Examining the Effect of Capital Flight on Domestic Investment in the Franc Zone

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Abstract

Capital flight is a very important phenomenon in that it can affect investment. Using the generalized method of moment and the ordinary least squares method for the Franc Zone countries in the period 1970 to 2005, the econometric analysis indicates that capital flight affects negatively and significantly domestic investment, and that one dollar increase in capital flight lowers 4.5 cents of domestic investment. The results reveal that this negative influence operates through the private investment channel more than the public investment channel, and is caused by capital outflows from CEMAC more than those from WAEMU. Those results suggest that capital flight repatriation can help increase the domestic investment level. The study proposes some policy implications for capital flight repatriation.

JEL Classification: F20; E22; O55

Keywords: Capital Flight; Domestic Investment; Private Investment; Public Investment; CEMAC; WAEMU; Franc Zone

1. Introduction

What happens to domestic investment in a context of massive capital flight? I investigate this research question using annual panel data on the 15 countries in the Franc Zone (FZ) in the 1970-2005 period.

The national income accounting identity suggests that domestic and external savings are the counterparts to domestic investment[1]. Capital flight takes place through transferring a part of domestic savings abroad, resulting thus in fewer resources available for the financing of domestic investment. Capital flight can then influence domestic investment.

[1] According to the national income accounting identity, national income plus import equals consumption plus investment plus export. The external savings is the opposite of the current account balance.

The issue of examining the impact of capital flight on domestic investment is of high importance for the FZ countries for two reasons. First, recent estimates indicate that, over the period 1970 to 2004, 13 countries in the FZ experienced a massive capital flight that amounts to nearly $50 billion (Ndikumana and Boyce, 2007). Their paper reveals that the FZ countries are part of the sub-Saharan African countries where, for every dollar of external borrowing in this period, roughly 60 cents left these countries as capital flight. As external debt is supposed to finance in part investment, then the more the magnitude of capital flight the less external debt is used for domestic investment financing.

Second, the FZ is more confronted with a problem of scarcity of capital than the rest of sub-Saharan Africa. Indeed, the World Bank Africa Database (2005) shows that, in the period 1965 to 2003, the ratio of savings to GDP is lower in the FZ (17.7%) than in the non-FZ (23.3%). In addition, since the second half of the 1980s, the FZ suffered larger and more sustained declines in private capital flows than did non-FZ (Bhattacharya et al, 1996).

The contribution of this paper in the literature is twofold. Firstly, this study provides an empirical framework to estimate and examine capital flight from all the 15 FZ countries. This study provides thus a better cross-cutting analysis of capital flight magnitude in the FZ countries. Secondly, this paper contributes to a better understanding of the role of capital flight in explaining domestic investment, a topic not enough explored in the literature (Ndikumana and Fofack, 2008; Pattillo, 2007; Ndiaye, forthcoming).

The econometric analysis indicates that capital flight decreases domestic investment and that such an effect operates through the private investment channel more than the public investment route. Furthermore, this impact is found to be caused by capital outflows from the CEMAC zone more than those from the WAEMU zone.

The rest of the paper is organized as follows. Section 2 defines and measures capital flight, and explains theoretically how it can affect domestic investment. Stylized facts on capital flight and domestic investment are presented in section 3. The econometric analysis is undertaken in section 4, and section 5 concludes the paper.

2. Capital flight and domestic investment: a theoretical framework

2.1. Capital flight: definition and measure

Referring to the residual method, this paper defines capital flight as all resident capital outflows because what really matters is that *"for countries that are faced with large current account deficits and with payments of their external debt (and which are then in need for foreign capital), capital outflows increase their difficulties to finance their net imports and the payments of their debts"* (Hermes, Lensink and Murinde, 2002). Therefore, capital flight should not be distinguished from normal capital outflows (Erbe, 1985; World Bank, 1985; Morgan Guaranty Trust Company, 1986 and 1988). The choice of the residual method is motivated by the fact that, according to Hermes et al (2002), the other methods have important drawbacks. Indeed, those authors argue that the Dooley method and the hot money method are conceptually wrong to the extent that the distinction between normal and abnormal capital outflows is impossible on an empirical basis. They claim also that the asset method is too narrow.

This paper uses two versions of the residual method: the World Bank (1985) version and that of Morgan Guaranty (1986). Following Boyce and Ndikumana (2001), Ndikumana and Boyce (2003 and 2007), I adjust these measures for exchange rate fluctuations, trade misinvoicing and inflation[2]. Adjusted capital flight is calculated as follows:

$$RCF(WB)_{it} = \frac{(\Delta DEBA_{it} + FDI_{it}) - (CA_{it} + \Delta FRES_{it}) + TMIS_{it}}{PPI_t} \quad (1)$$

$$RCF(MG)_{it} = RCF(WB)_{it} - \frac{\Delta ADB_{it}}{PPI_t} \quad (2)$$

[2] In addition to those adjustments, Boyce and Ndikumana (2001) took also into account an adjustment for imputed interest earnings. However, these authors asserted that adjustment for inflation is useful in examining the causes and consequences of capital flight, while adjustment for imputed interest earnings permits more appropriate comparisons of capital flight to other aggregates, such as the stock of debt. Since the objective of this study is to analyse the impact of capital flight on domestic investment, adjustment for imputed interest earnings is thus not appropriate. Therefore, I take into account only adjustments for exchange rate fluctuations, trade misinvoicing and inflation.

Where RCF(WB) is real capital flight calculated by using the World Bank (1985) version of residual method adjusted for exchange rate fluctuations, trade misinvoicing and inflation; RCF(MG) is real capital flight calculated by using the Morgan Guaranty (1986) version of residual method adjusted for exchange rate fluctuations, trade misinvoicing and inflation; ΔDEBA is the adjusted change in debt for fluctuations in the exchange rate of the dollar against other currencies; FDI is net foreign direct investment; CA is current account balance; ΔFRES is change in foreign reserves; TMIS is total trade misinvoicing; ΔADB indicates the change in assets held overseas by domestic banks; PPI is the US producer price index.

The adjusted change in debt for fluctuations in the exchange rate of the dollar against other currencies (ΔDEBA) is computed as follows:

$$\Delta DEBA_t = DEB_t - NEWDEB_{t-1} \tag{3}$$

Where DEB_t is the stock of the debt of year t measured by the exchange rate at the end of year t; $NEWDEB_{t-1}$ is the stock of the debt of year t-1 measured by the exchange rate at the end of year t. $NEWDEB_{t-1}$ is computed as:

$$NEWDEB_{i,t-1} = \sum_{j=1}^{7}\left(\alpha_{ij,t-1} * LTDEB_{i,t-1}\right)/\left(EX_{jt}/EX_{j,t-1}\right) + IMFC_{i,t-1}/\left(EX_{SDR,t}/EX_{SDR,t-1}\right) + LTOTHER_{i,t-1} + LTMULT_{i,t-1} + LTUS_{i,t-1} + STDEB_{i,t-1} \tag{4}$$

Where LTDEB is the total long-term debt; α_j is the proportion of long-term debt held in currency j (j = French franc, the German Deutsche mark, the Japanese yen, the Swiss franc, the SDR, the UK pound, and the Euro[3]); EX is the end-of-year exchange rate of the currency of denomination against the dollar (expressed as units of currency per U.S. dollar); IMFC is the use of IMF credit denominated in Special Drawing Rights (SDR); LTOTHER is long-term debt denominated in other unspecified currencies; LTMULT is long-term debt denominated in multiple currencies; LTUS is long-term debt denominated in U.S. dollars; and STDEB is short term debt. Total trade misinvoicing (TMIS) is calculated as:

$$TMIS_{it} = \frac{EXD_{it}}{ASEX_i} + \frac{IMD_{it}}{ASIM_i} \tag{5}$$

[3] Euro (from 2001); Deutsche mark and French Franc (up to 2000).

Where EXD is the export discrepancies between the FZ countries and the industrialized countries; IMD is the import discrepancies between the FZ countries and the industrialized countries; ASEX is the average shares of industrialized countries in exports of the FZ countries; ASIM is the average shares of industrialized countries in imports of the FZ countries. EXD and IMD are computed as follows:

$$EXD_{it} = IMIC_{it} - (EXWA_{it} * CAF_{t}) \quad (6)$$

$$IMD_{it} = IMWA_{it} - (EXIC_{it} * CAF_{t}) \quad (7)$$

Where IMIC is the value of the industrialized countries' imports from the FZ countries as reported by the industrialized trading partners; IMWA is imports of the FZ countries from the industrialized countries as reported by the FZ countries; EXWA is exports of the FZ countries to the industrialized countries as reported by the FZ countries; EXIC is the industrialized countries' exports to the FZ countries as reported by the industrialized trading partners; CAF is the c.a.f/f.a.b factor, representing the cost of freight and insurance.

Table A.1 in appendix 1 provides the magnitude of capital flight from the FZ countries in selected studies. The volume of capital flight differs in methods used or period considered.

2.2. Theory of capital flight and domestic investment

There are many channels through which capital flight can induce a fall in domestic investment.

The domestic private savings channel

Capital flight takes place through transferring a part of domestic private savings abroad. Thus, capital flight leads to a decline in domestic savings. Therefore, when net capital outflows episodes occur, bank's domestic resources in the form of savings decline, curtailing then its ability to provide credit. The fall in bank credit can thereby result in a reduction in the volume of resources available for domestic investment financing.

The government revenue channel

Capital flight leads to an erosion of the domestic tax base (Ajayi, 1997), declining government revenue. Public investment may thus fall, influencing in turn private investment.

The decrease in public revenue may induce the government to recourse to seigniorage revenue, entailing thus a rise in the inflation tax. Investors are then inclined to reduce their domestic investment to avoid heavy losses in the real value of their domestic assets. Investors are therefore constrained to explore investment opportunities overseas, in accordance with the portfolio-choice theory (Collier et al, 2004).

The public policies uncertainty channel

An increase in capital flight can raise uncertainty about the government's ability to finance its budget deficit or its debt. The persistence of budget deficit heightens the government financing needs, entailing an inflationary spiral. Such a situation is unfavorable for investors as it raises the risk of losing their domestic wealth, inducing then a fall in private investment.

Due to the persistence of budget deficit, debt can appear to be unsustainable, inducing two consequences. The first one is related to a risk of bankruptcy for firms (in case of an internal debt), impeding private investment. The second one is a risk of deterioration in the quality of the government's signature. Such a situation is a bad signal sent to the financial market. In other words, when the government makes a loan issue, investors can be less inclined to subscribe to this loan issue.

Furthermore, the persistence of debt can induce investors to expect an increase in tax by the government in order to cope with this situation. This may raise the risk of losing the real value of the domestic assets of the private agents, inducing them thus to shift their portfolio composition in favor of foreign assets.

The speculative bubble channel

The phenomenon of capital flight reflects fewer capital controls. Capital flows without regulations increase speculative bubble, raising then macroeconomic uncertainties. This may

lead to a rise in the risk of losing domestic private assets, resulting in a fall in private investment since residents may leave the domestic environment to avoid losing their wealth.

The capital inflows channel

Capital inflows have been found to be an important cause of capital flight. The bank of France finds that, from 1973 to 1987, 28% of external debt are re-exported outside the FZ in the form of capital flight. Other studies reveal that for every dollar of external debt, roughly 75 to 90% (Hermes and Lensink, 1992) or 80% (Ndikumana and Boyce, 2003) or 60% (Ndikumana and Boyce, 2007) are channelled overseas in the form of capital flight. As one function of external debt is to contribute to the domestic investment financing, therefore the more the phenomenon of capital flight persists, the less external debt is used for investment financing.

In addition to external debt, aid can also be a potential channel through which capital flight affects investment. Indeed, Bauer (1981) argues that aid might be used to finance capital flight. Empirical evidence support the presumption that part of aid is channelled overseas in the form of capital flight (Hermes and Lensink, 2001; Lensink et al, 2000). To the extent that one function of aid is finance domestic investment, this implies thus that the persistence of capital flight makes aid less available for domestic investment financing.

The corruption channel

Corrupt elites take advantage of their favorable position to amass personal fortunes held abroad (Boyce and Ndikumana, 2001). Indeed, according to Burns et al (1997), Mobutu Sese Seko who ruled Zaire (the present Democratic Republic of Congo) from 1965 to 1997, has accumulated $4 billion in private assets by the mid-1980s. Onishi (1999) reveals that the Swiss bank accounts of the family of General Sani Abacha, who ruled Nigeria for five years, contain as much as $2 billion. A US Senate inquiry in the same year revealed that the Abacha family also held multi-million dollar accounts with Citibank in London and New York (Gerth, 1999; O'Brien, 1999).

Those capital flight episodes show then the important role of corruption in explaining the phenomenon of capital flight. In other words, the persistence of this phenomenon is indicative

of high level of corruption in the domestic environment. In such a situation, investors are not inclined to explore domestic investment opportunities.

3. Capital flight and domestic investment: Stylized facts

The paper uses annual data for a panel comprising all the 15 countries in the Franc Zone (FZ): Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Comoros, Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Guinea-Bissau, Mali, Niger, Senegal and Togo. The time period is 1970-2005 for all countries, except for Comoros (1980-2005)[4], for Congo (1971-2005), for Equatorial Guinea (1987-2005) which was member of the FZ on January 01, 1985[5], for Gabon (1970-2004), for Guinea-Bissau (1998-2005) which was member of the FZ on May 02, 1997, and for Mali (1985-2005) as this country was member of the FZ on June 01, 1984.

3.1. Capital flight: Stylized facts

Table 1 reports total and mean annual real capital flight in the FZ in the period 1970 to 2005. This table reveals contrasted capital movements across the FZ countries. Indeed, capital flight is found to be positive for 7 countries: Burkina Faso, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire and Gabon, implying thus that those countries have experienced net capital outflows in the period. Among those countries, Côte d'Ivoire leads with a remarkable $34.4 or $34.1 billion in capital flight, representing $956.7 or $946.1 million annually. With the World Bank method, Côte d'Ivoire is followed, in order, by Cameroon ($14.8 billion), Congo ($13.1 billion), Gabon ($11.4 billion), Chad ($2.247 billion), Burkina Faso ($2.244 billion) and Central African Republic ($1.6 billion). This classification holds true with the Morgan Guaranty method, and remains also robust when mean annual real capital flight is used as indicators of comparisons.

However, the ratio of capital flight to GDP is not heavier in countries experiencing the most important positive capital flight in absolute terms. Indeed, when capital flight is measured as a percentage of GDP, Congo leads with a ratio of 329.8% or of 325.6%. Congo is followed by

[4] To estimate capital flight from Comoros, I consider the period 1980-2005 with respect to the World Bank method. However, regarding the Morgan Guaranty method, the period considered is 1982-2005 because assets held overseas by comoran domestic banks are available only from 1982 to 2005.
[5] But data with which capital flight from this country is computed are available only in the period 1987 to 2005.

Côte d'Ivoire with 329% or 325.4%; Gabon with 217.4% or 209.3%; Central African Republic with 178% or 175%; Cameroon with 123.5% or 119.6%; Chad and Burkina Faso (for these two countries, the ratio of capital flight to GDP is smaller than 100%).

Real capital flight is negative for the 8 other countries of the sample: Benin, Comoros, Equatorial Guinea, Guinea-Bissau, Mali, Niger, Senegal and Togo[6], suggesting then that those countries have benefited from net capital inflows. One explanation of negative capital flight may be related to remittances. Indeed, according to Gupta, Pattillo and Wagh (2007), Benin, Comoros, Guinea-Bissau, Mali, Senegal, and Togo, are in the top ten recipients of remittances in Sub-Saharan Africa. Table A.2 in appendix 2 reports remittances in the FZ, in terms of total volume, mean annual and in percentage of GDP.

As a whole, real capital flight for the 15 FZ countries is found to be massive with a magnitude that amounts to roughly $53.1 or $49.7 billion, representing $94.6 or $87.9 million per annum, and 91.4% or 85.6% of GDP, respectively. Therefore, the group of FZ countries has experienced net capital outflows in the period.

Inside the FZ, the magnitude of capital flight is higher in the CEMAC zone ($43.1 or $41.8 billion, representing respectively 150.8% or 146.2% of GDP) than in the WAEMU zone ($10.1 or $8.1 billion, representing respectively 34.7% or 27.7% of GDP). Capital flight from CEMAC stands at 81.2% or 84% of total capital flight in the FZ, depending on the technique of measure used. The predominance of capital flight in the CEMAC zone can be explained by the productive structure of the CEMAC countries which are all oil and other natural resources producing countries. The abundance of natural resources constitutes an important factor that increases the level of corruption (Leite and Weidmann, 1999; Stevens, 2003; Wurthmann, 2006), and consequently can be a worsening source of capital flight.

[6] Since the length of the time period is not identical for these countries, annual average of capital flight appears thus to be the best comparison indicator of capital flight from these countries.

Table 1: Total and mean annual real capital flight in the FZ (million 2000 $ US), 1970-2005[a]

Country	Real Capital Flight, World Bank[b]			Real Capital Flight, Morgan Guaranty[c]		
	Total	Mean annual	% of GDP	Total	Mean annual	% of GDP
Benin	-4711.7	-130.9	-171.1	-5036.2	-139.9	-182.9
Burkina Faso	2244.7	62.4	67.3	1998.2	55.5	59.9
Cameroon	14885.1	413.5	123.5	14415.7	400.4	119.6
Central African Republic	1633.8	45.4	178.0	1605.8	44.6	175.0
Chad	2247.5	62.4	86.4	2177.3	60.5	83.7
Comoros	-166.5	-6.4	-71.9	-174.3	-7.3	-75.3
Congo	13147.4	375.6	329.8	12979.4	370.8	325.6
Côte d'Ivoire	34441.8	956.7	329.0	34058.3	946.1	325.4
Equatorial Guinea	-207.9	-10.9	-5.5	-354.2	-18.6	-9.3
Gabon	11433.1	326.7	217.4	11006	314.5	209.3
Guinea Bissau	-294.8	-36.8	-138.1	-280.7	-35.1	-131.5
Mali	-2022.0	-96.3	-61.4	-2254.6	-107.4	-68.4
Niger	-6015.8	-167.1	-275.5	-6127.6	-170.2	-280.6
Senegal	-9851.2	-273.6	-178.4	-10430.5	-289.7	-188.9
Togo	-3634.4	-101.0	-241.9	-3826.6	-106.3	-254.7
WAEMU[d]	**10156.5**	**26.7**	**34.7**	**8100.2**	**19.1**	**27.7**
CEMAC[e]	**43139.0**	**202.1**	**150.8**	**41830.5**	**195.4**	**146.2**
Franc Zone	**53129.1**	**94.6**	**91.4**	**49756.4**	**87.9**	**85.6**

Source: Author's computations using data from: World Bank, *Global Development Finance 2007* (CD-ROM Edition); World Bank, *World Development Indicators 2007* (CD-ROM Edition); IMF, *International Financial Statistics 2007* (CD-ROM Edition); IMF, *Balance of Payments Statistics* (2004 CD-ROM Edition completed by yearbooks); IMF, *Direction of Trade Statistics* (2004 CD-ROM Edition completed by yearbooks); IMF, *Selected Issues and Statistical Appendix* (in www.imf.org).

a. The time period is 1970-2005 for all countries, except for Comoros (1980-2005), Congo (1971-2005), Equatorial Guinea (1987-2005), Gabon (1970-2004), Guinea-Bissau (1998-2005), and Mali (1985-2005).
b. Capital flight is measured by using the World Bank (1985) version of the residual method adjusted for exchange rate fluctuations, trade misinvoicing and inflation (Boyce and Ndikumana, 2001).
c. Capital flight is measured by using the Morgan Guaranty (1986) version of the residual method adjusted for exchange rate fluctuations, trade misinvoicing and inflation (Boyce and Ndikumana, 2001).
d. WAEMU: Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal and Togo.
e. CEMAC: Cameroon, Central African Republic, Chad, Congo, Equatorial Guinea and Gabon.

3.2. Domestic investment: Stylized facts

Table 2 reveals contrasted volume of investment across the FZ countries in the 1970-2005 period. Indeed, 3 countries have benefited from massive investment flows. Among them, Cameroon leads with a volume of about $64.2 billion, representing $1783 million annually. Next are, in order, Gabon (with $52.7 billion, representing $1464 million annually), Côte

d'Ivoire (with $46 billion, representing $1278.9 million annually). Investment received by 4 other countries is of less volume, but important since it is between $10 and 25 billion. Those 4 countries are: Congo (with $24.3 billion, or $674.6 million per year), Senegal (with $21 billion, or $584.6 million per year), Mali (with $15.3 billion, or $4249 million per year), and Burkina Faso (with $10.6 billion, or $310.6 million per year).

For the remaining 8 countries, investment volumes are smaller than $10 billion. Among those countries, Equatorial Guinea, Chad and Togo benefit from the more important volumes that amount to roughly $10 billion: $9.8 billion or $656.6 million annually for Equatorial Guinea, $9.7 billion or $312.9 million annually for Chad, $9.2 billion or $256.7 million annually for Togo. Next are, in order, Niger, Benin, Central African Republic (the volumes of investment are between $3 and 8 billion for these 3 countries), Comoros and Guinea Bissau (investment volumes are smaller than $1 billion for these 2 countries).

Investment volumes are more important in the CEMAC zone compared to the WAEMU zone. Indeed, in the period 1970 to 2005, investment volumes in CEMAC stand at approximately $164 billion (representing 58.1% of total investment in the FZ), compared to $117.4 billion in investment for WAEMU. One explanation of this preponderance may be related to the productive structure of the CEMAC countries which are oil and other natural resources producing countries, thus which can attract more investment volumes. For the FZ as a whole, total investment accounts for $282 billion or $553.7 million annually.

The preponderance of investment in CEMAC holds true also with the ratio of investment to GDP that stands at 25.6% compared to 18.1% for WAEMU. As a whole, the 15 FZ countries benefit from 21.3% in investment as a proportion of GDP. Investment rates are not higher in countries that benefit from the more important investment volume.

Table 2: Domestic Investment in the FZ, (million 2000 $ US), 1970-2005

Country	Total	Mean annual	% of GDP
Benin	6822.2	189.5	16.2
Burkina Faso	10561.4	310.6	19.4
Cameroon	64192.6	1783.1	20.0
Central African Republic	3229.7	97.9	12.3
Chad	9701.2	312.9	16.6
Comoros	983.7	37.8	20.5
Congo	24285.8	674.6	28.4
Côte d'Ivoire	46040.9	1278.9	16.1
Equatorial Guinea	9848.7	656.6	42.4
Gabon	52703.7	1464.0	33.9
Guinea Bissau	835.4	23.2	24.1
Mali	15295.1	424.9	19.3
Niger	7547.0	209.6	13.5
Senegal	21046.6	584.6	15.4
Togo	9239.8	256.7	20.9
WAEMU	**117388.6**	**409.8**	**18.1**
CEMAC	**163961.6**	**831.5**	**25.6**
Franc Zone	**282333.9**	**553.7**	**21.3**

Source: Author's computations using data from: World Bank, *Africa Development Indicators 2007* (CD-ROM Edition)

Note: Domestic investment is measured using gross capital formation.

Contrasted investment volumes in the FZ countries can also be appreciated through descriptive statistics in table 3. Indeed, the smallest investment level is of $10.17 million, while the highest investment volume stands at $3729.1 million. Guinea Bissau has experienced the smallest investment received in 1975, while Gabon has benefited from the highest volume in 1976. Those volumes reveal thus strong domestic investment variability, with a coefficient of variation of 116.02%. Since investment has been identified as an important factor conducive to economic growth in the literature, this implies thus that domestic investment variability can hamper economic growth and induce macroeconomic instability in the FZ.

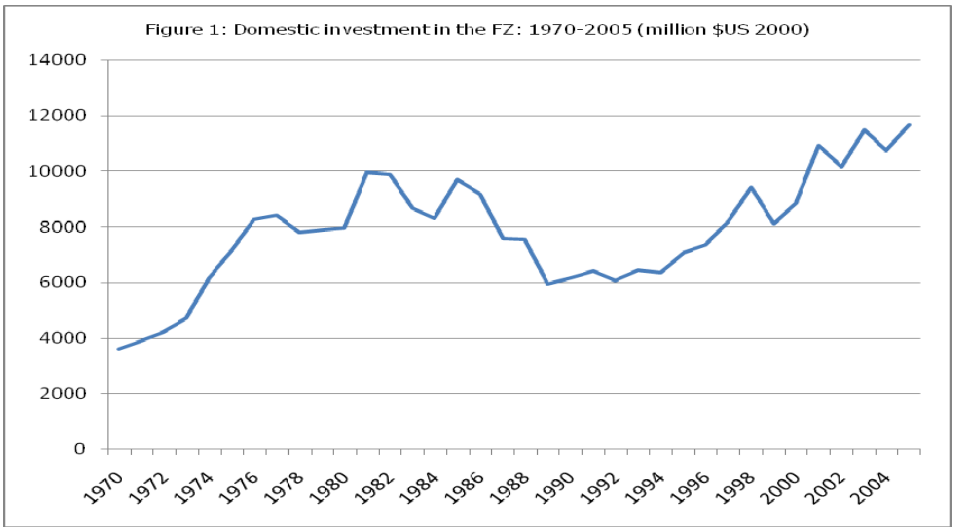
Table 3: Descriptive statistics on domestic investment in the FZ, (million 2000 $ US), 1970-2005

Indicator	Domestic investment
Mean	553.7
Minimum	10.17
Maximum	3729.1
Standard deviation	642.4
Coefficient of variation	116.02%
Observations	499

Source: Author's computations using data from: World Bank, *Africa Development Indicators 2007* (CD-ROM Edition)

Note:
- Domestic investment is measured using gross capital formation.
- The coefficient of variation is standard deviation divided by mean.

Domestic investment variability in the FZ is also highlighted in figure 1 which shows irregular evolution of investment in the 1970-2005 period: investment is found to be falling more than it increases. Indeed, for the FZ as a whole, from 1970 to 2000, domestic investment has not exceeded its level of $9.9 billion reached since 1981. Between 2001 and 2005, investment is showing an upward trend, with volumes that stand at $10.9 and $11.7 billion, respectively. The persistent decline in domestic investment since 1981 (up to 2000) can be explained by the debt crisis of the early 1980s in developing countries. At this time, the capital account of many African countries was paradoxical, with the simultaneous occurrence of high external debt accumulation and substantial hemorrhage of financial resources in the form of capital flight (Ajayi, 1992 and 1997; Ndikumana, 2005). The FZ countries are part of the African countries whose capital account presents also a stunning paradox as part of capital flight from the FZ is financed by funds borrowed by the FZ countries (Ndikumana and Boyce, 2003 and 2007).



Source: Author's computations using data from: World Bank, *Africa Development Indicators 2007* (CD-ROM Edition)

Note: Domestic investment is measured using gross capital formation.

4. Econometric Analysis

The sets of empirical relationships are threefold. First, I examine econometrically the effect of capital flight on total domestic investment. Second, I investigate econometrically the impact of capital flight on private investment and on public investment, in order to see whether the domestic investment impact of capital flight operates through the private investment channel or that of public investment. Third, as capital flight from CEMAC is predominant (81.2% or 84%) in the FZ, I explore econometrically the influence of capital flight from CEMAC and that from WAEMU on domestic investment in the FZ.

4.1. Effect of capital flight on total domestic investment

The following baseline equation is specified:

$$INVP_{it} = \alpha_1 INVP_{i,t-1} + \alpha_2 \Delta FCRP_{i,t-1} + \alpha_3 X_{it} + \alpha_4 Y_{it} + u_i + v_t + \varepsilon_{it} \quad (8)$$

Where:

- INVP is the ratio of total domestic investment to GDP, investment being measured using gross capital formation (World Bank, Africa Development Indicators 2007). Empirical evidence has shown that past domestic investment influences positively its current level (Asante, 2000).

- FCRP is the ratio of real capital flight to GDP. On looking at the theory, the coefficient of capital flight is expected to be negative.
- X is the vector of control macroeconomic variables, including real growth GDP (TCP) the ratio of the credit to the private sector to GDP (CPP), inflation rate (INF) measured as the change in GDP deflator[7]. Those control variables allow to take account of the role of the macroeconomic environment in explaining domestic investment.
- Y is the vector of control institutional variables including the quality of institutions measured using constraints on the executive power (CONEX) that take values ranging from 1 (strongest constraints, then the worst institutional quality) to 7 (smallest constraints, then the best institutional quality) (sourced from Polity IV Project database); governance (GOUVER) measured using the political regime index (Polity 2 indicator) that takes values ranging from -10 (the worst governance) to +10 (the best governance) (drawn from Polity IV Project database). Those control variables allow to take account of the role of the institutional environment in explaining domestic investment.
- u is the country-specific fixed effect; v is the time-specific fixed effect; ε is the error term.

The definition and the sources of all variables are indicated in table A.3 in appendix 3. I use the generalized method of moments (GMM) to address endogeneity problems due to the lagged dependent variables used as regressor, and other sources of endogeneity. Some explanatory variables such as the economic growth rate can increase when investment rises. Therefore, the economic growth rate appears to be a potential endogenous variable. The Hausman test confirms that the lagged dependent variable (i.e. past investment) and the economic growth rate are endogenous, justifying the use of GMM to correct for endogenous problems. The Blundell and Bond (1998) system GMM estimator is implemented.

The results, reported in tables 4 and 5, indicate that capital flight affects negatively and significantly domestic investment, implying thus that in a context of financial hemorrhage in the form of capital flight, there are less resources available for domestic investment financing. This negative influence of capital flight on investment does not depend on the capital flight measure used and holds true even after controlling for macroeconomic variables (economic

[7] As data on the consumer price index are unavailable in the period of the study for some countries in the sample, change in GDP deflator is thereby used as a proxy for inflation rate.

growth rate, credit to the private sector, inflation) or institutional variables (governance, quality of institutions).

In tables 4 and 5, capital flight presents coefficients ranging from -0.039 to -0.050, with an average value of -0.045. Since both capital flight and domestic investment are measured as percentages of GDP, this implies then that one dollar increase in capital flight lowers 4.5 cents of domestic investment.

Table 4: Effect of capital flight on total domestic investment in the FZ, World Bank method[#]

Explanatory variables[##]	(1)	(2)	(3)	(4)	(5)
$\Delta FCRP_{-1}$	-0.040	-0.042	-0.044	-0.045	-0.044
	(2.27)**	(2.32)**	(1.82)*	(2.03)*	(2.34)**
$INVP_{-1}$		0.481	0.468	0.560	0.478
		(2.27)**	(2.29)**	(3.14)***	(2.26)**
ΔCPP			0.668	0.612	
			(2.45)**	(2.22)**	
TCP_{-2}			0.768	0.490	
			(2.21)**	(1.47)	
INF_{-3}				-0.118	
				(2.14)*	
$\Delta GOUVER$					0.000
					(0.12)
$CONEX_{-1}$					0.000
					(2.24)**
Constant	0.208	0.108	0.086	0.085	0.109
	(10.06)***	(2.16)**	(2.17)**	(2.57)**	(2.18)**
Observations	430	427	423	411	427
Countries	15	15	15	15	15
AR(1) test	0.312	0.039	0.054	0.067	0.039
AR(2) test	0.828	0.406	0.202	0.959	0.400
Hansen test	0.244	0.364	0.226	0.443	0.343

Robust t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Note: The dependent variable is domestic investment as a percentage of GDP. The regressions are run using the Blundell and Bond (1998) system GMM method.

Capital flight is measured using the World Bank (1985) version of the residual method adjusted for exchange rate fluctuations, trade misinvoicing and inflation (Boyce and Ndikumana, 2001).

The definitions of variables are indicated in table A.3 in appendix 3.

Table 5: Effect of capital flight on total domestic investment in the FZ, Morgan Guaranty method [#]

Explanatory variables[##]	(1)	(2)	(3)	(4)	(5)
$\Delta FCRP_{-1}$	-0.039	-0.042	-0.048	-0.050	-0.045
	(2.32)**	(2.38)**	(1.92)*	(2.21)**	(2.43)**
$INVP_{-1}$		0.475	0.468	0.561	0.472
		(2.26)**	(2.29)**	(3.13)***	(2.26)**
ΔCPP			0.667	0.610	
			(2.46)**	(2.23)**	
TCP_{-2}			0.777	0.493	
			(2.36)**	(1.51)	
INF_{-3}				-0.121	
				(2.13)*	
$\Delta GOUVER$					0.000
					(0.15)
$CONEX_{-1}$					0.000
					(2.27)**
Constant	0.208	0.109	0.086	0.084	0.110
	(9.99)***	(2.20)**	(2.14)*	(2.54)**	(2.22)**
Observations	428	425	423	411	425
Countries	15	15	15	15	15
AR(1) test	0.328	0.046	0.050	0.065	0.045
AR(2) test	0.775	0.411	0.191	0.931	0.405
Hansen test	0.215	0.358	0.237	0.449	0.327

Robust t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Note: The dependent variable is domestic investment as a percentage of GDP. The regressions are run using the Blundell and Bond (1998) system GMM method.

Capital flight is measured using the Morgan Guaranty (1985) version of the residual method adjusted for exchange rate fluctuations, trade misinvoicing and inflation (Boyce and Ndikumana, 2001).

The definitions of variables are indicated in table A.3 in appendix 3.

4.2. Effect of capital flight on private and public investments

The following baseline equations are estimated:

$$INVPRI_{it} = \alpha_1 INVPRI_{i,t-1} + \alpha_2 \Delta FCRP_{i,t-3} + \alpha_3 TCP_{i,t-6} + u_i + v_t + \varepsilon_{it} \quad (9)$$

$$INVPUB_{it} = \alpha_1 INVPUB_{i,t-1} + \alpha_2 \Delta FCRP_{i,t-3} + \alpha_3 TCP_{i,t-6} + u_i + v_t + \varepsilon_{it} \quad (10)$$

Where INVPRI is the ratio of domestic private investment to GDP (i.e. gross private investment in World Bank, Africa Development Indicators 2007); INVPUB is the ratio of domestic public investment to GDP (i.e. gross public investment in World Bank, Africa Development Indicators 2007); FCRP is the ratio of capital flight to GDP; TCP is the economic growth rate used as a control variable to account for accelerator effects.

With GMM, the results, presented in tables 6 and 7, indicate that capital flight influences significantly private investment, while its effect on public investment is found to be insignificant. Therefore, the negative impact of capital flight on total domestic investment in the FZ operates through private investment more than public investment. Two reasons explain these results. First, capital flight takes place through transferring abroad a part of domestic private savings which is supposed to finance private investment. Second, capital flight can also be explained by uncertain macroeconomic, political and institutional environment. In a context of portfolio choice (Collier et al, 2004), such an environment increases the risk of losing the real value of domestic assets of private agents, forcing them thus to shift their portfolio composition in favor of foreign assets, inducing thereby a fall in private investment.

Table 6: Effect of capital flight on private and public investment, World Bank method[#]

Explanatory variables##	Private investment	Public investment	Private investment	Public investment	Private investment	Public investment
$\Delta FCRP_{-3}$	-0.023	0.003	-0.028	0.003	-0.021	-0.000
	(2.00)*	(0.33)	(2.51)**	(0.37)	(2.62)**	(0.04)
$INVPRI_{-1}$			0.337		0.490	
			(2.91)**		(5.41)***	
$INVPUB_{-1}$				1.097		0.975
				(8.42)***		(7.55)***
TCP_{-6}					0.210	-0.068
					(1.80)*	(2.01)*
Constant	0.131	0.072	0.088	-0.009	0.060	0.002
	(6.02)***	(15.31)***	(3.36)***	(0.92)	(3.41)***	(0.21)
Observations	336	339	325	329	314	318
Countries	15	15	15	15	15	15
AR(1) test	0.283	0.704	0.203	0.029	0.176	0.035
AR(1) test	0.457	0.311	0.343	0.297	0.299	0.399
Hansen	0.665	0.998	0.643	0.814	0.136	0.420

Robust t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Note: The dependent variables are private and public investments as percentages of GDP. The regressions are run using the Blundell and Bond (1998) system GMM method.

Capital flight is measured using the World Bank (1985) version of the residual method adjusted for exchange rate fluctuations, trade misinvoicing and inflation (Boyce and Ndikumana, 2001).

The definitions of variables are indicated in table A.3 in appendix 3.

Table 7: Effect of capital flight on private and public investment, Morgan Guaranty method[#]

Explanatory variables##	Private investment	Public investment	Private investment	Public investment	Private investment	Public investment
$\Delta FCRP_{-3}$	-0.024	0.005	-0.026	0.004	-0.020	0.001
	(2.18)**	(0.56)	(2.57)**	(0.53)	(2.25)**	(0.15)
$INVPRI_{-1}$			0.345		0.489	
			(2.97)**		(5.33)***	
$INVPUB_{-1}$				0.976		0.977
				(6.14)***		(7.59)***
TCP_{-6}					0.210	-0.068
					(1.81)*	(2.03)*
Constant	0.132	0.070	0.087	-0.000	0.060	0.002
	(6.03)***	(15.60)***	(3.32)***	(0.01)	(3.37)***	(0.20)
Observations	334	337	323	327	314	318
Countries	15	15	15	15	15	15
AR(1) test	0.283	0.816	0.202	0.041	0.173	0.035
AR(1) test	0.456	0.263	0.339	0.346	0.296	0.393
Hansen	0.524	0.675	0.606	0.417	0.133	0.415

Robust t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Note: The dependent variables are private and public investments as percentages of GDP. The regressions are run using the Blundell and Bond (1998) system GMM method.

Capital flight is measured using the Morgan Guaranty (1985) version of the residual method adjusted for exchange rate fluctuations, trade misinvoicing and inflation (Boyce and Ndikumana, 2001).

The definitions of variables are indicated in table A.3 in appendix 3.

4.3. Effect of capital flight from CEMAC and WAEMU on investment in the FZ

The baseline equation is presented as follows:

$$INVP(FZ)_t = \alpha_1 INVP(FZ)_{t-1} + \alpha_2 FCRP(WAEMU)_{t-2} + \alpha_3 FCRP(CEMAC)_{t-2} + \alpha_4 TCP(FZ)_t + \nu_t + \varepsilon_t \quad (11)$$

Where INVP(FZ) is the ratio of total domestic investment to GDP for all the 15 FZ countries; FCRP(WAEMU) is the ratio of capital flight to GDP for the WAEMU countries; FCRP(CEMAC) is the ratio of capital flight to GDP for the CEMAC countries; TCP(ZF) is the economic growth rate for all the 15 FZ countries (this is a control variable to account for accelerator effects).

The Hausman test indicates that the economic growth rate is not endogenous in equation (11). With ordinary less squares method, the results, reported in table 8, reveal that capital flight from CEMAC affects negatively and significantly total domestic investment in the FZ, while capital flight from WAEMU has no significant influence on total domestic investment in the FZ. These results suggest that the negative effect of capital flight on domestic investment in

the FZ is caused by capital flight from CEMAC more than capital flight from WAEMU. One reason is related to the predominance of capital flight from CEMAC that accounts for 81.2% or 84% of total capital flight from the FZ, due to the productive structure of the CEMAC countries which are oil and other natural resources producing countries. Indeed, the abundance of natural resources is an important cause of capital flight as it raises the corruption level.

Table 8: Effect of capital flight from CEMAC and WAEMU on investment in the FZ[#]

Explanatory variables##	World Bank	Morgan Guaranty	World Bank	Morgan Guaranty
$FCRP_{-2}$ (WAEMU)	0.057	0.056	0.047	0.051
	(1.37)	(1.30)	(1.60)	(1.66)
$FCRP_{-2}$ (CEMAC)	-0.139	-0.137	-0.152	-0.153
	(2.34)**	(2.40)**	(2.68)**	(2.59)**
$INVP_{-1}$			0.435	0.430
			(2.75)**	(2.69)**
TCP			0.254	0.267
			(2.13)**	(2.23)**
Constant	0.221	0.221	0.122	0.122
	(40.11)***	(41.61)***	(3.69)***	(3.71)***
Observations	34	34	34	34
R-squared	0.11	0.11	0.47	0.48

Robust t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Note: The dependent variable is domestic investment as a percentage of GDP. The regressions are run using Ordinary Less Squares method.

Capital flight is measured using the World Bank (1985) and Morgan Guaranty (1985) versions of the residual method adjusted for exchange rate fluctuations, trade misinvoicing and inflation (Boyce and Ndikumana, 2001).

The definitions of variables are indicated in table A.3 in appendix 3.

4.4. Policy implications

On looking at the negative impact of capital flight on investment, capital flight repatriation can thus be helpful in raising the level of domestic investment. The results indicate that the investment influence of capital flight is operated by private actors more than by public leaders. Thus, the question is how to repatriate fled private capital. Since private savings is one of the channels through which private capital flight operates, then if residents transfer their savings overseas, this implies that the conditions of remuneration for deposits are more attractive abroad than in the domestic environment. Promoting domestic interest rates on deposits can thereby contribute to repatriate private savings towards domestic banks.

Another channel through which private capital flight occurs is related to risks that induce losses in the domestic assets of residents. Such risks are attributable to the uncertainty about

the macroeconomic and institutional environment. The more the impact of this environment on the real value of the domestic assets of private investors is uncertain, the more they prefer to transfer their wealth abroad, increasing thus capital flight. It is therefore important to minimize uncertainty about the macroeconomic and institutional environment to repatriate fled private capital. In that sense, low inflation, low budget deficit, low taxes, minimized change in exchange rate, high terms of trade, minimized uncertainty of public policies, can help decrease risks of losing the real value of the domestic assets of private actors, inducing then private capital flight reversal. Furthermore, given that the FZ benefits from exchange rate stability, this zone is then less sensitive to external shocks. Therefore, with this stability, private agents' wealth is less exposed to risks of losses; hence another argument for repatriating fled private capital.

With respect to the institutional environment, efforts to improve governance and institutional quality, and to promote stable political environment, can help minimize risks affecting residents' wealth and then to repatriate fled private capital.

The econometric analysis reveals also that the negative influence of capital flight on domestic investment is attributable only to the CEMAC countries, because of the productive structure of those countries which are oil and other natural resource producing countries. Indeed, the abundance of natural resource increases the level of corruption and raises thereby capital flight. In other words, a part of natural resources revenues is channeled overseas in the form of capita flight. The issue of repatriating such revenues implies thus both responsibility of governments of CEMAC countries and that of foreign banks. Capital flight reversal depends strongly on efforts to promote more responsibility for governments of CEMAC countries in managing natural resources revenues. For that, it is important to fight corruption and poor institutional governance. In addition, foreign banks should become aware that resources that were transferred in their institutions as capital flight are public funds, and then are to be used for social sectors financing: education, health, infrastructures, energy (water, electricity). Foreign banks have thus a moral responsibility to collaborate for the repatriation of those public funds.

5. Conclusion

This study has explored the influence of capital flight on domestic investment in the FZ using annual panel data on the 15 FZ countries in the 1970-2005 period, and two capital flight measures i.e. the adjusted World Bank and Morgan Guaranty methods for exchange rate fluctuations, trade misinvoicing and inflation (Boyce and Ndikumana, 2001). The econometric estimates indicate that capital flight decreases significantly domestic investment and that one dollar increase in capital flight lowers 4.5 cents of domestic investment.

The results reveal also that capital flight reduces significantly private investment, while its effect on public investment is found to be insignificant. Therefore, the negative impact of capital flight on total domestic investment operates through the private investment channel more than that of public investment.

Furthermore, the results show that capital flight from CEMAC affects negatively and significantly total domestic investment, while capital flight from WAEMU has no significant influence on total domestic investment. Thus, the negative effect of capital flight on domestic investment in the FZ is caused by capital outflows from CEMAC more than those from WAEMU.

Those findings imply that capital flight repatriation can then help increase the level of domestic investment. For that, it is fundamental to repatriate private savings towards domestic banks by promoting domestic interest rates on deposits. To repatriate fled private capital, the paper suggests also to minimize uncertainty about the macroeconomic and institutional environment in order to reduce risks of losses in the real value of the domestic assets of private investors. In addition, efforts to improve governance and institutional quality, and to promote stable political environment are necessary to repatriate fled capital. In that sense, the paper calls for more responsibility for governments of CEMAC countries particularly in managing natural resources revenues and for a moral responsibility for foreign banks to collaborate for the repatriation of public funds.

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Appendix

Appendix1: Table A.1: Selected studies on capital flight measure in the FZ countries (million 2000 $US)

	Ojo (1992)		Ajayi (1997)					Hermes, Lensink and Murinde (2002)				Ndikumana and Boyce (2007)	
WAEMU Countries	World Bank	Period	World Bank	Morgan Guaranty	Adjusted World Bank#	Adjusted Morgan Guaranty#	Period	World Bank	Period	World Bank	Period	Adjusted World Bank##	Period
Benin	NA		NA	NA	NA	NA		NA		NA		-3457.4	1974-2004
Burkina Faso	NA		NA	NA	NA	NA		NA		NA		1265.5	1970-2003
Cameroon	NA		NA	NA	NA	NA		480	1983-1989	460	1990-1998	13099.4	1970-2004
Central African Republic	NA		91.8	146.97	692.33	747.5	1980-1991	NA		NA		250.2	1970-2004
Chad	NA		NA	NA	NA	NA		NA		NA		931.1	1977-2004
Comoros	NA		NA	NA	NA	NA		NA		NA		-176.4	1980-2004
Congo	NA		NA	NA	NA	NA		NA		NA		12195.5	1971-2004
Côte d'Ivoire	10900	1975-1991	3397.1	2914.5	9438.71	8956.11	1980-1991	296	1983-1989	-346	1990-1998	33029.6	1970-2004
Gabon	NA		NA	NA	NA	NA		NA		NA		7834.6	1978-2004
Guinea-Bissau	NA		269.56	270.28	229.16	229.88	1980-1991	NA		NA		NA	
Mali	NA		644.1	1229.5	-302.56	273.84	1980-1991	NA		NA		-1642.5	1970-2004
Niger	NA		274.8	377.5	1815.67	1918.37	1980-1991	NA		NA		-5970	1970-2004
Senegal	NA		NA	NA	NA	NA		NA		NA		-8962.8	1974-2004
Togo	NA		NA	NA	NA	NA		NA		NA		-3210.3	1974-2004

adjusted for trade misinvoicing

adjusted for exchange rate fluctuations, trade misinvoicing and inflation

Appendix 2: Table A.2: Remittances in the FZ countries, 1970-2005 (million 2000 $US)

Country	Total	Mean annual	% of GDP
Benin	2201.6	68.8	4.2
Burkina Faso	3128	97.8	4.7
Cameroon	424	15.7	0.2
Central African Republic	3	1.0	0.2
Chad	5	0.8	0.1
Comoros	239	9.2	4.1
Congo	105	7.0	0.3
Côte d'Ivoire	2242	72.3	0.7
Equatorial Guinea	1	1.0	0.6
Gabon	58	5.3	0.1
Guinea Bissau	121	7.6	3.1
Mali	2544	82.1	3.6
Niger	483.5	15.1	0.7
Senegal	5300	165.6	3.5
Togo	1071	33.5	2.2
WAEMU	**17091.1**	**67.8**	**2.8**
CEMAC	**596**	**5.1**	**0.2**
Franc Zone	**17926.1**	**27.4**	**2.4**

Source: Author's computations using data from: World Bank, *Africa Development Indicators 2007* (CD-ROM Edition)

Appendix 3: Table A.3: Definitions and sources of variables

Variable	Definition	Source
CONEX	Constraints on the executive power, (institutional quality indicator), takes values ranging from 1 to 7	Polity IV Project's Database
CPP	Ratio of credit to the private sector to GDP	World Bank World Development Indicators (2007)
FCRP	Ratio of real capital flight to GDP	My computations
FCRP(CEMAC)	Ratio of real capital flight to GDP for the CEMAC zone	My computations
FCRP(WAEMU)	Ratio of real capital flight to GDP for the WAEMU zone	My computations
GOUVER	Governance indicator: takes values ranging from -10 to 10	Polity IV Project's Database
INF	Inflation rate: change in GDP deflator	World Bank World Development Indicators (2007)
INVP	Ratio of total domestic investment to GDP, investment being measured by gross capital formation	World Bank Africa Development Indicators (2007)
INVP(FZ)	Ratio of total domestic investment to GDP for all the Franc Zone countries, investment being measured by gross capital formation	World Bank Africa Development Indicators 2007
INVPRI	Ratio of gross private investment to GDP	World Bank Africa Development Indicators (2007)
INVPUB	Ratio of public investment public to GDP	World Bank Africa Development Indicators (2007)
TCP	Real GDP growth rate	World Bank World Development Indicators (2007)
TCP(FZ)	Real GDP growth rate for all the Franc Zone countries	World Bank World Development Indicators (2007)