The Effect of Illicit Financial Flows on Government Revenues in the West African Economic and Monetary Union Countries

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The Effect of
Illicit Financial Flows on Government Revenues in the West African Economic and Monetary Union Countries

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Abstract

This is a study of the effect of illicit financial flows (IFFs) on government revenues in the West African Economic and Monetary Union (WAEMU) countries over the 1996–2013 period. The study found that IFFs had a negative and significant effect on government revenues and that this effect was tied to per capita income, corruption and governance. It further highlighted the significance of the per capita income in the relationship between illicit financial flows and government revenues.

Key words: government revenues, illicit financial flows, capital flight

1. Introduction

Public resource mobilization is an important and indispensable strategy a given government must use in its implementation of investment, poverty reduction and public service provision policies (Ogunleye and Fashina, 2009; Culpeper and Bhushan, 2010). Even though this issue has not received the attention it deserves, today increasing government revenues has emerged as a necessary step for developing countries towards reducing their reliance on foreign aid (Diarra, 2012).

An analysis of public revenue mobilization rates in developing countries taken together or individually reveals contrasting situations. In the West African Economic and Monetary Union (WAEMU) area, this rate was 19.1% in 2013, which was lower than the average for sub-Saharan Africa (27.5%) (BCEAO, 2013). This notwithstanding, between 2000 and 2014, the WAEMU member states made great efforts to meet the minimum threshold of 17% of their gross domestic product (GDP). During that period, Senegal and Togo significantly increased their tax collection rate to 19.3% and 19.8% respectively. The two countries were able to achieve these rates because they widened their tax base as a result of the recent boom in their mining industries and in their telecommunications and banking sectors (Annex A).

Burkina Faso and Niger also increased their public revenues to 15% of their GDP in 2014, compared to around 10% in 2000. In contrast, Côte d'Ivoire, Mali and Benin made very little progress during the same period: 14.7% against 15.2% for Côte d'Ivoire, 12.3% against 12.5% for Mali, and 14.1% against 14.8% for Benin. Guinea Bissau had the lowest tax collection rate in the WAEMU area, with an average rate of only 7% (BCEAO, 2013).

Despite the tax collection performance of these countries, their situation constitutes a surprising paradox (Ndikumana, 2014). Most of them do not have enough savings to finance their investments. This means that their economies are forced to depend on official development aid, which has been constantly declining as a result of recurring financial crises. However, large sums of money are illegally transferred out of them (and the continent) every year (GFI,[1] 2008; ECA, 2013).

Illicit financial flows (IFFs) have become a major concern for governments and international development agencies. Narrowly defined, IFFs are undeclared funds that are illegally acquired, transferred or used as the product of criminal activities or corruption (GFI, 2008, ECA, 2013). Broadly defined, they are funds acquired and transferred by taking advantage of the loopholes in the law or some other artificial

arrangements aimed at circumventing the spirit of the law (OECD, 2014). This paper will follow the narrow definition and define IFFs as any income that is acquired, transferred or used illegally.

IFFs are increasingly attracting attention because of their scale and negative impact on countries' development efforts. Empirical studies (AfDB, 2010; GFI, 2013; ECA, 2013) have reported large sums of money that has illegally left the African continent. While there is much controversy about the exact amount of money involved in this capital flight, it most likely exceeds the official development assistance (ODA) and investment inflows. Estimates of illicit capital flight from Africa show that, on average, it increases by 12% per year (GFI, 2013; Dickinson, 2014).

According to GFI (2013), IFFs from developing countries grew by 10.2% between 2002 and 2012. In 2012, Asia experienced the highest rate of IFFs (39.6%), while developing Europe and Western countries in the western hemisphere experienced rates of 21.5% and 19.6%, respectively (Annex C). The average rate for the Middle East and North Africa regions was 11.2%. Although sub-Saharan Africa experienced the lowest nominal rate (7.7%), it had the highest average GDP ratio, 5.7% (Kar and Leblanc, 2014).

IFFs are tied to several transmission channels, most of which come from corruption, criminal activity and trading activities. GFI (2010) estimated that 30% to 35% of those flows from African countries were linked to organized crime. That is a very high proportion, compared to that of IFFs linked to corruption (5%). But most striking is the fact that 60% to 65% of the total IFFs were related to trading activities.

According to the High Level Group (2015), Africa itself is to blame for IFFs, because of the weaknesses in its governance system and especially of the inability of its regulatory institutions to prevent them. But those IFFs can also be blamed on the opacity and lack of transparency of the international banking system, which is a facilitating factor in the easy transfer, circulation, and concealment of financial resources. They can also be blamed on the existence of safe havens, which makes it difficult for African countries to monitor the IFFs (ECA, 2014).

All these problems show that IFFs have many and complex effects on countries' economies and can affect their levels of public revenue mobilization through various mechanisms involving the violation of the law and the undermining of good governance both in the public and the private sectors. IFFs hinder economic growth, leading to a reduction in investment and, hence, in public revenues (UNDP, 2011; Ndikumana, 2014).

The link between IFFs and public revenue mobilization, as has been shown in the previous contextual analysis, is crucial to the economies of African countries. This study analyses how IFFs affect government revenues in the WAEMU countries. Specifically, it measures the effect and the contribution of the transmission channels through which IFFs affect government revenues. The study was motivated by the observation that IFFs reduce the resources that could have been invested to create wealth in the countries affected. This suggests that IFFs have a potentially negative effect on public revenues.

An analysis of such an IFF effect is particularly relevant to the situation of the WAEMU countries for several reasons. First, one of the characteristics of their economies is the existence of a fixed exchange rate between the CFA franc and the euro. This exchange-rate fixity means that the countries concerned are unable to adjust the exchange rate, which has led to a strong sensitivity of their economic growth to shocks (Savvides, 1996), a state of affairs which in turn encourages illicit capital outflows. Second, the opening of the capital account increases the countries' vulnerability to fluctuations in capital flows, particularly by providing the legal channels for an illicit outflow of capital (Ndikumana, 2014). Third, the informal networks, which are extremely active in cross-border trade, have fostered the growth of cross-border criminal trafficking across the porous borders of the countries. The local border populations, who rely on these smuggling networks, do not distinguish between illicit and lawful goods (OECD/CSAO, 2014; Reitano and Shaw, 2014).

The state of affairs described in the preceding paragraph is conducive to IFFs; these have indeed become a chronic and growing phenomenon in the WAEMU area. The most recent estimates show that over the 2003–2014 period, IFFs reached the staggering amount of about US$900 billion (GFI, 2013). The GFI (2013) estimates show how high the levels of these IFFs are compared to those from the rest of sub-Saharan Africa. In this regard, two WAEMU countries rank in the top 10 sub-Saharan African countries with the highest amounts of IFFs: ranking 5th is Côte d'Ivoire (with US$23 billion, corresponding to 6% of its GDP) and ranking 8th is Togo (with US$18 billion, corresponding to 4.7% of its GDP).

There is unanimity in the literature on econometric research in recognizing the adverse effects of IFFs on an economy (Macharia, 2014; Fofack and Ndikumana, 2015). Against this background, the contribution of this study is threefold. First, it enriches the existing literature on IFFs in developing countries. Second, it considers the difficulty arising from the substitution effect between certain components of government revenues. Third, it provides new tools for addressing the endogeneity issues in IFFs in the WAEMU area, contributing to a better understanding of the impact of these flows on the poor performance in public revenue mobilization of the respective governments.

The study used a method developed by Mo (2001) and borrowed by Attila et al. (2009) to empirically analyse the contribution of the various channels through which IFFs affect public revenues. The results showed that IFFs negatively affect public revenues through per capita income, corruption and governance.

The remainder of the paper is structured as follows: Section 2 is a review of the literature on the relationship between IFFs and government revenues. Section 3 provides information on the trends in IFFs. Section 4 outlines the methodology used in the study, and Section 5 is the conclusion.

2. Literature review

Although public revenue mobilization has many determinants, recent literature is not unanimous on their nature. Nevertheless, empirical consensus exists on the significant effect of the level of development and trade openness on the negative relationship between IFFs and public resource mobilization.

Determinants of public revenue mobilization

Early research on the determinants of public revenue mobilization dates back to Shin (1969), Lotz and Morss (1970), and Bahl (1971). Since this early research, several studies have been conducted in developed and developing countries to explain the structural factors in public resource mobilization (Karagöz, 2013; Castro and Camarillo, 2014; Sharma and Singh, 2015). For these authors, the development level, often measured by the per capita GDP, is considered one of the primary determinants of the tax burden.

Ajaz and Ahmad (2010) conducted a study on the effect of institutional and structural variables on tax revenues. They showed that structural variables such as the per capita income, trade openness, the share of the industry in the economy and the inflation rate play an important role in tax mobilization.

Thornton (2014), who added another variable, namely the revenue from natural resources, also found that those structural variables are generally associated with higher tax revenue rates, while corruption and the revenue from natural resources has the opposite effect.

At the same time, other studies have shown that the degree of openness of an economy has a positive effect on fiscal performance thanks to tax collection facilities (Bird and Martinez-Vazquez, 2008; Baunsgaard and Keen, 2010). Trade openness accounts for the fiscal disparities that exist between developing countries. However, some studies have shown that it leads to losses in public revenues (Cagé and Gadenne, 2016; Sokolovskan, 2015).

In addition to those factors, empirical studies have shown that the sectoral composition of the economy also accounts for the trends in tax collection (Mahdavi, 2008; Botlhole, 2011; Anware, 2014). Gupta (2007) has shown that countries that depend on agriculture have difficulty collecting taxes because of the predominance of informal activities in this sector. In contrast, since industrial activities and services are better organized, they are easier to tax (Thomas and Trevino, 2013; Crivelli and Gupta, 2014).

In addition to economic determinants, performance in public revenue mobilization may be affected by the institutional context. Various studies have shown that tax collection is one of the most important areas where corruption is most likely to appear (Feger, 2014; Hossain, 2014; Syadullah and Wibowo, 2015).

Links between IFFs and resource mobilization

The ever-increasing interest in IFFs has led to production of a large body of literature on the subject (Zucman, 2014; Dyreng et al., 2015). The same interest is also attributable to the many significant effects which IFFs have on the levels of development of different countries (Herkenrath, 2014, Epaphra, 2015; Ortega et al., 2017). Most striking is the effect they have on public bodies. According to Kar and Cartwright-Smith (2010), those capital outflows, which could have been spent on public service expenditures, undermine economic development in poor countries. Not only do IFFs have a direct impact on public service delivery, they also threaten the stability and credibility of a country's financial system and its institutions (Fontana, 2010).

With respect to the relationship between IFFs and public revenues, existing literature is unanimous about the fact that the former constitute an obstacle to resource mobilization and wealth creation (Ayadi, 2008; Ritter, 2015). Moreover, some studies suggest that they erode the tax base (Ajayi, 1997). In fact, empirical studies conducted in several African countries have indicated that the public debt burden would disappear if IFFs were stopped (Forgha, 2008; Fofack and Ndikumana, 2015).

Ndikumana (2009) found that illicit capital flight affected a country's budget balance by reducing its tax base through a contraction of its economic activity. The erosion of the tax base occurs because funds sent abroad cannot be taxed since they are out of the reach of tax authorities in the countries of origin. This result corroborates that obtained by Iweala et al. (2003) in a study conducted in Nigeria.

Kar and Leblanc (2014), using a double-squares method, found that IFFs negatively affected domestic revenues in the Philippines over the 1960–2011 period. Incoming IFFs negatively and significantly reduced the country's tax collection rate and strengthened its underground economy. The country incurred a significant wealth loss representing about 37% of its social budget in 2011. By testing the robustness of their results using a Vector Error Correction Model, the authors showed that in the long run a higher performance in tax collection required a reduction in IFFs. This result corroborates that obtained by Macharia (2014) in a study based on data from Kenya.

All these studies have shown that the effects of IFFs were the same, whether the study used a descriptive approach or an econometric one. However, only a few of them have focused on the impact of IFFs on public revenues through transmission channels to which IFFs seem to be tied (Ndikumana and Boyce, 2012). This study attempts to do that.

3. Illicit financial flows in the Uemoa countries

Given the lack of consensus on the definition of IFFs, measuring them is not easy. Economists frequently use three models to measure the size of IFFs: the hot-money model (Cuddington, 1986); the World Bank residual model (World Bank, 1985); and trade misinvoicing (GFI, 2008).

The hot-money model uses net errors and omissions in the balance of payments to estimate IFFs. A constantly high and negative net value of errors and omissions is seen as a sign of illicit capital flows. The World Bank model is used to determine a country's source of funds for their registered use. Any inflow of funds that exceeds its stated use is considered non-allocated capital and, hence, IFF (Boyce and Ndikumana, 2001). Unlike the previous two models, fraudulent misinvoicing involves comparing exports and imports between partner countries. Differences in trading data, after adjusting for transport and insurance costs, which suggest over- or under-invoicing, are evidence of some IFF (Kar and Cartwright-Smith, 2008; ECA, 2013).

An analysis of IFFs within the WAEMU area highlights the significance of the phenomenon in the decade 2004–2013 (see Figure 1). IFFs followed an upward trend with uneven fluctuations: for example they were on an upward trend from 2004 to 2008, decreasing between 2008 and 2009, most likely due to the 2008 financial crisis, and increasing again from 2010 (Figure 1).

Figure 1: Trends in IFFs in the WAEMU area from 2004 to 2013 (in US$ millions)
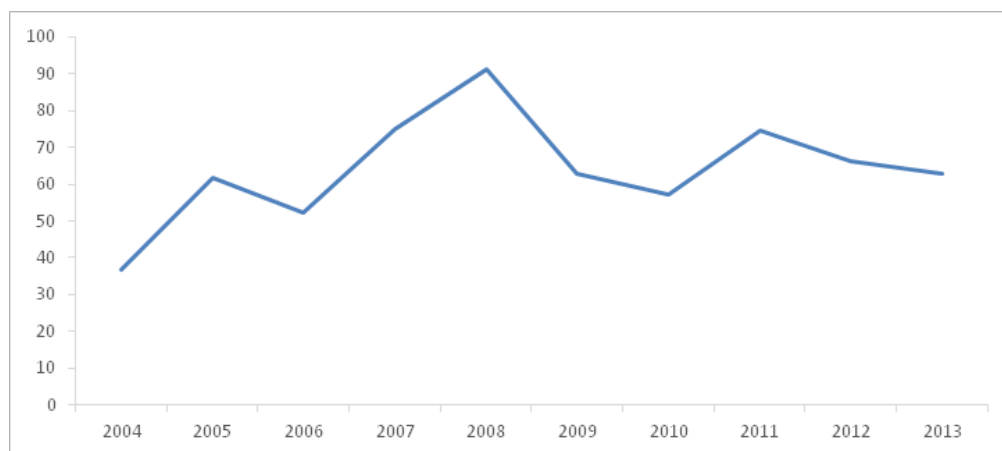
Source: Author's based on data from the GFI (2013)

Figure 2 compares IFFs with inflows of ODA in the WAEMU area from 2004 to 2013, in current US dollars. During this period, IFFs exceeded the ODA received annually and increased over time: the average was US$80 billion, against only US$50 billion for ODA. This observation corroborates that made by the High-Level Group (2015), namely that African countries on average lose between US$50 billion and 148 billion per year (ECA, 2013).

Figure 2:   IFFs vs. ODA in the WAEMU area from 2004 to 2013
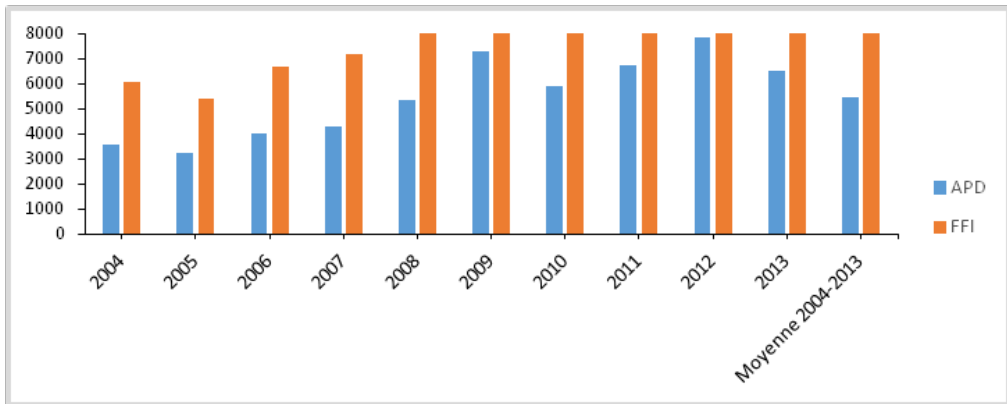
Note: In blue, APD: ODA; in orange, FFI: IFF
Moyenne 2004-2013: Average for 2004-2013
Source: Author's compilation based on data from the GFI (2013) and the World Bank (2014a)

An analysis of the average share of IFFs in GDP during the same period reveale three groups of countries: in the first group, composed of just one country, Togo, this average share was 137%. In the second group, it was between 10% and 20%: Côte d'Ivoire (20%), Guinea Bissau (15%), Senegal (13%), Burkina Faso (10%) and Mali (10%). For the third group it was between 4% and 6%: Niger (6%) and Benin (4%) (see Figure 3).

The fact that the average share was highest for Côte d'Ivoire and Togo confirms the conclusion reached by GFI (2013) that these two countries were among the 10 African countries with the highest amounts of IFFs. In the case of Togo, the high proportion is attributable to the role it plays as one of the leading countries in West Africa in "warehouse trade". Indeed, most of the goods that go through Togo in transit to Burkina Faso are diverted to Nigeria through contraband channels (GFI, 2013). During the period under study Côte d'Ivoire was going through a socio-political crisis. In addition, the country is rich in natural resources, for example cocoa, which accounts for 49.7% of its IFFs, according to GFI (2013).

Figure 3: IFFs as a percentage of GDP (averages for the 2004–2013 decade)
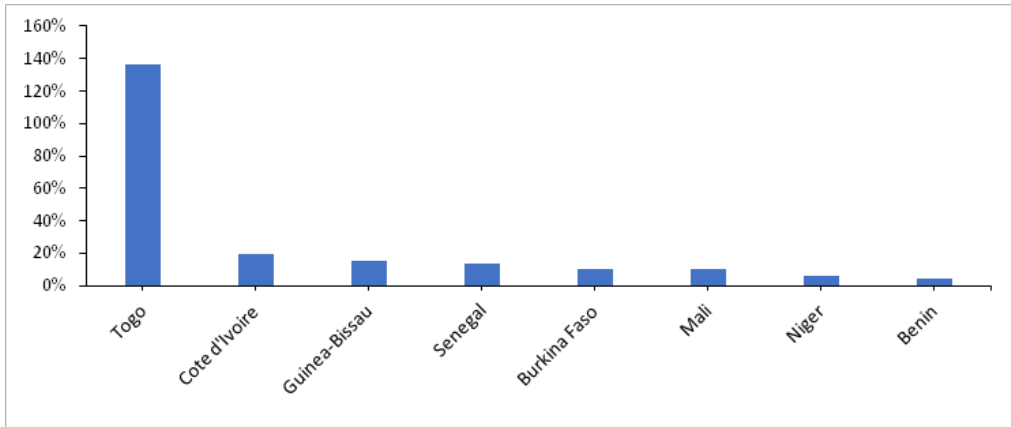
Source: Author's compilation based on data from the GFI (2013)

Figure 4 presents a scatter plot of public revenues (as a percentage of GDP) and IFFs. It shows a negative relationship between these two variables: an increase in the IFFs is associated with a decrease in public revenue mobilization. It follows from this that countries experiencing huge amounts of IFFs achieve a low rate of public revenue mobilization.

Figure 4:   Relationship between public revenues and IFFs
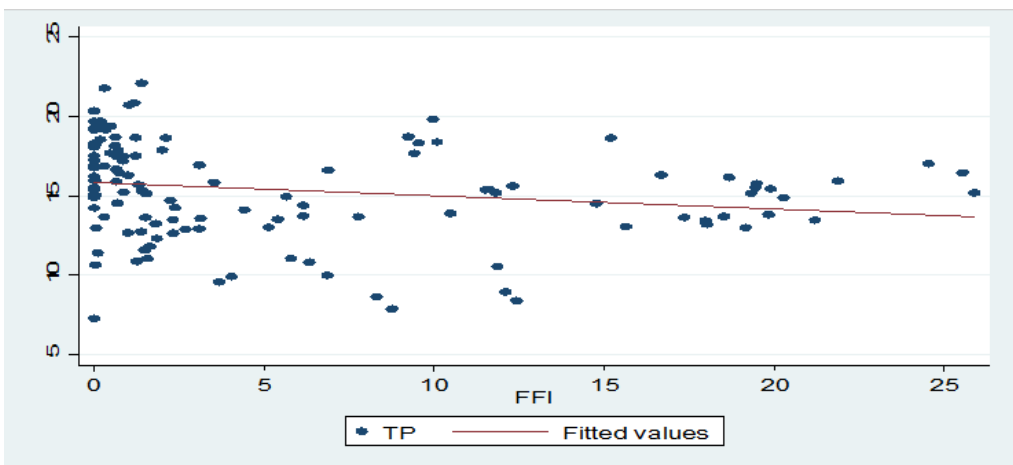
Note: TP is the ratio of government revenues to GDP; FFI: IFFs
Source: Author's compilation

All in all, descriptive statistics attest to high rates of IFFs in the WAEMU countries. Therefore, the following questions arise: Can these rates account for the poor performance in public revenue mobilization in these countries? Which transmission channel contributes most to the effect of those IFFs on this poor performance?

4. Empirical analysis of the effect of Iffs on government revenues

Section 2 reviewed the theoretical and empirical literature aimed at providing insights into the effect of IFFs on government revenues in the WAEMU area. This section aims to examine this effect empirically, which means establishing a relationship between the two variables. This relationship is expected because taxation plays a key role in the growth of an economy, since it is the main mode of financing development (Brun et al., 2005; Di John, 2007; OECD, 2010; Fakile et al., 2014).

Since public revenues are a source of development funding (Dennis-Escoffier and Fortin, 2008; Aghion et al., 2016), any factor that can stimulate economic growth is pro these revenues (and vice versa). That is why research on the impact of IFFs needs to closely examine the relationship between such factors and taxation. More specifically, it is important to establish whether IFFs do indeed have a negative impact on tax collection in the WAEMU countries.

This study first specifies the model to be used then describes the nature and source of variables, the estimation techniques, and the results of the estimations and how to interpret them.

Modelling the effect of Iffs on government revenues

The theoretical framework underlying the empirical analysis in this study is based on Heller's (1975) model. Heller proposed a budget-response model that makes it possible to study the effects of financial assistance on countries' behaviour. The model suggests that this financial assistance is likely to influence all the components of expenditure and the financing of this expenditure. Leuthold (1991) and Sani (2009) based their own models on Heller's. All of these models analyse the following utility function for the public sector:

$$U = U(Y - T; G; D; F + L) \tag{1}$$

where Y-T (GDP exclusive of taxes) represents the private sector's disposable income; G the total government expenditure; D the net domestic borrowing; and F+L the net foreign financial assistance to the country (F = grants; L = borrowing).

The public sector budget constraint is expressed in the following equation:

$$T + F + L + D = G \tag{2}$$

Following Leuthold's (1991) model, the taxation rate (T/Y) is a function of the normal taxation rate (T/Y)* of tax base B; the economic policy (PE); and the level of corruption (C):

$$T / Y = f[\ T / Y)^*; B; PE\ ; C] \tag{3}$$

In this study, corruption and IFFs are linked and can produce the same effects on public revenue mobilization. In this case, Equation 3 will be rewritten as follows:

$$T / Y = f[\ 1 / Y)\ (F + L) / Y; B; PE\ ; FFI] \tag{4}$$

The desired public revenue mobilization rate is determined by maximizing Equation 1 under the constraint of Equation 2. It is assumed that the utility function takes a quadratic form (Heller, 1975).

The literature on the determinants of public revenue mobilization offers a whole series of testable hypotheses. This study seeks to highlight the impact of IFFs on public revenue mobilization. It assumes that this impact is negative. Indeed, studies (such as Ghura, 1998; Attila et al., 2009) have reported a negative impact of corruption on tax revenues. Starting from the assumption that corruption is likely to be a conducive environment for IFFs, it is only logical to hypothesize that they in turn will have a negative effect on public revenues. This hypothesis will be tested on a group of WAEMU countries. However, changes will be necessary in order to include the variables of interest that will enable the study to answer its research questions.

Following this theoretical framework, this study will use an approach developed by Mo (2001) and borrowed by Attila et al. (2009). It is a three-step approach: first, it analyses the direct impact of IFFs on public revenues. At this step, control variables with a temporal dimension are introduced. At the second step the study estimates the effect of illicit financial flows on each of the control variables representing the transmission channels. The third step incorporates this latter model into the first specification.

To estimate the effect of the IFFs on public revenues, the following specification will be used:

$$P_{i,t} = c + \alpha FFI_{i,t} + \theta_j X_{i,t} + \mu_i + \nu_t + \varepsilon_{i,t} \tag{5}$$

where TP represents the ratio of government revenues to GDP; FFI represents the value of the IFFs; X is a vector of the variables that are likely to affect public revenues; μ_i designates the specific individual effect, which can be fixed or random; νt represents the specific temporal effect; ε represents the error term; i is the name of the country; and t is the period under study.

The specification in Equation 5 represents only the direct effects of IFFs on public revenues. It is suggested (Ndikumana, 2014; Benassi and Dorigatti, 2015), in line with the existing literature, that IFFs are a ubiquitous phenomenon that negatively affects the functioning of the economy in several ways. The focus in this case is the transmission channels through which IFFs can affect public revenues, channels that are represented by the other explanatory variables.

The aim is to measure the relative effect of the different transmission channels on the level of public revenues. This will be done by isolating the IFF effect that is transmitted through the other explanatory variables. Two steps will be followed: first, a correlation will be tested between IFFs and each one of the explanatory variables representing the transmission channels:

$$X_{i,t} = \beta_0 + \beta_j FFI_{i,t} + \eta_{i;t} \tag{6}$$

where $X_{i,t}$ represents the explanatory variables considered to be the transmission channels and $FFI_{i,t}$ the variable "illicit financial flows".

The second step incorporates Equation 6 into the previously estimated model (Equation 5). This means that as many residues are incorporated as the variables that are likely to represent the transmission channels. The model is expressed as follows:

$$P_{i,t} = \psi_0 + (\alpha_1 + \alpha_{1+i}\beta_j)FFI_t + \psi_2\eta_t + \upsilon_{i,t} \tag{7}$$

where i=1, 2, 3,….n and j=1, 2, 3…... m; α_1 FFI is the direct effect of the IFFs on public revenues; (α_1+iβj) FFI is their indirect effect; and η_{it} the residues of Equation 6.

Description and sources of variables

To study the effect of IFFs on public revenues in the WAEMU countries, it is very useful not only to describe the different variables of the model, but also to provide their sources (Annex B). The data used in the empirical modelling come mainly from the databases of the World Bank (2014a, 2014b), the BCEAO (2014) and GFI (2013).

Choice of the dependent variable: government revenues

The two most commonly used indicators in the literature (Ajaz and Ahmad, 2010; Torrance and Morrissey, 2013) to measure a country's level of government revenue mobilization are the tax burden ratio and the government revenue mobilization ratio. Since tax revenues do not cover all government revenues, it is difficult to make comparisons between countries that are able to mobilize huge amounts of non-tax revenues; that is the case of countries that are rich in natural resources. This

limitation is overcome by using the government revenue mobilization ratio. This ratio is calculated as the sum of the total government revenues as a percentage of the country's GDP. It is preferable to the tax burden ratio because it has the advantage of being less sensitive to the substitution effect between the major categories of public resources (Diarra, 2012). For this reason, it is the ratio that was used in this study.

Analysis of the control variables

The government revenue mobilization rate is a function of a set of variables. Since the pioneer work of Shin (1969), Lotz and Morss (1970), and Bahl (1971), various studies have identified the structural factors in government resource mobilization (Basirat et al., 2014; Velaj and Prendi, 2014). These empirical studies have explored factors that are likely to affect government revenues in both developing and developed countries. However, it is difficult to encounter all the variables at the same time in the same study (Attila et al., 2009; Diarra, 2012).

Ajaz and Ahmad (2010) analysed the effect of institutional (i.e., related to corruption and governance) and structural variables on tax revenues for 25 developing countries between 1990 and 2005. They found that corruption has a negative effect on tax revenues while good governance improves the tax collection rate.

Velaj and Prendi (2014) investigated the relationship between tax revenue collection and other variables, including the per capita GDP, the inflation rate, and imports of goods and services from 2001 to 2013 in the case of Albania. They found a positive relationship between these three variables and tax revenue collection.

Castro and Camarillo (2014) developed an empirical model for 34 Organisation for Economic Co-operation and Development (OECD) countries for the 2001–2011 period. They found that the per capita GDP, the share of industry in GDP, and civil liberties had a positive impact on tax revenues, while the share of the agriculture sector in GDP had a negative impact on tax collection.

This study mainly followed the framework used by Ajaz and Ahmad (2010), but it also considered the traditional determinants of tax collection. The main difference between this study and that of Ajaz and Ahmad (2010) is that it analysed the effect of illicit financial flows on government revenues in their totality.

Level of development

The effect of a country's level of development on its revenue mobilization capacity has been demonstrated both theoretically and empirically (Tanzi, 1992). This indicator is most often represented by several variables such as the country's real per capita income and its degree of monetization. Several studies have found a positive and significant effect of the level of development on government revenues, while only a few have found a negative effect of it (Dioda, 2012; Torrance and Morrissey, 2013). The positive relationship between the per capita GDP and government revenues has been further expanded by referring to Wagner's law, which states that the share of

public expenditure in GDP increases with the standard of living. In this study, the level of development was represented by the real per capita income.

The share of agriculture in GDP

The share of the agriculture sector and that of the industry sector in GDP are most often considered the two indicators of an economy's structure. Tanzi (1992) argues that a country's economic structure is one of the factors likely to influence its tax collection rate. The author shows that in the developing countries the agriculture sector has a significant impact on tax revenues from both demand and supply. The higher the share of the agriculture sector in the GDP, the less well those countries do in raising taxes. This negative relationship is justified by the fact that the agriculture sector is difficult to tax, especially if it is dominated by a large number of subsistence farmers. Torrance and Morrissey (2013) and Imam and Jacobs (2014) drew the same conclusion.

The inflation rate

The inflation rate is used to characterize macroeconomic instability. There is often a mismatch between the tax date and the tax collection date. In such a situation, the real value of the tax revenues collected is influenced by the inflation rate (Tanzi, 1992). When this is too high, it discourages the mobilization of public resources by reducing the value of the tax revenues (Hakim and Bujang, 2011).

Trade openness

The effect of trade openness on public revenue mobilization, particularly of tax revenues, has been viewed differently by economists. For some, a country's economic openness has a positive influence on this mobilization (Jafri et al., 2015; Cagé and Gadenne, 2016). For others, it could have a negative effect on the level of public revenues, particularly through the reduction in tariffs, which trade openness implies (Bevan, 1999; Asghar and Mehmood, 2017). So, its effect on government revenue mobilization is more or less uncertain; an econometric analysis is thus needed to clarify the relationship involved. Trade openness is measured by the sum of imports and that of exports in relation to GDP.

Institutional variables

The choice of these variables as explanatory variables is relevant insofar as they allow us to have an idea of the effect of the institutional quality on government revenue mobilization and of a possible policy to fight IFFs. Recently, theoretical and empirical studies have both highlighted the effect of institutional factors on government revenue mobilization (Feger, 2014; Hossain, 2014; Syadullah and Wibowo, 2015). The institutional quality measures come from the data set compiled by Kaufmann et al. (2010). This study uses corruption and governance indicators, namely the control of corruption index and the government effectiveness index.

The variable of interest: Illicit financial flows

In the literature, the phrases illicit financial flows and capital flight are often used interchangeably (Kar and Cartwright-Smith, 2008; Ndikumana and Boyce, 2012). However, by definition, and in reality, the two are different. There are two forms of capital flight: a legal form and an illegal one. The legal form corresponds to capital that goes out of the country but is registered in the accounting books of the entity performing the outgoing transfer. This form of capital flight is resorted to by savers/investors looking for higher returns or more stable environments. As for the illegal form of capital flight, it is not registered anywhere and most often escapes the tax system.

In the case of IFFs, the goal of the owners of these funds is to hide them and avoid legal action (Ndikumana, 2014; High Level Group (2015),). The owners are sometimes willing to accept low or even negative returns as long as they manage to hide the illegal origin of the funds. So, it is only fitting to characterize these hidden resources as illicit since they are unregistered capital flows from criminal activities, corrupt practices and trading activities.

Results of the econometric estimations

This study is about the WAEMU countries[2] for which data are available and covers the 1996–2013 period. There is thus a double dimension to the size of the sample, which allows the study to group the data into panels. There are many advantages to panel-data models. For one thing, they allow the taking into account of individual and temporal dimensions, unlike time series and cross-sections, and, in addition, they can handle a very large number of varied data (Sevestre, 2002).

IFFs and the government revenue mobilization rate

The model used in this study was first estimated using the quasi-generalized least squares (QGLS) method. According to Sevestre (2002), this method optimally combines intra- and inter-individual variations. It also solves the problems of heteroscedasticity and autocorrelation between the explanatory variables at the individual level and between countries. It rests on the assumption that there is no correlation between the explanatory variables and the country-specific effects. However, in the face of measurement errors and a low temporal variability on the part of the variable of interest, the use of the fixed-effects method is not appropriate.

The results of the estimations of Equation 5 using the QGLS method are reported in Table 1. IFFs have a negative and significant effect on the government revenues of the countries in the sample (Table 1). This means that the massive outflow of capital from those countries has led to a significant reduction in their public revenue mobilization rate. These results confirm those obtained by several previous empirical studies (Pastor, 1990; Ayadi, 2008; Ndikumana, 2009).

Table 1:   Results of the estimation of the QGLS model

	TP (i.e. ratio of government revenues to GDP)	TP	TP
FFI	-0.0834*	-0.0777*	-0.112***
	(-2.25)	(-2.43)	(-4.94)
PIBhbt		0.00745***	0.0120***
		(6.03)	(5.04)
VAGR		-0.00969	-0.0372
		(-0.28)	(-1.43)
INF		0.0371	-0.00201
		(0.57)	(-0.09)
ouv			0.106***
			(8.32)
corr			-7.735***
			(-4.16)
Gouv			1.222*
			(2.11)
Burkina Faso			2.918***
			(4.28)
Côte d'Ivoire			-6.320***
			(-6.09)
Mali			3.365***
			(5.76)
Niger			5.152***
			(4.99)
Senegal			1.652
			(1.36)
Togo			-0.00356
			(-0.00)
Constant	15.84***	11.95***	-0.785
	(46.87)	(7.68)	(-0.41)
No. of obs.	126	126	119

(.) t-statistics; (***), (**), (*): the coefficients are significant at the levels of 1%, 5%, and 10% respectively.
Source: Author's compilation

The robustness of these results is validated by the fact that by controlling, through several variables, for the effect of financial flows, the relationship remains negative and significant. IFFs have a negative effect on public revenue mobilization in the WAEMU countries. They hinder this mobilization and they are likely to cause honest taxpayers to engage in tax avoidance practices (Diarra, 2012).

   With respect to control variables, the results show that corruption has a negative and significant effect on the government revenue mobilization rate. This result corroborates those obtained by various other studies (Attila et al., 2009; Diarra, 2012). It means that the high level of corruption in the WAEMU countries has contributed to significantly reducing their public revenues. The same result calls into question the old but optimistic theory that corruption "fuels the economic wheel" and renders the economies more efficient. In contrast to corruption, government effectiveness was found to have a positive and significant effect on government revenues. This result suggests that effective institutions contribute to improving public revenue collection (Ajaz and Ahmad, 2010).

   The level of development was found to have a positive and significant effect on government revenues. This result is consistent with the theoretical literature, which argues that government revenues increase with the per capita income (Tanzi, 1992).

   Trade openness was found to have a positive and significant effect on the public revenues of the WAEMU countries. This result confirms those obtained by the proponents of a positive effect of trade openness on government revenues (Pessino and Fenochietto, 2010; Dioda, 2012). It also suggests that the positive effect is due not only to the tax reforms undertaken in the WAEMU area since the 2000s (cf. the Common External Tariff adopted in 2014), but also to institutional reforms, notably the modernization of the tax administration (for example with the 2013 new general tax code in Senegal).

The endogeneity test

The Durbin-Wu-Hausman test, the null hypothesis for which is the exogeneity of the suspected endogenous variable, does not reject the null hypothesis of the exogeneity of IFFs. However, it rejects the corruption hypothesis at the 5% threshold. Thus, the corruption variable is endogenous (Table 2). Indeed, the endogeneity can first of all come from a measurement error arising from the fact that the estimators provided by the indicators of corruption and their level of precision relate only to the perception of it and not to the phenomenon itself. The endogeneity bias may also result from the omission of explanatory variables that are correlated with the level of corruption. Finally, it can also be attributed to a simultaneity bias (Sanyal et al., 2000). To overcome this difficulty, estimations done using the instrumental variable method, which seems more convergent than the ordinary least squares one, were referred to.

Table 2: Results of the Durbin-Wu-Hausman endogeneity test

Variable	χ^2	p-value
IFFs	276.50	0.111
Corruption	276.50	0.24

Source: Author's compilation

Traditionally, the literature provides four types of instruments: ethnolinguistic division, legal traditions (French and British), distance from the equator,[3] and the urbanization rate (Adserà et al., 2000; Uslaner, 2004). By way of instruments, this study used the location of a given WAEMU country in relation to the coast, the number of borders with countries outside WAEMU, and the urbanization rate. On the face of it, these variables do not have a direct link with tax revenues while at the same time being correlated with corruption (Attila et al., 2009).

Several studies have shown that geographical position, culture and population are determinants of corruption. For example, Sandholtz and Gray (2003) found that countries surrounded by corrupt countries seemed to be equally corrupt. For the authors, this could be attributed to the sharing of the same culture. La Porta et al. (1997) and Gerring and Thacker (2005) suggested that the latitude (relative to the equator) had a negative and significant effect on corruption. Knack and Azfar (2003) and Damania et al. (2004) found a positive correlation between population and corruption. However, their results were contradicted by those obtained by Tavares (2003). The economic rationale for the use of such instruments lies in the fact that a country's geographical characteristics are said to influence its setting up of sustainable institutions (Acemoglu et al., 2001), which in turn have an impact on the extent of corruption.

The results are presented in Table 3. The p-value for the Hansen instrument validity test is higher than 5%. Moreover, the Durbin-Wu-Hausman test rejects the hypothesis of exogeneity of the corruption variable, which is an indication of the superiority of the instrumental variable method. IFFs have a negative and significant effect on government revenues, which corroborates the theoretical predictions. For the entire sample and over the period under study, results showed that a 1 standard-deviation increase in IFFs reduced the public revenue mobilization ratio by 0.85 points.

Table 3: Results of the estimation with the instrumental variable (IV) model

	TP (1)	TP (2)	TP (3)	TP (4)
FFI	-0.0798**	-0.0778**	-0.0644**	-0.147***
	(-2.90)	(-2.67)	(-2.86)	(-4.40)
PIBhbt		0.00648***	0.00634***	0.0174***
		(7.71)	(5.12)	(5.07)
VAGR			0.111***	-0.00527
			(3.64)	(-0.13)
INF			0.0921	0.0122
			(1.69)	(0.34)
Ouv			0.113***	0.133***
			(7.40)	(5.02)
Corr				-2.843
				(-1.71)

Table 3 Continued

	TP (1)	TP (2)	TP (3)	TP (4)
Gouv				2.761*
				(2.33)
Burkina Faso				4.137***
				(3.45)
Côte d'Ivoire				-7.228***
				(-3.93)
Mali				5.424***
				(4.93)
Niger				3.791*
				(2.55)
Senegal				-1.394
				(-1.21)
Togo				0.446
				(0.28)
Constant	16.22***	13.23***	5.529***	-1.878
	(24.67)	(20.67)	(4.22)	(-0.60)
No. of obs.	119	119	119	119
J Hansen Stat.	41.74	43.63	34.43	1.197
J Hansen p-value	0.00	0.00	0.00	0.878

(.) t-statistics; (***), (**), (*): the coefficients are significant at the levels of 1%, 5%, and 10%, respectively.
Source: Author's compilation

Highlighting the transmission channels

Table 4 presents the results of Equation 6. IFFs were negatively correlated with the per capita GDP and with the government effectiveness variable. IFFs undermine good governance to the extent that they contribute to compromising a country's capacity for action (ECA, 2013). A positive relationship was observed between IFFs and corruption (Fontana, 2010). Typically, IFFs are associated with the high costs of corruption (Benassi and Dorigatti, 2015).

Table 4: The effect of the IFFs on the main transmission channels

	PIBhbt	VAGR	INF	Ouv	Gouv	Corr
IFFs	-2.358**	-0.018	-0.108	0.032	-0.007*	0.002*
	(-3.03)	(-0.25)	(-1.78)	(-0.20)	(-1.82)	(-1.51)
Burkina Faso	-183.922***	-8.312***	0.036	-15.107***	-0.170**	0.249***
	(-13.47)	(-6.39)	(-0.03)	(-5.39)	(-2.67)	(-9.77)
Côte d'Ivoire	416.664***	-11.569***	1.227	27.885***	-0.488***	-0.143***
	(-27.44)	(-8.00)	(-1.040)	(8.95)	(-6.88)	(-5.03)
Mali	-137.510***	5.516***	1.901	-1.252	-0.268**	-0.016
	(-7.56)	(3.19)	(-1.340)	(-0.34)	(-3.16)	(-0.47)
Niger	-320.371***	2.799**	0.465	-5.592**	-0.304***	0.370***
	(-23.24)	(2.13)	(-0.430)	(-1.98)	(-4.72)	(-14.340)
Senegal	151.945***	-18.080***	-1.011	11.280***	0.155**	0.433***
	(-11.12)	(-13.89)	(-0.95)	(-4.02)	(-2.43)	(-16.970)
Togo	-181.617***	1.023	0.719	33.573***	-0.855***	0.075**
	(-13.02)	(0.77)	(-0.660)	(11.73)	(-13.13)	(2.87)
Constant	591.987***	35.332***	3.395***	55.792***	-0.464***	-0.767***
	(-61.00)	(38.23)	(4.49)	(28.02)	(-10.23)	(-42.29)
Nbr. Obs.	126	126	126	126	126	126
p-value	0.000	0.000	0.647	0.000	0.000	0.000

(.) t-statistics; (***), (**), (*): the coefficients are significant at the levels of 1%, 5%, and 10%, respectively.
Source: Author's compilation

Relative contributions of the transmission channels

Table 5 presents the relative contributions of the different transmission channels. These contributions were calculated using the coefficients in Tables 1 and 4. Three channels contribute to the effect of the IFFs on government revenues: the per capita income, corruption and governance. The contribution of the per capita income is the most important: up to 10%. It is followed by that of corruption, 5.5%. The government effectiveness channel contributes only 3.02%. The total indirect effect of IFFs on government revenues represents 60% of the total effect.

Table 5:   Relative contributions of the different transmission channels

	Government revenues as a ratio of GDP			
	$\hat{\beta}$ (Table 4)	$\hat{\theta}_*\hat{\beta}$ (Table 1)	$\hat{\theta}_*\hat{\beta}$	Relative contribution to the total effect
Per capita GDP	-2.358	0.012	-0.028296	10
Agricultural share in GDP	-0.018	-0.037	-0.000666	0
Inflation rate	-0.018	-0.002	-0.000036	0
Trade openness	0.032	0.106	0.003392	-1.2
Corruption	0.002	-7.737	-0.015474	5.5
Governance	-0.007	1.222	-0.008554	3.02
Total indirect effect			-0.171	60.12
Direct effect			-0.112	39.88
Total effect			-0.283	100

Note: The contribution of each transmission channel was calculated using the following formula:

$$\hat{\theta}*\hat{\beta} \Big/ \sum \hat{\theta}*\hat{\beta} \quad \text{where} \quad \sum \hat{\theta}*\hat{\beta} \quad \text{is the total effect of the illicit financial flows.}$$

Source: Author's compilation

5. Conclusion

This study has shown that IFFs cause heavy losses to the economies in the WAEMU area. The study's econometric results show that IFFs have a negative and significant effect on the public revenue mobilization of the WAEMU countries. In particular, they highlight the significant impact of the per capita income, corruption and governance, as transmission channels, on this mobilization.

The study recommends that governments should reconsider their policies for combating IFFs. In particular, they should strengthen their tax collection capacity to better identify and prevent certain illegal activities associated with IFFs. At the regional level, the WAEMU Commission should consider setting up an appropriate IFF consultative body that would bring together state and non-state actors. This body would serve as a platform for consultation, sharing of experiences, and discussing IFF issues.

With regard to the per capita income as the main transmission channel, governments should put in place the incentives that people need to keep and invest a large part of their profits and savings in their countries of origin.

This study has several limitations. The main one lies in the difficulty encountered when collecting data. Research on the issue would be enriched if the econometric analysis focused on the structure of tax revenues, particularly on direct and indirect taxes. Finally, this research can be taken a step further by looking at the investment and job-creation losses resulting from illicit financial flows.

Notes

1. GFI (Global Financial Integrity) is a non-governmental organization (NGO) researching issues of illicit financial flows.

2. The exclusion of Guinea Bissau was due to the non-availability of data in the country.

3. This study does not use the first two instruments because all the countries involved were colonized by the same country and occupy the same position relative to the equator.

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Annexes

## Annex A: Trends in the government revenue mobilization rate by country from 1980 to 2013
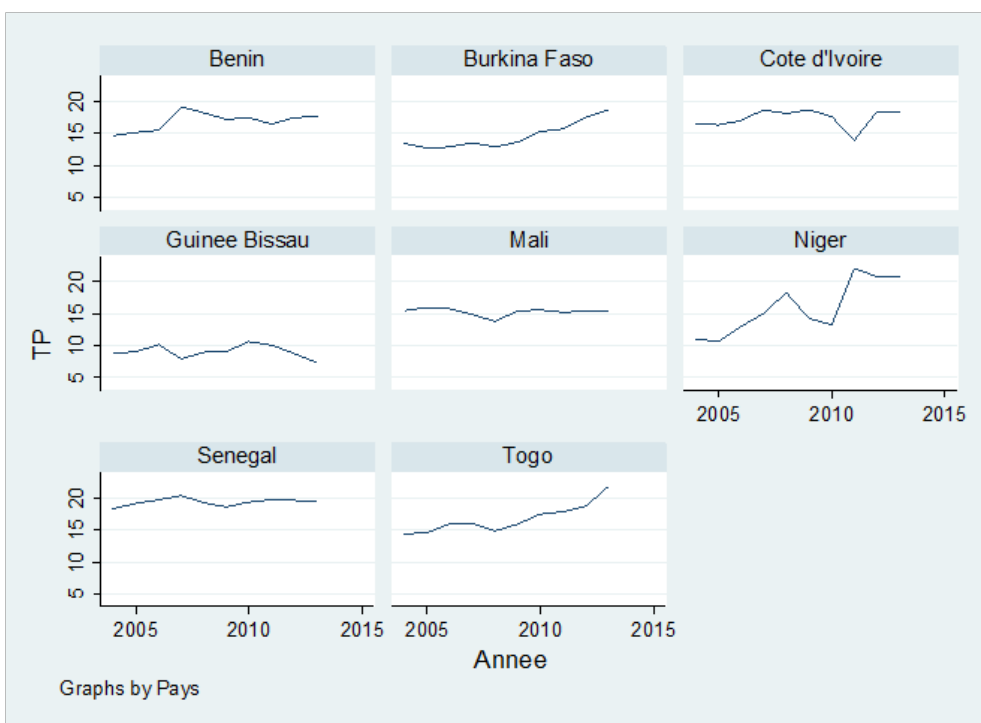
Note: "graphs by pays": graph by country; année: year
Source: Author's compilation based on data from the BCEAO

Annex B: Description of the variables

Variables	Description of the variables	Sources
Government revenues	Sum of the tax and non-tax revenues as a percentage of GDP	Author
PIB/tête [per capita GDP]	Ratio of GDP to the total population	WDI
Inflation rate	Rate of average annual growth of the consumer price index	
Trade openness rate	Ratio of the total exports and imports of goods and services to GDP	
Agricultural VA	Ratio of the agricultural value-added to GDP	
Corruption	Control of corruption index	WGI
Governance	Government effectiveness index	
IFFs	Illicit financial flows as measured by the the trade misinvoicing and hot-money methods	GFI

Source: Author's compilation

Annex C: Trends in the IFFs by geographical sub-region of Africa
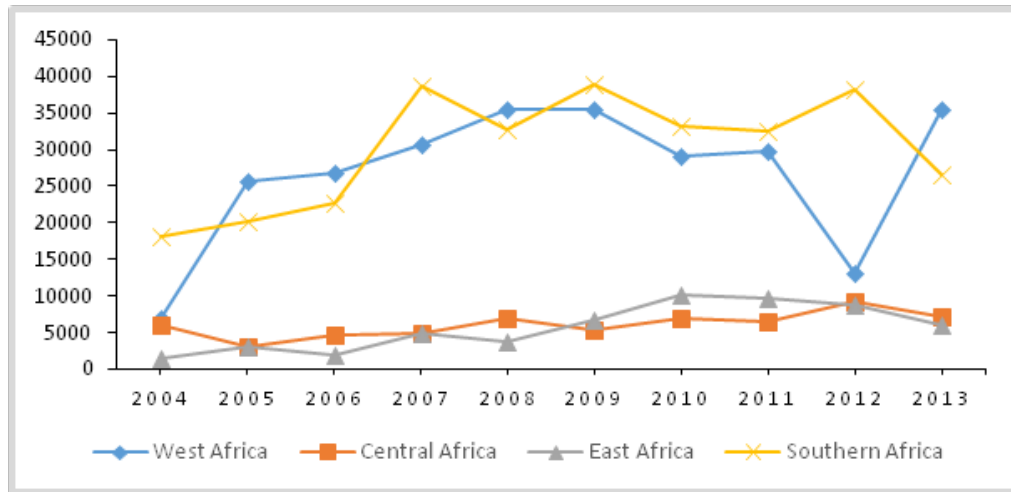
Source: Author's compilation based on data from the GFI (2013)

Mission

To strengthen local capacity for conducting independent,
rigorous inquiry into the problems facing the management of economies in sub-Saharan Africa.

The mission rests on two basic premises: that development is more likely to
occur where there is sustained sound management of the economy, and that such
management is more likely to happen where there is an active, well-informed group of
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