatorial Guinea, but is the country that invests less in education.

The variation coefficient (VC) is a measurement of the relative variability or consistency of data; from Table 7 we can conclude that, for most of the variables, a VC>30% is observed,

indicating a strong dispersion (a variable with a smaller VC is less dispersed than a variable with a larger VC). On average, the variables exhibiting larger dispersion are Growth Rate and FDI; the variables exhibiting lower dispersion are T. Population and GDP *per capita*; other variables are according to total average of VC, about 27%.

All countries display positive values for all variables except Growth Rate, Control of Corruption and PSAVT. All observations of Growth Rate variable are positive in MOZ and STP. In the Total GDP the minimum value in ANG is larger than the maximum value observed for all other countries; and in case of trade openness, the minimum value in ANG is superior to the average value of GNB. Trade openness is on average greater in GNQ and ANG, is lesser in GNB and STP.

In regards to FDI, the minimum value in ANG is superior to the average value of GNB. FDI is, on average, greater in ANG and GNQ, is lesser in GNB and CPV. On average, Political Stability and Absence of Violence/Terrorism (PSAVT) presents values close to 1 (CPV), close to -1 (ANG, GNB) and close to 0 (GNQ, MOZ, STP), what suggests that the sample covers countries with strong and weak governance performance (WGI indicator). The variable PSAVT is thus too heterogeneous.

All observations for Control of Corruption in CPV are positive. Instead, for all the remaining countries, the observations have both positive and negative values. Quite correlated with PSAVT, ANG, GNB and GNQ exhibit higher corruption while CPV and STP are countries where the control of corruption is more enforced.

Table 4 – Min, Max, mean and Stdev of variables, Angola and Cape Verde

	Angola				Cape Verde			
	MAX	MIN	Mean	Stdev	MAX	MIN	Mean	Stdev
FDI	66,8685652	2,07007424	18,7065988	13,8681542	12,5759149	1,46540741	7,045784263	2,92701399
Trade.Openess	180,891482	50,816141	115,483003	31,6715867	115,610819	65,999223	93,78302676	15,59532444
Growth.Rate	15,029198	-0,66535493	6,69871181	5,05158221	11,861828	-1,270426	5,03366002	3,48502128
Total.GDP	103777,041	30666,7647	65058,3176	26984,8208	1860,16536	715,471458	1369,550349	381,8491284
Inflation.CPI	6091,05768	1,02139127	2304,57416	2023,05754	140,416582	86,7052035	115,904896	16,80524028
PSAVT	1,03857601	-2,31307221	-0,92948822	0,88624674	1,21924353	0,35077915	0,892005465	0,189276718
Control.of.Corruption	0,460206	-1,52268505	-1,24944971	0,40190176	1,14333737	0,460206	0,772925475	0,176810813
Access.to.electricity	42	18,423502	29,2832446	7,18326746	92,6115875	46,7216454	69,5227223	14,31996368
T.Population	28813463	14682284	20794680,4	4456574,62	539560	398773	475390,4762	42329,17886
GDP.Per.Capita	3819,45007	2088,6917	2999,84742	676,631154	3447,55979	1794,1823	2833,572064	575,8270431
Education.expenditure	0,03886287	0,02164504	0,0284477	0,00527965	0,0611718	0,03858662	0,047463833	0,005143325
Natural.resources	61,1898131	11,2743214	40,8017936	13,7881478	0,84030173	0,36785542	0,571551435	0,124676376

Table 5 – Min, Max, mean and Stdev of variables, Guinea Bissau and Equatorial Guinea

	Guinea Bissau				Equatorial Guinea			
	MAX	MIN	Mean	Stdev	MAX	MIN	Mean	Stdev
FDI	3,91305916	0,19222569	1,51430721	1,01851555	72,7925289	0,40444338	16,50244498	20,32377523
Trade.Openess	61,706315	19,50367	43,8928458	11,2748751	268,243163	103,689949	153,6042369	53,56696685
Growth.Rate	13,226603	-16,909848	2,42062705	5,51976048	95,262155	-9,028391	16,30131206	25,01258583
Total.GDP	1030,94907	588,141092	779,266517	126,162125	18805,1084	1246,35715	11678,3174	6122,261286
Inflation.CPI	139,051922	58,3743513	113,241962	21,2645374	228,042165	85,4955644	150,6224367	48,18933471
PSAVT	-0,3499439	-1,85609126	-0,79150024	0,4255107	0,37325558	-0,5222889	-0,028623016	0,243622498
Control.of.Corruption	-1,0110443	-1,55633581	-1,21946316	0,14571708	-1,2643694	-1,8134402	-1,521904321	0,149299899
Access.to.electricity	17,2	3,09707117	8,67325913	4,17162176	67,8892899	61,0421486	64,29587944	2,064431917
T.Population	1815698	1159060	1440795,1	205403,451	1221490	523999	824552	219828,7595
GDP.Per.Capita	599,998897	490,152296	540,063247	25,7875337	20333,9365	2378,54871	13247,33732	5418,216447
Education.expenditure	0,02282032	0,01106266	0,01692102	0,00399796	0,01471245	0,00335874	0,007332733	0,00318244
Natural.resources	31,5907847	11,0012688	17,1656662	4,76681248	74,4029095	15,2724516	48,7124725	18,05517626

Table 6 – Min, Max, mean and Stdev of variables, Mozambique and Sao Tome and Principe

	Mozambique				São Tomé and Principe			
	MAX	MIN	Mean	Stdev	MAX	MIN	Mean	Stdev
FDI	38,5490982	1,35466199	12,1883683	12,4658778	40,5348401	0,24890074	10,59369614	10,28143442
Trade.Openess	111,681352	38,446294	73,4087602	21,918416	90,672439	40,913055	68,77655776	11,33449095
Growth.Rate	26,845322	1,678503	8,57773685	4,83712931	9,115647	0,11825858	3,970140647	2,573315642
Total.GDP	14858,3813	3409,88915	8266,83719	3610,64737	246,75117	111,246813	166,9793608	47,67088439
Inflation.CPI	360,188527	79,1550749	204,462338	98,1174048	751,386239	38,6794535	308,5890292	237,8328458
PSAVT	0,6261856	-1,04877222	0,06810909	0,38265285	1,15020824	0,0078264	0,483167307	0,405950665
Control.of.Corruption	-0,4240031	-0,86556131	-0,5390719	0,11754344	0,40166718	-0,5369121	-0,106002144	0,221444803
Access.to.electricity	24,1983395	2,31869793	13,0575034	6,79712498	68,6	48,2974396	56,69759718	5,499327112
T.Population	28829476	16248232	21897634,1	3927831,67	199910	128821	160986,381	22531,60615
GDP.Per.Capita	515,38853	209,862165	361,005457	96,9034258	1260,32181	855,463915	1017,699107	149,459804
Education.expenditure	0,05360322	0,01557548	0,03870343	0,01136451	0,07682903	0,02252007	0,039473725	0,016419951
Natural.resources	17,227582	6,68796636	10,321594	2,68498601	4,24756179	2,02848938	3,207066309	0,582279971

Table 7 – Basic statistics of the variables of interest, PALOP

	lag.FDI.1	Trade.Openess	Growth.Rate	T.Population	Inflation.CPI	PSAVT
			Panel 4.1, PALOP			
nobs	126.000000	126.000000	126.000000	1.260000e+02	1.260000e+02	126.000000
NAs	0.000000	0.000000	0.000000	0.000000e+00	0.000000e+00	0.000000
Minimum	0.192226	19.503670	-16.909848	1.288210e+05	1.021391e+00	-2.313072
Maximum	72.792529	268.243163	95.262155	2.882948e+07	6.091058e+03	1.219244
1. Quartile	3.188694	63.059768	2.499989	4.822058e+05	1.034948e+02	-0.494910
3. Quartile	12.619542	109.325607	8.510005	1.758181e+07	2.549383e+02	0.488231
Mean	**11.091867**	**91.491405**	**7.167031**	**7.599006e+06**	**5.328991e+02**	**-0,051055**
Median	7.022438	81.282644	5.197076	1.177558e+06	1.369525e+02	0.022008
Sum	1397.575194	11527.917028	903.045957	9.574748e+08	6.714529e+04	-6.432922
SE Mean	1.172566	4.027923	1.040679	8.960359e+05	1.016987e+02	0.071338
LCL Mean	8.771213	83.519646	5.107399	5.825640e+06	3.316248e+02	-0.192243
UCL Mean	13.412520	99.463164	9.226664	9.372373e+06	7.341735e+02	0.090133
Variance	173.238756	2044.244215	136.459565	1.011629e+14	1.303171e+06	0.641235
Stdev	**13.162019**	**45.213319**	**11.681591**	**1.005798e+07**	**1.141565e+03**	**0,800772**
Skewness	2.436944	1.402582	4.555798	8.710820e-01	3.230960e+00	-0.721112
Kurtosis	6.744880	2.645272	29.099277	-1.010423e+00	9.919139e+00	0.385186
VC (%)	**118,663693**	**49,41810545**	**162,9906582**	**132,3591533**	**214,217851**	**-1568,449711**

	Access.to.electricity	GDP.Per.Capita	Education.expenditure	Natural.resources	Control.of.Corruption	log.Total.GDP
			Panel 4.2, PALOP			
nobs	126.000000	1.260000e+02	126.000000	126.000000	126.000000	126.000000
NAs	0.000000	0.000000e+00	0.000000	0.000000	0.000000	0.000000
Minimum	2.318698	2.098622e+02	0.003359	0.367855	-1.813440	4.711751
Maximum	92.611588	2.033394e+04	0.076829	74.402910	1.143337	11.550000
1. Quartile	14.566097	5.364530e+02	0.016380	3.340211	-1.324358	6.585141
3. Quartile	62.691034	3.405094e+03	0.044923	34.298167	-0.095998	9.596877
Mean	**40.255034**	**3.499921e+03**	**0,029724**	**20.130024**	**-0,643828**	**7.993740**
Median	44.360823	1.527252e+03	0.026947	12.266336	-0.807202	7.509689
Sum	5072.134327	4.409900e+05	3.745191	2536.383026	-81.122281	1007.211271
SE Mean	2.280435	4.460538e+02	0.001467	1.839769	0.073589	0.176408
LCL Mean	35.741771	2.617125e+03	0.026821	16.488893	-0.789469	7.644607
UCL Mean	44.768298	4.382717e+03	0.032627	23.771155	-0.498186	8.342873
Variance	655.248185	2.506946e+07	0.000271	426.478354	0.682331	3.921085
Stdev	**25.597816**	**5.006941e+03**	**0,016465**	**20.651352**	**0,826033**	**1.980173**
Skewness	0.027808	2.083493e+00	0.309452	0.999997	0.585176	0.093544
Kurtosis	-1.381599	3.090182e+00	-0.598438	-0.261405	-0.947483	-1.065363
VC (%)	**63,5891054**	**143,0586862**	**55,39294846**	**102,5898032**	**-128,3002603**	**24,77154623**

Considering the average values shown in Table 7, the difference of this value compared with the average value across countries (Tables 4, 5 e 6) is presented in Table 8, where ↗ means that the average value for the country is higher than the overall PALOP countries average and ↘ means the reverse.

Table 8 – Comparison of the mean value of each country *vis-a-vis* PALOP average

Indicators	ANG	CPV	GNB	GNQ	MOZ	STP
FDI	↗	↘	↘	↗	↗	↘
Trade.Openess	↗	↗	↘	↗	↘	↘
Growth.Rate	↘	↗	↘	↗	↗	↘
Total.GDP	↗	↘	↘	↘	↘	↘
Inflation.CPI	↗	↗	↘	↘	↘	↘
PSAVT	↘	↗	↘	↗	↗	↗
Control.of.Corruption	↘	↗	↘	↘	↗	↗
Access.to.electricity	↘	↗	↘	↗	↘	↗
T.Population	↗	↘	↘	↘	↗	↘
GDP.Per.Capita	↘	↗	↘	↗	↘	↘
Education.expenditure	↘	↗	↘	↘	↗	↗
Natural.resources	↗	↘	↘	↗	↘	↘

Symmetry

The extremes diagram and quartiles can give visual information about minimum and maximum range, median and in which quartile observations are. It also gives information about outliers.

Overall, except for the PSAVT variable is negatively skewed, all other variables are positively skewed. It is also possible to verify that, for most of the variables, most of the observations are in Q3, therefore in the 75% of the sample. The median value is also important because it separates the higher half from the lower half of a data sample; for most of variables, median is central; the only exceptions are for Total.GDP and T. Population; generally robust data have breaking points near 50%, so it is possible to observe some inconsistency in this data. We can also verify the presence of outliers in many variables (see Figure 11).

Figure 11 – Extremes diagram and quartiles (boxplot) for the variables under study, considering N = 126 observations.
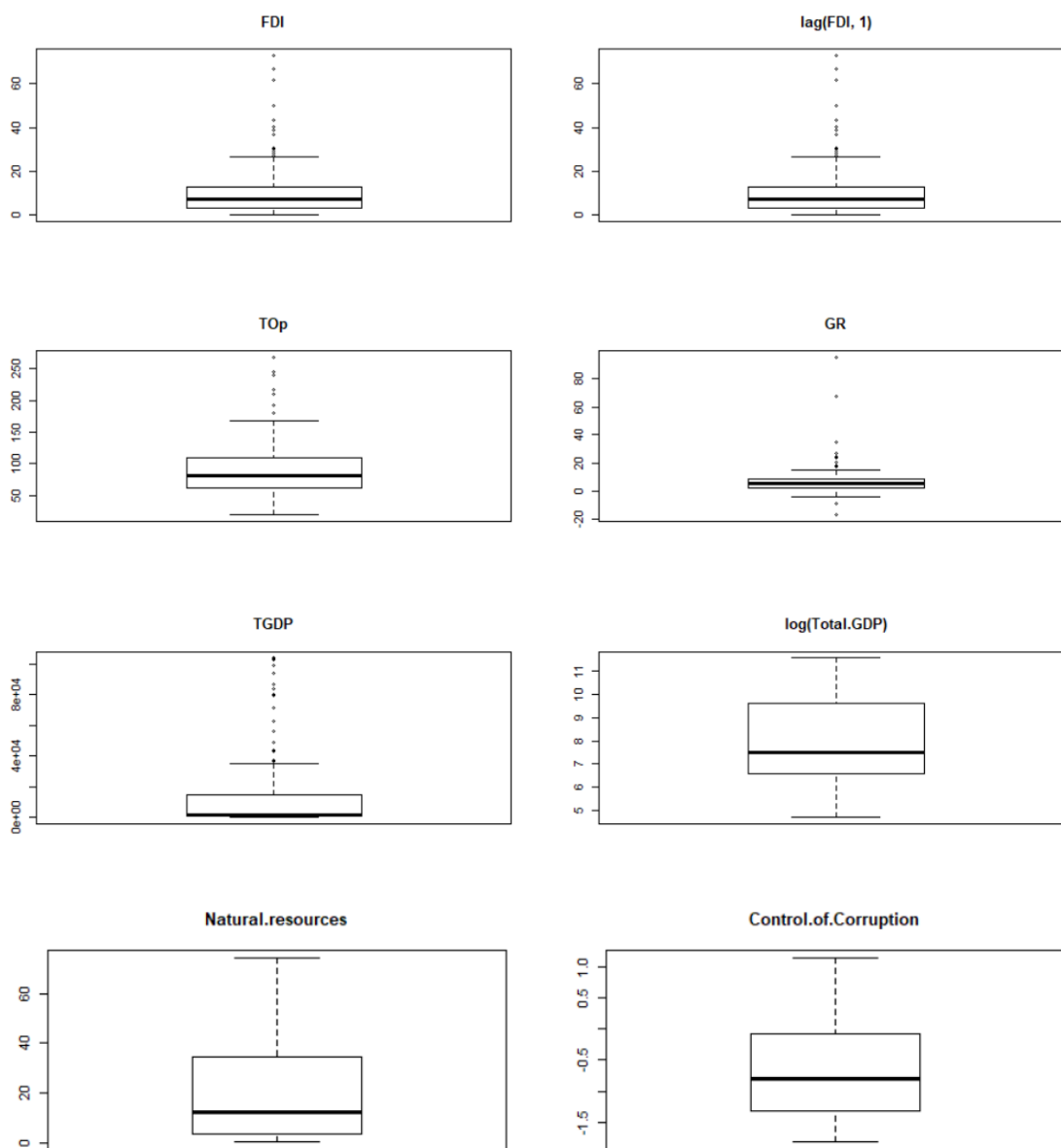
Figure 11 – Extremes diagram and quartiles (boxplot) for the variables under study, considering N = 126 observations (cont.)
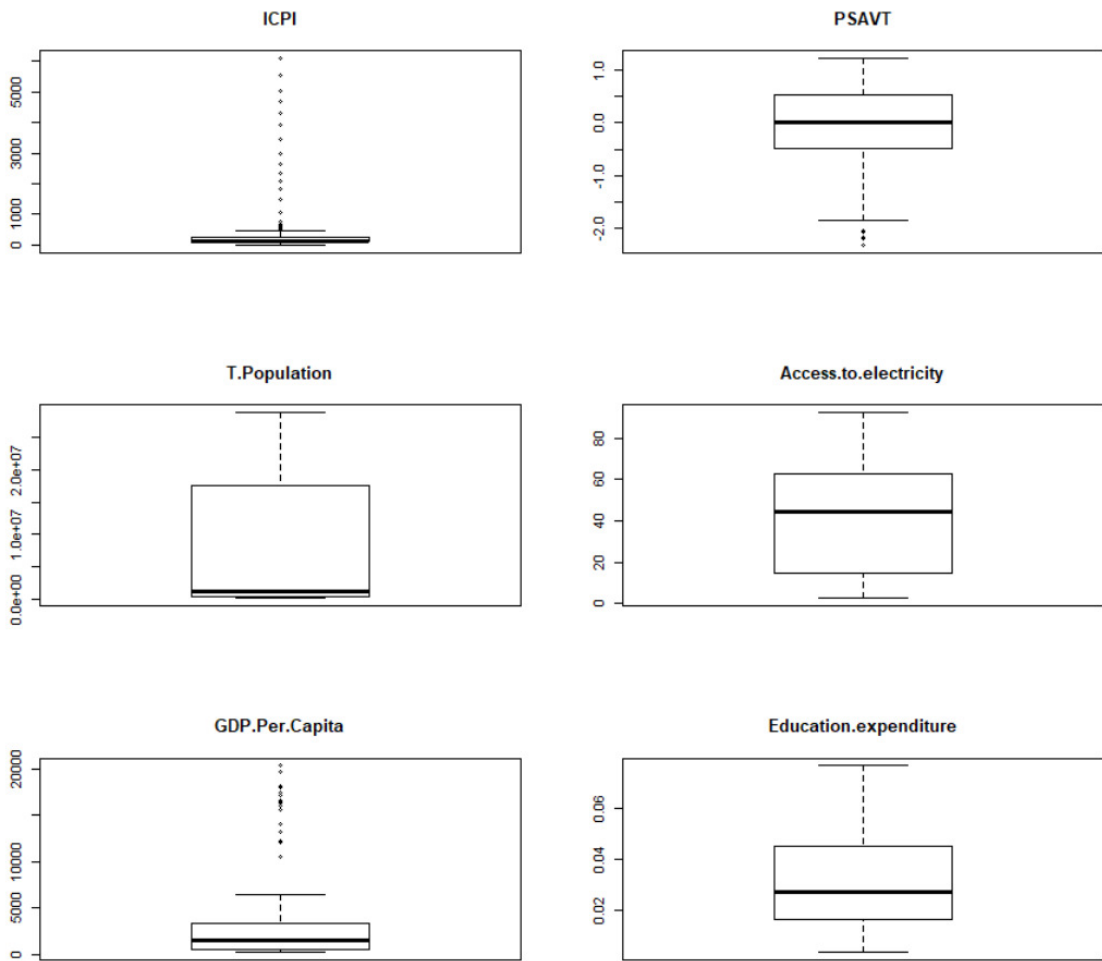
TOp - Trade Openness

GR – Growh Rate

TGDP – Total GDP

ICPI – Infation.CPI

Heterogeneity between countries

Figure 12 presents, for all variables, the study of heterogeneity between countries. In this chart it is possible to verify differences across the countries in our study concerning all variables considered. These differences were already referred in Average and dispersion indicators.

Figure1 2 – Heterogeneity between countries
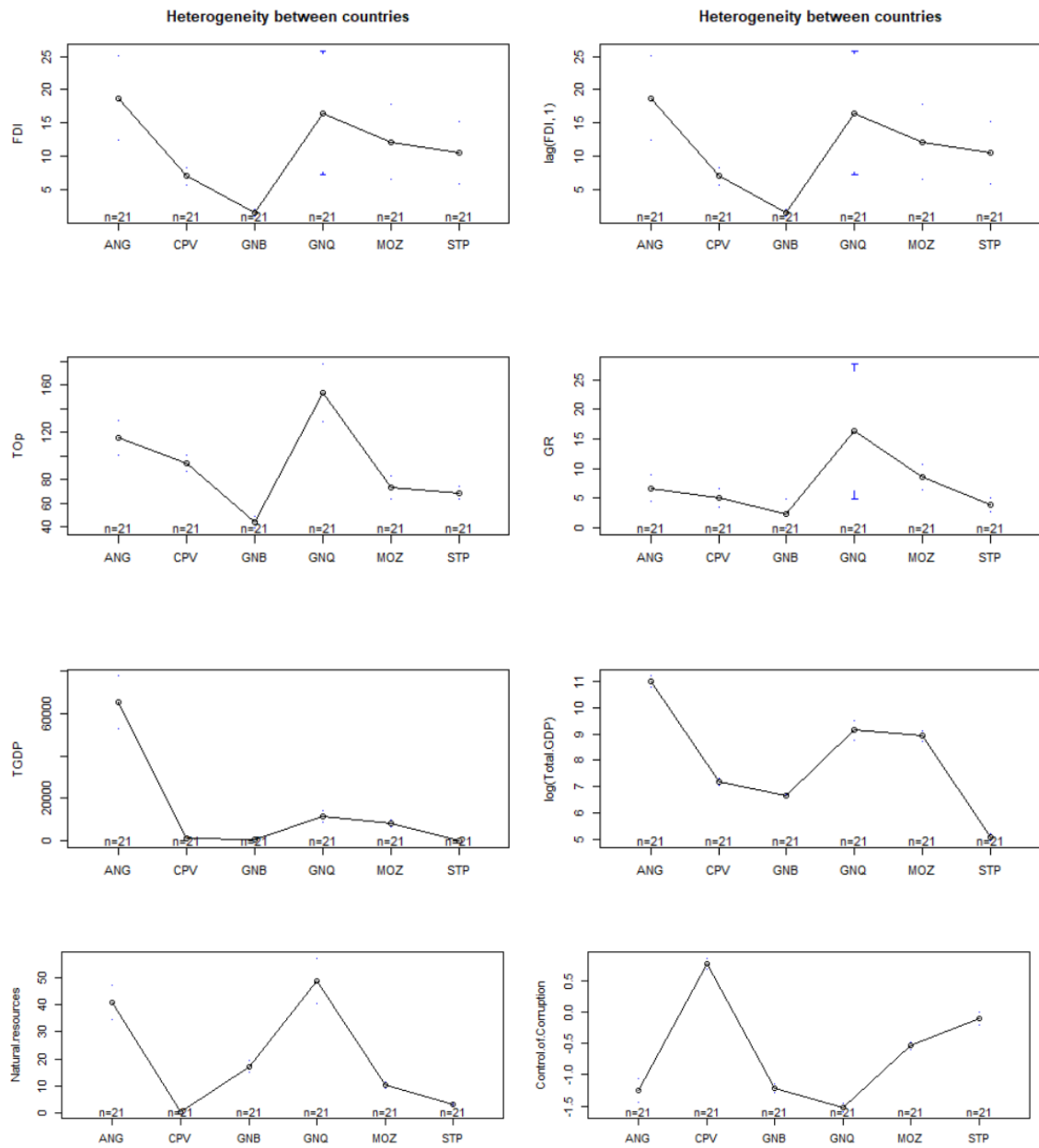
Figure 12 – Heterogeneity between countries (cont.)
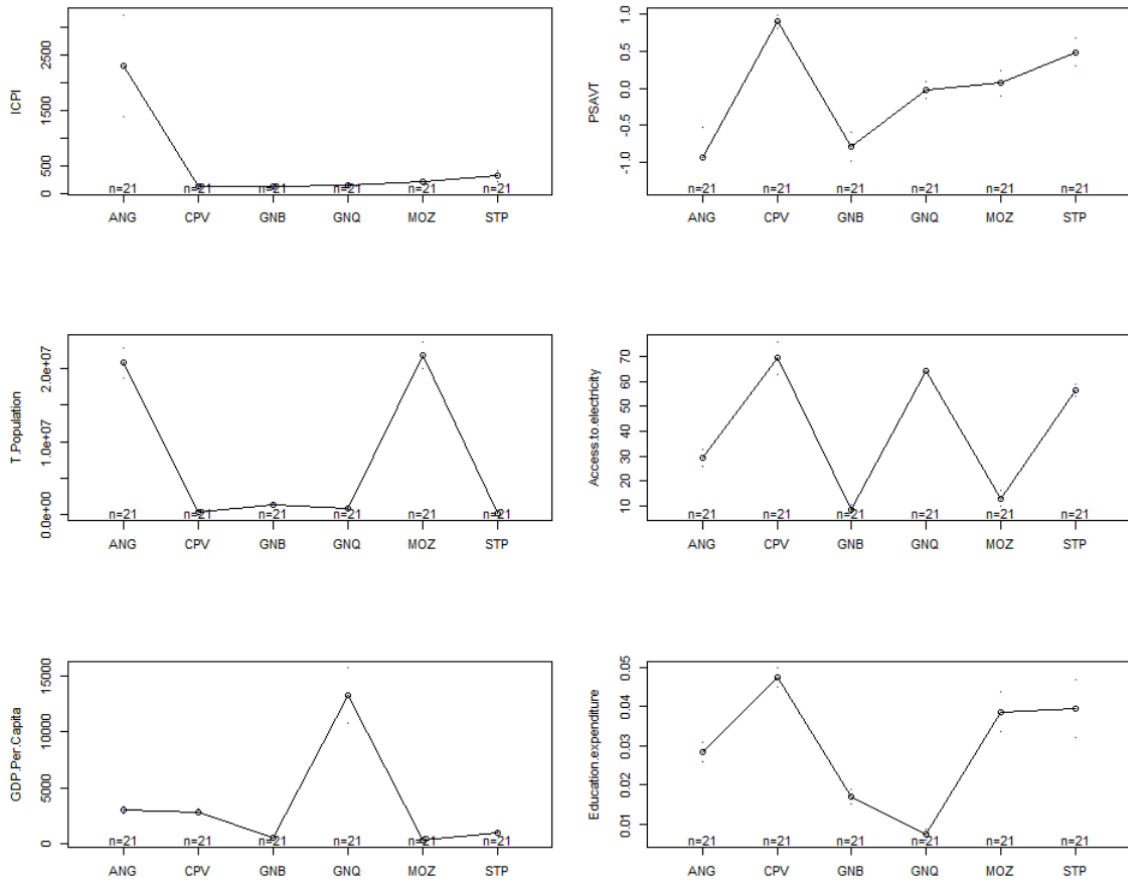
TOp - Trade Openness

GR – Growh Rate

TGDP – Total GDP

ICPI – Infation.CPI

Heterogeneity between years

Figure 13 shows the heterogeneity between years, considering all the countries as a single sample for all variables of interest. This chart depicts temporal evolution for all variables. FDI had a pick in 2003 but has a steady behavior thru time observed, indicating some stagnation of investment. It's also possible to verify an increasing trend for Total GDP, population, inflation, access to electricity, GDP *per capita* (although exhibiting a decreasing trend in most recent years) and education expenditure. Trade openness is quite stationary; control of corruption (having a pick in 2004) and political stability has been improving but

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also not showing great evolution. From this observation, we can conclude, that throughout twenty years theses variables have evolved very slowly in the PALOP countries.

Figure 13 – Heterogeneity between years
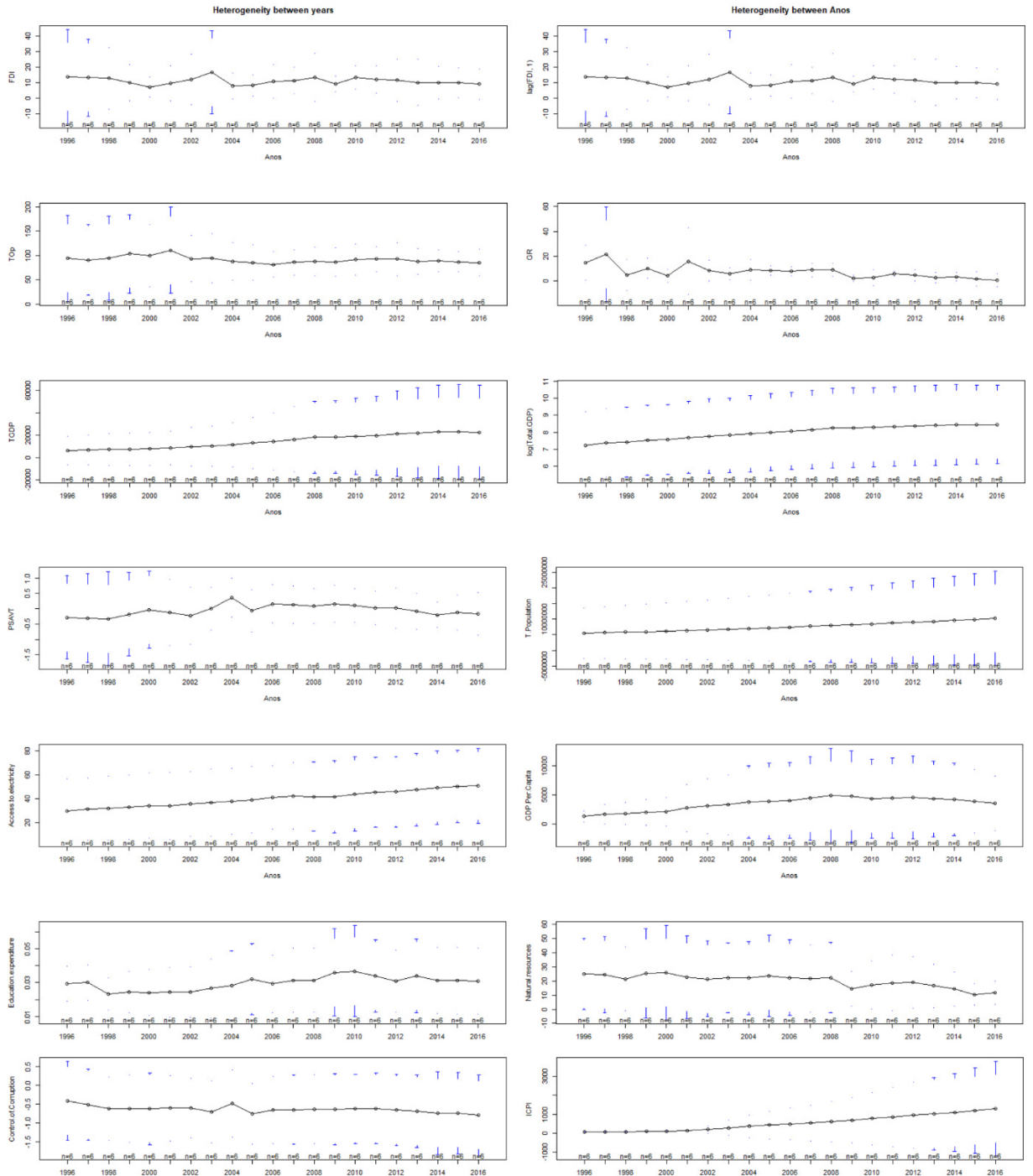
Correlation

Pearson's Correlation Coefficient is a linear correlation coefficient that returns a value of between -1 and +1. A -1 means there is a strong negative correlation and +1 means that there is a strong positive correlation. A 0 means that there is no correlation (this is also called zero correlation). Correlation coefficients whose magnitude are between 0.9 and 1.0 indicate variables which can be considered very highly correlated: correlation coefficients whose magnitude are between 0.7 and 0.9 indicate variables which can be considered highly correlated, others whose magnitude are between 0.5 and 0.7 indicate variables which can be considered moderately correlated. Finally, correlation coefficients whose magnitude are between 0.3 and 0.5 indicate variables which have a low correlation, and those whose magnitude are less than 0.3 have little if any (linear) correlation. Correlations can be positive or negative orientation.

Table 9 presents the correlation matrix between all variables. There is a very highly, positive and significant correlation between: log(Total.GDP) and T.Population; PSAVT and Control.of.Corruption; Control.of.Corruption and Education.expenditure and Natural.resources (negative orientation). Other relevant correlations are found, in some cases of moderate magnitude, as that between Trade.Openness, lag(FDI, 1), natural resources and Growth.Rate, statistically significant and positive. The remaining correlations are of weak and very weak magnitude, although in most of the cases, statistically significant.

Table 9 – Correlation matrix between variables

	Lag (FDI, 1)	log(Total.GDP)	Trade.Openess	Growth.Rate	Inflation.CPI	PSAVT	Control.of.Corruption	Access.to.electricity	T.Population	GDP.Per.Capita	Education.expenditure	Natural.resources
lag(FDI, 1)	#	0,25*	0,59**	0,43**	0,11	-0,12	-0,13	0,12	0,24*	-0,01	0,10	0,37**
log(Total.GDP)		#	0,42**	0,1	0,53**	-0,39**	-0,50**	-0,16	**0,71****	0,39**	-0,21*	0,59**
Trade.Openess			#	0,54**	-0,02	-0,01	-0,22*	0,44**	0,01	0,45**	-0,22*	0,69**
Growth.Rate				#	-0,07	0,001	-0,13	0,08	0,0006	0,1	-0,16	0,46**
Inflation.CPI					#	-0,13	-0,24*	-0,04	0,55**	-0,002	0,06	0,19*
PSAVT						#	**0,72****	0,55**	-0,29**	0,06	0,35**	-0,50**
Control.of.Corruption							#	0,40*	-0,24*	-0,39**	**0,70****	**-0,70****
Access.to.electricity								#	-0,51**	0,5**	0,17	-0,03
T.Population									#	-0,24*	0,19*	0,15
GDP.Per.Capita										#	-0,51**	0,50**
Education.expenditure											#	-0,61**
Natural.resources												#

* p<0.05   ** p<0.01(level of significance of the correlat

Inter-country comparison

Table 10 presents the results of the simultaneous comparison among the 6 countries included in this study. It is shown that, for all variables, there is statistically significant evidence to reject equality of means so, for each variable, at least one pair of countries is significantly different.

Table 10 – Analysis of Variance (ANOVA)

	Df	Group	F	Pr(>F)
FDI	5	120	3.2425	0.008805 **
lag(FDI, 1)	5	120	3.2425	0.008805 **
log(Total.GDP)	5	120	5.8229	7.512e-05 ***
Trade.Openess	5	120	7.9465	1.697e-06 ***
Growth.Rate	5	120	8.0173	1.5e-06 ***
Inflation.CPI	5	120	48.813	< 2.2e-16 ***
PSAVT	5	120	6.4985	2.211e-05 ***
Control.of.Corruption	5	120	0.7128	0.615
Access.to.electricity	5	120	17.237	7.927e-13 ***
T.Population	5	120	41.868	< 2.2e-16 ***
GDP.Per.Capita	5	120	21.063	4.543e-15 ***
Education.expenditure	5	120	9.4385	1.311e-07 ***
Natural.resources	5	120	21.015	4.831e-15 ***

Levene's Test for Homogeneity of Variance (center = median)

According to the results of the analysis of variance, the obtained differences in sample variances are unlikely to have occurred based on random sampling from a population with equal variances for all variables except for Control.of.Corruption. Therefore, the null hypothesis of equal variances is rejected, and it is concluded that there is a difference between the variances in the population.

Table 11 – Bartlett test of homogeneity of variances

	K-squared	Df	p-value
FDI and Countries	132	5	p-value < 2.2e-16
lag(FDI, 1) and Countries	132	5	p-value < 2.2e-16
log(Total.GDP) and Countries	54,864	5	p-value = 1.392e-10
Trade.Openess and Countries	77,098	5	p-value = 3.393e-15
Growth.Rate and Countries	159,33	5	p-value < 2.2e-16
Inflation.CPI and Countries	507,15	5	p-value < 2.2e-16
PSAVT and Countries	58,445	5	p-value = 2.546e-11
Control.of.Corruption and Countries	44,145	5	p-value = 2.164e-08
Access.to.electricity and Countries	71,86	5	p-value = 4.202e-14
T.Population and Countries	491	5	p-value < 2.2e-16
GDP.Per.Capita and Countries	470,51	5	p-value < 2.2e-16
Education.expenditure and Countries	81,108	5	p-value = 4.92e-16
Natural.resources and Countries	318,69	5	p-value < 2.2e-16

From the output of this table we can see that some p-value are not less than the significance level of 0.05. This means we cannot reject the null hypothesis that the variance is the same for all treatment groups, and so, there is no evidence to suggest that the variance is different for all groups.

Table 12 – One-way Independent-measures Analysis of Variance (ANOVA).

	dfn	dfd	*F*	*p*
FDI	5	120	5.66	<0.001*
Trade.Openess	5	120	39.2	<0.001*
Growth.Rate	5	120	4.28	0.001*
TGDP	5	120	102.53	<0.001*
Inflation.CPI	5	120	22.97	<0.001*
PSAVT	5	120	46.06	<0.001*
Control.of.Corruption	5	120	318.12	<0.001*
Access.to.electricity	5	120	253.05	<0.001*
T.Population	5	120	404.88	<0.001*
GDP.Per.Capita	5	120	100.6	<0.001*
Education.expenditure	5	120	60.86	<0.001*
Natural.resources	5	120	93.07	<0.001*

dfn – degrees of freedom numerator, "between groups"

dfd – degrees of freedom denominator, "within groups"

* Statistically significant differences

The shape of the F distribution depends on dfn and dfd: the lower the degrees of freedom, the larger the value of F needed to be significant. From the ANOVA test it is not possible to know which countries are significantly different and so it is necessary to do a post-hoc.

Table 13 presents Games-Howell post-hoc significance levels to compare variables across countries. The variables with the highest number of statistically significant differences are Inflation.CPI, PSAVT, Control.of.Corruption, Education.expenditure. Oppositely, the variables with less significant differences are Total.GDP, Natural.resources, T.Population, GDP.Per.Capita. To better understand what these differences are, recall the mean values in Tables 4, 5 and 6, above.

Table 13 – Games-Howell post-hoc significance levels of the comparison between studied countries

	CPV vs ANG	GNB vs ANG	GNQ vs ANG	MOZ vs ANG	STP vs ANG	GNB vs CPV	GNQ vs CPV	MOZ vs CPV	STP vs CPV	GNQ vs GNB	MOZ vs GNB	STP vs GNB	MOZ vs GNQ	STP vs GNQ	STP vs MOZ
FDI	.012	<.001	.998	.602	.284	<.001	.320	.462	.655	.031	.010	.007	.960	.839	.997
Trade.Openess	.083	<.001	.082	<.001	<.001	<.001	.001	.016	<.001	<.001	<.001	<.001	<.001	<.001	.953
Growth.Rate	.813	.116	.531	.819	.265	.458	.352	.095	.868	.172	.005	.849	.733	.260	.007
Inflation.CPI	.001	.001	.001	.001	.003	.997	.046	.006	.015	.032	.005	.014	.244	.066	.450
PSAVT	.001	.987	.002	.001	.001	.001	.001	.001	.003	.001	.001	.001	.922	.001	.017
Control.of.Corruption	.001	.999	.071	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001
Access.to.electricity	<.001	<.001	<.001	<.001	<.001	<.001	.574	<.001	.009	<.001	.148	<.001	<.001	<.001	<.001
T.Population	<.001	<.001	<.001	.956	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
GDP.Per.Capita	.954	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Education.expenditure	.001	.001	.001	.009	.070	.001	.001	.035	.307	.001	.001	.001	.001	.001	.000
Natural.resources	<.001	<.001	.606	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Total.GDP	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	.266	<.001	<.001

Note: non-significant (p>0,05).

4.2. Some notes on model selection

Panel data models are structures with both cross-sectional and temporal dimensions of combined data where the same cross-sectional unit is analyzed over time, providing information about the dynamics of its behavior.

Thus, a time series (1996 to 2016) is assigned to each unit (country) of the cross-section, and the methodology is to monitor the evolution of the countries in each indicator over the time. More over panel data use more informative data, delivering more variability and less collinearity which provides a more robust econometric analysis and enriches empirical results.

Country Fixed-effects vs Random-effects model

Consider, first, a cross-section fixed effects model (FE), where all observations are combined by letting each cross-cutting unit to have its own dummy variable (intercept). Although the intercepts may differ between individuals (in this case, the PALOP countries), the intercept relative to each individual does not vary over time; it is invariant in time (equation 1).

$$FDI_{it} = \beta\chi_{it} + \mu_1 (lag(FDI, 1))_i + \mu_2(Trade.Openess)_i + \mu_3(Growth.Rate)_i +$$
$$\mu_4(log(Total.GDP))_i + \mu_5(Inflation.CPI)_i + \mu_6(PSAVT)_i + \mu_7(Control.of.Corruption)_i +$$
$$\mu_8(Access.to.electricity)_i + \mu_9(T.Population)_i + \mu_{10}(GDP.Per.Capita)_i + \mu_{11}$$
$$(Education.expenditure)_i + \mu_{12}(Natural.resources)_i + v_{it} \qquad (1)$$

where $\beta\chi_{it\ i}$ stands for the country fixed effects and v_{it} is the error term. Estimation results are present in Table 14.

Table 14 – Country fixed-effects model, all variables

Data = dados, effect = c("individual"),
Model = "within", index = c("Paises", "Anos"))
Balanced Panel: n = 6, T = 20, N = 120

Residuals:

Min.	1st Qu.	Median	3rd Qu.	Max.
-23.26378	-2.98816	-0.51346	2.10551	25.62419

Coefficients:	Estimate	Std. Error	t-value	Pr(>|t|)
lag(FDI, 1)	6.8640e-01	7.8224e-02	8.7747	4.149e-14***
Trade.Openess	6.4210e-02	4.3195e-02	1.4865	0.14023
Growth.Rate	1.0983e-01	7.2608e-02	1.5127	0.13345
log(Total.GDP)	-1.1001e+01	5.2656e+00	-2.0892	0.03917*
Inflation.CPI	-3.4268e-03	1.6128e-03	-2.1247	0.03603*
PSAVT	2.7207e-01	1.8525e+00	0.1469	0.88353
Control.of.Corruption	-1.1970e+01	3.8087e+00	-3.1430	0.00219**
Access.to.electricity	2.4214e-01	1.5467e-01	1.5656	0.12055
T.Population	1.2457e-06	5.9675e-07	2.0875	0.03934*
GDP.Per.Capita	1.5980e-03	7.7528e-04	2.0612	0.04183*
Education.expenditure	3.0706e+01	8.5859e+01	0.3576	0.72136
Natural.resources	-2.0283e-01	8.2726e-02	-2.4518	0.01591*

Note: Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 13678
Residual Sum of Squares: 3940.6
R-Squared: 0.7119
Adj. R-Squared: 0.66388
F-statistic: 21.0037 on 12 and 102 DF, p-value: < 2.22e-16

Constant for each country:

ANG	CPV	GNB	GNQ	MOZ	STP
82.27877	60.51185	54.64442	45.21033	61.29927	37.97975

(overall_intercept) 56.9874

attr(,"se")[1] 32.96932

The column t-value shows the t-test associated with testing the significance of the parameter listed in the first column of Table 14. For example, the t-value of 8.7747 refers to the t-test of the estimated coefficient on lagged FDI, 6.8640e-01, divided by the standard error of that estimate, 7.8224e-02. $Pr(>|t|)$ provides the corresponding p-value (the proportion of the t distribution, for the corresponding degrees of freedom, which is greater than the absolute value of your t statistic), 4.149e-14. Asterisks following the $Pr(>|t|)$ are a visually accessible way of assessing whether the statistic meets several significance criteria. The p-value is the chance that the result happened due to random variation. Commonly, a p-value of .05 or less (5% chance or less of happening due to random variation) is taken to state that the result is significant. Also, the within intercept function provides both the global model constant and its default error. This function estimates a new model computationally more demanding than simply using weighted average (Table 14 Constant for each country).

With the exact same model, we tried to run a random-effects (RE) model, but it was not possible, obtaining the message "Random effects estimation requires number of cross sections>number of coefs for between estimator for estimate of RE innovation variance" implying that in our database we have insufficient number of cross section / individuals. Thus, it is not be possible to estimate the random-effects model. However, the output of the estimation would be similar to the estimation by fixed effects, according to Gujarati (2003), when T = 21 is large compared to n = 6, as in this case, the estimates of the parameters between FE and RE will not be very different. In addition, in this study we are considering all PALOPs, and not a random sample drawn from a wider population thus covering for the entire population of the PALOP countries.

In addition, when considering only fewer independent variables - lag(FDI,1), Trade.Openess, Control.of.Corruption, Natural.resources (see Annex 6), we computed the output for a fixed-effects model and for a random-effects model and proceed with the Hausman test (Hausman, 1978). The hypotheses are:

H$_0$: the random effects model is more consistent, $Cov(\eta, X_{it}) = 0$.

H$_1$: the fixed effects model is more consistent, $Cov(\eta, X_{it}) \neq 0$.

Test statistic with chi-square distribution is given by:

$$H = (\hat{b}_{RE} - \hat{b}_{FE})' \left[Var(\hat{b}_{FE}) - Var(\hat{b}_{RE}) \right]^{-1} (\hat{b}_{FE} - \hat{b}_{RE}) \sim \chi^2_{(k)}$$

where k is the number of degrees of freedom, therefore, the number of independent variables introduced in the model, $\hat{b}_{FE}$ is the vector of the fixed effects model estimators, $\hat{b}_{RE}$ it is the vector of the random effects model estimators, $Var(\hat{b}_{FE})$ is the matrix of variances-covariance of the estimators $\hat{b}_{FE}$, $Var(\hat{b}_{RE})$ is the variance-covariance matrix of the estimators $\hat{b}_{RE}$.

The test rejects H$_0$ if p≤α ou $H > \chi^2_{(k;1-\alpha)}$. So, the rejection of the null hypothesis can be interpreted as an indicator that the fixed effects model is the most appropriate:

The p-value obtained is less than 0,05 (0,005993), therefore, is possible to conclude fixed effect consistency.

If one model is inconsistent, is better to use a fixed effects model to improve consistency, so is possible to conclude that a fixed effect model would be a better choice. In this case, there is statistically significant evidence not to reject the consistency of the fixed effects model, suggesting that the preferred model for this study is of that of fixed effects.

Refined selection of independent variables

Considering the initial model (1) as starting point, and once Trade Openness, although a theoretically important variable, is highly correlated with several other variables (Growth rate, Natural resources, Access to electricity, GDP per Capita, Education Expenditures and Control of corruption) is the model, it was excluded from the model. The results are shown in Table 9 (correlation matrix between variables).

Table 15 – Country fixed-effects model, without Trade Openness

Residuals:

Min.	1st Qu.	Median	3rd Qu.	Max.
-23.40704	-2.99103	-0.52778	1.46595	25.96817

Coefficients:

	Estimate	Std. Error	t-value	Pr(>|t|)
lag(FDI, 1)	6.8984e-01	7.8648e-02	8.7713	3.947e-14***
Growth.Rate	1.4139e-01	6.9843e-02	2.0244	0.045519*
log(Total.GDP)	-1.0170e+01	5.2665e+00	-1.9310	0.056233.
Inflation.CPI	-4.6630e-03	1.3900e-03	-3.3547	0.001113**
PSAVT	1.8198e-02	1.8554e+00	0.0098	0.992193
Control.of.Corruption	-1.1585e+01	3.8221e+00	-3.0312	0.003081**
Access.to.electricity	3.0517e-01	1.4961e-01	2.0398	0.043934*
T.Population	1.4120e-06	5.8961e-07	2.3948	0.018436*
GDP.Per.Capita	1.1230e-03	7.1049e-04	1.5806	0.117038
Education.expenditure	2.3186e+01	8.6212e+01	0.2689	0.788513
Natural.resources	-1.6640e-01	7.9475e-02	-2.0937	0.038741*

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 13678
Residual Sum of Squares: 4025.9
R-Squared: 0.70566
Adj. R-Squared: 0.65994
F-statistic: 22.4486 on 11 and 103 DF, p-value: < 2.22e-16

ANG	CPV	GNB	GNQ	MOZ	STP
78.19188	57.70167	51.31201	47.98662	54.40842	35.68470

(overall_intercept) 54.21422
[1]
attr(,"se") 33.10923

It was also tested to include Trade Openness and to exclude Natural Resources; in this case only lag(FDI, 1) and Control.of.Corruption were significant; Inflation.CPI and T.Population were marginally significant; also the adjusted R-squared was of 0.64753, slightly inferior to the previous model, so model shown in Annex 8 prevailed (results not shown).

Furthermore, we decided to exclude variables that captured the same dimension to explain FDI inflows. So the model was tested using log(Total.GDP) or T.Population, alternatively, as they both capture market's dimension, and using PSAVT or Control.of.Corruption, alternatively, as both capture political instability.

Using log(Total.GDP) and PSAVT, only lag(FDI, 1) is significant while Growth.Rate and Inflation.CPI are just marginally significant; the adjusted R-Squared is of 0.61032, meaning

that the overall explanation power of the model is 61%. Using T.Population and PSAVT, the model improves; lag(FDI, 1), Growth.Rate, T.Population and Inflation.CPI are significant, also Natural.resources becomes marginally significant. The adjusted R-Squared in this model rises to 63%. In both cases PSAVT has a negative influence on FDI, as expected, but it does not contribute to the explanation power of the model due to its non-significance shown in Anexx 9 (results not shown).

Considering the alternative using T.Population and Control.of.Corruption, lag(FDI, 1), Growth.Rate, Inflation.CPI and Control.of.Corruption are significant, Natural.resources is marginally significant; the adjusted R-Squared is of 65%. Using variable log(Total.GDP) instead, lag(FDI, 1), Inflation.CPI, Control.of.Corruption are significant; Growth.Rate and Natural.resources are marginally significant; also the adjusted R-Squared is of 65%, so very similar to the previous model. In both cases, Control.of.Corruption is significant. The latter model was thus the selected to proceed with the analysis of results. Estimation results are provided Annex 10 (results not shown).

Table 16 – Country fixed-effects _selected_ model

Residuals:

Min.	1st Qu.	Median	3rd Qu.	Max.
-26.28123	-3.22002	-0.56682	1.87957	25.24664

Coefficients:

	Estimate	Std. Error	t-value	Pr(>|t|)
lag(FDI, 1)	7.4251e-01	7.6742e-02	9.6755	3.281e-16 ***
Growth.Rate	1.3888e-01	7.1019e-02	1.9555	0.0531786 .
log(Total.GDP)	-2.9471e+00	4.3969e+00	-0.6703	0.5041606
Inflation.CPI	-2.4745e-03	9.3529e-04	-2.6457	0.0094044 **
Control.of.Corruption	-1.2441e+01	3.3682e+00	-3.6938	0.0003528 ***
Access.to.electricity	2.0055e-01	1.4105e-01	1.4219	0.1580215
GDP.Per.Capita	4.4855e-04	6.6305e-04	0.6765	0.5002131
Education.expenditure	2.9374e+01	8.5254e+01	0.3445	0.7311239
Natural.resources	-1.3834e-01	7.9963e-02	-1.7301	0.0865525 .

(Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1)

Total Sum of Squares: 13678
Residual Sum of Squares: 4252.3
R-Squared: 0.68911
Adj. R-Squared: 0.64766
F-statistic: 25.8598 on 9 and 105 DF, p-value: < 2.22e-16

ANG	CPV	GNB	GNQ	MOZ	STP
24.839124	15.374460	4.652531	-5.433914	20.625953	4.054978

(overall_intercept)
10.68552
attr(,"se")
[1] 28.22777
[1] 28.40255

4.3. Selected model - Analysis of results

Results and literature

The graph of normal quantile-quantiles presents a general configuration based on the In regression analysis it is assumed that all factors affect the dependent variable but were not included as regressors (predictors) can be summarized by a random error term. This leads to the assumption that v_i are random, independent and identically distributed individuals (in this study, Countries) and are treated as an error term. In this model it is necessary to assume that the independent variables are not correlated with each specific term for each cross-sectional unit. With this, the number of parameters to be estimated is substantially reduced.

Fixed-effects models can be used when the interest is to analyze the impact of variables over time, it explores the relationship between predictor and outcome variables within an entity (in this case FDI) where each entity has its own individual characteristics that may or may not influence the predictor variables and removes the effect of time-invariant characteristics so it can be possible to assess the net effect of the predictors on the outcome variable. These time-invariant characteristics are unique to the individual and should not be correlated with other individual characteristics (if they are correlated this model is not suitable).

The model in Table 16 shows the coefficient estimates, the 95% confidence interval, the standard errors, the value and the significance level (p) for each variable included in the model to explain inflows of foreign direct investment. In the selected model, the intercept and the predictor variables log(Total.GDP), lag(FDI, 1), Inflation.CPI, Control.of.Corruption are statistically significant at 5%; Growth.Rate and Natural.resources are statistically significant only at 10 %.

Thus, we can say that all predictors have influence on the dependent variable, FDI.

In the case of panel data the interpretation of the beta coefficients would be "…for a given country, as X varies across time by one unit, Y increases or decreases by β units" Bartels (2008). Results show that if lag(FDI, 1) increases by one percentage point, FDI in the following period will increase by 7.4251e-01 percentage points; that is, each time lag(FDI, 1) grows, FDI also grows. We can conclude in the same for Growth.Rate contribution, which increases FDI by 1.3888e-01 percentage points by unit change, Access.to.electricity (increase of 2.0055e-01), GDP.Per.Capita (increase of 4.4855e-04) and Education.expenditure (increase of 2.9374e+01). These results are according to the existing literature and it is expected a positive relation between these variables and FDI Asiedu (2006); Brada et al. (2006). However, the latter three are not significant.

Also, an one-unit increase in Control.of.Corruption (-1.2441e+01); will produce an estimated decrease in FDI of 1.2441e+01 percentage points, that is, each time the Control.of.Corruption grows, FDI decreases, we can conclude in the same way for Inflation.CPI (-2.4745e-03) and Natural.resources (-1.3834e-01). Control.of.Corruption and Inflation.CPI have a negative impact on FDI inflows as according to the existing literature Asiedu (2006). In case of log(Total.GDP), this independent variable has no statistically significant impact on the foreign direct investment inflows. Natural.resources are only marginally significant, but with a negative relation with FDI. In this particular case, the existing literature is somehow divergent: some authors find in their research a positive relation between natural resources and FDI Asiedu (2006); Mijiyawa (2015) while others find that natural resources might have, instead, an adverse effect on FDI Asiedu (2013). One explanation to this negative relation is related to the *Dutch Disease* effect: natural resources might lead to the appreciation of local currency, making countries to become less competitive and affecting negatively investment in the other non-natural resource-based sectors. Also this boost given by natural resources can have a volatile effect on exchange

rates: this implies a less diversified trade and might induce a more instable macroeconomic environment, therefore negatively affecting FDI inflows. Finally, FDI oriented to natural-resources sectors requires a larger amount of investment in the initial phase of the resource exploitation, while involving substantially lower amounts in subsequent phases, affecting FDI inflows negatively if initial exploitation periods are covered by our sample Asiedu (2013).

4.4. Diagnosis of the selected fixed effects model

Residuals Normality

The graph of normal quantile-quantiles presents a general configuration based on the normality of the residuals, since almost all the observations are located on the line (Q-Q Plot), although with a slight deviation in the upper tail (see Figure 14). The histogram of the residuals with the density curve shows that most of the observations are around 10 and -10, although with some problems in the left tail of the distribution.

Figure 14 - Residues in the normal quantile and histograms of residues without and with the density curve.
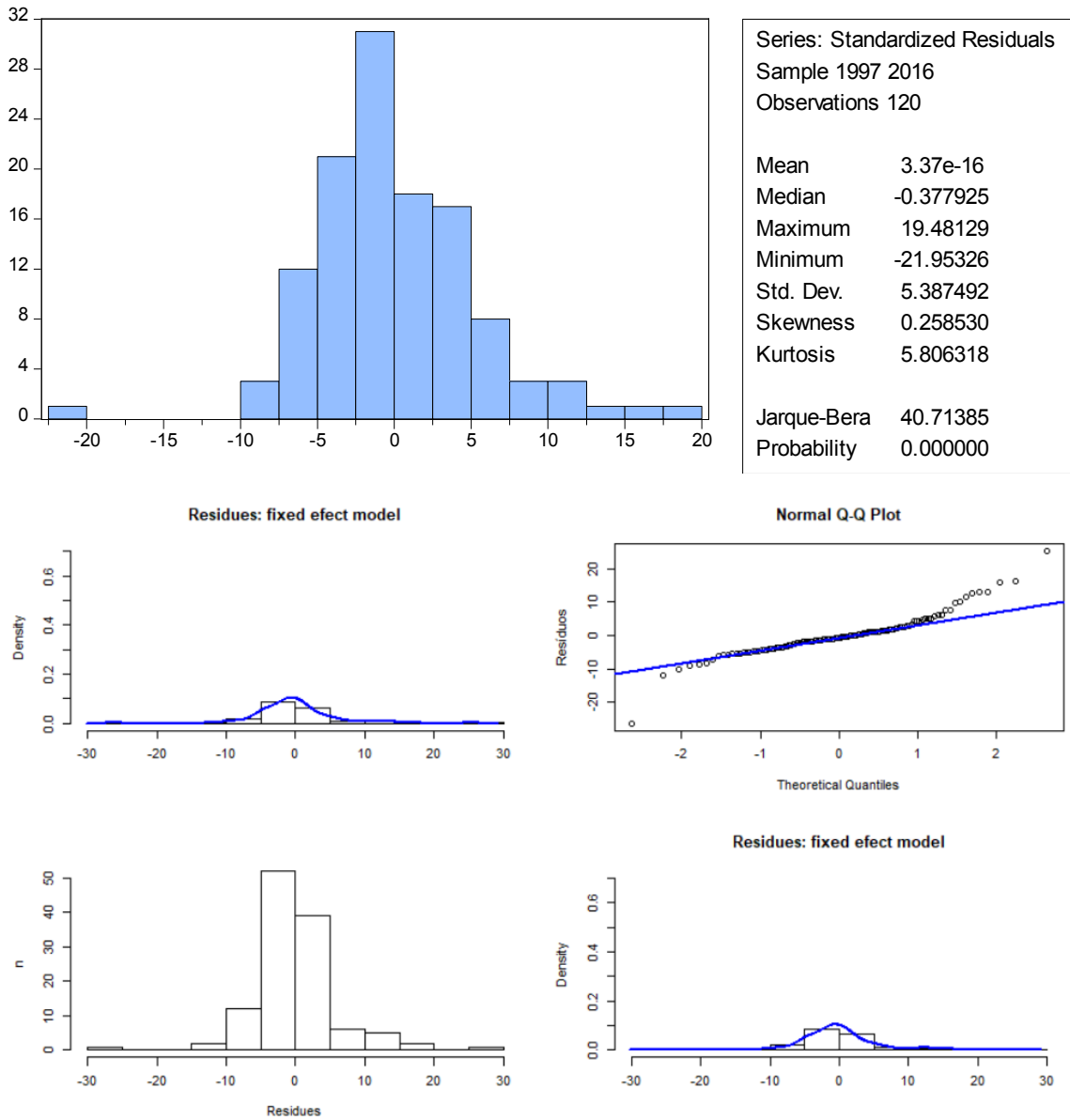
The Chi-Square Test for Normality allows us to check whether a model or theory follows an approximately normal distribution, according to the results of the test displayed below, is possible to conclude the data is normally distributed since p-value is less than 5%:

In this test relative to the normality of the residues of the model under study, we find that P=30.733, p-value = 0.001214.

Considering Jarque-Bera (JB) test data above and the following hypothesis, H_0 : Data is normal or H_1 : Data is NOT normal, at a Significance level of $\alpha = 0.05$; we obtained the following results:

JBObs = 40.7 > $\chi2$ 2,1-α = 30.7

So it is possible to conclude that at 5% significance level we reject the null of that the disturbance term is normally distribute.

Multicollinearity

Multicollinearity occurs when predictor variables (independent or explanatory) have very high intercorrelations or inter-associations among them. It is therefore a type of disturbance in the data and, if present, statistical inference may not be reliable. According to Tabachnick (2007) multicollinearity occurs when the bivariate correlation is above 0.90 (regardless of the signal). The most common test in the verification of multicollinearity is VIF Montgomery (2003), that is, a high level of linear dependence among predictor variables, whose test statistic is given by:

$$VIF(\beta_j) = (1 - R_j^2)^{-1}, \quad j = 1,...,k$$

Where R_j is the multiple correlation coefficient between variable j and the other predictor variables. The minimum possible equals 1. In turn, a VIF>10 value is indicative of the presence of multicollinearity Montgomery (2003). Other authors point to VIF values below 4 or 5 Miles (2001).

In this case, for all variables, it is possible to conclude that there are no problems of multicollinearity between the predictive variables since VIF of all variables falls below 4 (see Table 17).

Table 17 - VIF of all variables

Variable	VIF
LAG_FDI	0,00000067
GROWTH_RATE	0,00000044
LOG_TOTAL_GDP	0,00000909
INFLATION_CPI	0,00000073
CONTROL_OF_CORRUPTION	0,00000492
ACCESS_TO_ELECTRICITY	0,00000829
GDP_PER_CAPITA	0,00000701
EDUCATION_EXPENDITURE	0,00000125
NATURAL_RESOURCES	0,00000173

Own computation, using formula: $VIF = \frac{(SE)^2 * (n-1) Std.Dev^2}{OSE^2}$.

Homoscedasticity of residuals

Figure 19 shows a homoscedastic appearance, since the residuals maintain approximately constant amplitude of variation with respect to the horizontal zero line. Except for four observations located below the horizontal line -2 and above line 2, very deviant observations are not verified, but certain randomness around the horizontal line is present; so we can presume homoscedasticity.

Figure 19 - Homoscedasticity of the residues of the fixed effects model.
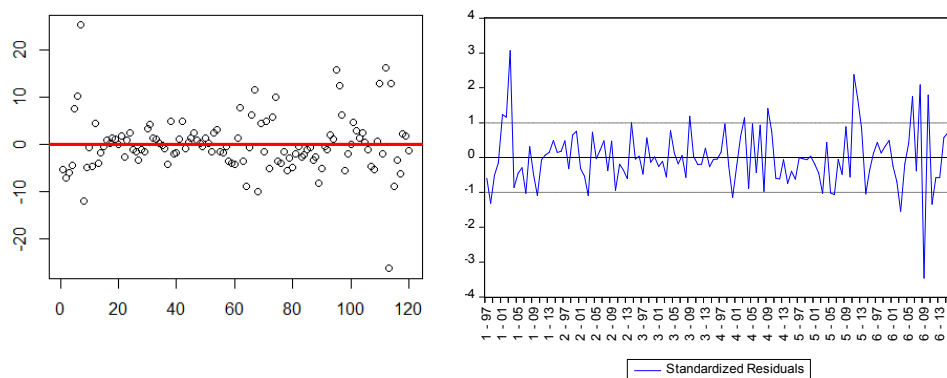
Complementarily the Breusch-Pagan test result is 33.11558 (p=0.0045), confirming the presence of homogeneity of the residues. Several authors consider heteroscedasticity as a

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problem Baltagi (2006); Wooldridge (2002). However, despite the controversy surrounding the theme, several authors point out that heteroscedasticity is not a problem when working with data models in panels, since these models are themselves a solution to that Drukker (2003).

The cross-sectional dependence was verified by the Pesaran test for cross-section dependence and the serial correlation by the average correlation coefficient for cross-sectional dependence Pesaran (2004, 2012, 2015). The hypotheses are: H_0: residues between countries have cross-sectional independence (not correlated) or H_1: residues between countries have cross-sectional dependence (correlated).In terms of cross-sectional dependence, the model of this study registered p=0.0036. Thus, there is no evidence to reject the null hypothesis, so the errors have no serial correlation or significant cross-sectional dependence (see Table 18 below).

Table 18 - Pesaran test for cross-section dependence

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in residuals
Equation: EQ0F
Periods included: 20
Cross-sections included: 6
Total panel observations: 120
Cross-section effects were removed during estimation

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	33.11558	15	0.0045
Pesaran scaled LM	3.307438		0.0009
Bias-corrected scaled LM	3.149543		0.0016
Pesaran CD	-2.909205		0.0036

Overall Significance of the Model

The overall significance of the model was performed by the F test. The null hypothesis indicates that the coefficients of the model are all equal and equal to zero (the model is not adequate). Since $F(9)= 25,860$, $p<0.001$ (Table 19), there is statistically significant evidence to reject the null hypothesis that the coefficients are all equal to zero and state that the model is overall significant and the variability explained is not due to chance. The test statistic is given by:

$$F = (SSR/k)/(SSE/(nT-n-k)) = MSR/MSE$$

where SSR is the sum of squares of the regression, SSE is the sum of squares of errors (residues), n is the number of countries, T is the number of time periods and k is the number of predictor variables.

The complete ANOVA table (Table 19) follows bellow:

Table 19 –ANOVA of the regression of the model under study

Variation	Sum of Squares	df	Mean Squares	F
Regression	9 426	9	1047,30	25,860
Residual (Error)	4 252	105	40,498	
TOTAL	13678	114		

Adjustment of the model (goodness-of-fit for panel model)

The adjustment of the model was carried out by the coefficient of determination (R^2) and by the adjusted coefficient of determination (R_a^2) that vary between [0, 1]. Higher the value better is the adjustment goodness. In this study, R^2=0.68911 and R^2_α= 0.64766. Since the number of predictor variables is 9 (k=9), then it is preferable to use the adjusted coefficient of determination, since it is not affected by the increase in the number of predictor variables in the model, unlike what happens with the coefficient of determination. The test statistic is given by:

$$R_a^2 = 1 - (SSE/(N-p))/(SST/(p-1))) = 1 - ((N-1)/(nT-k-1)) * (1-R^2),$$

where SST is the sum of squares total, SSE is the sum of squares of errors, N is the sample size, k is the number of predictor variables. The overall adjustment is reasonable. In other words, about 65% of the total variability of the dependent variable, FDI, can be explained by the predictors that participate in the model: lag(FDI, 1), Growth.Rate, log(Total.GDP), Inflation.CPI, Control.of.Corruption, Access.to.electricity, GDP.Per.Capita,

Education.expenditure and Natural.resources. Nonetheless, the non-determination coefficient is $1-R^2_\alpha=1-0.64766=0.35234$, that is, about 35.2% of the proportion of FDI variability is not explained by the variability of the predictors of the regression model, but by other factors.

5. Conclusions

The main goal of this study was to assess whether political instability impacts on the attraction of FDI by PALOP countries, a rather absent issue in existing empirical literature. To achieve this goal, we proceeded with a detailed literature review regarding key determinants for FDI inflows, focusing on Africa in order to account for the specific characteristics of the countries in this continent as also pointed out mentioned in the existing literature (*e.g.*, Asiedu (2006)). Comparing with other countries or geographic areas, the literature is scarce, however with relevant findings on this topic and to our research. Most of literature point to a negative relation between political instability and FDI; also corruption and inflation as negative impact on FDI Asiedu (2006); Dupasquier and Osakwe (2006); Fedderke and Romm (2006); Lemi and Asefa (2003); Mijiyawa (2015); market size, good infrastructures, economic growth, trade openness and labor force point to a positive relation with FDIAnyanwu and Yaméogo (2015); Bende-Nabende (2002); Yasin (2005). Natural resources have study's to point to a positive relations and other a negative one Asiedu (2002, 2013).

We then proceed with an empirical analysis in order to answer our main research question. We collected data form several fonts, namely from the Worldwide Governance Indicators (WGI), UNQTADSTAT, World Development indicators and World Bank. The sample data covers for the main determinants of FDI inflows as described in the literature for Africa, collected on a yearly basis. Data covers, specifically, for what we consider as PALOP countries (Angola, Cape Verde, Guinea Bissau, Equatorial Guinea, Mozambique and Sao Tome and Principe) throughout 21 years (from 1996 to 2016). We first described the behavior of each variable across time and country and then, with a view to select a particular panel data model, we proceeded with several statistical tests to establish a particular country fixed-effects model. Overviewing the major findings is possible to conclude that Guinea Bissau has lower values for most of the variables. FDI is higher in Angola and Equatorial Guinea, natural resources have more importance for Angola and Equatorial Guinea, and lest to Cape Verde and São Tomé and Principe. Concerning control of corruption, the countries with lest controls are Angola, Guinea Bissau and Equatorial, also as expected. Inflation is higher in Angola and Political stability and absence of violence and terrorism is more evident in Cape Verde, in other and, we can observe that Angola and Guinea Bissau are countries with more instability. Angola and Mozambique are

the countries with more population; Guinea Bissau and Mozambique, in other hand, have less access to electricity. GDP per capita is greater in Equatorial Guinea, but is the country that invests less in education. Considering time evolution, FDI has a steady behavior thru time observed, indicating some stagnation of investment. It's also possible to verify crescent evolution for Total GDP, population, inflation, access to electricity, GDP per capita (although, decrescent in this most recent years) and education expenditure. Trade openness is a bit stationary also as control of corruption and political stability has been improving but not showing great evolution. In general, is possible to see evolution but very shallow.

Our main results from the model point to a negative and significant relation between FDI inflows to PALOP countries and political instability (as measured by Control of Corruption). Results also show evidence for time-dependence of FDI inflows, proving long-lasting effects of investment shocks in these countries. GDP growth rate also contributes positively for FDI attraction in PALOP countries. In turn, Inflation (as measured by the consumers price index) has a negative impact on FDI, as expected and pointed out in the existing literature, and natural resources rents are only marginally significant, but also with a negative relation with FDI. Indeed, some literature points, and among others, to the *Dutch disease* negative effect on FDI Asiedu (2013) while others still find a positive relation between natural resources and FDI Asiedu (2006); Mijiyawa (2015).

Additionally, our results find no statistical significance for the access to electricity (as a proxy for infrastructure endowment), GDP per capita, GDP and education expenditure on attracting FDI, as recurrently found in the literature Asiedu (2006); Brada et al. (2006). Despite the constraints faced during the development of this work, namely the scarceness and disparity of data across countries, we managed to organize and use a vast set of extremely robust information to withdraw some import findings about PALOP countries, contributing to the literature in an innovative way. In terms of policy recommendations, policy authorities in PALOP countries should promote economic growth, disinflationary policies and a better control for corruption in order to foster FDI inflows.

Finally, regarding leads for further research, it would be useful for such research to be better equipped with data to capture political instability, such as the quality of public services, regulatory quality, rule of law, voice and accountability (degree of freedom of citizens to vote or to freely express themselves), capturing a broader connection with FDI

concerning political/social regimes in PALOP countries that, due to history of democracy, may also contribute to instability. In other hand, it would be also interesting to have more robust findings about the true impact of natural resources because, in our sample we have countries were the importance of natural resources is large, like Angola, but we also have countries, like Cape Verde, that do not rely on important natural resources to explore. Time constraints, availability and the poor quality of the data for the PALOP countries, prevented us to go any further.

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Annexes

Annex 1

Figure I.1. FDI inflows, global and by group of economies, 2005–2016, and projections, 2017–2018
(Billions of dollars and per cent)
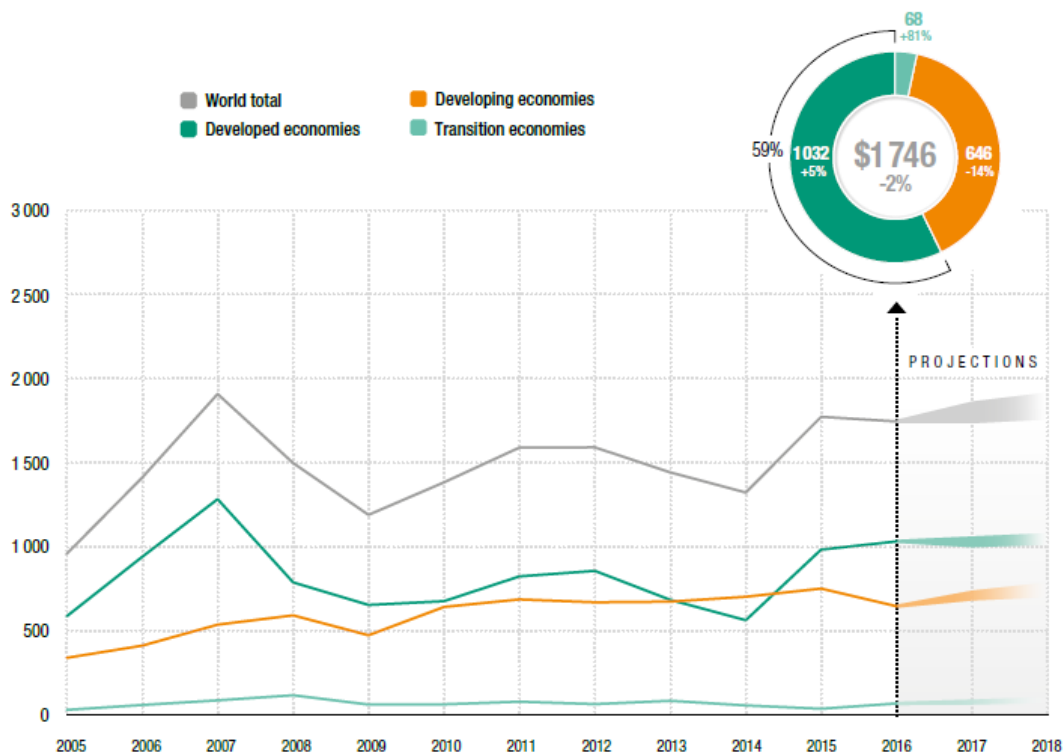
Source: ©UNCTAD, FDI/MNE database (www.unctad.org/fdistatistics).

Source: UNCTAD, FDI/MNE database (www.unctad.org/fdistatistics), accessed on November 9, 2017

Annex 2

Figure I.4. | **Factors influencing future global FDI activity** (Per cent of all executives)

Macroeconomic factors

Factor	Increase	Decrease
The state of developing Asian economies	82	7
The state of the United States economy	70	30
The state of the BRICS and other emerging economies	55	21
The state of the EU economy	45	29
Quantitative easing programs	36	10
Commodity prices, including oil	36	25
Changes in tax regimes	28	29
Changes in global financial regulations	23	25
Changes in trade agreements	22	60
Exchange rate volatility	11	57
Rising interest rates	7	53
Debt concerns in emerging markets	4	54
Geopolitical uncertainty	3	87

Corporate and external factors

Factor	Increase	Decrease
Technological change including digital economy	70	6
Global urbanization	51	4
Availability of skilled labour force	41	21
Energy security	39	19
Changes in offshore outsourcing of corporate operations	37	18
Changes in consumption patterns	32	12
Food security	28	16
Climate change	17	35
Migration	13	25
Cyberthreats and data security	4	46
Social instability	4	70
Natural disasters (including pandemics)	4	48
Terrorism	3	75

■ Share of executives who think this factor will lead to an increase in FDI globally

■ Share of executives who think this factor will lead to a decrease in FDI globally

Source: ©UNCTAD, business survey.

Source: UNCTAD, FDI/MNE database (www.unctad.org/fdistatistics), accessed on November 9, 2017

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Annex 3

| Table I.1. | FDI inflows by group of economies and region, 2014–2016, and projections, 2017 (Billions of dollars and per cent) |

Group of economies/region	2014	2015	2016	Projections 2017
World	1 324	1 774	1 746	1 670 to 1 870
Developed economies	563	984	1 032	940 to 1 050
Europe	272	566	533	560
North America	231	390	425	360
Developing economies	704	752	646	660 to 740
Africa	71	61	59	65
Asia	460	524	443	515
Latin America and the Caribbean	170	165	142	130
Transition economies	57	38	68	75 to 85
Memorandum: annual growth rate (per cent)				
World	-8	34	-2	(-4 to 7)
Developed economies	-18	75	5	(-9 to 2)
Europe	-20	108	-6	~-5
North America	-15	69	9	~-15
Developing economies	4	7	-14	(2 to 15)
Africa	-4	-14	-3	~10
Asia	9	14	-15	~15
Latin America and the Caribbean	-3	-3	-14	~-10
Transition economies	-33	-34	81	(10 to 25)

Source: ©UNCTAD, FDI/MNE database (www.unctad.org/fdistatistics).

Source: UNCTAD, FDI/MNE database (www.unctad.org/fdistatistics), accessed on November 9, 2017.

Annex 4

FDI and Armed Conflict Involving the State, Africa, 1997-2014

Source: http://www.crisis.acleddata.com/conflict-resilient-investment/
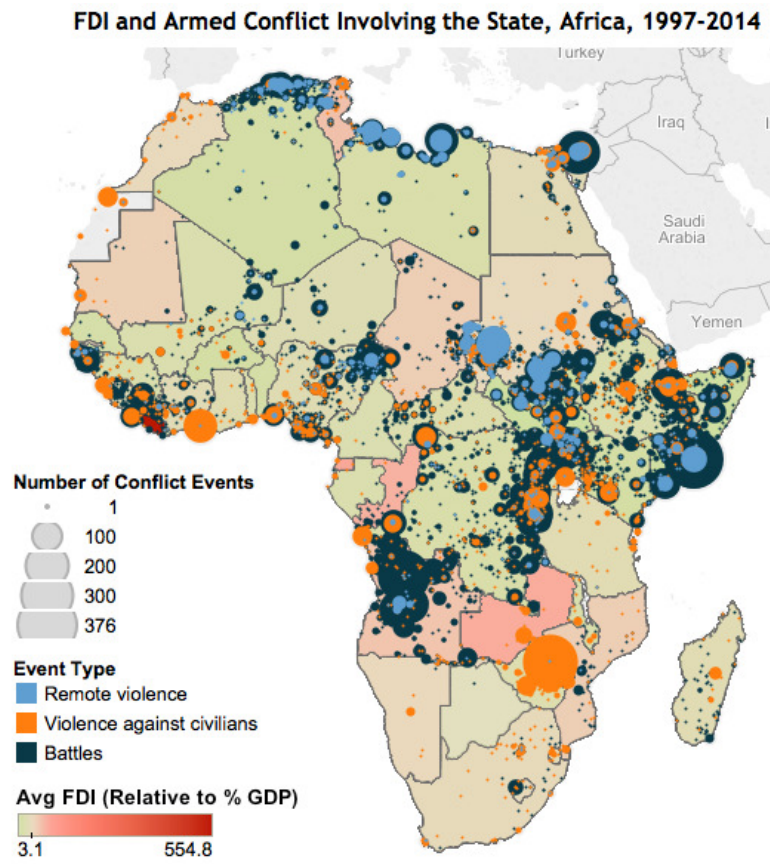
Map of conflict events involving the state between 1997 and 2014 over the average annual rate of FDI stock received by states (relative to their GDP) during the same time period.

Annex 5

Voice and Accountability

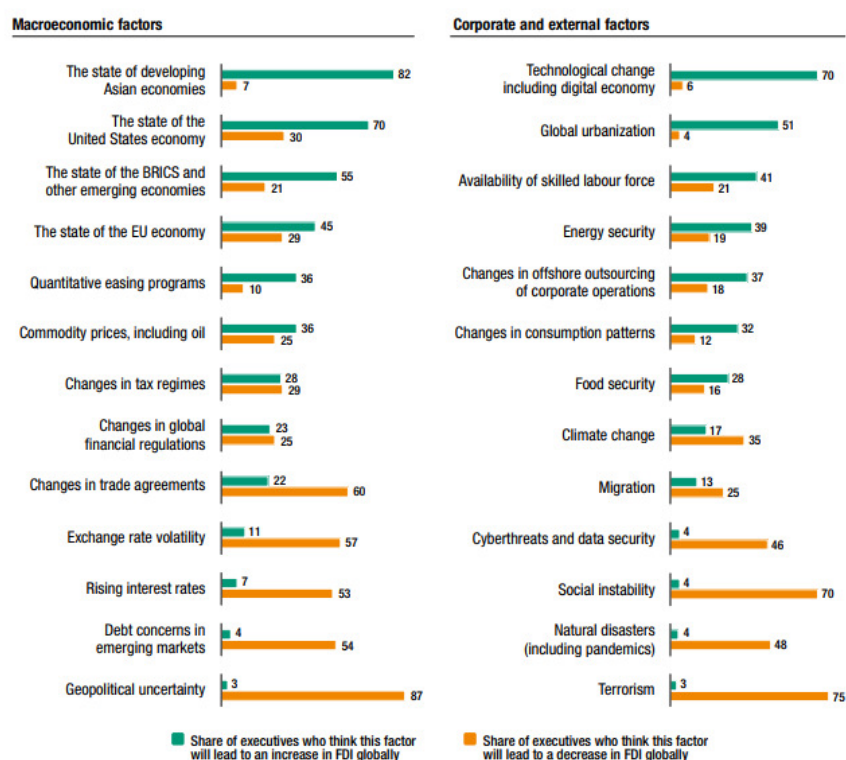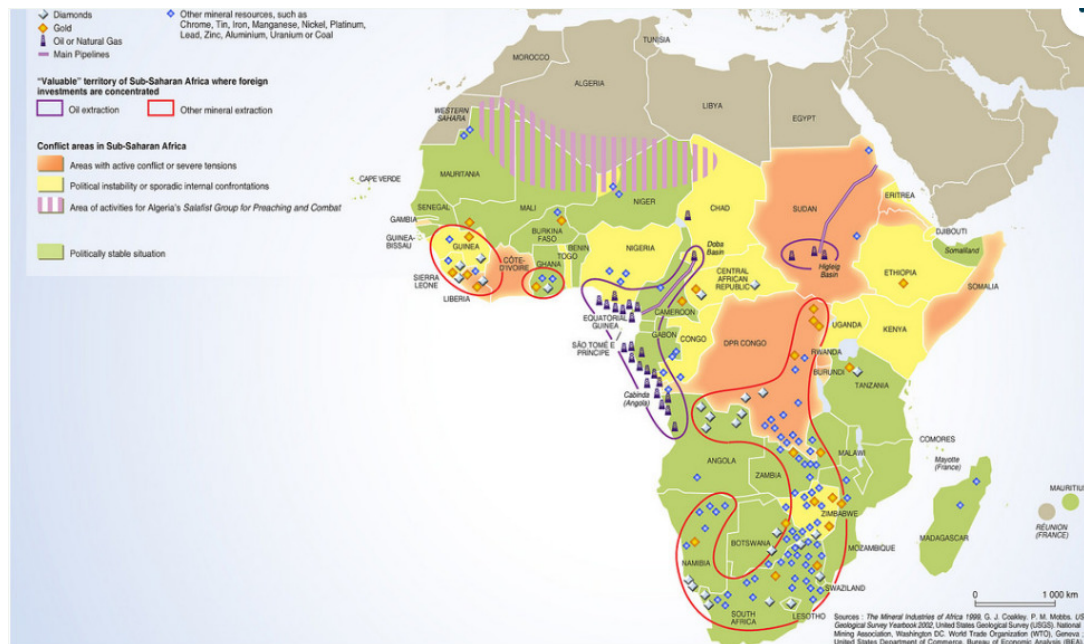| Country/Territory	WBCode	1996	1998	2000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	AVG Voice&Acc
Angola	AGO	-1,58	-1,41	-1,46	-1,24	-1,27	-1,29	-1,23	-1,25	-1,19	-1,12	-1,13	-1,12	-1,13	-1,08	-1,11	-1,15	-1,18	-1,17	-1,23
Cape Verde	CPV	0,94	0,93	0,80	0,69	0,59	0,65	0,44	0,78	0,86	0,94	0,89	0,89	0,97	0,94	0,92	0,96	0,96	1,02	0,84
Guinea-Bissau	GNB	-0,97	-0,94	-0,64	-0,66	-1,07	-0,84	-0,48	-0,63	-0,71	-0,72	-0,76	-0,82	-0,85	-1,33	-1,34	-0,85	-0,75	-0,70	-0,84
Equatorial Guinea	GNQ	-1,52	-1,56	-1,60	-1,62	-1,66	-1,64	-1,68	-1,83	-1,89	-1,89	-1,81	-1,86	-1,90	-1,91	-1,97	-1,98	-2,00	-1,93	-1,79
Mozambique	MOZ	-0,28	-0,16	-0,22	-0,22	-0,03	-0,03	0,01	-0,09	-0,08	-0,07	-0,11	-0,12	-0,20	-0,20	-0,26	-0,25	-0,27	-0,39	-0,17
São Tomé and Principe	STP	0,33	0,51	0,48	0,56	0,24	0,11	0,06	0,27	0,19	0,18	0,16	0,12	0,25	0,18	0,14	0,32	0,28	0,45	0,27

Political Stability and Absence of Violence/Terrorism

Country/Territory	WBCode	1996	1998	2000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	AVG Pol_Inst
Angola	AGO	-2,06	-2,31	-2,04	-1,58	-1,01	-1,06	-0,89	-0,54	-0,67	-0,36	-0,35	-0,23	-0,37	-0,39	-0,39	-0,33	-0,50	-0,39	-0,86
Cape Verde	CPV	1,03	1,11	1,22	0,73	0,92	1,04	0,75	0,96	0,88	0,81	0,82	0,84	0,72	0,81	0,78	0,35	0,87	0,88	0,86
Guinea-Bissau	GNB	-1,54	-1,86	-0,35	-0,73	-0,49	-0,38	-0,56	-0,50	-0,46	-0,71	-0,67	-0,69	-0,75	-0,97	-0,90	-0,71	-0,52	-0,50	-0,74
Equatorial Guinea	GNQ	-0,13	-0,08	-0,04	-0,52	0,11	-0,06	-0,39	0,17	0,26	0,20	0,37	0,24	0,15	0,23	0,12	-0,37	-0,21	-0,19	-0,01
Mozambique	MOZ	-0,05	0,11	-0,13	0,19	0,25	0,00	0,12	0,52	0,36	0,38	0,63	0,39	0,33	0,39	-0,23	-0,34	-0,51	-1,05	0,08
São Tomé and Principe	STP	1,05	1,08	1,15	0,55	0,26	0,57	0,58	0,35	0,39	0,18	0,15	0,12	0,01	0,01	0,11	0,18	0,14	0,23	0,40

Government Effectiveness

Country/Territory	WBCode	1996	1998	2000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	AVG Gov_Eff
Angola	AGO	-0,86	-1,34	-1,46	-1,24	-1,16	-1,31	-1,14	-1,37	-1,21	-1,06	-0,96	-1,12	-1,15	-0,99	-1,22	-1,12	-1,00	-1,04	-1,15
Cape Verde	CPV	#N/A	0,37	0,32	-0,08	-0,02	-0,03	-0,21	0,16	0,35	0,07	0,05	-0,02	0,15	0,12	0,10	0,07	0,15	0,10	0,10
Guinea-Bissau	GNB	-1,41	-1,26	-1,01	-1,09	-1,22	-1,46	-1,36	-1,10	-1,08	-1,04	-1,03	-1,03	-1,03	-1,23	-1,43	-1,58	-1,61	-1,64	-1,26
Equatorial Guinea	GNQ	-0,96	-1,43	-1,51	-1,34	-1,24	-1,44	-1,43	-1,58	-1,67	-1,67	-1,70	-1,68	-1,63	-1,61	-1,54	-1,50	-1,42	-1,41	-1,49
Mozambique	MOZ	-0,14	-0,39	-0,43	-0,38	-0,48	-0,54	-0,52	-0,62	-0,51	-0,51	-0,55	-0,58	-0,64	-0,63	-0,61	-0,72	-0,75	-0,85	-0,55
São Tomé and Principe	STP	-0,38	-0,61	-0,46	-0,56	-0,57	-0,61	-0,68	-0,77	-0,71	-0,67	-0,66	-0,79	-0,70	-0,68	-0,73	-0,82	-0,75	-0,68	-0,66

Regulatory Quality

Country/Territory	WBCode	1996	1998	2000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	AVG Reg_Q
Angola	AGO	-1,42	-1,69	-1,80	-1,46	-1,21	-1,25	-1,26	-1,13	-1,02	-1,07	-1,03	-1,04	-1,10	-0,97	-1,05	-0,99	-0,91	-1,00	-1,19
Cape Verde	CPV	-0,53	-0,16	0,03	-0,24	-0,19	-0,32	-0,32	-0,18	-0,18	-0,04	0,04	-0,03	0,07	0,06	-0,10	-0,18	-0,26	-0,30	-0,16
Guinea-Bissau	GNB	-0,83	-1,25	-1,17	-0,97	-0,81	-1,07	-1,12	-0,94	-1,07	-1,12	-1,18	-1,14	-1,12	-1,23	-1,26	-1,19	-1,20	-1,24	-1,11
Equatorial Guinea	GNQ	-1,44	-1,60	-1,68	-1,46	-1,36	-1,45	-1,43	-1,39	-1,31	-1,32	-1,28	-1,38	-1,33	-1,44	-1,43	-1,36	-1,35	-1,38	-1,41
Mozambique	MOZ	-0,52	-0,28	-0,16	-0,31	-0,53	-0,49	-0,71	-0,56	-0,55	-0,45	-0,39	-0,40	-0,43	-0,45	-0,40	-0,41	-0,50	-0,70	-0,46
São Tomé and Principe	STP	-0,65	-1,07	-0,75	-0,46	-0,57	-0,83	-0,87	-0,64	-0,75	-0,71	-0,74	-0,84	-0,73	-0,78	-0,79	-0,80	-0,77	-0,81	-0,75

Rule of Law

Country/Territory	WBCode	1996	1998	2000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	AVG Rule_law
Angola	AGO	-1,63	-1,70	-1,66	-1,62	-1,52	-1,50	-1,43	-1,30	-1,37	-1,37	-1,23	-1,27	-1,27	-1,27	-1,27	-1,12	-1,08	-1,08	-1,37
Cape Verde	CPV	1,04	0,83	0,78	0,34	0,29	0,36	0,40	0,65	0,63	0,58	0,54	0,47	0,51	0,52	0,54	0,63	0,59	0,35	0,56
Guinea-Bissau	GNB	-1,67	-1,80	-1,32	-1,17	-1,14	-1,17	-1,25	-1,25	-1,31	-1,39	-1,34	-1,33	-1,31	-1,52	-1,59	-1,33	-1,28	-1,49	-1,37
Equatorial Guinea	GNQ	-1,28	-1,55	-1,42	-1,46	-1,41	-1,48	-1,46	-1,37	-1,30	-1,27	-1,27	-1,30	-1,27	-1,30	-1,35	-1,45	-1,46	-1,44	-1,38
Mozambique	MOZ	-0,81	-0,80	-0,73	-0,64	-0,67	-0,67	-0,62	-0,61	-0,60	-0,61	-0,59	-0,47	-0,57	-0,59	-0,82	-0,81	-0,85	-1,02	-0,69
São Tomé and Principe	STP	0,27	-0,20	-0,02	-0,42	-0,40	-0,32	-0,53	-0,49	-0,43	-0,48	-0,68	-0,66	-0,66	-0,75	-0,77	-0,79	-0,76	-0,69	-0,49

Control of Corruption

Country/Territory	WBCode	1996	1998	2000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	AVG Corrup
Angola	AGO	-1,17	-1,41	-1,52	-1,18	-1,32	-1,31	-1,30	-1,22	-1,29	-1,28	-1,40	-1,33	-1,34	-1,27	-1,31	-1,44	-1,39	-1,41	-1,33
Cape Verde	CPV	1,14	0,56	0,63	0,57	0,59	0,46	0,56	0,81	0,89	0,87	0,87	0,86	0,90	0,87	0,84	0,94	0,95	0,88	0,79
Guinea-Bissau	GNB	-1,19	-1,21	-1,10	-1,01	-1,15	-1,22	-1,15	-1,09	-1,19	-1,18	-1,20	-1,16	-1,16	-1,28	-1,33	-1,54	-1,48	-1,56	-1,23
Equatorial Guinea	GNQ	-1,26	-1,31	-1,55	-1,43	-1,52	-1,66	-1,61	-1,59	-1,50	-1,47	-1,47	-1,47	-1,46	-1,52	-1,59	-1,77	-1,77	-1,81	-1,54
Mozambique	MOZ	-0,42	-0,43	-0,43	-0,51	-0,60	-0,60	-0,53	-0,62	-0,52	-0,49	-0,44	-0,45	-0,49	-0,57	-0,60	-0,67	-0,75	-0,87	-0,55
São Tomé and Principe	STP	0,40	0,01	0,20	-0,07	-0,26	-0,36	-0,54	-0,29	-0,30	-0,30	-0,20	-0,25	-0,18	-0,18	-0,18	0,00	-0,05	-0,06	-0,14

Source: Own computation, www.govindicators.org, The Worldwide Governance Indicators, 2017 Update, *Aggregate Governance Indicators 1996-2016,* accessed on December 26, 2017.

Annex 6

Indicator	Country	Year	Percentile Rank (0 to 100)
Voice and Accountability	Equatorial Guinea	2006	
		2011	
		2016	
Political Stability and Absence of Violence/Terrorism	Equatorial Guinea	2006	
		2011	
		2016	
Government Effectiveness	Equatorial Guinea	2006	
		2011	
		2016	
Regulatory Quality	Equatorial Guinea	2006	
		2011	
		2016	
Rule of Law	Equatorial Guinea	2006	
		2011	
		2016	
Control of Corruption	Equatorial Guinea	2006	
		2011	
		2016	

Indicator	Country	Year	Percentile Rank (0 to 100)
Voice and Accountability	Guinea-Bissau	2006	
		2011	
		2016	
Political Stability and Absence of Violence/Terrorism	Guinea-Bissau	2006	
		2011	
		2016	
Government Effectiveness	Guinea-Bissau	2006	
		2011	
		2016	
Regulatory Quality	Guinea-Bissau	2006	
		2011	
		2016	
Rule of Law	Guinea-Bissau	2006	
		2011	
		2016	
Control of Corruption	Guinea-Bissau	2006	
		2011	
		2016	

Indicator	Country	Year	Percentile Rank (0 to 100)
Voice and Accountability	Mozambique	2006	
		2011	
		2016	
Political Stability and Absence of Violence/Terrorism	Mozambique	2006	
		2011	
		2016	
Government Effectiveness	Mozambique	2006	
		2011	
		2016	
Regulatory Quality	Mozambique	2006	
		2011	
		2016	
Rule of Law	Mozambique	2006	
		2011	
		2016	
Control of Corruption	Mozambique	2006	
		2011	
		2016	

Source: Kaufmann et al. (2010), The Worldwide Governance Indicators: Methodology and Analytical Issues ; http://info.worldbank.org/governance/wgi/index.aspx#reports, accessed on December 26, 2017

Country/Territory	VA_2014	VA_2015	VA_2016	PINST_2014	PINST_2015	PINST_2016	GE_2014	GE_2015	GE_2016	RQ-2014	RQ-2015	RQ-2016	RL_2014	RL_2015	RL_2016	CC_2014	CC_2015	CC_2016
Angola	15	15	17	33	28	32	13	15	13	17	18	13	11	13	13	4	4	6
Cape Verde	75	76	78	59	74	77	57	60	57	48	45	43	75	71	63	79	80	79
Guinea-Bissau	25	27	28	23	27	28	4	4	4	10	10	9	7	7	6	3	3	4
Equatorial Guinea	2	2	2	30	40	39	6	7	7	6	6	4	4	7	0	0	0	0
Mozambique	39	37	34	32	28	12	24	23	19	37	35	25	21	21	16	29	25	18
São Tomé and Princip	59	58	61	54	53	54	21	23	26	25	25	21	23	25	27	58	56	55

Source: Own computation, , The Worldwide Governance Indicators, 2017 Update, *Aggregate Governance Indicators 1996-2016,* accessed on December 26, 2017.

Annex 7

#modelo com menos variáveis para fazer Hausman test
> #EFixos
> test.7<-
plm(FDI~lag(FDI,1)+Trade.Openess+Control.of.Corruption+Natural.resources,
data=dados, index=c("Paises", "Anos"), model="within", effect = c("individual"))
> summary(test.7)
Oneway (individual) effect Within Model

Call:
plm(formula = FDI ~ lag(FDI, 1) + Trade.Openess + Control.of.Corruption +
    Natural.resources, data = dados, effect = c("individual"),
    model = "within", index = c("Paises", "Anos"))

Balanced Panel: n = 6, T = 20, N = 120

Residuals:
Min.
-23.97980

Coefficients:

lag(FDI, 1)

Trade.Openess
Control.of.Corruption
Natural.resources

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 13678
Residual Sum of Squares: 4435.1
R-Squared: 0.67574
Adj. R-Squared: 0.64921
F-statistic: 57.3097 on 4 and 110 DF, p-value: < 2.22e-16
> fixef(test.7) # constante para cada País
ANG
-11.553179
> within_intercept(test.7) # constante global do modelo + erro-padrão
(overall_intercept)
        -9.115171
attr(,"se")
[1] 2.911318
> #Evariaveis
> test.8<-
plm(FDI~lag(FDI,1)+Trade.Openess+Control.of.Corruption+Natural.resources,
data=dados, index=c("Paises", "Anos"), model="random", effect = c("individual"))
> summary(test.8)
Oneway (individual) effect Random Effect Model
   (Swamy-Arora's transformation)

Call:
plm(formula = FDI ~ lag(FDI, 1) + Trade.Openess + Control.of.Corruption +
   Natural.resources, data = dados, effect = c("individual"),
   model = "random", index = c("Paises", "Anos"))

Balanced Panel: n = 6, T = 20, N = 120

Effects:

idiosyncratic
individual
theta: 0

Residuals:
Min.
-23.80262

Coefficients:

(Intercept)
lag(FDI, 1)
Trade.Openess
Control.of.Corruption
Natural.resources

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 17409
Residual Sum of Squares: 5298.8
R-Squared: 0.69563
Adj. R-Squared: 0.68504
F-statistic: 65.7061 on 4 and 115 DF, p-value: < 2.22e-16
> # COMPARAR modelo de efeitos fixos vs modelo de efeitos aleatórios
> # TESTE DE HAUSMAN
> phtest(test.7, test.8)

      Hausman Test

data: FDI ~ lag(FDI, 1) + Trade.Openess + Control.of.Corruption + Natural.resources
chisq = 14.448, df = 4, p-value = 0.005993
alternative hypothesis: one model is inconsistent

FDI ~ lag(FDI, 1) + Trade.Openess + Control.of.Corruption + Natural.resources

chisq = 14.448, df = 4, p-value = 0.005993

alternative hypothesis: one model is inconsistent

Annex 8

EFEITOS FIXOS, países
> test.1<-
plm(FDI~lag(FDI,1)+Growth.Rate+log(Total.GDP)+Inflation.CPI+PSAVT+Control.
of.Corruption+Access.to.electricity+T.Population+GDP.Per.Capita+Education.expendi
ture+Trade.Openess, data=dados, index=c("Paises", "Anos"), model="within", effect =
c("individual"))
> summary(test.1)
Oneway (individual) effect Within Model

Call:
plm(formula = FDI ~ lag(FDI, 1) + Growth.Rate + log(Total.GDP) +
    Inflation.CPI + PSAVT + Control.of.Corruption + Access.to.electricity +
    T.Population + GDP.Per.Capita + Education.expenditure + Trade.Openess,
    data = dados, effect = c("individual"), model = "within",
    index = c("Paises", "Anos"))

Balanced Panel: n = 6, T = 20, N = 120

Residuals:
    Min. 1st Qu.   Median 3rd Qu.   Max.
-23.54928 -3.24442 -0.15735 1.96298 27.54550

Coefficients:

85

```
                     Estimate  Std. Error t-value  Pr(>|t|)
lag(FDI, 1)           6.7754e-01  8.0019e-02  8.4672  1.845e-13 ***
Growth.Rate           6.9770e-02  7.2446e-02  0.9631  0.337775
log(Total.GDP)       -8.5011e+00  5.2901e+00 -1.6070  0.111123
Inflation.CPI        -3.2345e-03  1.6496e-03 -1.9607  0.052611 .
PSAVT                 3.0901e-01  1.8970e+00  0.1629  0.870918
Control.of.Corruption -1.1776e+01  3.8994e+00 -3.0200  0.003188 **
Access.to.electricity 2.2283e-01  1.5818e-01  1.4087  0.161939
T.Population          1.1215e-06  6.0889e-07  1.8418  0.068375 .
GDP.Per.Capita        1.2895e-03  7.8339e-04  1.6461  0.102791
Education.expenditure 3.0520e+01  8.7923e+01  0.3471  0.729206
Trade.Openess         3.2832e-02  4.2248e-02  0.7771  0.438857
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    13678
Residual Sum of Squares: 4172.8
R-Squared:      0.69492
Adj. R-Squared: 0.64753
F-statistic: 21.3289 on 11 and 103 DF, p-value: < 2.22e-16
```

> # Utilizamos o Lag para reportar a um período anterior, neste caso menos um ano Lag(FDI,1),
> # partindo do pressuposto que um investidor que fez no ano passado um investimento deverá também
> # continuar o mesmo
> fixef(test.1) # constante para cada País

```
    ANG     CPV     GNB     GNQ     MOZ     STP
54.44787 47.73827 36.88822 23.66006 42.80792 28.42617
```

> within_intercept(test.1) # constante global do modelo + erro-padrão

```
(overall_intercept)
        38.99475
attr(,"se")
[1] 32.91488
```

Annex 9

```
> test.1<-
plm(FDI~lag(FDI,1)+Growth.Rate+log(Total.GDP)+Inflation.CPI+PSAVT+Access.to
.electricity+GDP.Per.Capita+Education.expenditure+Natural.resources, data=dados,
index=c("Paises", "Anos"), model="within", effect = c("individual"))
> summary(test.1)
Oneway (individual) effect Within Model

Call:
plm(formula = FDI ~ lag(FDI, 1) + Growth.Rate + log(Total.GDP) +
    Inflation.CPI + PSAVT + Access.to.electricity + GDP.Per.Capita +
    Education.expenditure + Natural.resources, data = dados,
    effect = c("individual"), model = "within", index = c("Paises",
        "Anos"))
```

Balanced Panel: n = 6, T = 20, N = 120

Residuals:
    Min. 1st Qu. Median 3rd Qu.   Max.
-25.7165 -2.3276 -0.3240   1.3608 29.6101

Coefficients:
                       Estimate Std. Error t-value Pr(>|t|)
lag(FDI, 1)   0.64516081 0.07524160 8.5745 9.46e-14 ***
Growth.Rate   0.14502435 0.07471955 1.9409 0.05495 .
log(Total.GDP)   1.67664329 4.41616762 0.3797 0.70496
Inflation.CPI   -0.00192585 0.00115333 -1.6698 0.09793 .
PSAVT   -2.60915574 1.72910451 -1.5090 0.13431
Access.to.electricity 0.04687078 0.14562935 0.3218 0.74821
GDP.Per.Capita   -0.00021561 0.00066588 -0.3238 0.74674
Education.expenditure 79.10422266 91.06484884 0.8687 0.38702
Natural.resources   -0.13193371 0.08409511 -1.5689 0.11969

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 13678
Residual Sum of Squares: 4702.9
R-Squared: 0.65617
Adj. R-Squared: **0.61032**
F-statistic: 22.2645 on 9 and 105 DF, p-value: < 2.22e-16
> # Utilizamos o Lag para reportar a um período anterior, neste caso menos um ano
Lag(FDI,1),
> # partindo do pressuposto que um investidor que fez no ano passado um
investimento deverá também
> # continuar o mesmo
> fixef(test.1) # constante para cada País
     ANG   CPV   GNB   GNQ   MOZ   STP
 -7.392863 -14.062580 -12.025291 -9.208396 -12.551651 -8.393178
> within_intercept(test.1) # constante global do modelo + erro-padrão
(overall_intercept)
       -10.60566
attr(,"se")
[1] 28.94289

> # EFEITOS FIXOS, países
> test.1<-
plm(FDI~lag(FDI,1)+Growth.Rate+T.Population+Inflation.CPI+PSAVT+Access.to.el
ectricity+GDP.Per.Capita+Education.expenditure+Natural.resources, data=dados,
index=c("Paises", "Anos"), model="within", effect = c("individual"))
> summary(test.1)
Oneway (individual) effect Within Model

Call:
plm(formula = FDI ~ lag(FDI, 1) + Growth.Rate + T.Population +
    Inflation.CPI + PSAVT + Access.to.electricity + GDP.Per.Capita +
    Education.expenditure + Natural.resources, data = dados,
    effect = c("individual"), model = "within", index = c("Paises",
        "Anos"))

Balanced Panel: n = 6, T = 20, N = 120

Residuals:
     Min.   1st Qu.   Median   3rd Qu.   Max.
-22.69947 -2.54719 -0.24023   1.47299 30.17554

Coefficients:

lag(FDI, 1)
Growth.Rate
T.Population
Inflation.CPI
PSAVT
Access.to.electricity
GDP.Per.Capita
Education.expenditure
Natural.resources

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 13678
Residual Sum of Squares: 4461.5
R-Squared: 0.67381
Adj. R-Squared: **0.63032**
F-statistic: 24.0998 on 9 and 105 DF, p-value: < 2.22e-16
> # Utilizamos o Lag para reportar a um período anterior, neste caso menos um ano
Lag(FDI,1),
> # partindo do pressuposto que um investidor que fez no ano passado um
investimento deverá também
> # continuar o mesmo
> fixef(test.1) # constante para cada País
       ANG   CPV   GNB   GNQ   MOZ   STP
 -5.7926862 0.8009289 -1.2606714 6.7176412 -20.6930746 3.5479602
> within_intercept(test.1) # constante global do modelo + erro-padrão
(overall_intercept)
       -2.779984
attr(,"se")
[1] 4.608254

Annex 10

test.1<-
plm(FDI~lag(FDI,1)+Growth.Rate+T.Population+Inflation.CPI+PSAVT+Control.of.

Corruption+Access.to.electricity+GDP.Per.Capita+Education.expenditure+Natural.reso
urces, data=dados, index=c("Paises", "Anos"), model="within", effect = c("individual"))
> # EFEITOS FIXOS, países
> test.1<-
plm(FDI~lag(FDI,1)+Growth.Rate+T.Population+Inflation.CPI+Control.of.Corruptio
n+Access.to.electricity+GDP.Per.Capita+Education.expenditure+Natural.resources,
data=dados, index=c("Paises", "Anos"), model="within", effect = c("individual"))
> summary(test.1)
Oneway (individual) effect Within Model

Call:
plm(formula = FDI ~ lag(FDI, 1) + Growth.Rate + T.Population +
    Inflation.CPI + Control.of.Corruption + Access.to.electricity +
    GDP.Per.Capita + Education.expenditure + Natural.resources,
    data = dados, effect = c("individual"), model = "within",
    index = c("Paises", "Anos"))

Balanced Panel: n = 6, T = 20, N = 120

Residuals:
    Min.   1st Qu.   Median   3rd Qu.   Max.
-23.68245 -3.32565 -0.28459 1.71058 26.54238

Coefficients:
                      Estimate Std. Error t-value   Pr(>|t|)
lag(FDI, 1)   6.9487e-01 7.9104e-02 8.7843 3.233e-14 ***
Growth.Rate   1.5802e-01 6.9819e-02 2.2632 0.025679 *
T.Population   7.6530e-07 4.8606e-07 1.5745 0.118382
Inflation.CPI   -4.2421e-03 1.2837e-03 -3.3045 0.001302 **
Control.of.Corruption -1.0402e+01 3.3008e+00 -3.1512 0.002119 **
Access.to.electricity 9.6061e-02 9.7836e-02 0.9819 0.328426
GDP.Per.Capita   -5.2766e-06 4.0588e-04 -0.0130 0.989652
Education.expenditure -6.4678e+00 8.3079e+01 -0.0779 0.938095
Natural.resources   -1.3985e-01 7.8865e-02 -1.7733 0.079077 .

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 13678
Residual Sum of Squares: 4172
R-Squared: 0.69498
Adj. R-Squared: 0.65431
F-statistic: 26.5821 on 9 and 105 DF, p-value: < 2.22e-16
> # Utilizamos o Lag para reportar a um período anterior, neste caso menos um ano
Lag(FDI,1),
> # partindo do pressuposto que um investidor que fez no ano passado um
investimento deverá também
> # continuar o mesmo
> fixef(test.1) # constante para cada País
     ANG   CPV   GNB   GNQ   MOZ   STP
-10.620614   3.077077 -11.546920 -16.054505 -17.888082 -1.946881
> within_intercept(test.1) # constante global do modelo + erro-padrão

89

```
(overall_intercept)
      -9.163321
attr(,"se")
[1] 4.657144
[1] 5.038871
```