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Extent of Capital Flight and Its Impact on Economic Growth: The Case of WAEMU Countries

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Abstract: This paper estimates the magnitude of capital flight and analyzes its impact on economic growth in the West African Economic and Monetary Union countries. Over the period from 1970 to 2019, total real capital flight from these countries is positive and significant with a magnitude that amounts to $31,075.26 million in constant dollars, or 17.40 percent of investment. Six countries have experienced significant real capital flight over the past four decades: Ivory Coast, Guinea Bissau, Mali, Niger, Burkina Faso, and Senegal. Using dynamic fixed-effects estimation, the paper finds that, in the long run, capital flight significantly reduces economic growth in countries where capital flight is positive and that the negative effect does not appear to be cumulative with investment in the case of these groups of countries. In addition, the paper recommends that the authorities commit to reducing capital flight by improving governance and strengthening the quality of institutions.

Keywords: Economic Growth; Dynamiques Fixed Effects; Capital Flight; Residual Method; WAEMU

Introduction

In the 1980s, several underdeveloped economies began the process of capital market liberalization in order to relax domestic restrictions, dismantle foreign trade controls, and attract foreign direct investment and portfolio investment. As a result, there has been a further surge in capital flows from developed economies to emerging markets. At the same time, however, residents of these countries moved scarce capital to rich countries, resulting in capital flight (Tornell & Velasco, 1992).

Today, it is widely recognized that the phenomenon of capital flight is a real obstacle to the economic progress of developing countries in general, and Africa in particular, as it constitutes the essential untapped resource for financing economic growth (Hermes, Lensink & Murinde, 2002). There is a plethora of scholarly and popular debate about the nature and extent of capital flight from Sub-Saharan Africa. Studies since the early 1990s have documented significant capital

flight from African countries (Wood & Moll, 1994). There is even evidence that it is increasing. Interest in the issue has been rekindled by new empirical studies revealing the increasing scale of the financial hemorrhage caused by capital flight (Henry, 2012; Ndikumana & Boyce, 2011a; Almounsor 2017; Lawal et al. 2017; Orimolade & Olusola 2018; Ogbenro, 2019).

However, according to Ndikumana & Boyce, (2011a), capital flight is only increasing and reached a peak of $40,407.2 million in 2006. Moreover, in the literature, Ivory Coast is among the top countries in Sub-Saharan Africa with the highest capital flight ($45.4 billion or 194.1% of GDP). The richest countries in Africa in terms of natural resources (Nigeria, Angola, etc.) are those where capital flight is most massive. The MENA region (Middle East and North Africa) to record the largest growth in illicit financial flows (31.5% per year), followed by Sub-Saharan Africa at 19.8%.

However, the outflow of capital from African countries is therefore a cause for concern. Thus, it is becoming increasingly clear that countries cannot afford to ignore the role of capital flight and its reversal in their quest for economic development. In the literature, authors are unanimous in confirming the adverse consequences of capital flight on many economies: Ajayi, (1995 & 1997); Menbere, (2003); Cervena, (2006); Cerra, Rishi & Saxena, (2008); Ndikumana, (2003, 2009); Ndiaye, (2009b); Fofack & Ndikumana, (2009, 2010); Bakare, (2011); Ndikumana & Boyce, (2011a).

However, in relative terms, Africa suffers much more from the consequences of capital flight according to Collier, Hoeffler & Pattillo, (2001) and Henry, (2012). First, they show that Africa holds a much smaller stock of private capital than other regions. But at the same time, African private actors exhibit a reverse home bias, in that they tend to hold a relatively higher fraction of their assets abroad, compared to their counterparts in other regions. According to data from Collier et al. (2001), 40 percent of Africa's private capital is held abroad as capital flight, the highest ratio among all developing regions. Second, capital flight represents a relatively heavier burden on African economies compared to other regions, both in terms of lost output (Collier et al. 2001), and in terms of the ratio of capital flight to GDP (Henry, 2012). Another reason why capital flight is a more serious problem in the WAEMU zone is that the zone feels a greater need to accelerate progress in social development.

With a low level of domestic resource mobilization in the WAEMU zone, it is important to analyze the magnitude of capital flight to gauge its impact on economic growth. This paper first examines the magnitude of capital flight in WAEMU countries and then its effect on economic growth. Specifically, it will answer the following questions: what is the volume of capital flight in WAEMU countries during the period from 1970 to 2019? And what is its impact on economic growth?

From this perspective, the contribution of this work to the economic literature is threefold. The first contribution is methodological with the use of an updated technique of capital flight available in the literature. Second, to the best of our knowledge, this is the first study to examine the issue of capital flight on economic growth in a sample consisting essentially of WAEMU countries. Finally, while dissociating the zone into two groups of countries on the basis of the magnitude of capital flight, our contribution offers a better understanding of the effects of capital flight in explaining economic growth performance in this zone; with important policy prescriptions.

The paper is structured in five sections. The first section reviews the economic literature on the link between capital flight and economic growth. The next section presents the capital flight methodology adopted in this study. The third section discusses the methodology that will be adopted and provides an analysis of the stylized facts of capital flight and economic growth in the

zone. The fourth section develops the empirical results of the different estimates. And finally, the last section concludes the paper and draws policy implications.

Literature Review

In the literature, authors such as Ajayi (1997) unanimously recognize the potentially negative effect of capital flight on economic growth through several channels. Among all the channels identified in the literature, namely investment; imports; the tax base; incoming capital; balance of payments difficulties; the financial system; and corruption, the main channels are investment and the erosion of the tax base.

Investment: The Fundamental Channel of Capital Flight on Economic Growth

As noted above, capital flight reduces the resources that could have been invested to increase economic growth, which suggests that capital flight affects economic growth through investment. The phenomenon of capital flight occurs through the transfer abroad of part of domestic private savings. The persistence of this phenomenon can lead to a decline in domestic savings, which reduces the resources available for financing domestic investment and promoting economic growth. In the literature, Ndikumana, (2009) argues that capital flight reduces domestic investment by decreasing the volume of savings channeled through the domestic financial system, thereby retarding economic growth. To this end, high levels of capital flight pose serious challenges to the mobilization of domestic resources to support investment and growth in Africa (Fofack & Ndikumana, 2009, 2010), suggesting that capital flight leads to lower domestic investment (Lawanson, 2007). Similarly, Boyce & Ndikumana, (2001) reveal that low levels of investment in Africa are attributed to capital flight. Therefore, by decreasing investment, capital flight can undermine economic growth. In this sense, Fofack & Ndikumana, (2009, 2010) show that capital flight reduces total domestic investment and private investment in sub-Saharan African countries, while its impact on investment is found to be insignificant, suggesting that the negative effect of capital flight on domestic investment is more through private investment than through public investment. Using the same econometric estimation technique, Ndiaye (2009b) also finds the same results for franc zone countries. Using the vector autoregressive model approach, Bakare, (2011) indicates that capital flight crowds out investment in Nigeria.

The Channel of Tax Base Erosion, Imports and Capital Inflows

Researchers also note the importance of the tax base erosion channel (Pastor, 1990) as one of the negative consequences of capital flight. Ndikumana, (2009) indicates that capital flight affects the government's fiscal balance by reducing the tax base and consequently reduces economic activity. According to Ajayi, (1997), capital flight leads to the erosion of the tax base, resulting in lower government revenues and consequently lower public investment which in turn can reduce private investment and economic growth. Tax base erosion through capital flight occurs because funds deposited outside the country cannot be taxed (Forgha, 2008), as they are not within the reach of the tax authorities in the home country (Cervena, 2006). Ndikumana & Boyce, (2011a) have shown empirically that countries with higher capital flight tend to generate lower tax revenues. Second, with respect to imports, if foreign exchange is used to finance capital flight, it is clearly not available to finance imports that may be crucial for economic growth (Lessard & William, 1987). If the money from capital flight had been invested in the production of goods or exports in the country that could finance imports, the import component of growth could have been considerable (Pastor, 1990). Finally, for capital inflows as a channel for capital flight, empirical evidence supports that capital flight significantly increases the need for foreign aid and external

debt (Cerra, Rishi & Saxena, 2008). As several studies (Baeur, 1981; Lensink, Hermes & Murinde, (2000); Ndikumana & Boyce, 2003; Cerra et al. 2008; Ndikumana & Boyce, 2008, 2011a and 2011b; Ndiaye, 2009a, 2011) have indicated, a significant portion of foreign aid and external debt is re-exported abroad as capital flight. Paradoxically, one of the attributes of foreign aid and capital flight is to support domestic investment. To this end, if the problem persists over time, the less funds are allocated for foreign aid and external debt, the lower the economic growth.

The Channel of Balance of Payments Difficulties, The Financial System and Corruption

For Menbere, (2003), capital flight can contribute to harming economic growth by affecting the balance of payments. Furthermore, authors such as Ajayi, (1995) have found that the constant difficulties in the balance of payments have been attributed to capital flight. By disrupting the financial system (savings and credit to the private sector), capital flight can also lead to lower economic growth, as large resource outflows would require an adjustment in interest rates and exchange rate policies (Menbere, 2003). Capital flight occurs when a portion of domestic private savings is transferred abroad. The persistence of this phenomenon can thus lead to a decline in domestic savings. As a result, banks will receive fewer resources in the form of savings, which may lead to a decline in their supply of credit to the private sector. In the same context, Schneider, (2003) argues that capital flight can reduce growth by destabilizing the financial system, as sudden large resource outflows would require an adjustment in interest and exchange rate policies. As a result, capital flight can reduce the volume of financial intermediation, which has a negative impact on economic growth. According to Ndikumana (2003), capital flight contributes to increased macroeconomic uncertainty, which depresses lending and investment. High capital flight is indeed symptomatic of an environment characterized by corruption (Ndikumana & Boyce, 2011a). This can harm economic performance by reducing investment and negatively affecting the quantity and quality of public infrastructure, leading to reduced tax revenue and lower human capital accumulation (Ndikumana, 2006). However, Mwangi et al. (2019) study the effect of corruption on capital flight in Kenya on quarterly data between 1998 and 2018. The lagged model they use does not show significant effects of corruption on capital flight in either the short or long run. In addition, capital flight is likely to occur due to the existence of country-specific risk, which may then lead to lower investment. In the next section, we examine the link between capital flight and economic growth.

Methods

Methodology for Estimating Capital Flight

Despite the substantial literature in recent years, there are no common measures of capital flight (Hermes et al. 2002; Ndikumana et al. 2014). The existing literature has proposed four[1] main methods (the residual method; the Dooley method; the trade transaction falsification method; and the hot money method). The indirect methods are thus used to calculate capital flight (Schneider, 2003):

$$ADJKF = CDEBTADJ + FDI + PI + OI - (CAD + RES) + MISINV \quad (1)$$

Where sources of funds (capital inflows) are given by the change in external debt stock adjusted for exchange rate fluctuations, debt forgiveness, and the change in interest arrears CDEBTADJ; FDI is foreign direct investment and uses of funds are the CAD current account deficit, RES is foreign exchange reserves (Hermes et al. 2002), and finally MISINV is net trade misinvoicing.

[1] The residual method (World Bank, 1985; Morgan Guaranty, 1986); the Dooley method (Dooley, 1986); the trade misinvoicing method and the hot money method (Cuddington, 1986).

Model

The empirical linear model in this study is inspired by the specification of the economic growth model in the literature (Forgha, 2008; Bakare, 2011). The final model is as follows with the inclusion of explanatory variables:

$$CROI = f(FKR, INV, CCP, INFL, OUV, INS) \quad (2)$$

$$CROIS_{it} = \alpha_1 FKR_{it} + \alpha_2 INV_{it} + \alpha_3 CCP_{it} + \alpha_4 INFL_{it} + \alpha_5 OUV_{it} + \alpha_6 INS_{it} + \mu_t \quad (3)$$

Where CROI is the real GDP growth rate; FKR is the ratio of real capital flight to GDP; INV represents the ratio of domestic investment to GDP, INF is the inflation rate measured by the annual change in the consumer price index, OUV represents the degree of openness , CCP represents the variable domestic credit to the private sector, and INS which denotes the institutional variable of the quality of institutions measured by the control of corruption, which takes values between -2.5 (least corruption) to 2.5 (highest corruption). The empirical nonlinear model reflecting our specification is based on the equation specified above and is as follows:

$$CROIS_{it} = \alpha_1 FKR_{it} + \alpha_2 INV_{it} + \alpha_3 CCP_{it} + \alpha_4 INFL_{it} + \alpha_5 OUV_{it} + \alpha_6 INS_{it} + \beta\left(FKR_{it} * INV_{it}\right) + \mu_t \quad (4)$$

The analysis of the model is followed by the analysis of the data that will be used to perform the econometric tests and estimates. First, we will indicate the sources of the data before specifying, in a second step, the tests and econometric estimates that will be applied.

Econometric Strategy

In this section we describe the data and the econometric methods used.
A panel data analysis approach for the WAEMU over the period 1970-2019 was adopted. In general, the data on capital flight are taken from the World Bank (World Development Indicator, 2021) and the International Monetary Fund (IMF, 2021) database. Other data on the selected variables are mainly from World Bank publications (economic growth (CROIS), investment (INV), openness (OUV), inflation (INF), and domestic credit to the private sector (CCP)) with the exception of statistics on corruption control, which come from the World Bank, Worldwide Governance Indicators (WGI). Since the variables for Guinea-Bissau have missing data for the period (1970-1984), this forced us not to consider this country in our estimates.

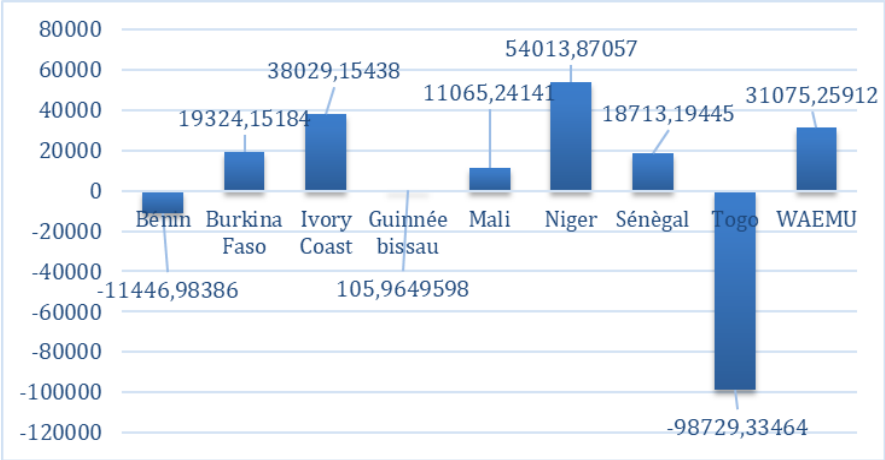
We use a family of alternative techniques for estimating cointegration relationships in panels, namely the Mean Group (MG), the Dynamic Fixed Effects (DFE) and the Pooled Mean Group (PMG). In practice, the PMG and MG techniques were not conclusive with our data. Indeed, the execution of the command in Stata does not lead to any result, probably because of the weakness of the temporal dimension of the panel. Consequently, only the DFE estimates were performed.

Findings

Results of Capital Flight Estimation

What is clear from the annual data on real capital flight is that the phenomenon in WAEMU is a chronic problem, which accelerated and worsened during the second half of the 1980s (Figure 1) until the first half of the 1990s.

Figure 1. **Real Capital Flight by WAEMU Country, 1970-2019 (US$ Million 2012)**



In general, between 1970 and 2019, the total real capital flight of the eight (8) countries in the subregion covered in this paper amounted to $31,075.26 million (US$ million 2012). However, these countries recorded a capital inflow of $46,212.98 million between 2010 and 2016 according to the residual method. It seems clear that some countries have positive values of capital flight while others have negative values over the period. Capital outflows have exploded particularly among the major countries that have a high productive structure and are therefore the most exporters in the area.

In general, countries that export more goods have positive values of real capital flight while others have negative values. However, when it comes to negative values or capital repatriation, the most important are Togo with an inflow of $98,729.335 million and Benin with $11,446.98 million over the period studied. The temporal trends in capital flight show significant variations among the eight WAEMU countries. However, in all these countries, it is clear that capital flight is not a new phenomenon in all cases.

However, the magnitude of capital flight should be taken seriously, even if the data relative to the size of the economy and population of these countries sometimes suggest otherwise. This analysis shows that WAEMU could have had financing available to meet its public investment needs in most of the priority sectors, particularly education and health. Indeed, this capital could have covered the needs in terms of human development, improving economic infrastructure and reducing unemployment and poverty.

Figure 2. **Relationship Between Capital Flight and Economic Growth Rate in The WAEMU Zone, 1970-2019**

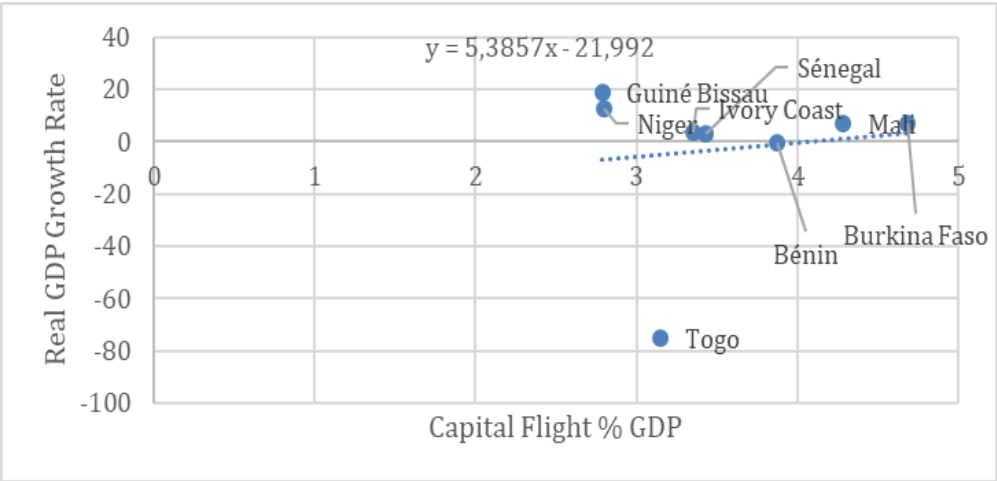


Figure 2 presents the scatterplots of capital flight and economic growth for the eight countries of the WAEMU zone over the period 1970-2019. A positive correlation is clearly observed with a slope of the equation line of 5.386. Figure 2 also suggests that countries like Bénin and Togo experience less capital flight than other countries. The link between capital flight and economic growth is therefore not easy to detect in WAEMU countries. In general, for the zone as a whole, an increase in capital flight is associated with a increase in economic growth.

Empirical Results

To study the effect of capital flight on economic growth in WAEMU countries, we adopt a three-step approach. First, we estimate the effect of capital flight on economic growth in the presence of other macroeconomic control variables. In the second stage, as Ndiaye, (2011) argues, the magnitude of capital flight serves as a barrier to growth, as it significantly reduces economic growth through the domestic investment channel. To this end, we use the interaction between domestic investment and capital flight in our subsequent estimates of economic growth. Finally, the configuration of the data (volume of capital flight) does not allow us to consider the broader range of the data. A decomposition of the total sample of countries into two groups is desired. This allows us to identify two different groups from which the EU countries could be situated: a situation in which capital flight is positive and one in which capital flight is observed to be negative over the period.

Analysis of Descriptive Statistics and Correlation Coefficients

Table A.2 (appendix) shows that all variables vary considerably across countries. The results from the descriptive statistics show that, on average, capital flight is -5.99 percent, yet the growth rate of GDP over the period is a relatively low 3.65 percent. The results also indicate that WAEMU countries are developing slowly and unevenly, with an average inflation rate of about 4.596 percent. Finally, investment, at 17.465 percent, is very low overall.

In Table A.3 (Appendix), there is a significant correlation between the economic growth rate and some of the explanatory variables included in the model, such as investment and the institutional control variable. Thus, the analysis of correlations between the different economic growth variables is also relevant, since a high correlation could make econometric estimates or

interpretations of the results difficult. As can be seen, of course, low correlation between the different explanatory variables is to some extent reassuring, because in this case our econometric estimates could not be compromised by possible multicollinearities.

Panel Unit Root Tests and Cointegration Tests

Before starting the estimations, we performed stationarity tests on panel data. These are the unit root test of Levin, Lin & Chu, (2002); Im, Pesaran & Shin, (IPS) (1997, 2002 and 2003) and Hadri, (2000) applied to the variables introduced in equation (4). The results of these tests are presented in the Appendix (Table A.4 and A.5) and suggest that only the economic growth and inflation variables are stationary in level while the others have a unit root. On the other hand, when all the variables are considered in first difference, they uniformly appear to be stationary and therefore integrated of order 1. It should be noted, however, that the non-stationarity of the variables is not obtained for all the specifications. Indeed, the presence of unit root is only revealed with the model introducing a trend for some series. In any case, the estimation technique used is robust both when the variables are I (0) and when they are of type I (1).

However, the analysis of cointegration is carried out in this study using Kao, (1999). The results of the Kao, (1999) test reject the hypothesis of non-cointegration for all 10 relationships at the 1% error level. This means that there is a long-run relationship in the WAEMU countries.

Estimation Results

The cointegration relationships thus highlighted are estimated using the Dynamics Fixed Effects (DFE). When we examine the results of the linear and non-linear models in Tables 2, 3 and 4 respectively, we find that the heterogeneous error correction model, proposed by Persean (1999), shows that the recall force is significant and has the expected signs. The error correction coefficient is significantly different from 0 at the 1% error threshold, in all the regressions, which means that the long term relationships between the variables are validated.

Impact of Capital Flight on Economic Growth in WAEMU Countries

According to the results of the econometric estimation presented in Table 2. The coefficient on the investment variable is positive and statistically significant at the 99% confidence level in all specifications. An increase in the investment variable has a positive effect on growth, as expected, and is very significant. Consistent with the gas pedal principle, investment growth facilitates more rapid economic growth. This suggests that investment stimulates growth. A percentage increase in investment leads to an increase of between 0.250% and 0.357% in the rate of economic growth. This suggests that WAEMU countries can promote economic growth by stimulating investment. This result suggests that countries are able to improve economic growth through sound macroeconomic policies and more efficient economic sectors.

The key variable in the model, capital flight, has a mixed sign due to its coefficient and the heterogeneity of the area (in terms of the volume of capital flight), which does not confirm the validity of the central hypothesis of this work that capital flight is a factor that weakens economic growth in our sample. The trade openness variable has a statistically significant and negative coefficient in the long-run relationships of the regressions. This result suggests that, in general, trade openness is not beneficial to economic growth in WAEMU countries. The effect of the institutional environment of WAEMU countries proxied by the control for corruption has a positive and statistically significant coefficient at the 90% confidence level. As defined above, the control of corruption varies between -2.5 and 2.5 with a higher value indicating more control of corruption (less corruption). This result indicates that levels of economic growth increase with a

satisfactory level of corruption control. In an environment where corruption is under control, domestic and foreign investors are encouraged to invest.

Impact of Capital Flight on Economic Growth by Country Group

The objective of this subsection is to test the robustness of the empirical results found earlier from a disaggregated perspective and to analyze some potential disparities between two groups of countries considered in order to better identify certain specificities. This demarcation is made necessary by the notable distinctions in the estimation of capital flight recorded in the WAEMU. The estimation results are presented in Tables 3 and 4 for each group of countries and using the 8 specifications in Table 2 above. In fact, these specifications group together the introduction of the different control variables of the model. The first intuition concerns the error correction coefficient, which is significantly different from 0 at the 1% error threshold; in all the regressions, therefore, the long-term relationships between the variables are validated.

It is clear from Table 3 that the coefficients of the first group of countries, associated with the investment, trade openness and institutional variables, retain their signs and significance. On the other hand, in the second group of countries, only domestic investment has a positive effect on economic growth. On the other hand, the key variable in the model, capital flight, has a negative and statistically significant coefficient in most specifications. However, establishing the negative influence of capital flight on growth is consistent with economic theory (group of countries with positive flight); since according to Ajayi, (1997) ; Almounsor (2017); Lawal et al. (2017); Orimolade & Olusola (2018) and Ogbenro, (2019) capital flight has influence on growth. This means that an increase in the ratio of capital flight to GDP generates a reduction in the economic growth rate and confirms the validity of the central hypothesis of this work. The capital flight variable has coefficients ranging from 0.027% to 0.059%, with an average of 0.043%.

But since capital flight and economic growth are measured as a percentage of GDP, the result is that, on average, for every dollar leaving some WAEMU countries in the form of capital outflows, 0.043% deprives the economy of resources that could be used to finance economic growth. On the other hand, the opposite result is given for countries with a negative leakage. These two opposite results may explain, in part, the configuration of the total sample that foreshadows the econometric result found in the aggregate case. Finally, these results are still robust to the case of controlling for the macroeconomic variable.

Finally, when the interaction variable is included in the last specifications of the model for countries with positive leakage, the result shows that the negative impact of capital flight on economic growth does not necessarily increase with the level of investment, implying that in some WAEMU countries the effect of capital flight on economic growth is not significant through domestic investment, which is inconsistent with previous results in the literature (Ndiaye, 2009b ; Fofack & Ndikumana, 2010).

Disaggregating the total sample by this criterion also allowed us to test for robustness. Indeed, the institutional environment proxied by the control of corruption turns out to be positive and statistically significant only in the case of countries with negative leakage (the majority of specifications), while for the other countries it does not exert a significant effect on economic growth. These results remain true even after controlling for other variables, notably macroeconomic ones (domestic investment, inflation, foreign direct investment, and degree of openness).

Table 2. **Estimation Results for Capital Flight on Economic Growth in The WAE**

Variables	Dependent Variable: Economic Growth as % GDP							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
EC	1.014	1.006	1.034	1.075	1.080	1.026	1.062	-1.36
	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***
FKR	-0.004	-0.003	-0.002	0.002	0.002	0.003	0.003	-0.01
	(0.005)***	(0.165)	(0.344)	(0.508)	(0.497)	(0.58)	(0.605)	(0.88)
INV	0.333	0.278	0.300	0.258	0.250	0.357	0.356	0.261
	(0.00)***	(0.01)*	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***
CCP		0.080		0.1243	0.099			0.104
		(0.184)		(0.06)*	(0.107)			(0.124)
INFL			-0.331		-0.242			-0.246
			(0.047)*		(0.079)*			(0.091)*
OUV				-0.062	-0.053		-0.054	-0.049
				(0.00)***	(0.00)***		(0.00)***	(0.007)**
INV*FUI						0.013	0.007	0.009
						(0.058)*	(0.315)	(0.154)
INS	1.062	1.382	1.286	0.985	1.137	1.039		1.174
	(0.22)	(0.031)*	(0.097)*	(0.04)*	(0.033)*	(0.250)		(0.061)*
Constante	1.587	1.821	0.165	-1.343	-2.00	2.051	-0.753	-1.507
	(0.333)	(0.278)	(0.87)	(0.24)	(0.018)**	(0.216)	(0.686)	(0.206)

Figures in parentheses indicate standard deviations. ***,** and * indicate significance at the 1%, 5% and 10% levels respectively

Table 3. **Results of Estimates of The Effect of Capital Flight on Economic Growth in WAEMU Countries with Capital Flight**

	Dependent Variable: Economic Growth as % GDP							
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
EC	1.108	1.103	1.129	1.2423	1.237	1.115	1.236	1.237
	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***
FKR	-0.027	-0.022	-0.022	-0.045	-0.043	-0.054	-0.059	-0.058
	(0.038)**	(0.242)	(0.25)	(0.05)*	(0.076)*	(0.027)**	(0.009)**	(0.223)
INV	0.372	0.318	0.336	0.306	0.306	0.3454	0.3409	0.288
	(0.003)***	(0.008)***	(0.00)***	(0.00)***	(0.00)***	(0.004)***	(0.00)***	(0.00)***
CCP		0.102		0.101	0.078			0.0837
		(0.22)		(0.091)	(0.211)			(0.212)
INFL			-0.290		-0.125			-.1079
			(0.059)*		(0.320)			(0.525)
OUV				-0.080	-0.074		-0.0675	-0.0706
				(0.00)***	(0.00)***		(0.000)***	(0.001)***
INV*FUI						-0.034	-0.015	-0.020
						(0.108)	(0.32)	(0.547)
INS	0.721	1.200	0.916	0.283	0.337	0.945		0.5165
	(0.368)	(0.056)*	(0.17)	(0.22)	(0.098)*	(0.311)		(0.060)*
Constante	2.135	2.749	0.718	-2.183	-2.569	1.435	-2.500	-2.720
	(0.382)	(0.242)	(0.63)	(0.22)	(0.128)	(0.576)	(0.279)	(0.11)

Numbers in parentheses denote standard deviations. ***,** and * indicate significance at the 1%, 5% and 10% levels respectively.

Table 4. **Results of Estimates of The Effect of Capital Flight on Economic Growth in Countries with Negative Capital Flight in The WAEMU**

	Dependent Variable: Economic Growth as % GDP							
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
EC	0.804	0.7680	0.7924	0.986	0.9093	1.119	0.958	1.176
	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.164)***	(0.00)***	(0.00)***	(0.052)***
FRK	-0.006	-0.009	-0.003	-0.000	0.006	0.016	0.005	0.011
	(0.286)	(0.148)	(0.000)***	(0.959)	(0.252)	(0.001)**	(0.047)*	(0.001)**
INV	0.286	0.337	0.233	0.616	0.412	0.462	0.677	0.383
	(0.047)**	(0.025)**	(0.032)**	(0.11)	(0.242)	(0.00)***	(0.186)	(0.113)
CCP		-0.055		-0.021	0.088			-0.065
		(0.00)***		(0.658)	(0.77)			(0.014)**
INFL			-0.580		-0.513			-0.212
			(0.362)		(0.68)			(0.46)
OUV				-0.1054	-0.097		-0.126	0.069
				(0.44)	(0.415)		(0.521)	(0.665)
INV*FUI						0.039	0.004	0.046
						(0.00)***	(0.853)	(0.088)*
INS	3.280	3.157	4.129	2.968	3.646	4.981		5.72
	(0.18)	(0.271)	(0.059)*	(0.130)	(0.00)***	(0.00)***		(0.00)***
Constant	1.498	1.54	-0.552	0.485	-2.079	5.539	0.578	7.643
	(0.505)	(0.514)	(0.851)	(0.875)	(0.56)	(0.00)**	(0.863)	(0.069)*

Numbers in parentheses note standard deviations. ***,** and * indicate significance at 1%, 5% and 10% respectively

Conclusion

For most developing countries, including most of the WAEMU countries, the need for sustainable capital inflows to supplement their weak output base is undeniable. Although there has been increasing evidence of such inflows to WAEMU, the ability to retain this capital for long-term growth appears weak given the strong impact of capital flight.

However, we first quantified the magnitude of capital flight in each country. This quantification is based on the World Bank's residual approach, which is the most widely used method in the literature. However, over the period 1970-2019, real capital flight for the eight (8) countries in the WAEMU zone was positive and significant, with a magnitude of about $31,075.26 million, or 17.40% of investments. The results of the measurement show that significant capital flight is recorded especially in economies such as Côte d'Ivoire, Burkina Faso, Guinea Bissau, Mali, Niger and Senegal.

To this end, the objective of the paper is to measure the impact of capital flight on economic growth. By adopting an econometric method, we used the Dynamic Fixed Effects (DFE) panel estimation method. The econometric results show that capital flight in aggregate does not

significantly reduce economic growth in the WAEMU. In contrast, when decomposing the sample, the group of countries with capital flight have coefficients that respect the central hypothesis of this paper over the period while the impact is not pronounced in countries with negative flight. The results also indicate that the harmful and devastating impact of capital flight on economic growth does not necessarily increase with the level of investment. These results are robust in the sense that they do not depend on the specifications of the economic growth model, and remain true even after controlling for other variables, including macroeconomic and institutional variables.

Based on the subsample results, the adverse effects of capital flight on growth in the WAEMU zone seem incontrovertible. Therefore, ignoring the investment channel may undermine the effects of capital flight on growth in the zone. We also note that the inflow of investment is not sufficient to offset the effect of capital flight from the zone. Nevertheless, they have proven to be essential in improving the growth performance of these four countries. Above all, stricter capital controls should be put in place to deter capital outflows from the WAEMU. In addition, serious and conscious efforts can be made to address the prevailing macroeconomic uncertainties in the WAEMU zone to mitigate its influence on capital flight. Finally, repatriation of capital flight through improved governance, strengthening the quality of institutions, and promoting a stable policy environment is necessary.

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Appendix

Table A.1: **Definition of Variables and Data Sources**

Variables	Définition	Source
Dependent variable: Economic growth (CROIS)	Measured by Real GDP Growth Rate	World Development Indicators (2021)
	Variables indépendantes	
Impact Variable: Capital Flight (FKR)	Ratio of real capital flight to GDP	Author's calculations
	Control variable	
Investment (INV)	Gross Fixed Capital Formation to GDP in %.	World Development Indicators (2021)
Inflation (INF)	Annual change in consumer price index (CPI)	Africa Development Indicators (2021)
Private Sector Credit (CCP)	Private Sector Credit (CCP)	Africa Development Indicators (2021)
Degree of openness (OUV)	Exports plus imports as % of GDP	Africa Development Indicators (2021)
	Institutional variable	
Control of Corruption (INS)	Estimates of public perceptions of corruption, expressed in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5	World Bank's Worldwide Governance Indicators (2021)

Table A.2: **Descriptive Statistics For Variables**

Indicators	Mean	Standard Deviation	Minimum	Maximum	Observation
CROIS	3.655	4.490	-17.047	20.28	350
FKR	-5.993	172.37	-3074.6	117.340	350
CCP	17.728	8.441	2.660	42.263	350
INF	4.596	7.201	-8.400	39.162	308
INV	17.465	5.259	7.396	32.604	304
OUV	56.289	19.362	21.597	140.860	350
INS	-0.477	0.725	-2.264	1.049	147

Source: Author (2021), Outputs from STATA Software

Table A.3: **Correlation Matrix of Variables Included in The Model**

Variables	CROIS	FRK	CCP	INFL	INV	OUV	INS
CROIS	1.000						
FKR	-0.0073	1.000					
CCP	-0.0358	0.020	1.000				
INF	-0.019	0.045	0.042	1.000			
INV	0.260*	-0.032	0.135*	-0.020	1.000		
OUV	-0.006	-0.081	0.496*	0.124*	0.137*	1.000	
INS	0.115*	-0.04	-0.203	0.167	0.068*	-0.312*	1.000

Source: Author (2021), Outputs from STATA Software

Table A.4: **Level Unit Root Tests**

Variables	CROIS	FRK	CCP	INFL	INV	OUV	INS
Constante							
Levin, Lin et Chu	-8.74	18.390	0.984			-0.825	-0.404
	(0.00)	(1.00)	(0.837)			(0.204)	(0.343)
Im, Pesaran et Shin	-10.82	-12.319	0.906	-7.51	-0.772	-1.903	0.935
	(0.00)	(0.00)	(0.817)	(0.00)	(0.220)	(0.028)	(0.825)
Hadri	2.89	0.740	27.726			17.710	22.14
	(0.04)	(0.229)	(0.00)			(0.00)	(0.00)
Constante+trend							
Levin, Lin et Chu	-8.99	22.116	1.460			-0.392	-2.859
	(0.00)	(1.00)	(0.927)			(0.347)	(0.002)
Im, Pesaran et Shin	-11.268	-12.523	0.184	-8.77	-3.872	-3.102	-2.948
	(0.00)	(0.00)	(0.426)	(0.00)	(0.00)	(0.00)	(0.00)
Hadri	1.916	6.509	31.246			16.193	12.798
	(0.00)	(0.00)	(0.00)			(0.00)	(0.00)

The numbers correspond to the probabilities p, for p> 0.1 the null hypothesis of non-stationarity cannot be rejected according to the LLC and IPS tests, on the other hand for p<0.1, the null hypothesis of stationarity is rejected according to the Hadri (2000) test.

Source: Author (2021), Outputs from STATA Software

Table A.5: **First Difference Unit Root Tests**

The figures correspond to the probabilities p, for p> 0.1 the null hypothesis of non-stationarity

Variables	**CROIS**	**FRK**	**CCP**	**INFL**	**INV**	**OUV**	**INS**
constante							
Levin, Lin et Chu	-17.88	11.834	-7.086			-9.918	-8.273
	(0.000)	(1.000)	(0.000)			(0.000)	(0.000)
Im, Pesaran et Shin	-14.41	-14.759	-10.03	-12.747	-10.071	-11.496	-5.608
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Hadri	-2.708	3.172	0.425			-1.321	-1.353
	(0.996)	(0.9603)	(0.000)			(0.906)	(0.912)
Constante+trend							
Levin, Lin et Chu	-16.429	15.77	-6.120			-8.924	-8.114
	(0.000)	(1.000)	(0.000)			(0.000)	(0.000)
Im, Pesaran et Shin	-14.419	-14.459	-10.061	-12.734	-10.17	-11.582	-5.649
	(0.000)	(0.000)	(0.000)	(-6.120)	(0.000)	(0.000)	(0.000)
Hadri	-3.583	3.547	6.561			-0.453	-0.459
	(0.999)	(0.000)	(0.335)			(0.674)	(0.677)

cannot be rejected according to the LLC and IPS tests, on the other hand for p<0.1, the null hypothesis of stationarity is rejected according to the Hadri (2000) test.

Source: Author (2021), Outputs from STATA Software

Table A.6: **Results of Kao Cointegration Tests in The WAEMU**

Equations	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
KAO ADF	-2.474	-2.41	-2.49	-2.57	-2.50	-2.48	1.035	-2.47	-2.47	-2.45

The statistics are N (0,1) under H0: non-cointegration. ***indicates the rejection of H0 at 1%.Source:

Source: Author (2021), Outputs from STATA Software

Appendix B. Brief Presentation of The Capital Flight Calculation Algorithm

Note: Detailed discussions on the calculation of capital flight are described in Ndikumana and Boyce (2010) and updated in subsequent publications, including Ndikumana & Boyce, (2018). Interested readers can consult Ndikumana & Boyce, (2018) for more detailed statistics on the trend of capital flight in Africa.

Capital flight is calculated as the difference between total recorded capital inflows and recorded currency outflows or uses, i.e., the differences between recorded currency inflows and uses in the country's balance of payments (BoP). Thus, the basic formula is a BoP residual calculated as follows:

$$ADJKF = CDEBTADJ + FDI - (CAD + RES) \quad (4)$$

CDEBTADJ is the change in total external debt stock, adjusted for exchange rate fluctuations and debt forgiveness, as reported in the World Bank's International Debt Statistics; FDI is net foreign direct investment; CAD is the current account deficit; RES is the net addition to the stock of reserves

The balance of payments residual above is further adjusted for discrepancies between the values of exports and imports recorded by the country and the values reported by trading partners, or trade falsification. Trade falsification is the sum of falsification of export transactions and falsification of import transactions. For WAEMU countries and their partners j at time t, export falsification (DX) is calculated as follows

$$DXIC_{it} = PXIC_{it} - \left(XIC_{it} * CIF_t \right) \quad (5)$$

Where PXIC is the value of imports from industrialized countries to WAEMU countries; XIC is exports from WAEMU countries to industrialized countries; CIF is the factor c.i.f/f.o.b, representing costs, insurance, and freight (c.i.f) relative to free on board (f.o.b) prices.

The import differential between WAEMU countries and their trading partners in industrialized countries (DMIC) is defined as follows

$$DMIC_{it} = MIC_{it} - \left(PMIC_{it} * CIF_t \right) \quad (6)$$

Where MIC is the imports of WAEMU countries from industrialized countries and PMIC is the exports of industrialized countries to WAEMU countries.

Falsification of export transactions:

$$DXIC_t = M_{IC,t} - cif * (X_{IC,t} + X_{IC,t}^{U}) \quad (7)$$

The falsification of import transactions:

$$DMIC_t = (M_{IC,t} + M^U_{IC,t}) - cif * X_{IC,t}$$

(8)

The terms $X^U_{IC,t}$ and $M^U_{IC,t}$ represent the amounts of exports and imports recorded in the "unspecified areas" that are attributed to WAEMU countries according to their shares in the total exports and imports of the African country.

For a given year t, for WAEMU countries, the falsification of export transactions (DXIC) and the falsification of import transactions (DMIC) relative to WAEMU countries are calculated as follows

$$MISINV_{it} = \frac{DXIC_{it}}{ICXS_t} + \frac{DMIC_t}{ICMS_t} \qquad \text{With}$$

$$ICXS = \frac{XIC}{XIC + XED} \qquad ; \qquad ICMS = \frac{MIC}{MIC + MED}$$

(9)

Where XIC and XED are exports to industrialized and emerging countries and developing countries, respectively; MIC and MED are imports from industrialized and emerging countries and developing countries, respectively.

Where ICXS and ICMS are the shares of industrialized countries in exports and imports recorded in WAEMU countries. The adjusted capital flight is then obtained as follows:

$$ADJKF = CDEBTADJ + FDI - (CAD + RES) + MISINV$$

(10)

MISINV is the net trade misinvoicing.