ADDIS ABABA UNIVERSITY SCHOOL OF GRADUATE STUDIES DEPARTMENT OF ECONOMICS

Political and Economic Determinants of Capital Flight: Panel Data Analysis from East African Countries.

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This is to certify that the thesis prepared by Bekele Mekonnen, entitled: ***Political and Economic Determinants of Capital Flight: Panel Data Analysis from East African Countries*** and submitted in partial fulfillment of the requirements for the Degree of Masters of Science in Economics (International Economics) complies with the regulations of the university and meets the accepted standards with respect to originality and quality.

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Abstract

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Capital flight has been a problem among many developing countries. It is more severe among African countries. Given their smaller resource base and limited market, the problem of capital flight justifies a serious attention particularly among East African Economies. Albeit most of these countries are in the ranking list of huge volume of capital flight east Africa has never been considered as a sub- region in the capital related studies. Cognizant of this, this paper intends to contribute to this body of knowledge by filling a noticeable gap. This paper examined the determinant of capital flight from 9 eastern Africa countries for the period 2006 - 2015. The linear regression panel corrected standard errors model was employed and found that absence of political freedom and good institutions to have a positive and significant effect for the prevalence of capital flight. Capital flight is also affected negatively by GDP growth; credit availability and exchange rate. Exchange rate has shown unexpected sign implying the exchange rate can have negative impact on the capital flight through its effect on current account whose value minimize the residual in the formulation of capital flight. Further budget deficit and level of debt have positive relationship with capital flight. The study forwards considerations for the policy makers the need to have easier access for credit facilities for the private sector accelerate economic growth, to devise a mechanism to widen the tax base to finance budget deficit and establish constructive institutions enhancing political freedom and ensuring political and civil liberties of citizens in order to curb current aggravated level of capital flight.

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List of Acronyms

BD: Budget Deficit

CA: Current Account Balance

CCI: Corruption Control Index

CIF: Cost Insurance and Freight

COMESA: Common Market for Eastern and Southern Africa

CPI: Corruption Perceptions Index

DCP- Domestic Credit for Private Sector

EAC: East Africa Community

FDI: Foreign Direct Investment

GDP: Gross Domestic Product

GMM: General Method of Moment

IMF: International Monetary Fund

OECD: Organization for Economic Cooperation and Development

TI: Transparency International

WDI: World Development Indicator

WGI: World Governance Indicator

Chapter One

Introduction

1.1. Background of the study

Huge sum of money is estimated to be transferred annually out of developing countries illegally. These illicit financial flows strip resources from developing countries that could be used for financing much-needed public services [OECD, 2014]. The situation will worsen the poor economic performance of the developing countries and negatively impact the economies of developing countries. As most of them possess small resources base and market, the issue draws the attention of developing nations. According to OECD (2014), the illicit financial flows likely exceed aid flows and investment in volume. This complements the report from KEPA[1] (2010) which states that about €1,200 billion crosses state borders illicitly each year. Out of the total sum, over half of the total which is €680–800 billion is from the developing countries. Comparing the capital flight from the developing countries with the development assistance paid by rich countries to them which was €80 billion in 2008, for instance, some scholars ironically, refer the difference to be "development assistance" from the poor to the rich [Boyce and Ndikumana, 2000 and 2001].

Owing to this, most developing countries are suffering from diversion of scarce resource out of their domestic investment. Capital flight is more severe in the case of Africa. Global Integrity Report (2014) indicated that sub-Saharan African countries exhibited a large proportion of illicit capital outflow in terms of GDP ratio.

[1] KEPA is The Service Centre for Development Cooperation, Finnish

Particularly, given the smaller resource base and limited market in the eastern Africa economy, the problem of capital flight justifies serious attention. According to the African Development Bank regional groupings, there are thirteen countries in this part of Africa, namely Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Seychelles, Somalia, Sudan, Tanzania, Uganda, and the newly independent country and the Republic of South Sudan. The problem has become even worse for various reasons. Exploring the various literatures the following four reasons come to the first line.

First, Eastern Africa is the most capital-scarce region among all developing regions. Eastern Africa had the lowest share of FDI flow out of the five African regions in 2008 and 2009 [African Development Bank, 2011]. Second, most Eastern African countries command extreme external debt. Public external debt, on average, constituted 36.6% of GDP [Ibid.]. Third, most African countries experience huge balance of payment deficit. According to the report of the Economic Commission for Africa (2015), in the year 2014 the continent's current account deficit widened because of declining export earnings and rising imports of capital goods. The report also forecasted that in east and central Africa the deficit was expected to slightly widen to 3.7 percent of GDP and 3.9 percent over the year 2014 through 2016 respectively.

The last reasons are the contemporary political unrests and frequent civil wars that take place in most eastern African countries. Eastern Africa has been plagued by civil wars, cross-border conflicts, social strife, and arms trafficking. Recent security concerns in the region includes the volatile situation in Somalia, conflict in Darfur, tensions between Ethiopia and Eritrea Djibouti-Eritrea conflict, piracy along the coast of Somalia and the Gulf of Aden and some outstanding post-referendum issues between Sudan and South-Sudan, including border demarcation and the status of Abyei. There are also intermittent outburst of civil conflicts among the various

constituent islands of Comoros and restive situation along the border between Rwanda and D R Congo. All these factors pose threat to private investment in East Africa [African Development Bank, 2011]. Corruption also remains to be a challenge across Eastern African institutions, especially with respect to those responsible for security and justice. According to International Corruption Perceptions Index, most countries in the region rank poorly [African Development Bank, 2014].

These problems are expected to aggravate capital flight out of most Eastern African states despite their huge financial resource requirement given their very low state of economic development. To address the problem, it demands to assess the possible determinants to the problem and come up with a possible solution or policy prescriptions.

1.2. Statement of the problem

Developing countries are suffering from diversion of scarce resource out of their domestic investment. Capital flight is more severe among African countries and exhibiting a larger proportion of their GDP ratio [Global Integrity Report, 2014]. Given their smaller resource base and limited market, the problem of capital flight justifies paying serious attention particularly among East African Economies. To my knowledge, there has not been a study that dealt with the determinants of capital flight out of eastern African countries despite the wide economic implication for these countries. Most studies have been done in relation to sub-Sharan African and there are few countries studied from eastern Africa.

A notable works in the preceding years comes from Haregewin (2012) and Eshete, Z. (2014) on this topic specifically in the case of Common Market for Eastern and Southern Africa (COMESA) and Eastern Africa Economic Community (EAC) respectively. [Hregewin, 2012]

aimed in finding the determinant of capital flight from 13 member countries of COMESA for the period 1990-2009 using Dynamic panel model and found that corrupted government officials are the main actors of capital flight among these countries. Eshete, Z. (2014) examines the impacts of political economy factors on an illicit capital outflow using fixed effect and random effect panel data models and found that poor regulatory quality and government ineffectiveness, state fragility, and the political instability index have a statistically significant positive influence on illicit capital flight out of EAC member countries. But, corruption level does not positively contribute to capital flight; it all depends on the intensity level of corruption. By grouping the index hierarchically from low level to high level of corruption it is found that corruption from those groups of countries with high index level affect capital flight positively. Therefore, only intensive corruption level positively influences capital flight overtime.

Though papers by Haregewoin (2012) and Eshete (2014) provide valuable insights about factors that affect capital flight, their coverage is partial. The study for Eastern African Communities constitutes only five of the Eastern African countries. While the study for COMESA encompasses larger number of countries but three of Eastern African countries, Tanzania, Djibouti and Comoros were not included in study. With this respect by including the other Eastern African countries and encompassing the excluded three countries from the respected research this paper will add to the existing knowledge. In addition to this, this particular research is motivated by the knowledge gap in three perspectives. Both Haregewoin (2012) and Eshete, Z. (2014) used a residual method which was developed by World Bank (1985) for the calculation of capital flight. In the calculation the capital flight is obtained by deducting the use of funds from the source of funds without considering illegal capital flight that emanate from trade miss-invoicing. But there is huge amount of capital flight in the form of miss-invoicing according to

Global Integrity Report (2015). Illicit financial flows for developing countries reached about 1.1trillion USD for the year 2013. Out of it 83% reported to be through trade miss-invoicing [GIR, 2015]. Therefore, excluding illegal trade which is the most important variable through which capital flight is manifested may reduce the credibility of research findings. In this respect, this paper will fill the research gap by modifying the residual method so as to incorporate the miss-invoicing during the formulation of calculating the dependent variable capital flight as it was done in Ndikumana & Boyce (2008).

East African countries have never been considered as a sub- region for the purpose of studying the determinants of capital flight. Most east African countries are in the top ranking list with huge volume of capital flight records as indicated in the Global Integrity Report (2014). This calls for an attention to undertake a research.

Finally the research will complement previous studies in terms of filling the knowledge gap due to time. Most previous researches could not explain the current political and economic status of the region. Therefore, this study attempts to find out the political and economic determinants of capital flight out of the east African countries. For this effect the following research questions will be scrutinized.

- Do economic factors such as GDP, capital inflows, financial development and budget deficit explain capital flight for east African countries?
- Do political factors such as political stability, political freedom and existence of good institutions and the prevalence of corruption determine the capital flight for east African countries?

1.3. Objective of the study

1.3.1. General objective

The general objective of this study is to examine the political and economic determinants of capital flight in Eastern Africa countries.

1.3.2. Specific objectives

The specific objectives of the study are:-

- to examine the size and magnitude of capital flight for the period 2006-2015 using the residual method adjusted with trade miss-invoicing and exchange rate fluctuations.
- to investigate whether economic factors such as GDP, budget deficit, exchange rate, and indebtedness could explain capital flight or not.
- to investigate whether political factors such as political stability and no violence, political freedom and existence of good institutions and corruption level explain capital flight.

1.4. Scope and limitation of the study

The study focuses on the political and economic determinants of capital flight out of 13 East African countries in accordance with the African Development Bank regional groupings for period between 2006 and 2015. But due to data unavailability the research is bound only for 9 countries. Estimation of capital flight has various limitations. Among these, it is worthy of noticing the unavailability of data with regard to transfer pricing, which is an important component of illicit financial out flow. This problem may tend to somehow affect the reliability

of computation of capital flight. Often this problem arises as some multinational corporations hide their profit by increasing their cost when they buy inputs from their affiliated companies in tax heaven countries[2]. In tax heaven countries, the presence of bank secrecy makes the data from the reporting countries and the trading partner countries to be one and the same. Unlike trade miss-invoicing which is calculated from the deviation of data obtained from reporting and trade partner countries the existence of bank secrecy hide the real data and makes estimation difficult.

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1.5. Significance of the study

Capital flight is a serious challenge for developing countries in general and those countries with limited resources base like eastern African countries in particular. The fact that most of them are prone to various political unrest, weak institutional setups and unstable macro economy therefor, it demands to investigate whether these economic and institutional variables have viable influences for the increasing level of capital flight out of eastern African countries. Thus, this study attempts to provide policy makers with the empirical evidence they need to understand the existing problems which most eastern Africans countries are facing. The study will also add its own modest contribution for the existing knowledge and be used a stepping stone for future research in different perspectives for the reason that there has not been studies on eastern African countries to-date.

[2] A country that imposes low rates of personal and corporate taxes, and as a consequence tends to attract wealthy individuals and multinational companies seeking to minimize their taxation liabilities.
(tax haven. (n.d.) *Collins Dictionary of Business, 3rd ed.* (2002, 2005). Retrieved May 21 2017 from http://financial-dictionary.thefreedictionary.com/tax+haven)

1.6. Organization of the study

The remaining part of the paper is organized as follows. Chapter two discusses theoretical and empirical literature emphasizing on the definition, methods of estimation and theoretical framework of capital flight. Chapter three discuss the data sources and methodology used. Chapter four will present an overview of the determinants and values of capital flight in Eastern Africa countries along with the trend and graphical presentation of the nexus among the capital flight and the potential determinants and discuss econometric results and analyze the possible political and economic determinants of capital flight. The final chapter forwards conclusion and recommendations for the findings.

Chapter two

Literature review

2.1. Theoretical review

2.1.1. Theoretical framework of capital flight

Before embarking on the various definitions most researchers prefer forwarding the various rationales in the literature used as bases for defining capital flight. With these perspectives, this study identifies four fundamental conceptual pillars of capital flight. In most literatures, a variety of definitions are stated and these definitions take roots from one theory or from the combined multiple theories. Therefore, definitions of capital flight and its responsible factors in subsequent section of this chapter are made in reference to following theories.

2.1.1.1. Debt- driven capital flight theory

There is a debt driven capital flight when residents of a country are motivated to move their asset to foreign countries as a consequences of external debt. Countries borrow and at the same time engaged in capital flight. This was termed as debt-flight revolving door [Boyce, 1992]. Boyce (1992) and Ajayi (1997) coined a theoretical framework for the possible links between debt and capital flight and they forwarded four possible causal links.

The first causal link is that foreign borrowing causes capital flight by increasing the likelihood of debt crises, worsening macroeconomic conditions and deterioration of the general investment climate. The second link is a debt fueled capital flight. In this case, the foreign borrowing

provides the resources as well as a motive for directing borrowed fund abroad. The third link provides a flight driven external borrowing. This occurs when there exists a gap that should be filled in the domestic economy as a result of a drain of foreign exchange due to capital flight. The last link is a flight fueled external borrowing. This is a situation when domestic currency leaves the country but reenters in guise of a foreign currency.

2.1.1.2. Portfolio choice theory

Capital flight can also be recognized to as a portfolio decisions by the investors as a result of the fact that these investors are rational economic agents. They are guided by profit maximization based on the risk adjusted returns to capital. Ndikumana L. and Boyce J. (2002) argued that in a world of complete information and negligible transaction costs the rate of return to capital would be expected to equalize across countries and markets. If investments in developing countries become risky, the risk adjusted returns become lower therefore, that will create an incentive for these investors to look for an area with higher rate of return with a lesser risk.

2.1.1.3. Investment diversion theory

The investment diversion theory emphases diversion of investment motivated by a more stable economic and political condition in developed countries. This theory of capital flight assumes that the outflows are due to the macroeconomic and political uncertainties in developing countries, and the existence of better investment opportunities like higher interest rate, available financial instruments, political and economic stability, favorable tax climate and secrecy of accounts in advanced countries Ajayi (1992) and Forgha (2008). Corrupt leaders and public officials exploit scarce capital resources from their countries and run away to advanced countries. They do this motivated by higher returns to safe guard their investment from political

instability, to diversify their assets, or to secure confidentiality and bank secrecy. Capital, which runs away in this way, therefore, will not be available for investment at home by restraining aggregate investment (Ibid, 2008).

2.1.1.4. Tax Depressing Thesis

This thesis postulates that an illegal outflow of capital leads to loss of tax revenue and as a result, wealth in the hands of those residents stashing their money in foreign countries is out of the control of the tax authorities. Therefore this will weaken the government's ability in debt servicing capacity consequently the debt burden will increase (Ajayi, 1992). If the government's ability of debt servicing capacity becomes weak then the country indebtedness increases thereby become the causes for capital flight.

2.1.2. Definition of capital flight

The estimates of capital flight available in the literature constitute only a sub set of Africa's 'missing wealth' which encompasses the broader phenomena of illicit financial flows Ndikumana (2015). In spite of the fact that in most cases the concept of capital flight and illicit financial flows are used synonymously, there is a deviation in their respected constituent. All capital flight could be referred as illicit financial outflows while all financial outflows could not be. This is exemplified by Ndikumana (2015), taking two forms of flow like, import smuggling and transfer pricing which is not captured by capital flight. Import smuggling is an illicit financial flow but does not constitute capital flight for the fact that the existence of a counterpart to the foreign exchange which are paid for it. And transfer pricing is a profit shifting scheme

used by multinational corporations in their intra firm trade by inflating their costs and reducing their profit to avoid higher taxes.

Ajayi (1995) defines capital flight on the bases of the countries from which it arises. Capital outflows from developed countries are termed as foreign direct investment by some economists, while the same activity is referred to as capital flight when it is undertaken by residents of a developing country. But there is unsettled debate on the specific definition of capital flight. According to Lawanson (2007), the major constraint to the consensus on a definition is traced to the difficulties in distinguishing between those flows that can be considered "normal" and those that fall into the category of "flight".

Cuddington (1987) defines capital flight from the portfolio model perspective stating that it is a short term speculative capital exports by the private non-bank sector. Schneider (2003) defines capital flight as the outflow of the resident capital which is motivated by economic and political uncertainty. This definition is shared by many scholars and the same line of definition will persist in this work.

2.1.3. Methods of measuring capital flight

There are no general agreements on the definitions of capital flight and therefore, there is no consensus in the measurement of it. Therefore, we have different ways of measuring capital flight as we have experienced it in its definition. Among those various alternatives the following five ways are considered apparent for most capital flight literatures.

2.1.3.1. The residual methods

This estimation technique is coined by World Bank (1985). It is referred as a broad measure of capital flight, in most literatures referred as "sources and uses" of funds approach, which claims changes in gross foreign public debt and net foreign investment are the sources of funds and current account deficits as well as additions to foreign reserves are uses of funds. It can be specified algebraically as follows:

$$KF_{res} = (\Delta DEBT + FDI) - (CA + \Delta RES) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots .1$$

Where: - KF_{res} is estimated capital flight, $\Delta DEBT$ is change in stock of gross external debt, FDI is net foreign investment, CA current account balance, and ΔRES change in stock of official foreign reserves.

2.1.3.2. Morgan Guaranty methods

Morgan Guaranty (1986) modified the residual method by subtracting short-term foreign assets of the banking system from World Bank (1985) This way of estimating does not assume the banking sector to be involved in the capital flight. Therefore, it arrives at a measure capturing the acquisition of foreign assets by the non-bank private sector. This method can be specified algebraically as follows

$$KF_{emorgan} = (\Delta DEBT + FDI) - CA - \Delta RES - \Delta B \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots .2$$

Where: - ΔB is change in the short term foreign asset of the domestic banking system.

2.1.3.3. The Hot Money method

This method is referred as a narrow measure of capital flight as it sums short term capital outflows plus errors and omissions in the balance of payments statistics. This method assumes capital flight could not be captured as a result of the illegal nature of its movement. Therefore, it is defined as a sum of net short term capital outflows of the non-bank private sector and the statistical discrepancies in the balance of payment statistics. Cuddington (1986) refers capital flight as “hot money” fleeing political and financial crisis, heavier taxes, capital controls, currency devaluation, or hyperinflation. This method can be specified algebraically as follows

$$KF_{hotmoney} = SCONB + EO \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots .3$$

Where: - $SCONB$ is a short term capital outflow by the non-bank private sector and EO is error and omissions which represent unrecorded capital outflows.

2.1.3.4. Dooley method

This method defines capital flight as a non-residual measure, an illegitimate or undeclared foreign asset, that is, the part of a country’s stock of foreign assets that do not generate income reported to the domestic authorities. The method distinguishes between normal capital flows from abnormal capital flows and permits an empirical distinction between capital outflows motivated by normal portfolio decisions and those based on the desire to place these assets out of the control of domestic authorities. Dooly (1986) refers to capital flight those capital outflows based on individual motive to place wealth beyond the reach of domestic authorities. Capital flight is therefore measured as the sum of externally held assets of the private sector that does not

generate recorded income in the country's balance of payments. Dooly method can be specified algebraically as follows

$$KF_{dooly} = TCO + ES \ldots \ldots \ldots 4$$

While TCO and ES are derived as follows

$$TCO = FB + FDI - CAD - \Delta FR - EO - \Delta WBIMF$$

Where: - TCO is total capital outflows; FB is foreign borrowing; EO is net error and omissions; $\Delta WBIMF$ is difference between the change in the stock of external debt reported by the world bank and foreign borrowing reported in the balance of payment statistics published by the IMF.

The stock of external asset which relate to the reported interest earnings is derived as follows

$$EAS = INTE/rus$$

Where: - EAS, external asset, rus is us deposit rate and $INTE$ is interest earnings

2.1.3.5. Trade miss-invoicing method

Trade miss-invoicing from the exports and imports is calculated by comparing trade data from the importing and exporting country. This holds true on account of two scenarios. First when the reporting country reports lower values of exported goods as compared to the reported value of the same goods by importers. Next, when importers report higher values of imported goods comparing to the reported value of the same goods by the trade partners as exporters.

2.1.4. Determinants of capital flight

2.1.4.1. Political and institutional factors

In various literatures, it has been identified that institutional strengths, political situations and corruption levels of a given country have effects on investments and motivate capital flight. North, (1990), indicated that taking a decision to invest in the domestic economy, depends on whether property rights and other investment-promoting institutions are in place and that well developed institutions indirectly increase the potential for higher rates of return within the domestic economy. In the portfolio diversification thesis it has been theorized that there is an incentive for investors to look for an area with higher rate of return and a lesser risk. This theory confirmed by the works of Hermes and Lensink (2002), admitting that perceived ill institutional variables in any economy may give rise to capital flight because citizens lose confidence in the domestic economy thereby holding their funds in abroad. Therefore, institutional factors are important drivers of capital flight.

Institutional factors are commissioned by various variables like: government effectiveness, voice and accountability, government regulatory quality and prevailing rule of law. According to Lensink et al., (2000), Weak institutions and lack of political freedom aggravate illegal outflow of capital from poor countries, diverting scarce resource from injecting the development pipeline. Ndikumana and Boyce (2003), contribute to existing literatures claiming that the existence of weak institutional system and lack of good governance expose elites to corrupt the capital market at the cost of the national interest. It is obvious that capitals accumulated by those unscrupulous and corrupt officials could not be invested in the domestic economy rather it will end up in foreign banks.

The other important driver of capital flight is political factors which play a vital role in determining capital flight. According to Ndikumana and Boyce (2003), political instability and poor governance encourage capital flight by worsening the overall investment climate through increased uncertainty. This line of argument takes roots along the theoretical framework of investment diversion theory. In this line of analysis the theory of capital flight assumes that the outflows are due to the macroeconomic and political uncertainties in developing countries.

The last determinant of capital flight in this line of grouping is the level of corruption. This line of grouping could be denominated from the theoretical fundamentals that, corrupt leaders and public officials exploit scarce capital resources from their countries and run away to advanced countries motivated by higher returns, safe guard their investment from political instability. Léonce Ndikumana, James K. Boyce and Ameth Saloum Ndiaye (2014), have contributed for this body of knowledge affirming capital flight occurred due to corrupt practices by international corporations that engage in the bribery of national authorities in the exploitation of oil and minerals. Much of the wealth acquired through these forms of corruption can be expected to be illegally transferred out of the country towards safe havens.

2.1.4.2. Economic factors

Capital flight is highly motivated by the portfolio diversification scheme of individual economic agents. Most of the decisions made by these economic agents specifically in developing countries are accounted by the risk adjusted returns assessment of the investment. Therefore risk related variables are the prime movers of capital flight. There are various indicators of risk and return; these could be interest rate differential, exchange rate movements and some macroeconomic indicators like government budget deficits.

The first driver in this line of grouping is interest rate differentials. Ndiaye (2011) indicated that capital flight occurs as a result of differences in the returns on assets between home and overseas. A positive impact of interest rate differential on capital flight is expected. Hermes and Lensink (1992), complement this idea by stating that, capital flight occurs for the reason that investing in foreign countries is more profitable than investing domestically.

The exchange rate movement importantly determines the volume of capital outflow. Overvalued exchange rate leads to increasing expectation of depreciation of the local currency in the near future and hence resident and foreign investors will prefer to hold assets abroad. Edwards (1989) forwards that poor exchange rate management, such as an overvalued currency or a black market premium, may contribute to economic uncertainty, as they generate incorrect signals to economic agents.

Whenever there is large budget deficit domestic investors are motivated to shift their capital abroad to avoid higher future taxation risk. This is because huge budget deficit today is expected to raise future tax. This is complemented by the works of various scholars [Boyce, (1992); Schineller, (1996); Loungani and Mauro, (2000); Lensink and Hermes (2000)], which found a positive effect of budget deficit uncertainty on capital flight.

The others drivers of capital flight are inflation and rate of economic growth. Inflation could be aligned with the portfolio diversification theory which argues that the existence of economic and political condition in developed countries motivate the economic agent to move his capital away [Olatunji and Ifedayo, 2015]. Capital flight occurs due to the macroeconomic and political uncertainties in developing countries and the existence of better investment opportunities and stable political and economic environment in developed countries [Ajayi, 1995]. Macro stability

can be measured by the volatility of key indicators like inflation. According to Ndiaye (2011), high inflation encourages capital flight since it reduces the real value of domestic assets, causing the residents to hold their assets abroad.

There is capital flight motivated by debt. This relationship has become prevalent in the literature of capital flight after Boyce (1992) and Ajayi (1995 and 1997) who frame the causal relationship between capital flight and debt arguing that countries borrow and at the same time engaged in capital flight. Ajayi and Khan (2000); Ndikumana and Boyce (2003) assert that external debt causes capital flight due to high debt overhang, which worsens macroeconomic conditions and leads to deterioration of the investment climate. In most literature, it was termed as a "debt-driven capital flight" [Ajayi, 1995, 1997; Ndikumana and Boyce, 2003]. Following these early works, Ndikumana and Boyce (2011a) and Ndikumana et al. (2015) found that external debt stock has a significant positive impact on capital flight.

The other link is a debt fueled capital flight, which was coined by Ajayi (1995 and 1997) and later complemented by Ndikumana and Boyce (2003) and Ndikumana et al. (2015). These scholars argue that corrupt leaders tend to re-export to overseas part of the borrowed funds as private assets, which implies that foreign borrowing provides resources as well as a motive for directing borrowed fund abroad; therefore, external debt is an important determinant of capital flight.

There are other determinants of capital flights which appear repeatedly in the literature with mixed results in referencing different perspectives. We can take, for instance, indicators of financial development. This can be represented by the availability of domestic credit to private sector. On the one hand it is associated with the portfolio diversification thesis, when financial

development gives rise expansion opportunities for domestic portfolio diversification, there by demotivating capital flight. On the other hand, if financial development facilitates international capital transfers it will induce capital flight. Ndikumana and Boyce (2003) indicated that the potential effect of financial development on capital flight could not be known in advance. The same author finds a significant negative impact of the domestic credit to private sector on capital flight, suggesting a well-developed financial system discourages capital flight. But, in his later analysis Ndikumana et al. (2015), finds no significant effect of financial development on capital flight.

2.2. Empirical review

Sarr and Ndikumana (2016) in their paper provide theoretical and empirical insights into the puzzling simultaneous rise in foreign direct investment (FDI) inflows in Africa and capital flight from the continent over the period 1970–2013 using dynamic panel data estimation methods. The econometric analysis is based on 32 African countries. They found that there is no robust evidence that capital flight is fueled by annual FDI inflows (there is no debt-fueled capital flight). This was not consistent with the findings of earlier works by Ndikumana and Boyce (2008), which conclude the existence of a positive relationship between the stock of FDI and capital flight. And above all they associate the impact of resource endowment, unlike many researches, in their analysis and found that natural resource endowment is directly and positively related to capital flight. They also indicated that high-quality institutions somehow weaken the link between FDI and capital flight.

Ndikumana, L. (2014) analyses the linkages between capital flight and domestic saving in the case of African countries and focused on strategies that aimed at stemming capital flight so as to increase domestic saving.

Boyce and Ndikumana (2001) used time series and cross-sectional data from 1970 to 1996 analyzing the relationship between external borrowing and capital flight in 25 low-income sub-Saharan African countries. They found positive and statistically significant relationship between external borrowing and capital flight. In their paper, Ndikumana and Boyce (2008) produced evidence on the dramatic financial outflow from African economies through capital flight based on the estimates using a sample of 40 countries as a whole over the period 1970-2004. The paper investigated the causes of capital flight and, consistent with past studies, it found strong links between capital flight and external borrowing. External borrowing appears to provide resources for capital flight while growing indebtedness provides a motive for private agents to export capital.

Haregewion (2012) examines the determinant of capital flight from 13 member countries of COMESA for the period 1990-2009. Using first difference General Method of Momentum (GMM) and system GMM to find out the determinant of capital flight from COMESA member countries and found that capital flight has a tendency to persist over time. The study also found that FDI has a positive and significant effect; which may reflect the existence of discriminatory-treatment for domestic investors. Capital flight from COMESA member countries is also fueled by the increase in Gross Domestic Product of the country. He also found that budget deficit has a negative impact on capital flight which may reflect that corrupted government officials are the main actors of capital flight from COMESA member countries.

Using panel data from a set of thirty two countries in Sub-Saharan Africa is analyzed over the period 2000-2012 and employing three different estimation techniques as Generalized Method of Moments (GMM), fixed effect regression and the pooled-OLS regression models, Domfeh (2015) examined the relationship between capital flight and institutional governance. The result revealed that macroeconomic uncertainty, political and institutional instability, less developed financial system, and higher rate of return differentials in other countries abroad induces capital flight from Sub-Saharan Africa. It also found corruption to have a positive and statistically significant effect on capital flight in these countries.

Ndikumana (2013) showed capital flight exhibit substantial opportunity costs for African economies. In particular, capital flight is found to be a constraint to domestic investment, which is especially problematic given the need to increase and sustain growth.

Studies done by Ndiaye (2012) for West African Economic and Monetary Union countries have shown that, capital flight from these countries is found to be important with a magnitude accounting for 34.7% or 27.7% of GDP. Since the phenomenon of capital flight takes place through transferring abroad a part of private savings, this implies that a rise in capital flight would lead to a fall in savings, and then a decline in credit to the private sector.

Eshete (2014) examines the impacts of political economic factors on illicit capital outflow from the East African Community. Employing panel data models of both fixed effect and random effect, he found that gross domestic product is a statistically significant variable and reduces an illicit outflow of capital from the community. Contrary to this, foreign direct investment, total grant and exchange rate have a statistically significant effect in terms of aggravating the outflow of capital. According to the author the finding is explained by poor governance and economic

policies that governments favor foreign investors over local investors. An aggregate index of poor regulatory quality and government ineffectiveness, state fragility and the political instability indices are statistically significant and positively influence an illicit capital flight from the community. However, the perceived corruption level does not positively contribute to capital flight, but an intensive corruption level positively influences capital flight overtime, bringing a mixed sign of negative and positive depending on the level of corruption that affect capital flight overtime in the community.

The various empirical studies on the determinant of capital flight mentioned here above and annexed at the end, have shown differences in the types of methodology implemented, and the time period covered by the study and diversity of geographical areas. These lead to difference in the effects of the variables. To come up with preferred econometric estimators various decisions are to be taken. For instance, among them is the need to decide whether the data is capable of estimating each model.

With that respect if the number of cross section is larger than the number of time dimension, dynamic panel data used and if otherwise static panel data analysis is implemented. Econometric tests made to decide whether fixed effect or random effect model is to be chosen. Therefore, mostly the type of econometric model used is dictated by the data set available. But, Weakness for the methods could arise in terms of formulation and estimation of magnitude of capital flight. Both works of Haregewoin (2012) and Eshete (2014) do not include the effect of exchange rate fluctuation while considering the level of debt stock which is a component of capital flight. This is very important for the reason that most countries borrow in terms of various currencies which made the value to fluctuate following the change in exchange rate. On top of this both studies exclude the effect of trade faking in the calculation.

Chapter Three

Data and Methodology of the study

3.1. Data source

In this study, all the data are obtained from secondary sources. To estimate capital flights, data covering the period between 2006 and2015 has been used. Data was sourced from, IMF, World Bank's World Development Indicators, 2016, Worldwide Governance Indicator, 2016 and Transparency International's (TI), 2016 and Corruption Perceptions Index (CPI). Independent variables are capital inflow which is captured through the annual foreign direct investment data, fiscal policy, approximated by the annual budget deficit or surplus as a percentage of GDP, financial development, is captured using the amount of credit available for private sector as a percent of GDP, corruption is taken care of by the values of countries' perceived corruption index, absence of political freedom and institutional quality is captured by the aggregated index of Rule of Law, regulatory quality and voice[3] by accountability index, and finally political risk and war, whose values are expressed in terms of the political stability and no violence index respectively.

3.2. Estimation Technique for Capital Flight

Capital flight, which is the dependent variable, is estimated using the modified residual method used by Ajayi (1995), Ndikumana & Boyce (2001, 2003, 2008, 2014 and 2016), which incorporates the miss-invoicing. Most researches are done using residual method which

[3] Voice and accountability captures perceptions of the extent to which a country's citizens are able to participate in electing their government, as well as freedom of expression, freedom of association, and a free media (WDI 2015)

estimates net unrecorded capital outflows by considering both sources and uses of funds. Of course, this method is preferred by many researchers for the fact that illicit outflow of capital always be made in the shadow and it is not recorded. But, it will be more accurate if the other forms of capital flight, such as illegal trade invoicing, are incorporated, when this variable is estimated. This paper, therefore, considers mis-invoicing as part of capital flight as huge amount capital flight in the form of miss-invoicing occurs illicitly or underground. Including the net illegal trade volume will increase the precision of the value of the capital flight as a dependent variable, which is formulated as follows:

$$KF_{it} = (\Delta DEBTADJ_{it} + DFI_{it}) - (CA_{it} + \Delta RES_{it}) + MISINV_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 5$$

Where:-

KF_{it} = Capital flight of country *i* during year *t*

$\Delta DEBTADJ_{it}$ = Change in stock of total external debt adjusted for country currency fluctuation

DFI_{it} = Net direct foreign investment

CA_{it} = current account balance deficit

ΔRES_{it} = change in stock of foreign reserve

$MISINV_{it}$ = Net trade miss-invoicing

3.2.1. Estimating the residual

In this study the residual is estimated through the modified version of the World Bank (1985) method. Therefore, adjusted change in debt stock and net foreign direct investment regarded as sources of funds, whereas current account balances and the change in the reserve are regarded as ways through which the different sources of funds are used. The difference between the two or discrepancies are taken as the volume of capital that ran out of the country illicitly.

In the paper the residual is stated as follows

$$KF_{res} = (\Delta DEBTADJ + FDI) - (CA + \Delta RES) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots .6$$

Where: - KF_{res} estimated capital flight, $\Delta DEBTADJ$ stock of gross external debt, FDI net foreign investment, CA current account balance, and ΔRES change in stock of official foreign reserves. In the process of formulating capital flight the usual residual methods added data that shows a change in the debt stock as a source of fund. But, these data are reported in a common currency, the fact that countries borrow in different currencies and that makes it difficult to have consistent data when the values of various currencies fluctuate as a result of change in the exchange rate of the currencies in terms of U.S. dollar.

We follow the same approach of making adjustments as James K. Boyce and Léonce Ndikumana (2010) & Léonce et al (2014). Total debt stock is the sum of long-term debt, short-term debt, and the use of IMF credit. IMF credit is denominated in Special Drawing Rights (SDR), while long-term debt and short-term debt are denominated in various currencies. The IMF reports annual data on long-term debt composition for eight major currencies: the French franc, the German Deutsche mark, the Japanese yen, the Swiss franc, the SDR, the UK pound, USD, and the Euros.

$$NEWDEBT_{i,t-1} = \sum_{j=1}^{7} \left(\left(\alpha_{ij,t-j} * LTDEBT_{i,t-1} \right) \right) / \left(EX_{jt} / EX_{j,t-1} \right) + \left(IMFCR_{i,t-1} \right) / \left(EX_{SDR,t} / EX_{SDR,t-1} \right) + LTOTHER_{i,t-1} + LTMULT_{i,t-1} + LTUSD_{i,t-1} + STDEBT_{i,t-1} \quad \ldots 7$$

Where:- $LTDEBT$ is the total long-term debt; α_{ij} is the proportion of long-term debt held in currency j, for each of the seven non-US currencies; EX is the end-of-year exchange rate of the currency of denomination against the dollar (expressed as units of currency per U.S), $IMFCR$ is the use of IMF credit; $LTOTHER$ is long-term debt denominated in other unspecified currencies; $LTMULT$ is long-term debt denominated in multiple currencies; $LTUSD$ is long-term debt denominated in U.S. dollars; and $STDEBT$ is short term debt.

We formulate the change in the U.S. dollar value of the debt stock carried over from the previous year that is attributable to exchange-rate movements in the current year by revaluing the beginning-of-year debt stock using end-of year exchange rates. This will give us new debt stock carried over from the previous year and when we deduct the beginning-of-year debt stock valued at beginning-of-year exchange rates then we arrive at the 'exchange-rate adjustment'.

$$ERADJ_t = NEWDEBT_{t-1} - DEBT_{t-1} \quad \ldots 8$$

This difference is subtracted from $\Delta DEBT$ to get an adjusted measure. Therefore the adjusted change in debt is calculated as follows:-

$$\Delta DEBTADJ_t = \Delta DEBT_t - ERADJ_t \quad \ldots 9$$

3.2.2. Estimating trade mis-invoicing

In this paper, trade mis-invoicing is formulated by comparing the import statistics of the reporting countries and the export statistics of their trading partners. In this study, the trading partner is taken to be the "World" Ajayi (1997). It is assumed that, what is reported by the respected Eastern African countries is to be equal with that of the records of the "World" in line with the double entry recording system. We can take instances in this regard: if the reporting country reports the amount of exports to be a certain amount and if the World records this specific transaction with a greater amount, it implies that export volume is understated in the records of the reporting country. From this discrepancy it could be deduced that a certain volume of capital is transferred illicitly in the form of understated export. The same reasoning applies when the reporting country's import is over stated from the records of Exports of the "World".

In this paper trade faking is formulated following Ajayi (1997), as follows

$$x_{mis} = x_{ctry} - m_{world} * cif_t \quad \ldots\ldots 10$$

$$m_{mis} = m_{ctry} * cif_t - x_{world} \quad \ldots\ldots 11$$

where x_{mis} is export mis-invoicing and m_{mis} is import mis-invoicing. x_{ctry} is export by the reporting country; m_{world} is the imports from the reporting country as it is recorded actually by the World; m_{ctry} is recorded as import value by the reporting country and x_{world} is what the reporting country record as value of imports but the actual amount exported by the World to the reporting country; and cif_t is CIF correction factor. Total mis-invoicing is therefore, the sum of the export and import mis-invoicing; which we actually refer them as export under invoicing and import over invoicing respectively.

3.3. Model for Empirical Estimation

3.3.1. Model specification

The paper applies panel data analysis. We use the static panel data model because the number of cross section is not larger than the number of time dimension [Nickell 1981]. The basic frame work for panel model is

$$y_{it} = x_{it}'\beta + z_i'\alpha + \varepsilon_{it} \quad \ldots\ldots\ldots 12$$

The heterogeneity or individual effect is $z_i'\alpha$ where z_i' contains a constant term and a set of individual or group specific variables [Green, 2002]. To that effect, three types of models are introduced: the fixed effects model, the random effects model and the pooled OLS model.

The fixed effect model allows the individual-specific effects to be correlated with the regressors and each individual is assumed to have different intercept term and the same slope parameters. The fixed effects formulation implies that differences across groups can be captured in differences in the constant term [Ibid.].

The model could be stated as:-

$$y_{it} = x_{it}'\beta + \boldsymbol{\alpha} + \varepsilon_{it} \quad \ldots\ldots\ldots 13$$

where:- $\boldsymbol{\alpha} = z_i'\alpha$: embodies all the observable effects and specifies an estimable conditional mean. It captures all of the variables that affect the dependent variable in a cross-sectional (country specific explanatory variable – unobserved variable). Assuming this variable will not vary over time [Ibid.].

The Random effect model stated if the unobserved individual heterogeneity, however formulated, can be assumed to be uncorrelated with the included variables adopting that the individual-specific effects are distributed independently of the regressors [Ibid.].

The model could be stated as:-

$$y_{it} = x'_{it}\beta + \alpha + \cup_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 14$$

Where, $\cup_{it}$ is a group specific random element, similar to ε_{it} except that for each group, there is but a single draw that enters the regression identically in each period [Ibid.]. Here, the crucial distinction between these two cases is whether the unobserved individual effect embodies elements that are correlated with the regressors in the model, not whether these effects are stochastic or not.

The pooled OLS model specifies constant coefficients, it is usually referred to be the population averaged model under the assumption that any latent heterogeneity has been averaged out. If z'_i contains only a constant term, then ordinary least squares provides consistent and efficient estimates of the common α and the slope vector β [Ibid.].

The model could be stated as:-

$$y_{it} = \alpha + x_{it}\beta + u_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 15$$

The types of panel model which is appropriate for the available data is to be determined after considering the respected statistical tests like the Hausman test and the Breusch-Pagan Lagrange Multiplier test.

In line with the above specification this research will use the following model to test the hypothesis of the capital flight from nine Eastern African countries:

$$KF_{it} = (EXR_{it}, DBT_{it}, CRA_{it}, GDP_{it}, COI_{it}, PSI_{it}, PFII_{it}, BD_{it}) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 16$$

Where; KF_{it} capital flight, EXR_{it} exchange rate, DBT_{it},countries indebtedness, CRA_{it} amount of credit available to private sectors, COI_{it} corruption control index, PSI_{it} political stability and no violence index , $PFII_{it}$ political freedom and existence of inclusive institution, BD_{it} Budget deficit, GDP_{it} To investigate economic progress, and ε_{it} the error term.

Therefore, after taking the natural logarithms of the variables, the following econometric equation will be used in estimation

$$LKF_{it} = \beta_1 LEXR_{it} + \beta_2 LDBT_{it} + \beta_3 LCRA_{it} + \beta_4 COI_{it} + \beta_5 PSI_{it} + \beta_6 PFII_{it} + \beta_7 LBD_{it} + \beta_8 LGDP_{it} + \gamma_i + \varepsilon_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 17$$

Where, γ_i is the country-specific fixed effect

3.3.2. Justification for prior expectations

Prior expectations of the relationships between explanatory variables and the dependent variable are established based on the results of selected determinants of capital flight from the empirical literature listed in Appendix A and from other literatures specified in the reference section.

Table 3.3.2: Economic Justification for prior expectations of explanatory variables

Variables	Economic justifications for the expected relationship with capital flight	source
Exchange rate	Has negative sign because of the inverse relationship like an overvalued exchange rate leads to increasing expectation of depreciation of the local currency in the near future and hence resident and foreign investors will prefer to hold asset abroad.	Cuddington (1986),S. Ibi Ajayi (1995), Leonce Ndikumaana and James K. Boyce (2003)
Foreign debt to GDP ratio	Has a positive relationship with capital flight. There is a direct causal effect where foreign debt motivates capital flight and in turn capital flight leads into an increase in demand for foreign debt (i.e. capital borrowed from other countries may be used for intended purpose but diverted for personal gains through investing in other countries abroad).	Cuddington (1986),Boyce (1992) and Ajayi (1997) Ndikumana and Boyce (2003)
Credit availability to private sector	An increase in domestic credit for private sector is one of the key incentives for private investment in the domestic economy. Therefore this may reduce capital flight from the domestic economy.	Cuddington (1987), Ndikumana and Boyce (2000) and (2003)

GDP growth rate	A negative relation is expected to occur between capital flight and GDP, because increases in economic activities of a given country are a result of macroeconomic and at times political stability; thus create conducive domestic environment that encourages investment. Thus, a lower GDP growth rate encourages capital flight where as a higher GDP discourage it.	Morgan Guaranty (1988), Ajayi (1992), Ndikumana and Boyce (2007)
Budget deficit (percentage of GDP	Has a positive relationship with capital flight because higher government budget deficit is a sign of higher tax rate in the future. This possibly leads to capital flight.	Boyce (1992), Schineller (1996),Loungani and Mauro (2000
Political stability and no violence	According to investment diversion theory, political stability is one of the factors to reduce capital flight. That means, if the country is not politically stable, the simultaneous existence of better investment opportunities in advanced and other politically stable countries will facilitate capital flight	Alberta Alesina (1988), Lensink et al (1998), Frish (2003), Eshete (2014).
Political freedom and existence of inclusive institute	These constitute the aggregated index of Rule of Law, regulatory quality and voice[4] and accountability index. Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in	Lensink et al (1998) and (2000), Leonce Ndikumaana and James K. Boyce (2003)

[4] Voice and accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media

Chapter Four

Empirical findings and discussions

4.1. Overview of capital flight and its determinants in eastern Africa

4.1.1. Trends of capital flight

Capital estimate from Table 4.1.1 shows that capital flight for all Eastern African Countries amounts to 24.8 billion US dollar annually for the study years. Excluding Djibouti which accounts on average annually 73% in context of its GDP, all Eastern African countries included in this study exhibit an annual average capital flight equivalent to 14% of their GDP. This will tell us that, for each dollar accumulated GDP for the study years 2006 – 2015 the Eastern Africa residents accumulated $0.14 dollar of external asset annually in foreign countries.

The capital flight estimation using the World Bank residual method considers the change in debt stock as a source of available funds in the formulation of data for capital flight. Most countries borrow in various currencies denominated in the respected lenders. Therefore, considering adjustment for exchange rate fluctuation will eliminate the potential effect of understating or overstating the capital flight report whenever these currencies appreciate or depreciate in reference to the US dollar.

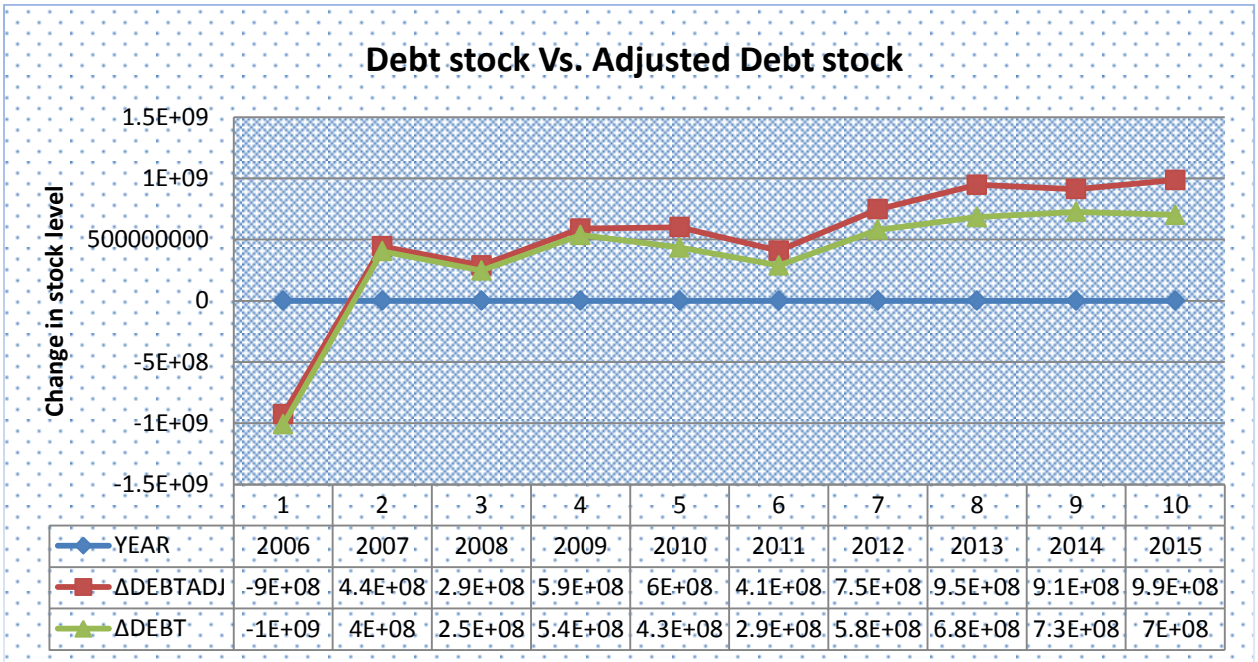
Table 4.1.1: Capital flight from eastern African Countries annual average: (2006 - 2015) $ '000000

Country Name	Change in external debt adjusted	Net foreign Direct Investment	Current Account Balance	Change in Official foreign reserves	Trade mis-invoicing	Capital flight	Capital flight (real)	Capital flight as % GDP
Burundi	-59	7	-253	3	104	302	261	0.13
Comoro	-3	7	-40	11	56	89	90	0.16
Djibouti	85	141	-200	27	509	909	875	0.73
Ethiopia	1498	787	-2634	255	4056	8721	6077	0.21
Kenya	1408	287	-3120	575	-153	4088	3306	0.08
Rwanda	90	103	-549	62	118	799	686	0.10
Sudan	471	731	-4455	-169	1585	7412	5581	0.11
Tanzania	1814	765	-3087	202	1269	6735	5572	0.18
Uganda	151	683	-1546	156	622	2846	2331	0.13
Total	5455	3515	-15888	1123	8169	31905	24779	

Source: Author computation from data IMF, WDI

Figure 4.1.1 depicts the existence of noticeable gap in using exchange rate adjusted change in debt stock. The change comes as a result most countries borrow in terms of various currencies and those currencies would change their values as the exchange rate fluctuates (appreciate or depreciate) in terms of US dollar.

Figure 4.1.1A: Trend Comparison of Change in Debt Stock for Exchange Rate Adjustment



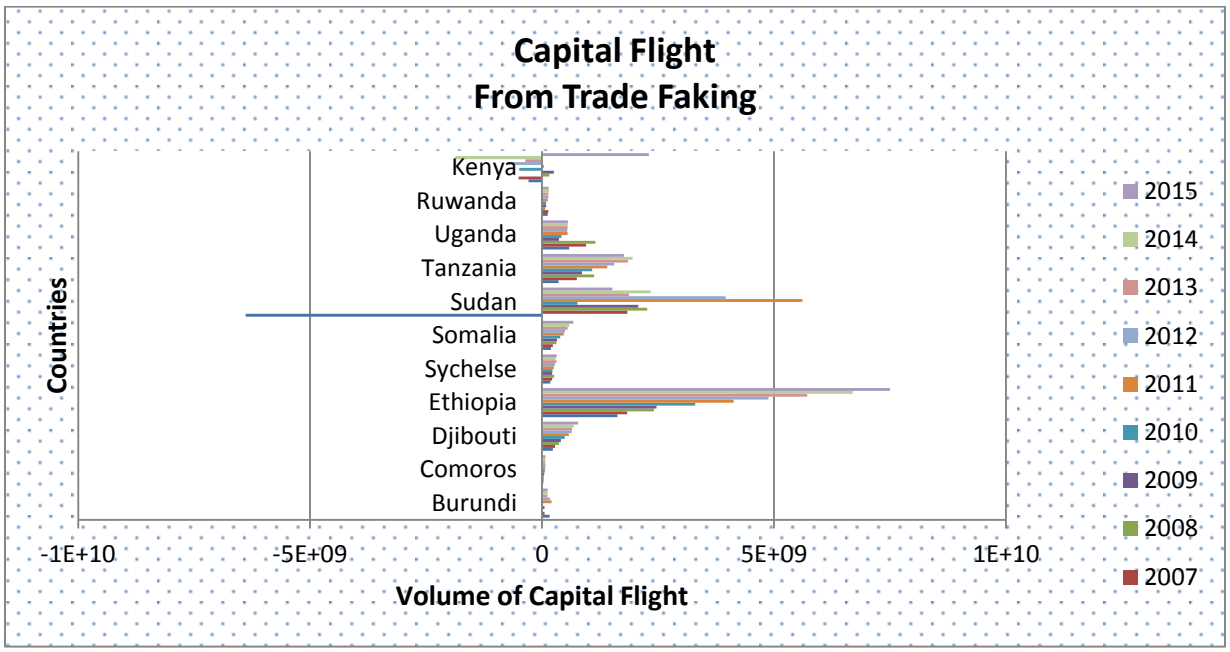
	1	2	3	4	5	6	7	8	9	10
YEAR	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
ΔDEBTADJ	-9E+08	4.4E+08	2.9E+08	5.9E+08	6E+08	4.1E+08	7.5E+08	9.5E+08	9.1E+08	9.9E+08
ΔDEBT	-1E+09	4E+08	2.5E+08	5.4E+08	4.3E+08	2.9E+08	5.8E+08	6.8E+08	7.3E+08	7E+08

Source: Author computation from data IMF, WDI

The capital flights were to be under reported had the exchange rate adjustment not been made. Comparison could be made by taking consideration the exhibited difference from Figure 4.1.1. Here the series stands for the years of the study were series 1 stands for the beginning of the study year 2006 and series 2 for the year 2007, continuing with the pattern series 10 represent the end of study year 2015.

From the data for the trade mis-invoicing (see appendices B), the estimation of capital flight were underestimated in preceding empirical findings for Eastern Africa countries to the extent that under-invoicing and over-invoicing contributed with positive values that exist in almost all countries of eastern Africa as it shown in the following figure.

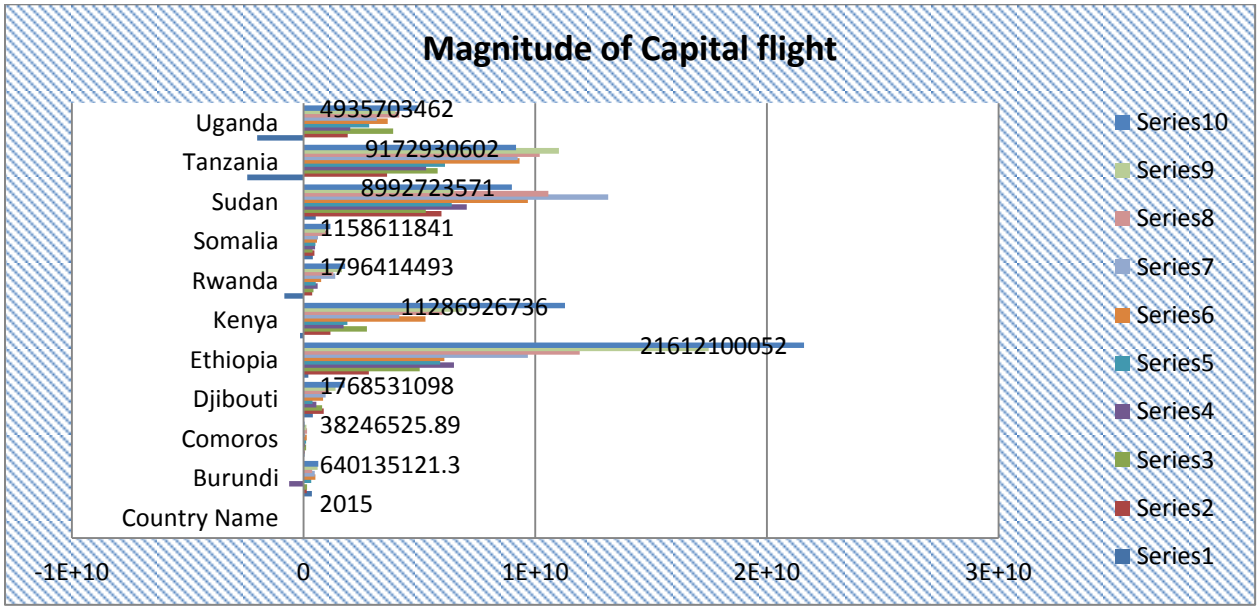
Figure 4.1.1B: Capital Flight from Trade Mis-invoicing



Source: Author computations from data IMF, WDI

As it is depicted in the figure above most eastern Africa countries experiencing positive values which is the sum total of trade faking in terms of export under invoicing and import over invoicing. With the exception of Sudan in the year of 2012, all east African countries exhibit enormously huge volume of capital out flows in the form of trade mis-invicing in the studied period. For individual country Sudan in the specified year the negative values depicts the inflows of capital rather than capital outflows, this inflow might be due to an increase in foreign lending or some other economic phenomena that needs to be researched further. But the inflow may not a repatriation of domestic capital out flows as there is no documented reference for justification. But, Ethiopia followed by Sudan and Tanzania experienced huge capital outflows in the form of trade faking. Most of the eastern Africa countries exhibit a capital flight that amounts in between five and twenty percent of their GDP. Figure 4.1.1D shows the volume of capital in terms of GDP.

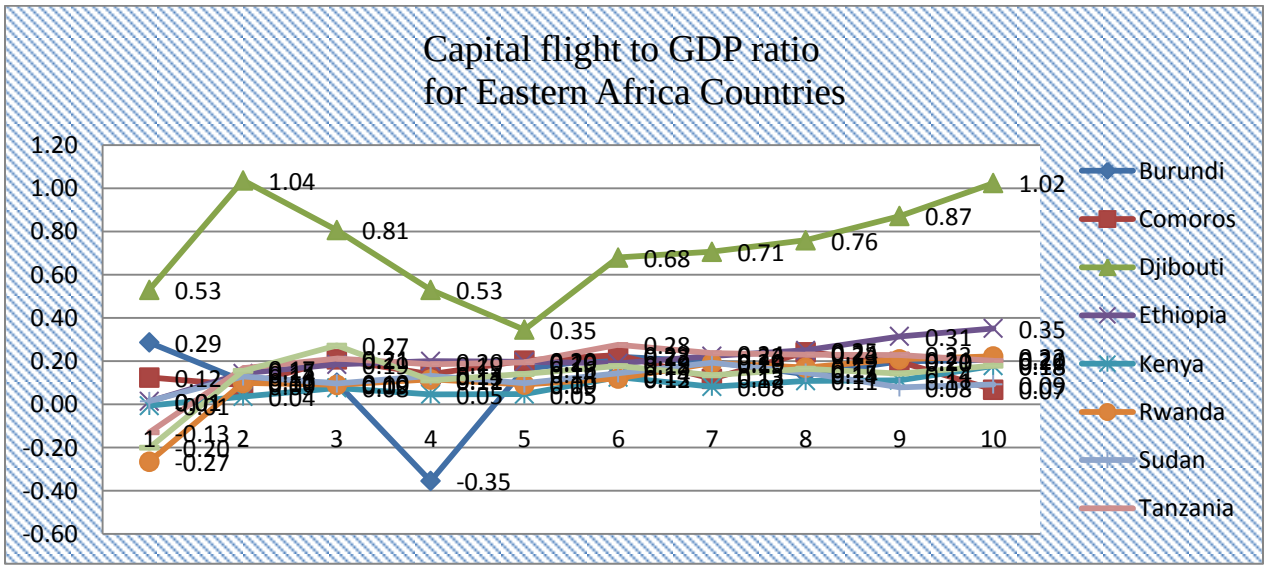
Figure 4.1.1C: Capital flight adjusted for Exchange rate and Trade mis-invoicing



Source: Authors computations from data IMF, WDI

Here after the dependent variable capital flight is represented by the share of Capital flight/GDP. We normalized it as a share of nominal GDP (in US dollars) so that it would be convenient for cross country comparisons.

Figure 4.1.1D: Capital flight to GDP ratio



Source: Authors computations from data IMF, WDI

4.1.2. Nexus between Capital flight and some potential determinants

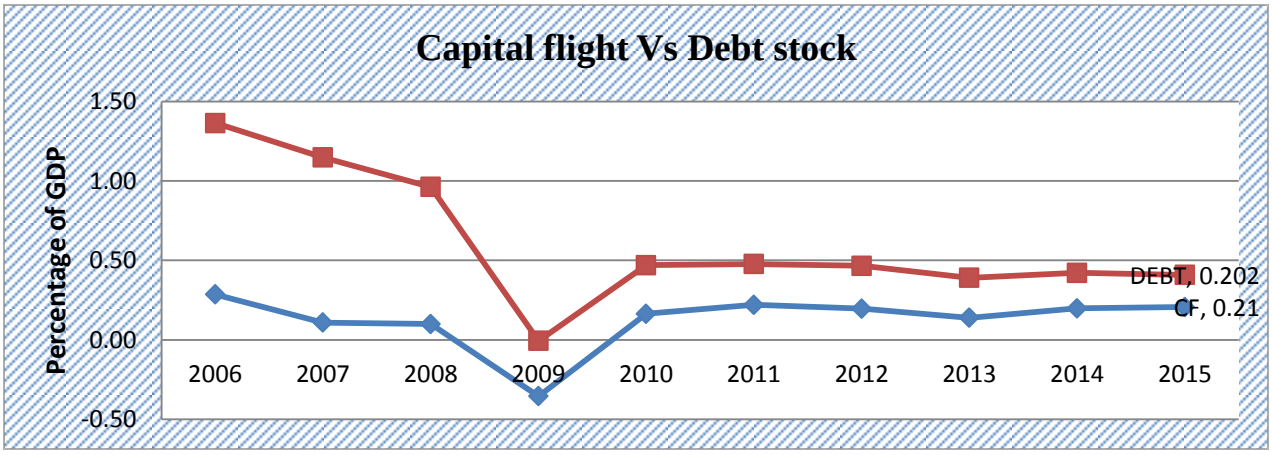
This section provides descriptive and graphical overview of the relationship between capital flight and some of the potential drivers. Giving an overview of such descriptive analysis would enable to have an intuitive understanding about the possible interrelationships among the variables which could be verified whether these relationships actually exist and if so what statistical meanings would they entail using econometrics investigation in subsequent sections.

A. Burundi

Burundi is located in the eastern African countries with the total population of 11.179 million which ranks 78th in the world. According to World Bank 2015 GDP ranking report it has 164th position in the world and accumulate a total of 3.097 billion USD. In absolute figure on average 302 million USD worth capital flew out of the country annually. But, expressing as a percentage of GDP it becomes the 5th following Djibouti, Ethiopia, Tanzania and Comoros.

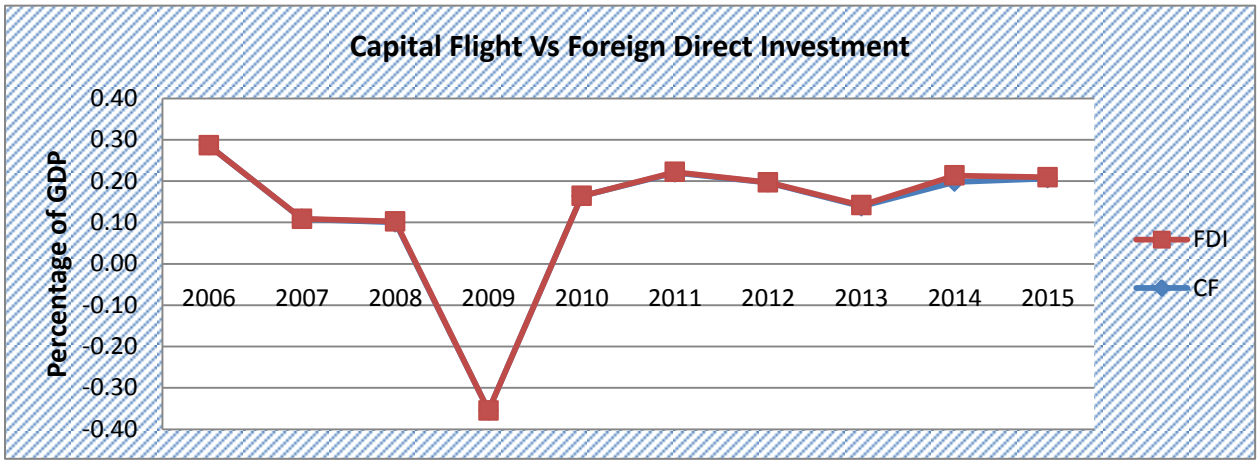
Figure 4.1.2A: Relationship between Capital Flight and Sources of Funds

Panel: A



Source: Author computation from data IMF, WDI

Panel: B



Source: Author computation from data IMF, WDI

Capital flight Versus Debt and Foreign Direct Investment

Data from 2006 - 2015, shows that on average Burundi received source of funds which amounts 867 million USD from external borrowing and 7 million USD from Foreign direct investment. Panel A depicts that capital flight and external debt stock are moving in the same direction, a decrease in external debt is related with a decrease in capital flight which implies a positive relationship between external debt and capital flight. The other panel shows that starting from 2006 up to 2009 capital flight tend to decrease while foreign direct investment falls steadily at a constant rate. Starting from 2009 onwards capital flight and foreign direct investment seems to have the same patterns. Decrease in foreign direct investment associates with a decrease in capital flight.

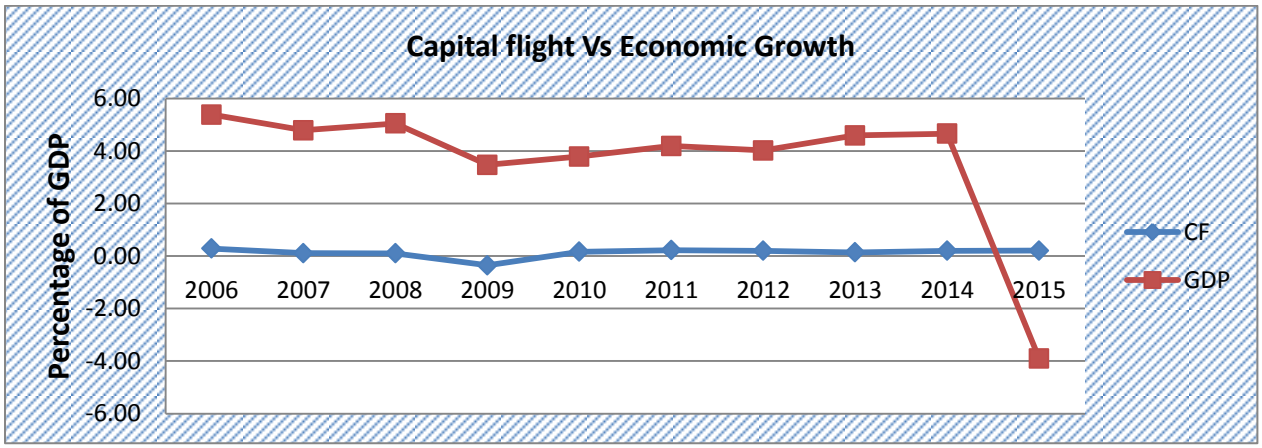
Capital flight Versus Economic growth and Budget deficits

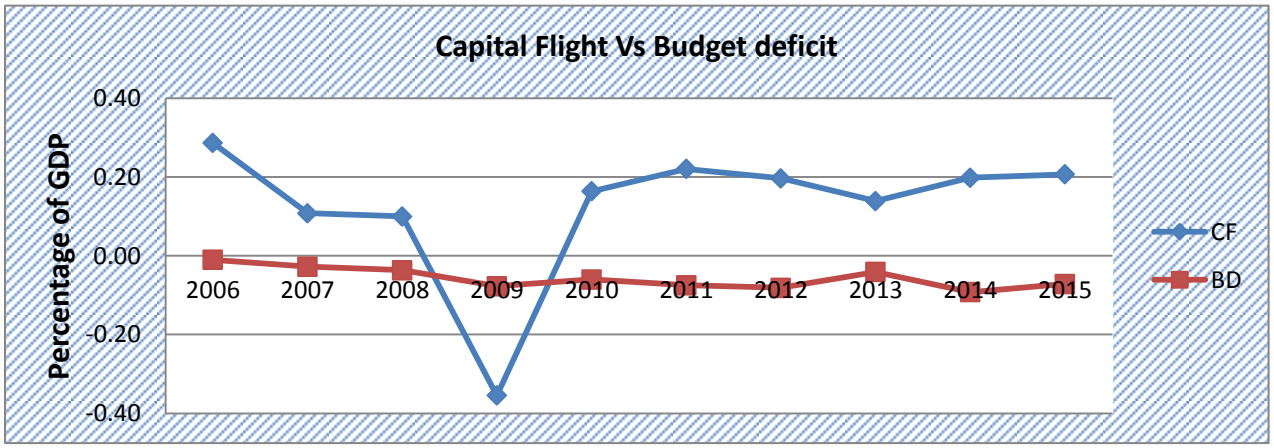
Capital flight was moving in opposite direction to the economic growth only for those time episodes initially for the year 2008, then 2013 and finally in the year 2015 it shows a pattern

consistent to the theory. But, the rest of the years demonstrate the same pattern of movement that shows capital flight might directly be associated with economic growth.

Figure 4.1.2B: Relationship between capital Flight and some Macroeconomic variables

Panel: A





Panel: B

Source: Author computation from data IMF, WDI

On the other hand, from Figure 4.1.2B Panel B illustrate that, an increase in budget deficit leads to a fall in capital flight in the year 2006 and a fall in budget deficit is related with an increase in capital flight in years 2010 and 2015 which implies a negative relationship between budget

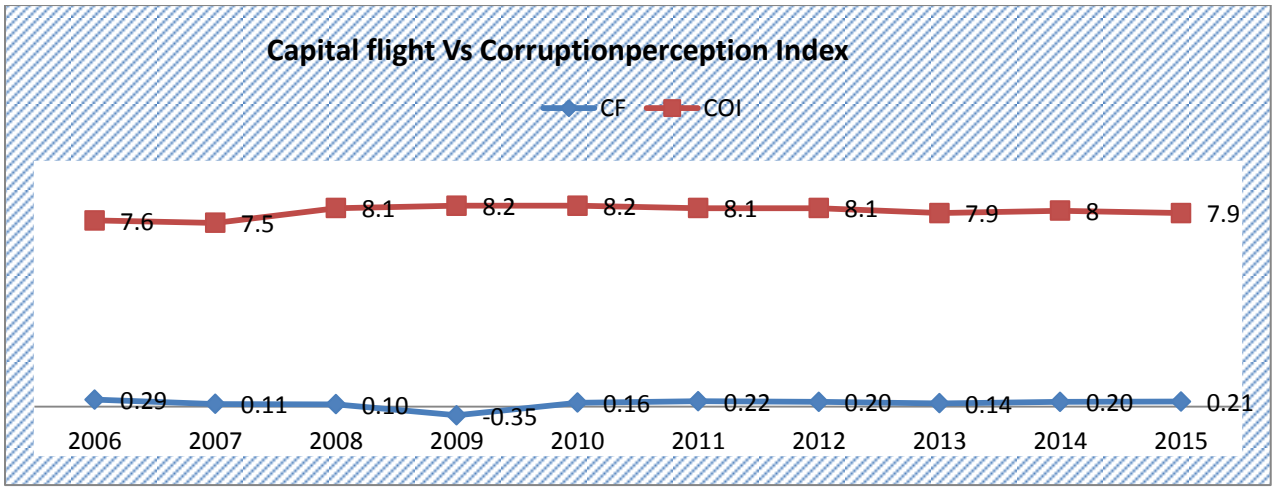
deficit and capital flight which is inconsistent to the theory while, in the remaining years a positive relationship is observed.

Capital flight Versus political variables

Capital flight in this case is moving parallel with the trends of perceived corruption index. It seems both variables interact in the same direction which implies one variable may not induce the other variable. In Figure 4.1.2C Panel A depicts a mirror copy trends among the variables. The same argument goes to the trend comparison between the level of political instability and capital flight. Panel B shows the higher political instability seems to have the same effect on capital flight for the specified time range. Therefore, both the variables appear to interact consistent to the theory.

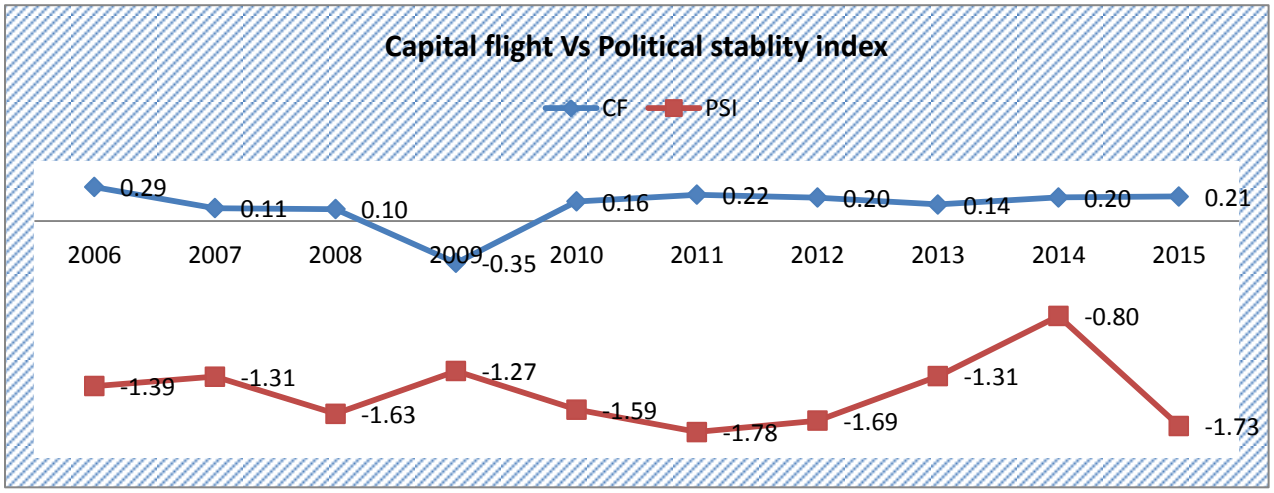
Figure 4.1.2C: Relationship between capital Flight and Political variables

Panel: A



Source: Author computation from data IMF, WDI

Panel: B



Source: Author computation from data IMF, WDI

B. Comoros

Comoros is one of the eastern African countries that is the least populated comparing with a total of 788 thousand people. It ranks 162th in the world. According to the World Bank 2015 GDP ranking report Comoros is ranked at 186th position in the world and generates a total of 566 million USD. On average 82 million USD worth capital flew out of the country annually. Comoros is no different in this respect with Burundi; it has the least capital outflows records. Capital flight as percentage of GDP is 0.16 which makes Comoros 4th after Djibouti, Ethiopia and Tanzania.

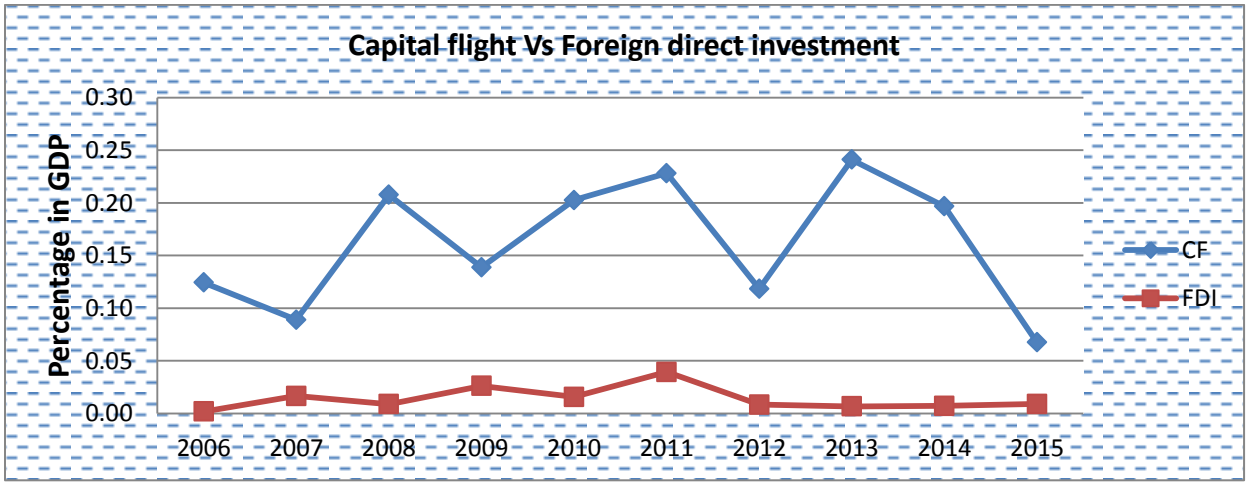
Capital flight Versus Debt and Foreign direct investment

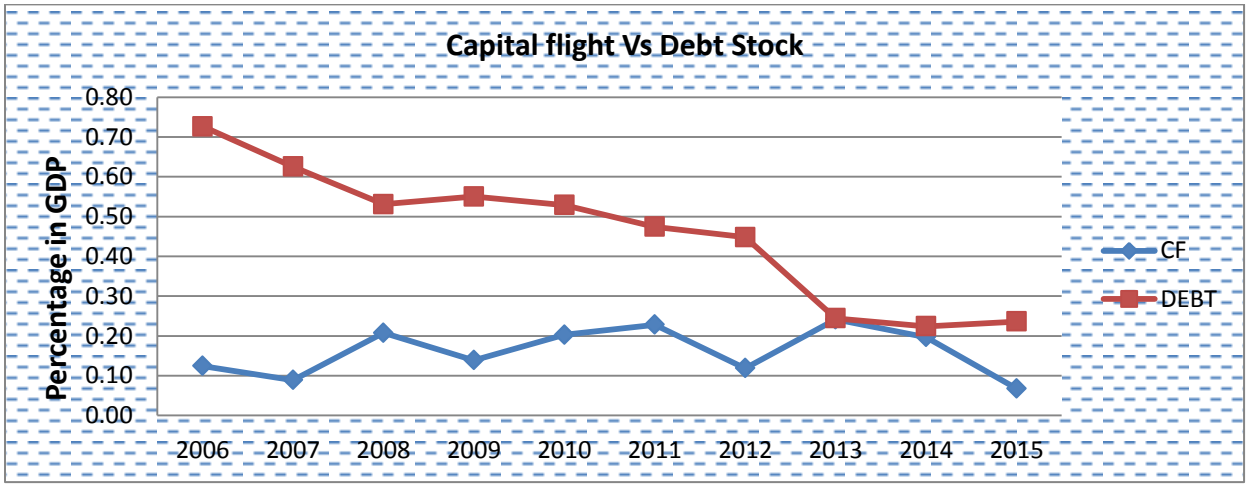
Comoros received source of funds which amounts on average 239.4 million USD from external borrowing and 7.7 million USD from Foreign direct investment for the study year 2006 - 2015. Panel B depicts that capital flight and external debt stock are moving in the same direction, for the years 2006, 2012 and 2014 an increase or decrease in external debt is related with an increase

or decrease in capital flight which implies a positive relationship between external debt and capital flight. For the rest of the years it seems it has negative relationship. According to Panel A: capital flight tends move in the same direction for the years 2011 and 2012. But, for the rest of the study years it shows negative relationship consistent to the theories. Therefore, decrease in Foreign Direct Investment increases the volume of capital flight and vice versa.

Figure 4.1.2D: Relationship between Capital Flight and Sources of Funds

Panel: A





Panel: B

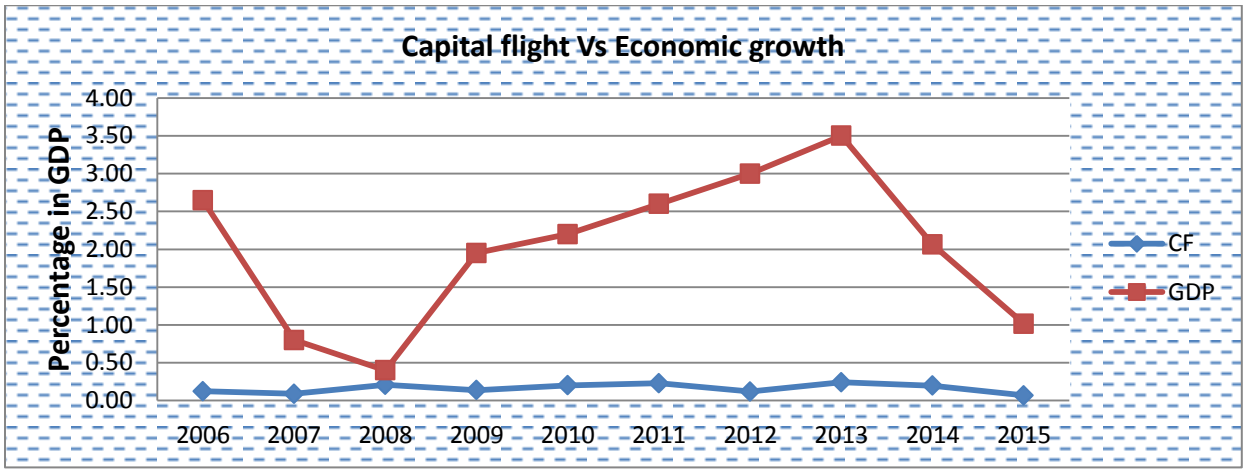
Source: Author computation from data IMF, WDI

Capital flight Versus Economic growth and Budget deficits

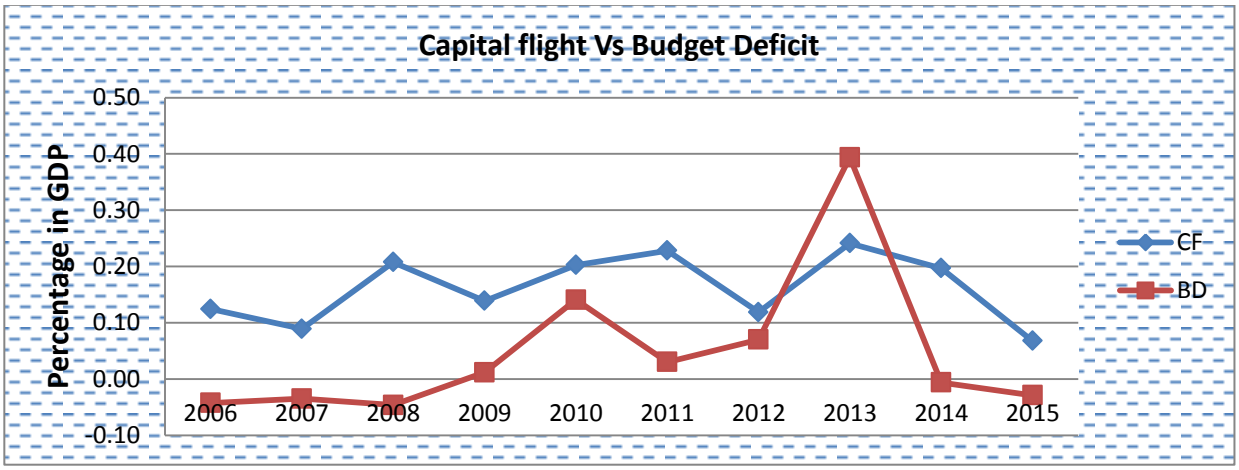
Capital flight move in the same direction as economic growth for the years 2008 – 2011 and 2014 – 2015 as it is seen in Panel A from Figure 4.1.2E. On the other time periods shows there is a negative relationship which is inconsistent to the theory.

Figure 4.1.2E: Relationship between Capital Flight and some Macroeconomic Variables

Panel: A



Panel: B



Source: Author computation from data IMF, WDI

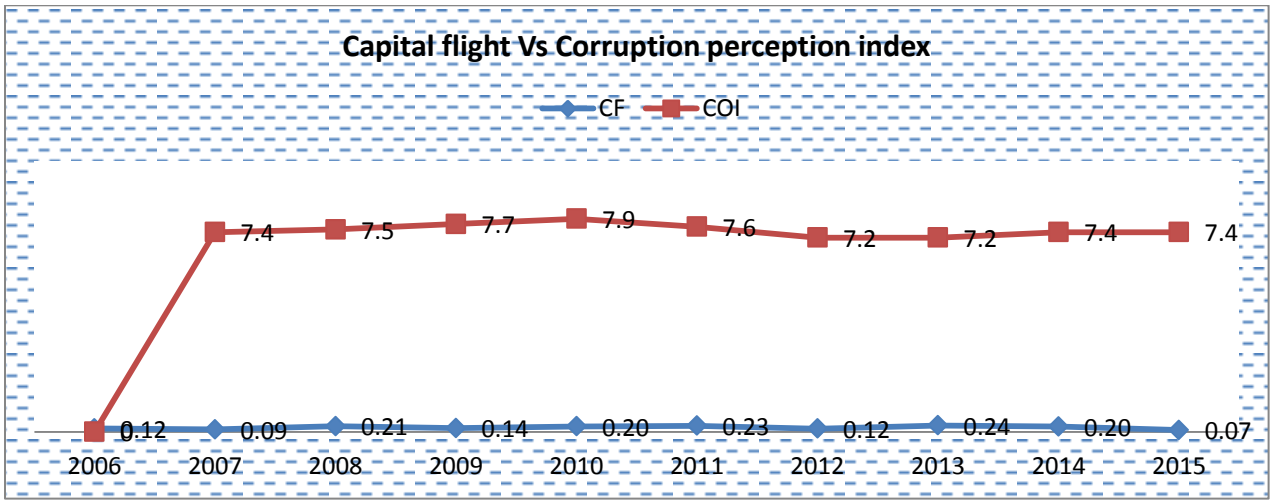
On the other hand, Panel B shows that, an increase in budget deficit leads to a fall in capital flight and a decrease in budget deficit leads to an increase in capital flight for the years 2006-2012 which implies negative relationships. For the years 2012 and onwards it seems the two variables moves in the same direction having positive relationships.

Capital flight Versus Political variables

For Comoros Capital flight is moving parallel with similar trends of perceived corruption index, it seems both variables do not interact among themselves. On the other panel, Panel B depicts that capital flight alternatively decreasing and increasing during consecutive years which makes comparison difficult among the two variables or relationship may not exist at all. But, the variable for political stability shows increasing trends starting from the year 2007 onwards, this implies that political instability shows a decreasing trend for the reason that political stability index has a negative values.

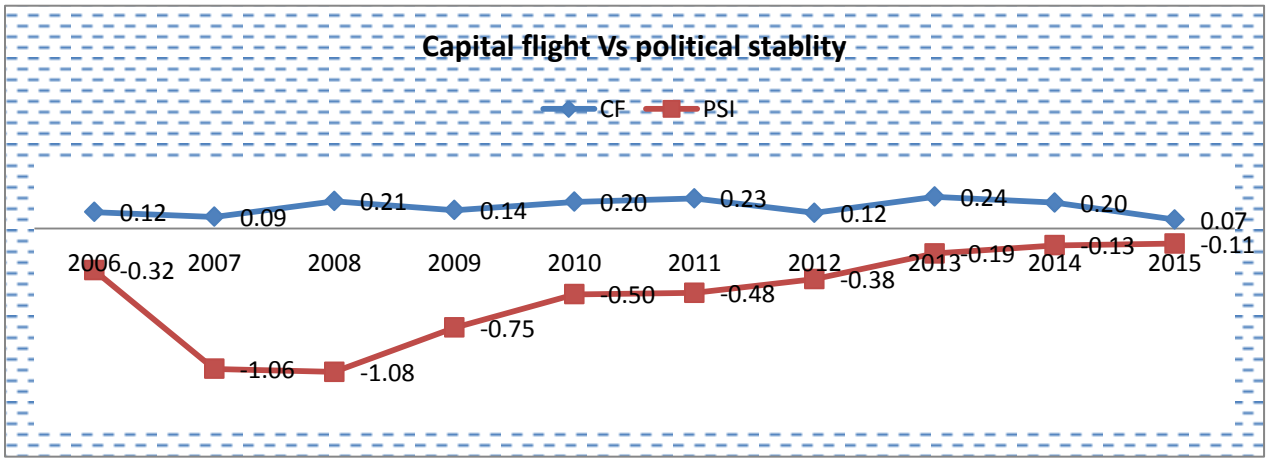
Figure 4.1.2F: Relationship between Capital Flight and Political Variables

Panel: A



Source: Author computation from data IMF, WDI

Panel: B



Source: Author computation from data IMF, WDI

C. Djibouti

Djibouti is the other eastern African countries which has a total population of 0.888 million with a rank of 160th in the world. World Bank 2015 GDP ranking report ranks Djibouti's GDP 171th position in the world and with a total of 3.097 billion USD. The average annual capital flight is estimated to be 302 million USD; on this account Djibouti become the 6th worst country for capital flight in eastern African countries. This volume of capital flight is the highest and makes Djibouti on the top list in eastern Africa when it is expressed as a percentage of GDP.

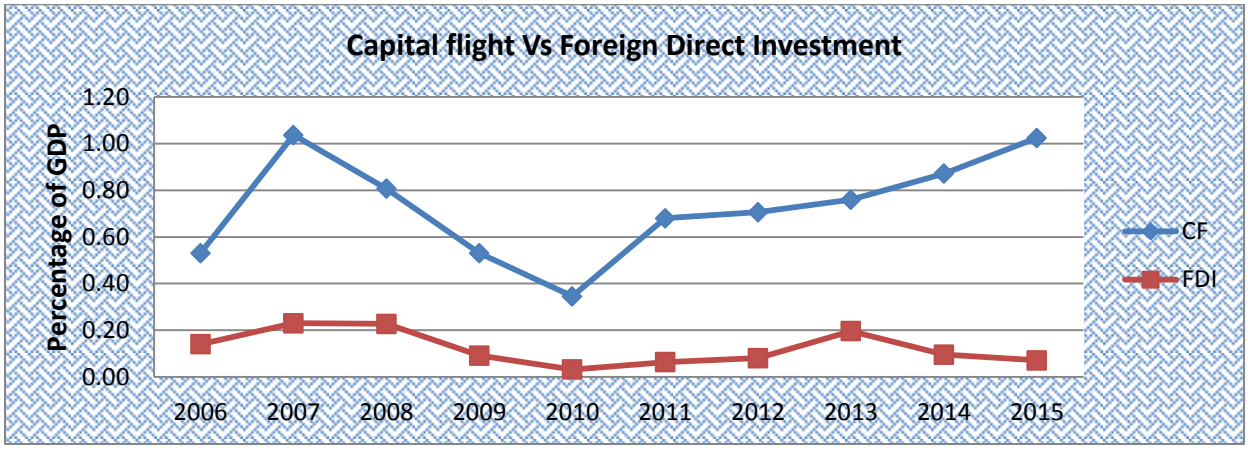
Capital flight Versus Debt and Foreign direct investment

During the study years (2006 – 2015) Djibouti received source of funds on average amounting 849.1 million USD from external borrowing and 141 million USD from foreign direct investment each year. The first panel demonstrates that except for the years 2014 and 2015 for which capital flight and foreign direct investment move apart, in the rest of time periods the two variables move with the same trends implying positive and direct relationships. The other panel

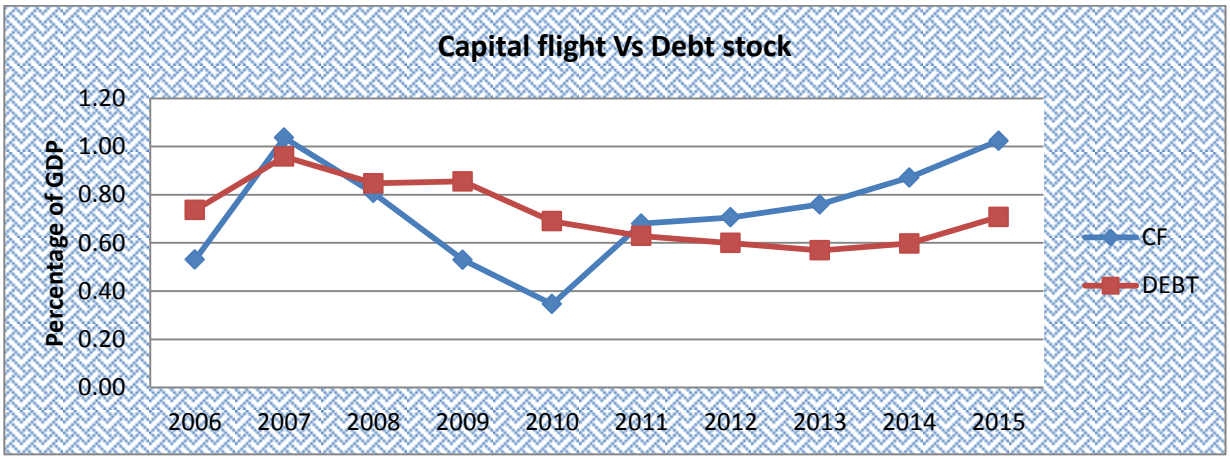
depicts that capital flight and external debt stock has a positive relationship meaning, a decrease in external debt is related with a decrease in capital flight which implies positive relationships between external debt and capital flight.

Figure 4.1.2G: Relationship between Capital Flight and Sources of Funds

Panel: A



Panel: B



Source: Author computation from data IMF, WDI

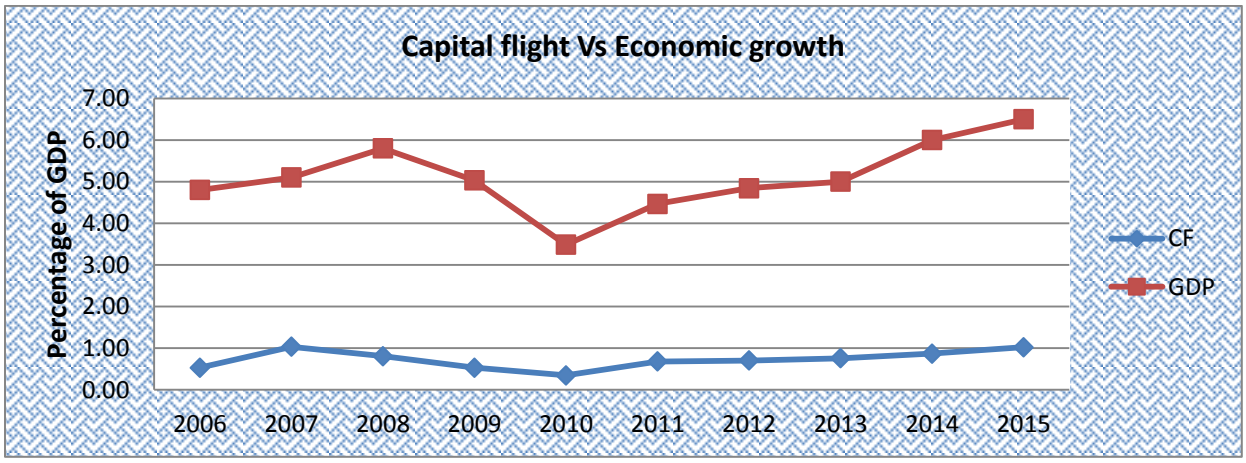
Capital flight Versus Economic growth and Budget deficits

Capital flight was moving in the same direction with economic growth consistent with the theory for all time episodes except for the years 2006, 2014 and 2015. This implies that capital flight

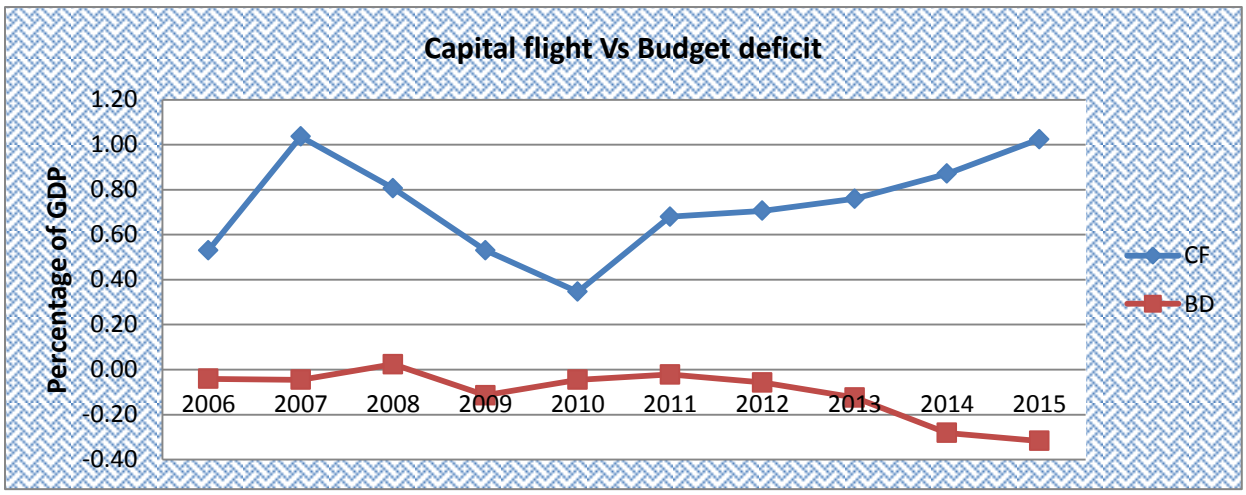
might directly associate with Economic growth. On the other hand, the other panel depicts that, an increase in budget deficit leads to a fall in capital flight for the years 2007-2010 and for the years 2010 onwards a down ward trend for budget deficit representing an increase in budget deficit, in which, capital flight is directly associated with budget deficit.

Figure 4.1.2I: Relationship between Capital Flight and some Macroeconomic Variables

Panel: A



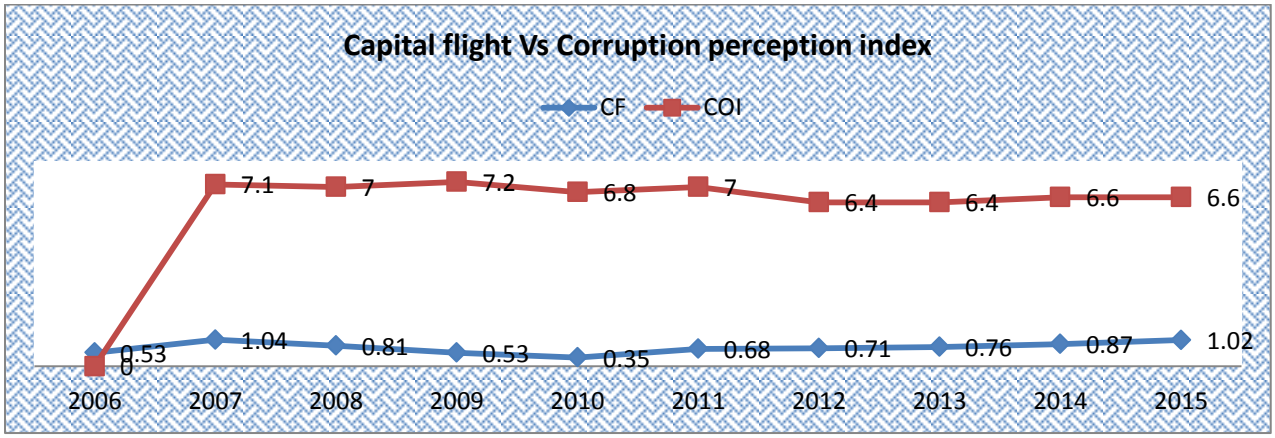
Panel: B



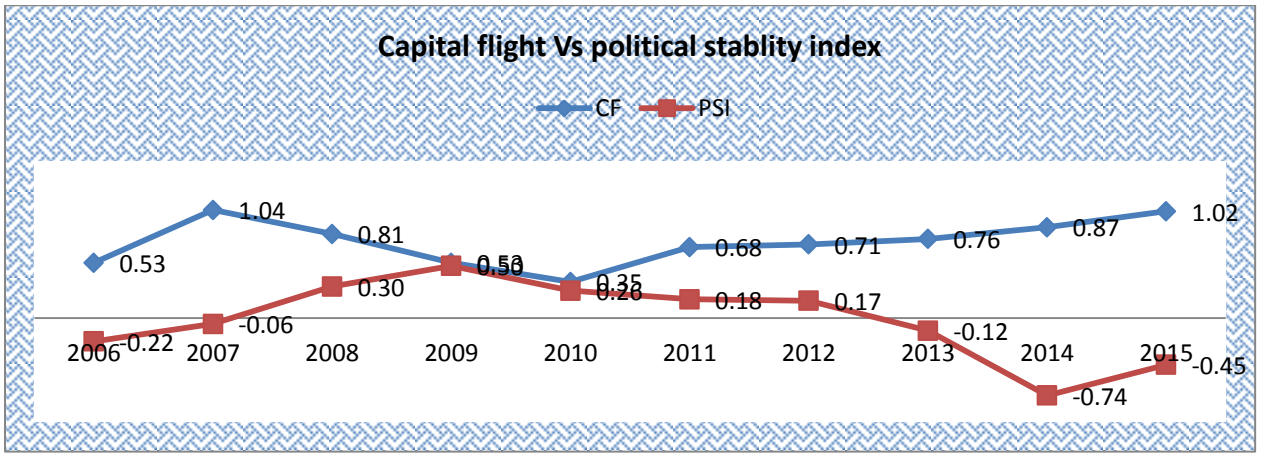
Source: Author computation from data IMF, WDI

Figure 4.1.2.J: Relationship between Capital Flight and Political Variables

Panel: A



Panel: B



Source: Author computation from data IMF, WDI

Capital flight Versus Political Variables

Capital flight has increasing trends for the study years. Though perceived corruption index, has a decreasing trends with smaller magnitude, the overall corruption index is higher. Therefore, the positive relationships may exist. On the other panel starting from the year 2007 it seems both variables move in the same direction. From Figure 4.1.2J Panel B shows the downward trend projected by the political stability index which implies that the given index represented with the negative values is to mean an increasing political instability.

D. Ethiopia

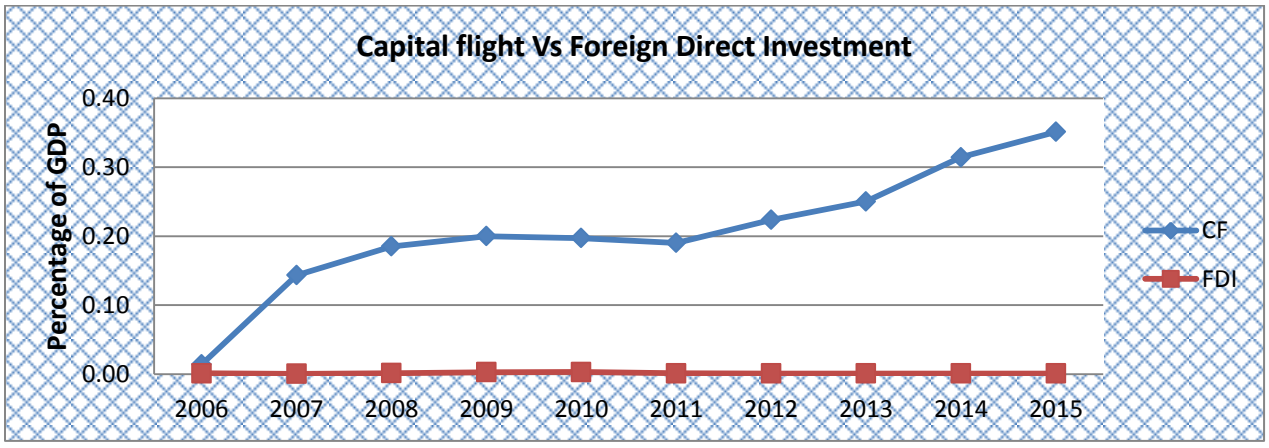
Ethiopia is located in the eastern Africa according to the World Bank 2015 report the population hits 99.391 million which is highly populated and ranks 13th in the world and the top from Eastern African Countries. World Bank 2015 GDP ranking report puts 73th position in the world and accrued a total of 61.54 billion USD. On average 8.721 billion USD worth capital flew out of the country annually. Therefore, Ethiopia experienced huge volume of capital flight and is on the front line from Eastern African Countries.

Capital flight Versus Debt and Foreign Direct Investment

Data from 2006 - 2015, shows that on average Ethiopia received source of funds which amounts 8.924 billion USD from external borrowing and 787 million USD from Foreign direct investment. The first panel in Figure 4.1.2K depicts that capital flight and foreign direct investment seems to have no relationships because while the foreign direct investment is moving constantly in horizontal fashion the capital flight tends to increase.

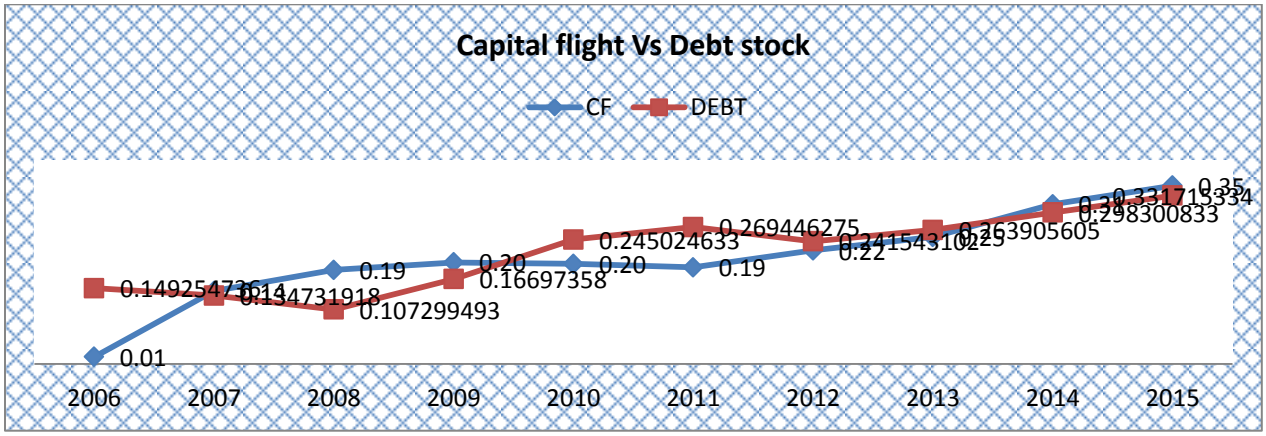
Figure 4.1.2K: Relationship between Capital Flight and Sources of Funds

Panel: A



Source: Author computation from data IMF, WDI

Panel: B



Source: Author computation from data IMF, WDI

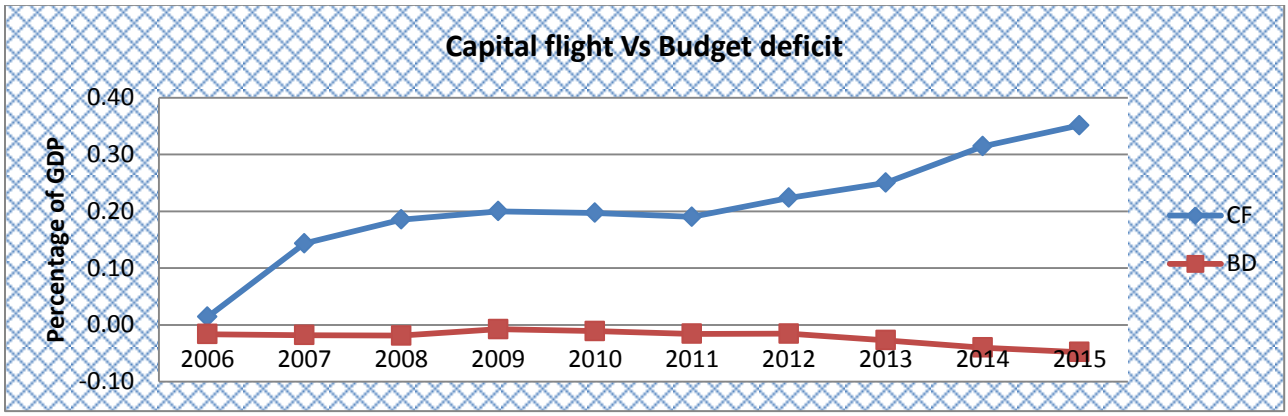
From the second panel it can be Saied that the capital flight is not debt driven because there is negative relationship among the variables, while the debt falls the capital flight rising and vice versa. But inference could be forwarded for these relationships.

Capital flight Versus Economic growth and Budget Deficits

Panel A in the following Figure illustrates increasing budget deficit. Budget deficit represented with the negative values, which has downward trend, implies an increase in budget deficit. The increase in budget deficit is directly related to the increase in capital flight for the study years which is consistent to the theory.

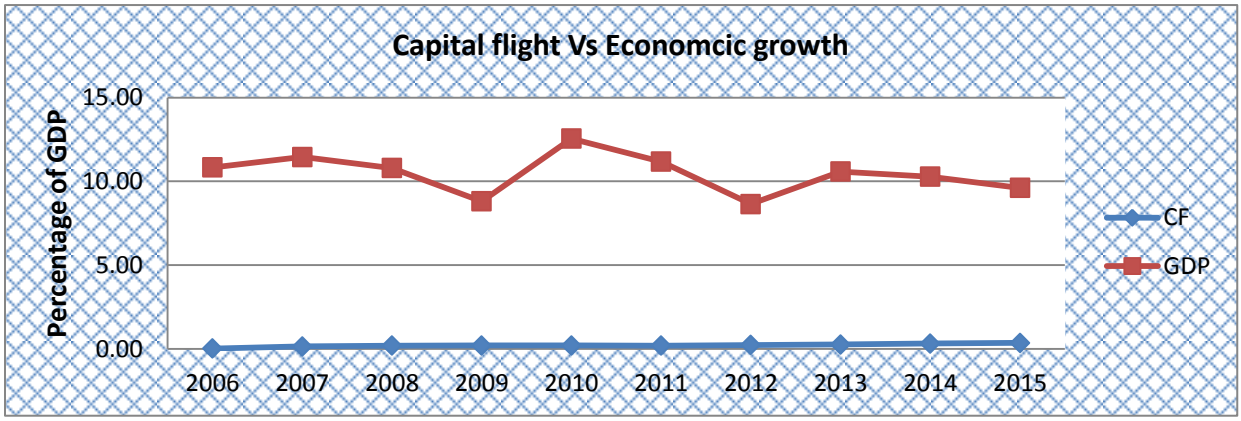
Figure 4.1.2L: Relationship between capital Flight and some Macroeconomic variables

Panel: A



Source: Author computation from data IMF, WDI

Panel: B



Source: Author computation from data IMF, WDI

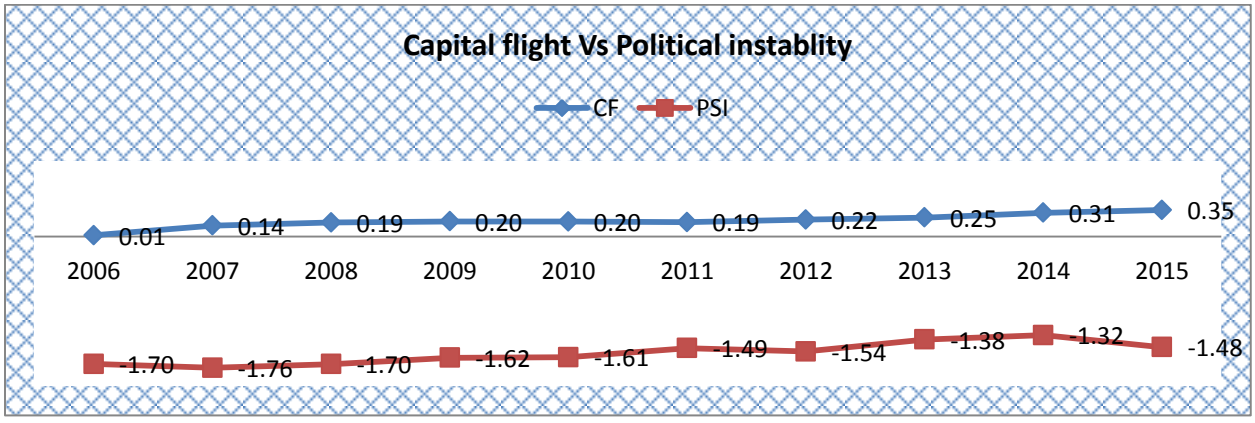
Panel B shows that Capital flight seems to move persistently irrespective of the move to the economic growth; which means that either falls or rises in economic growth may not have direct impact on capital flight in Ethiopia.

Capital flight Versus Political variables

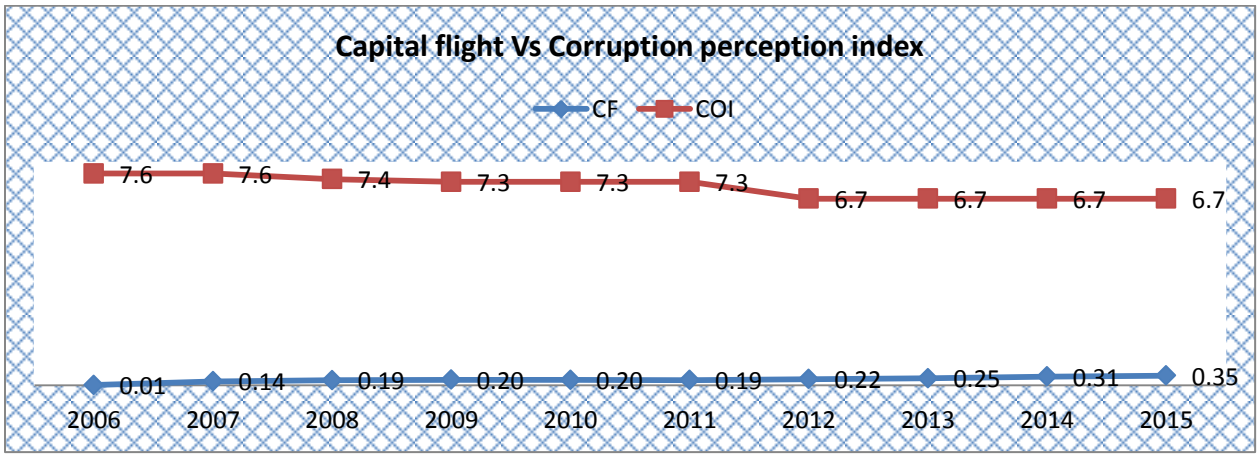
From Figure 4.1.2M, Panel: A shows that even though the instability is decreasing in a smaller margin, the overall trend could be seen as a higher state of instability. Therefore, the increasing trends of capital flight could be as a result of the high level of political instability.

Figure 4.1.2M: Relationship between Capital Flight and Political Variables

Panel: A



Panel: B



Source: Author computation from data IMF, WDI

The other panel shows that despite the existence of a small decrease in corruption perception index, the overall status of corruption index is higher. Therefore, higher corruption is associated with higher capital flight.

E. Kenya

Kenya is located in the eastern Africa with the total population of 46.050 million ranking 30th in the world and the third highly populated countries in Eastern Africa. Kenya scores a total GDP of 63.398 billion USD which is the second biggest economy in Eastern Africa and ranks 71th in the World Bank (2015). The total volume of capital flight on average is 4.088 billion USD per annum. Kenya ranks last from Eastern Africa when capital flight is expressed as a percentage of GDP (see appendix B).

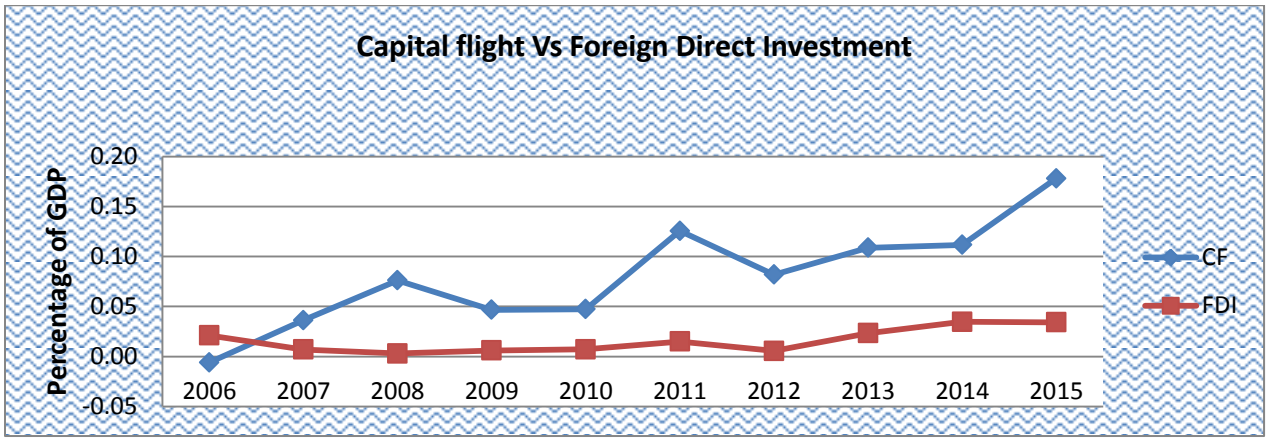
Capital flight Versus Debt and Foreign direct investment

Kenya received on average 11.088 billion USD from external borrowing and 287 million USD from Foreign direct investment per annum. From Figure 4.1.2N, Panel A demonstrates that

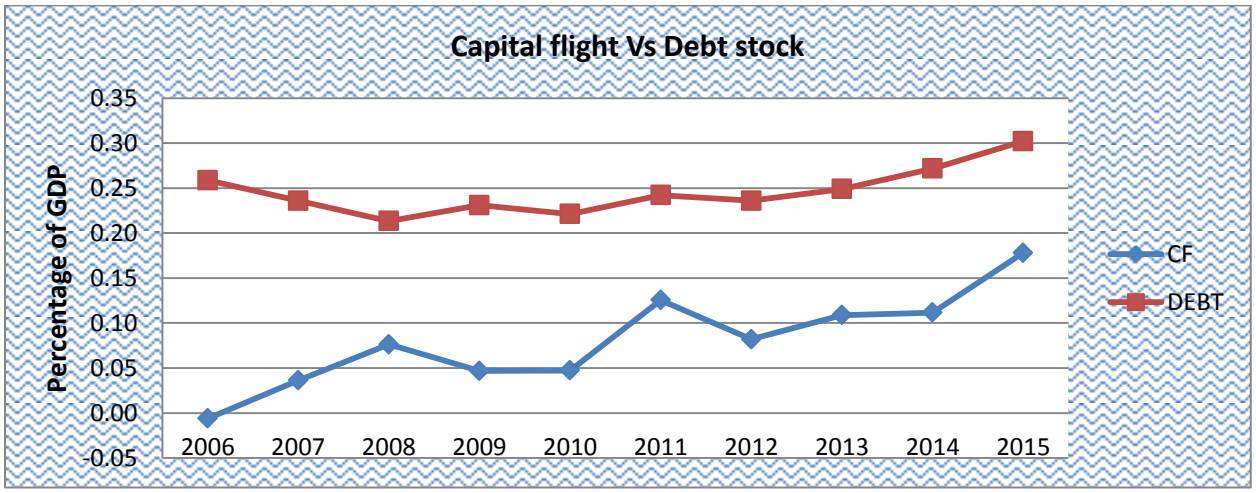
capital flight seems to be induced by the increment in foreign direct investment. Therefore, it can be deduced that whenever there are enough sources available it might motivate capital flight. Panel B shows that capital flight and external debt stock is moving in the same direction, an increase in external debt is related with an increase in capital flight which implies a positive relationship between external debt and capital flight.

Figure 4.1.2N: Relationship between Capital Flight and Sources of Funds

Panel: A



Panel: B



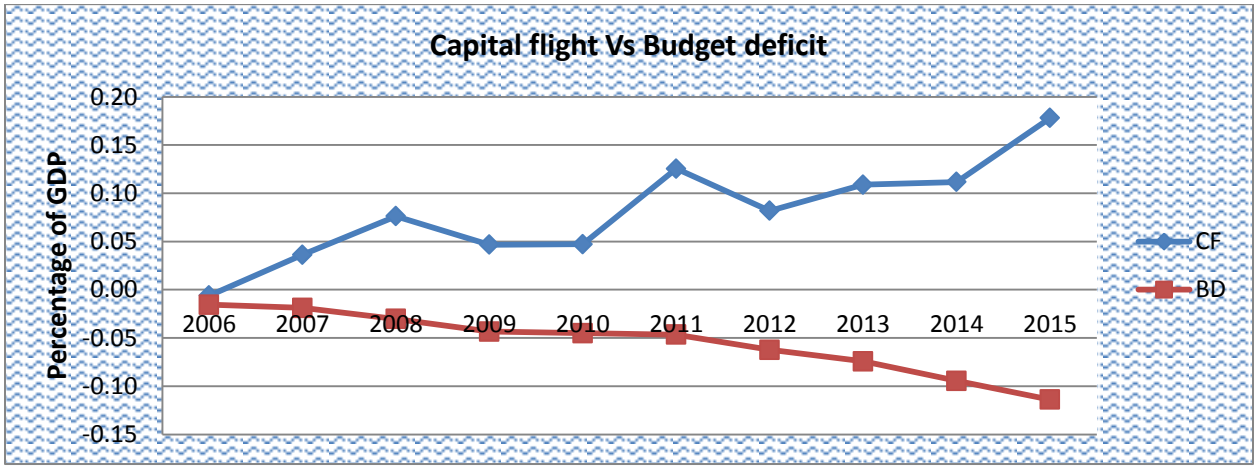
Source: Author computation from data IMF, WDI

Capital flight Versus Economic growth and Budget deficits

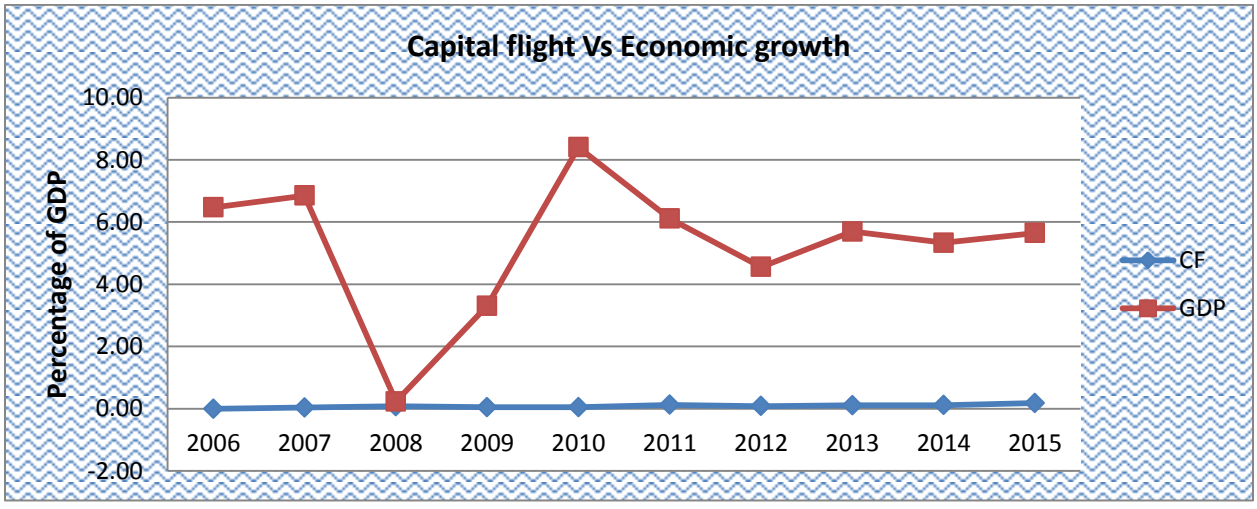
In the above Figure, Panel A depicts that, the rise in budget deficit leads to an increase in capital flight throughout the study years which implies a positive relationship between budget deficit and capital flight which is consistent to the theory. On the other hand Panel B shows that irrespective of the trends in economic performance the capital flight tends move in the same trend therefore, it is difficult establishing the relationships.

Figure 4.1.2O: Relationship between Capital Flight and some Macroeconomic Variables

Panel: A



Panel: B



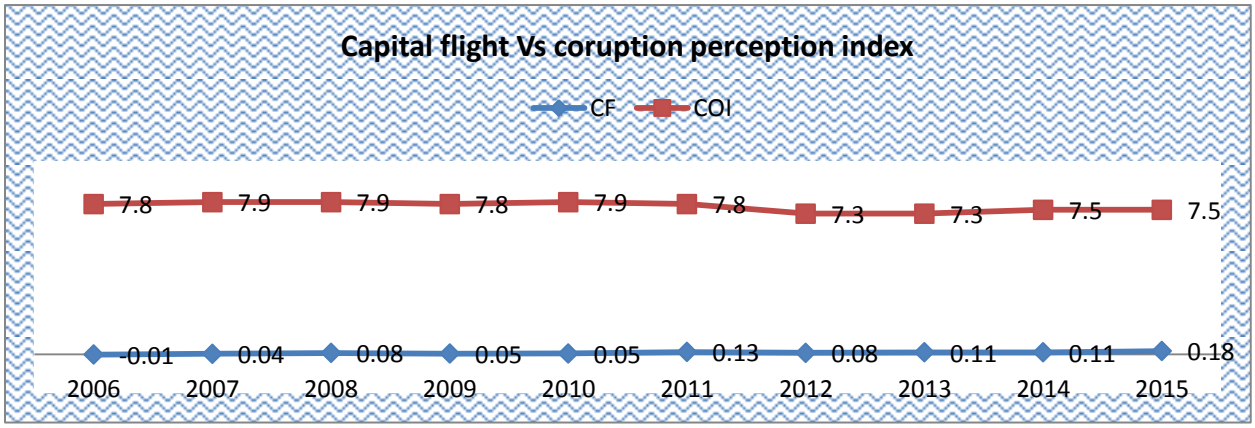
Source: Author computation from data IMF, WDI

Capital flight Versus Political variables

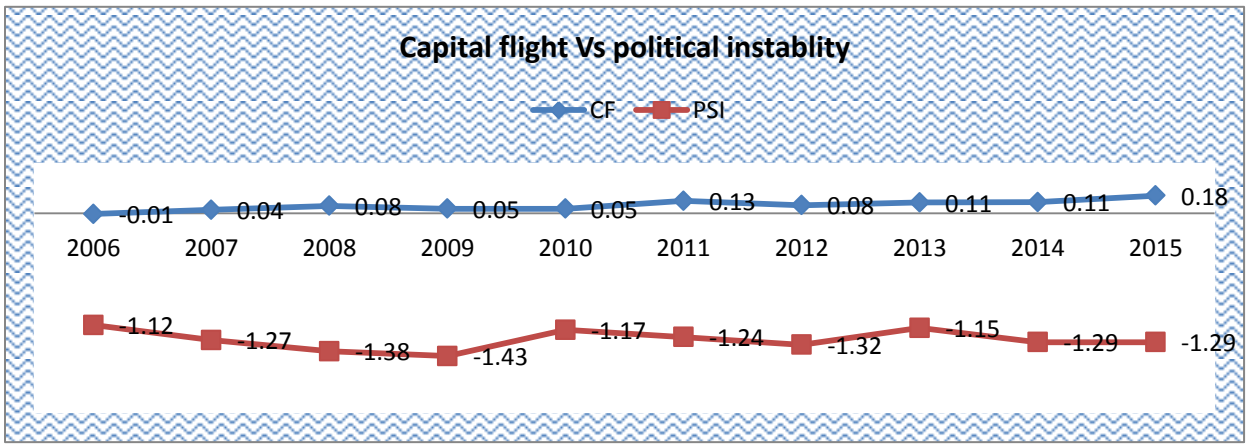
Capital flight in the first panel is slightly increasing and corruption perception index is higher but it is difficult in this scenario to presume one variable causes the other. Panel B depicts an increasing trend in capital flight especially after the year 2010 while political instability has negative values throughout the study years. That demonstrates a positive relationship among the two variables, the higher political instability the higher is capital flight. See the following Figure;

Figure 4.1.2Q: Relationship between capital Flight and Political variables

Panel: A



Panel: B



Source: Author computation from data IMF, WDI

F. Rwanda

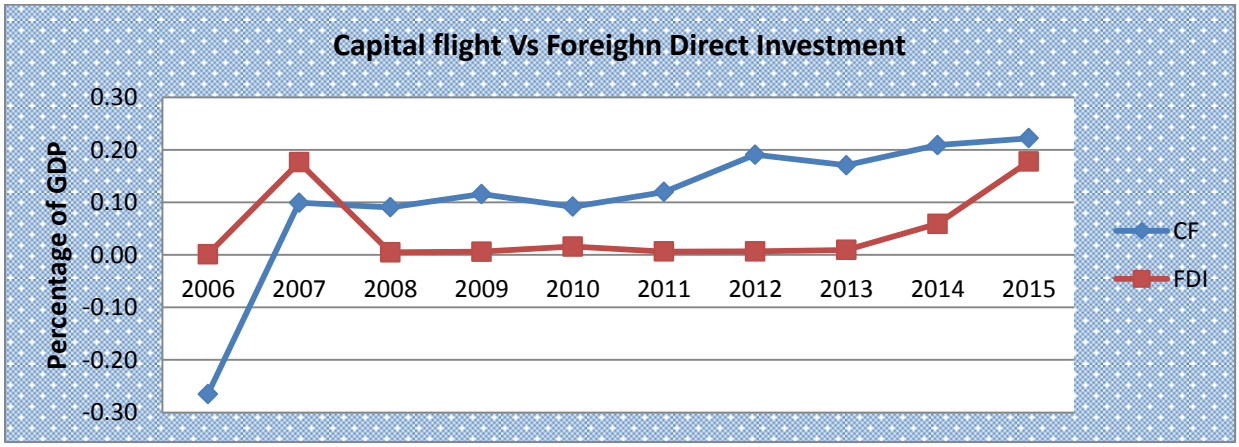
Rwanda is located in the eastern African countries with the total population of 11.610 million which ranks 75th in the world. According to World Bank 2015 report, Rwanda is 141th position in the world with a total worth of 8.096 billion USD aggregate GDP. The total worth of capital outflow is on average 799 million USD worth capital flew out of the country annually.

Capital flight Versus Debt and Foreign direct investment

Rwanda received source of funds amounting 1.195 billion USD from external borrowing and 103 million USD from Foreign direct investment. In Figure 4.1.2R, the first Panel depicts that, capital flight and foreign direct investment seems to have the same patterns. A decrease or increment in foreign direct investment associates with a fall or a rise in capital flight respectively.

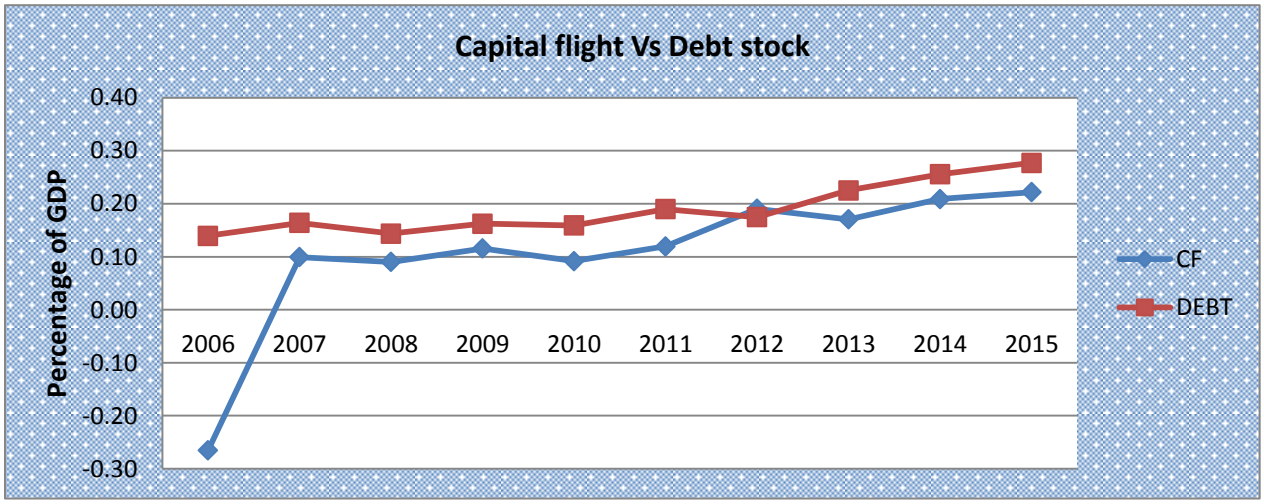
Figure 4.1.2R: Relationship between capital Flight and sources of funds

Panel: A



\ **Source:** Author computation from data IMF, WDI

Panel: B

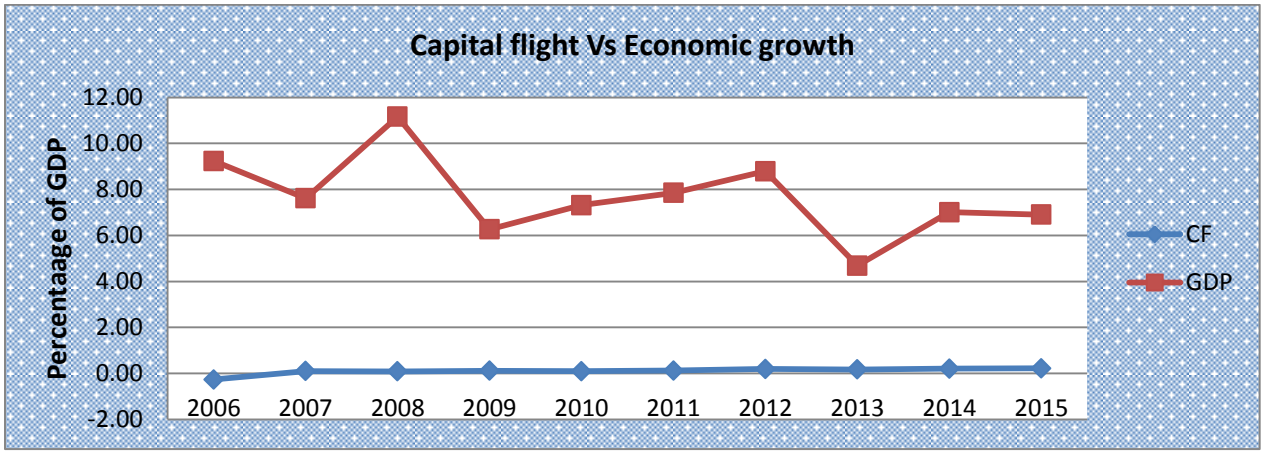


Source: Author computation from data IMF, WDI

As it is seen in Figure 4.1.2R, the second Panel shows capital flight and external debt stock are moving in the same direction, a decrease in external debt is related with a decrease in capital flight and an increase in external debt is associated with an increase in capital flight, which implies a positive relationship between external debt and capital flight.

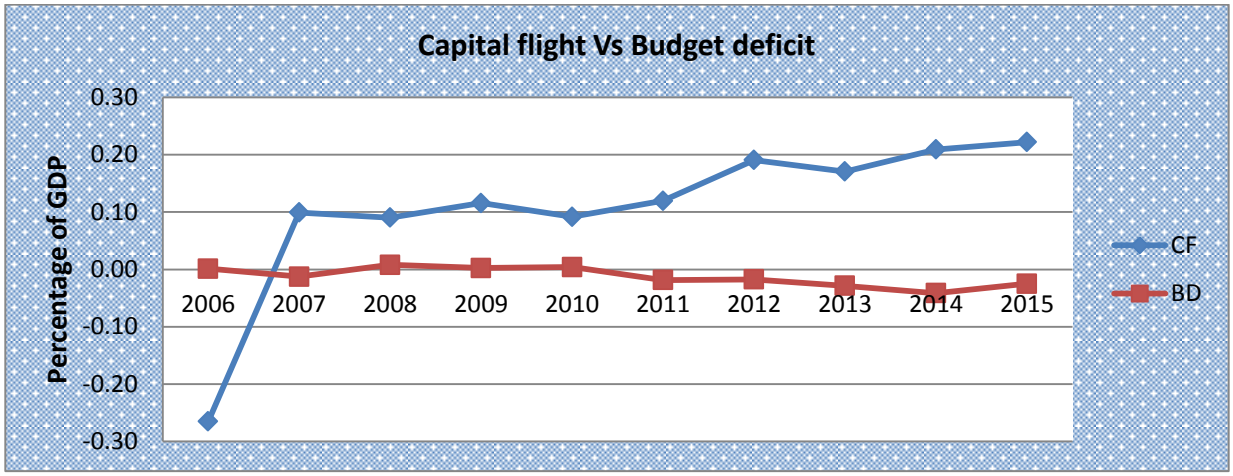
Figure 4.1.2S: Relationship between capital Flight and some Macroeconomic variables

Panel: A



Source: Author computation from data IMF, WDI

Panel: B



Source: Author computation from data IMF, WDI

Capital flight Versus Economic growth and Budget deficits

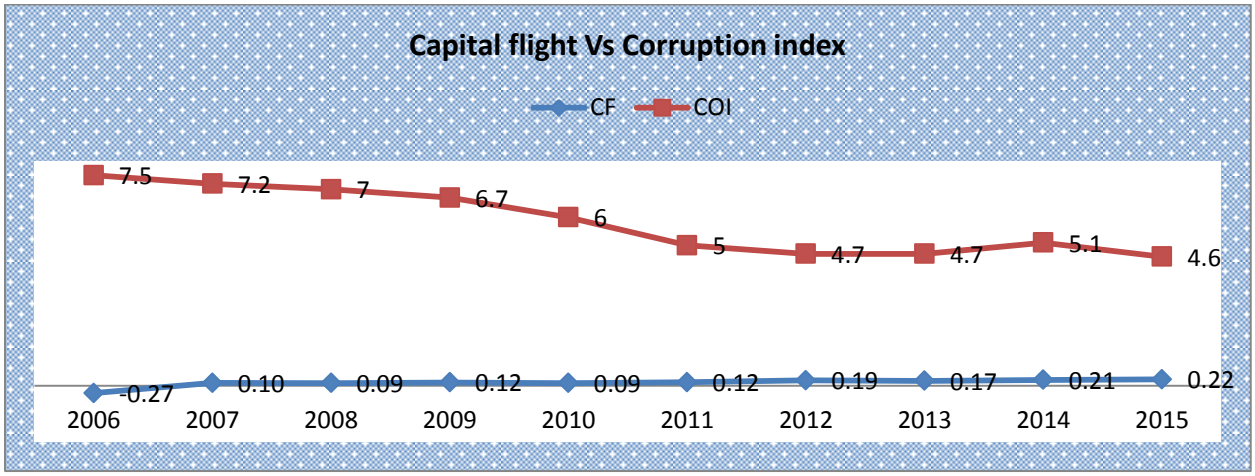
According to Figure 4.1.2S Capital flight was moving in increasing fashion notwithstanding the respected ups and down of the performance of the economy. Panel B depicts that, for the years 2010 onwards, an increase in budget deficit is related with an increase in capital flight.

Capital flight Versus Political variables

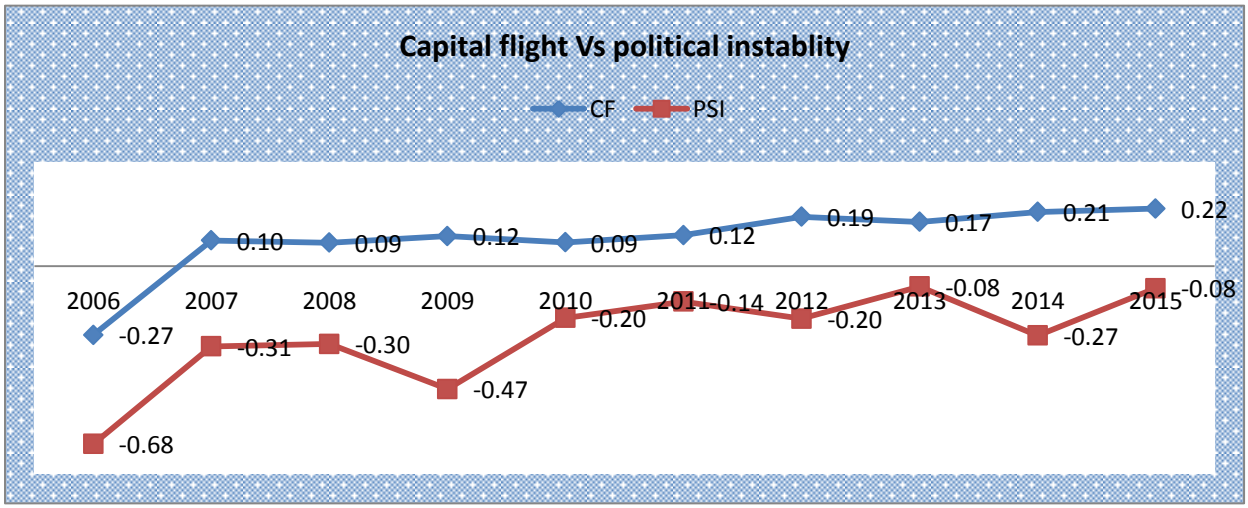
In the case of Rwanda Capital flight has increasing trends and corruption index is decreasing but has the higher perceived corruption index, which implies higher capital flight is associated with higher level of corruption. Unlike Panel A; Panel B demonstrates that there is an increasing volume of capital flight from year to year, while the political stability index falls on the negative values implying existence of political instability. Therefore, with this respect political instability may induce capital flight.

Figure 4.1.2T: Relationship between Capital Flight and Political Variables

Panel: A



Panel: B



Source: Author computation from data IMF, WDI

G. Sudan

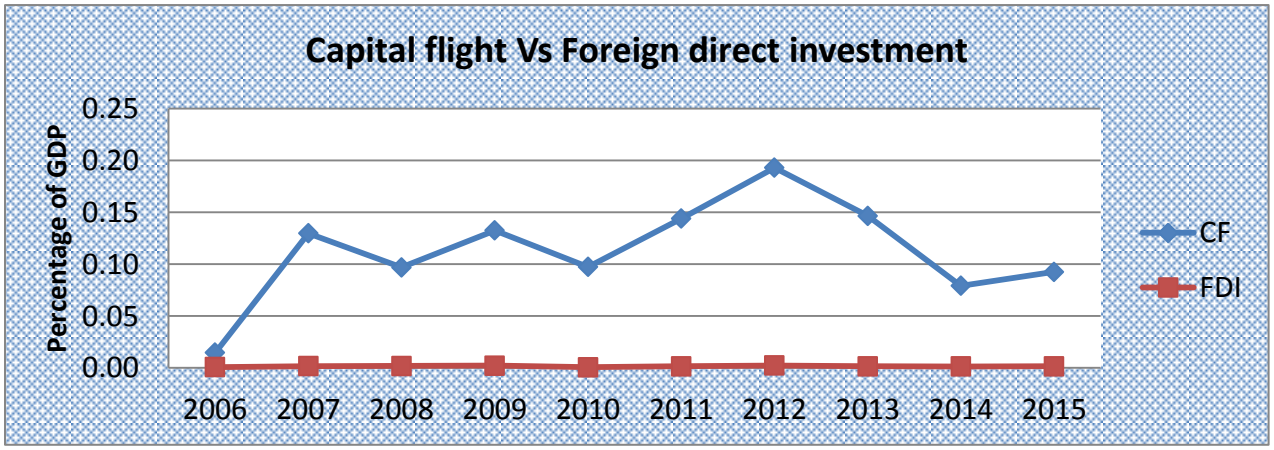
Sudan is on the top from Eastern African countries in its GDP ranking. It has a total population size of 40.235 million and ranks 33th according to World Bank (2015) report. Sudan is a country to be the second largest volume of capital flew out among Eastern African countries next to Ethiopia. On average 7.412 billion USD worth capital flew out of the country annually.

Capital flight Versus Debt and Foreign direct investment

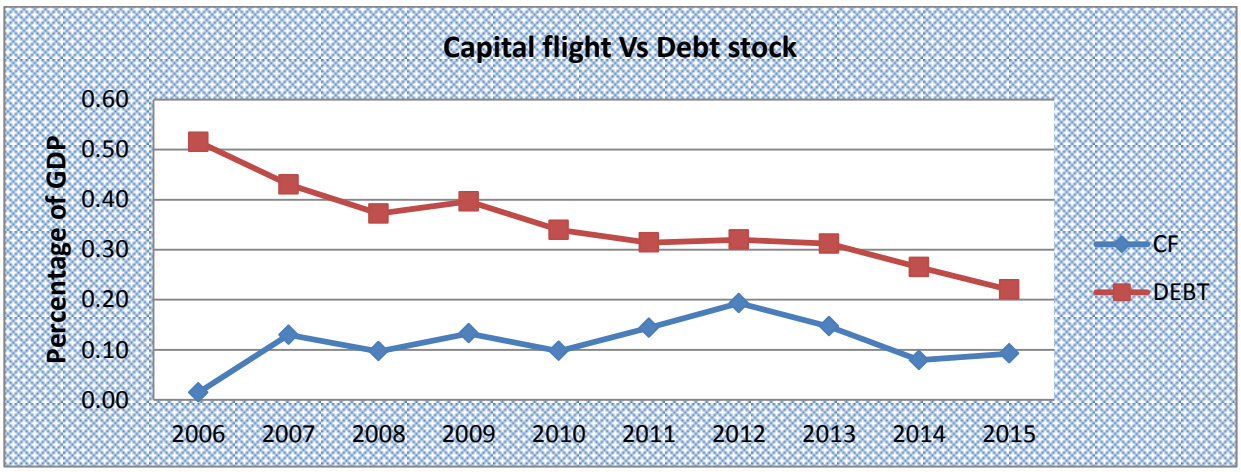
Using the data from world development indicators (2016), for the years 2006-2015 on average Sudanese received funds that amounts 21.043 billion USD from external borrowing and 731 million USD from foreign direct investment. On account to Figure 4.1.2U, Panel A depicts that capital flight is moving ups and down in consecutive years but, foreign direct investment seems to flow smoothly suggesting there might not any relations between the two variables.

Figure 4.1.2U: Relationship between Capital Flight and Sources of Funds

Panel: A



Panel: B

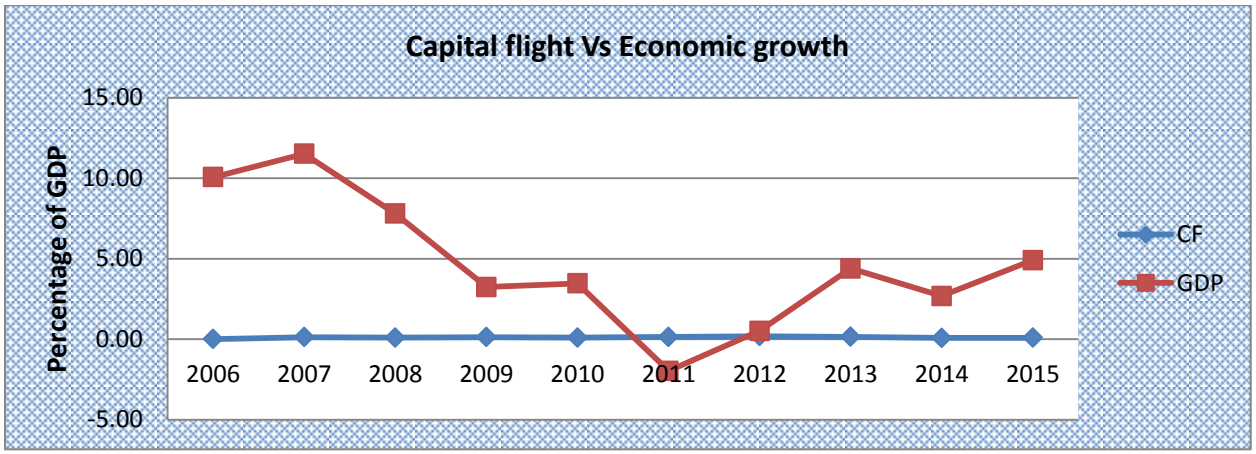


Source: Author computation from data IMF, WDI

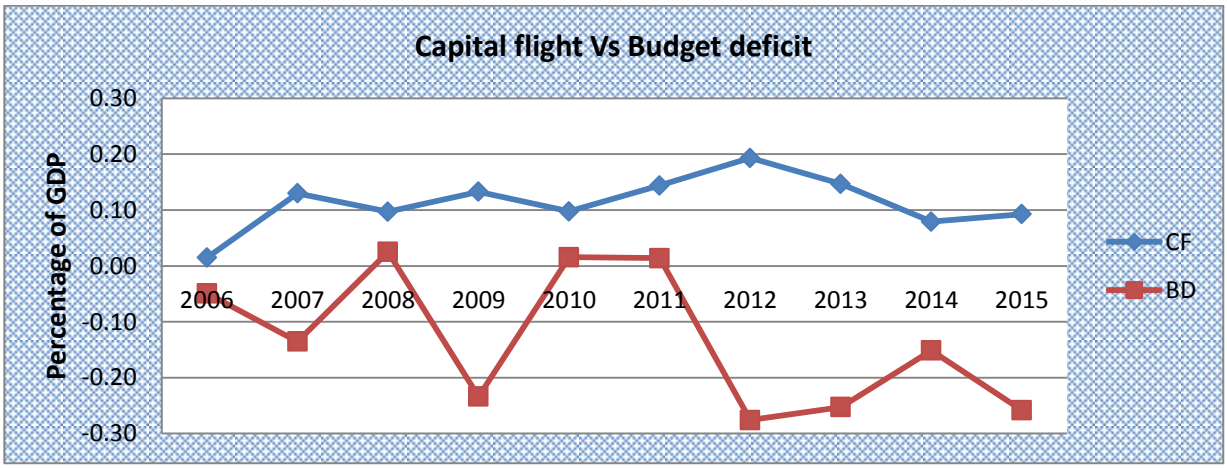
On the other hand external debt stock is moving with downward trends, but the capital stock has an increasing trend which seems inconsistent to the theory.

Figure 4.1.2V: Relationship between Capital Flight and some Macroeconomic Variables

Panel: A



Panel: B



Source: Author computation from data IMF, WDI

Capital flight Versus Economic growth and Budget deficits

Figure 4.1.2V above has shown that Capital flight was moving in the same direction with the budget deficit as it is depicted in Panel B. Which means that budget deficit induce capital flight. Therefore, the relationship is consistent to the theory. Panel A on the other hand illustrates

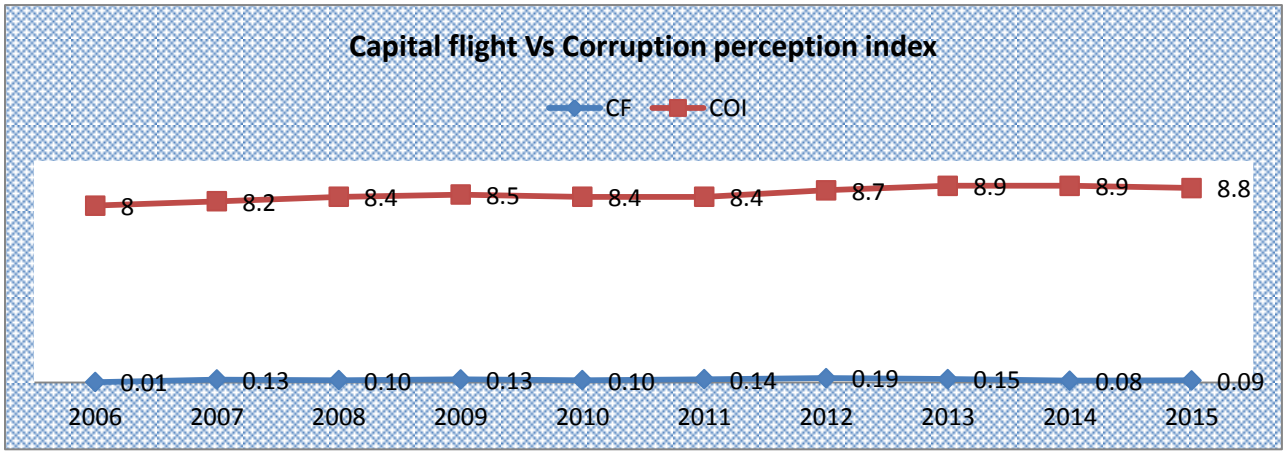
initially economic growth tends to decrease downwards and in the later years it starts rising while capital flight shows increments with slight magnitude. Therefore, the trend provides with mixed result.

Capital flight Versus Political variables

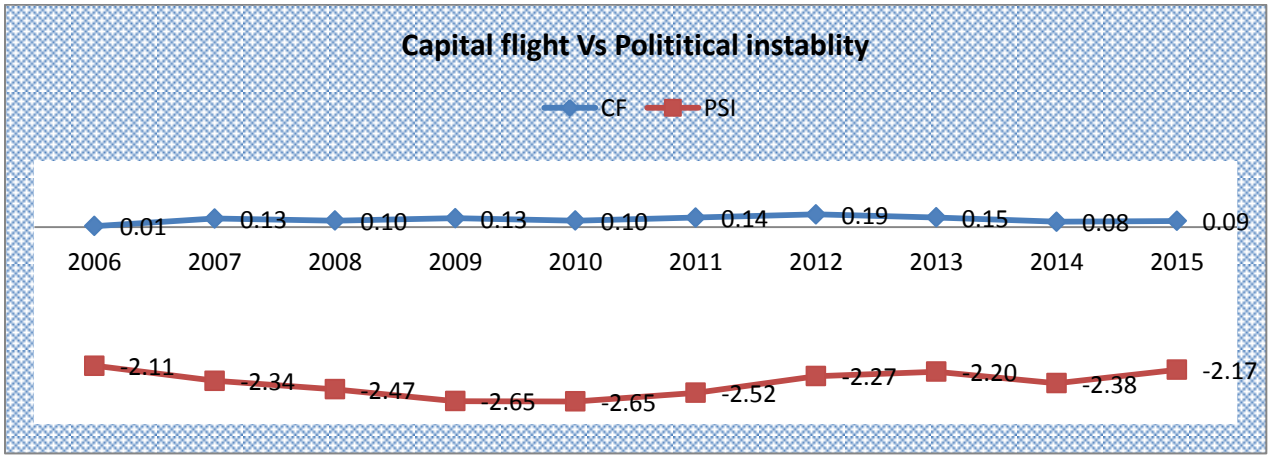
Capital flight in this case moving parallel to trends of perceived corruption index, it seems both variables interact in the same direction which implies one variable induces the other variable.

Figure 4.1.2W: Relationship between capital Flight and Political variables

Panel: A



Panel: B



Source: Author computation from data IMF, WDI

Panel B depicts that a growing trend in capital flight throughout the study years except for the years 2008, 2010 and 2015. The political stability index has negative values implying the existence of political instability. Therefore, consistent to the theory the higher the political instability the higher the capital flight exists.

H. Tanzania

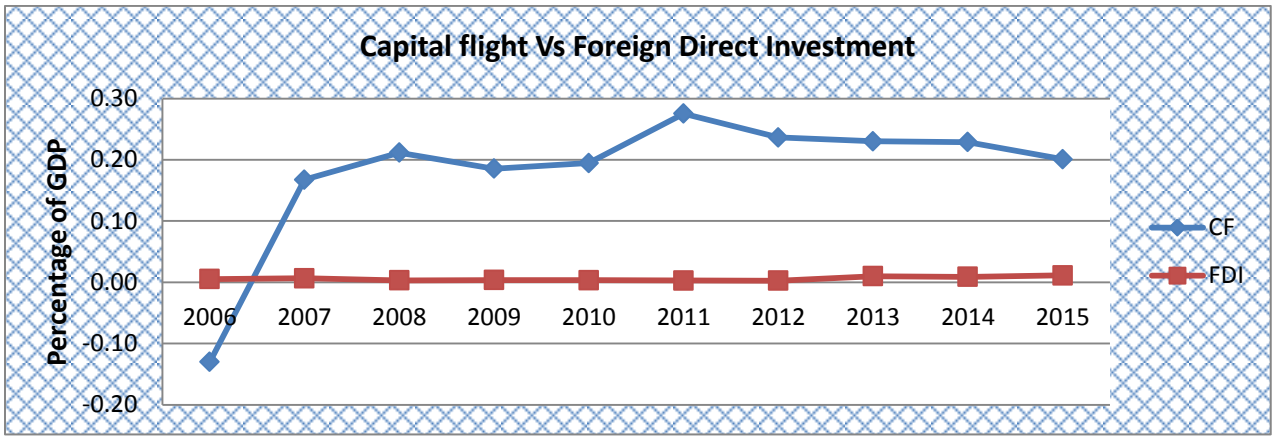
Tanzania is found in the eastern African countries with the total population of 53.47 million according to World Bank (2015) reports ranks 26th in the world. Tanzania accumulates an aggregate GDP 45.628 billion ranking 84th position in the world. In absolute figure on average 6.735 billion USD worth capital flew out of the country annually and this figure makes Tanzania to be ranked the third out of the Eastern African Countries.

Capital flight Versus Debt and Foreign direct investment

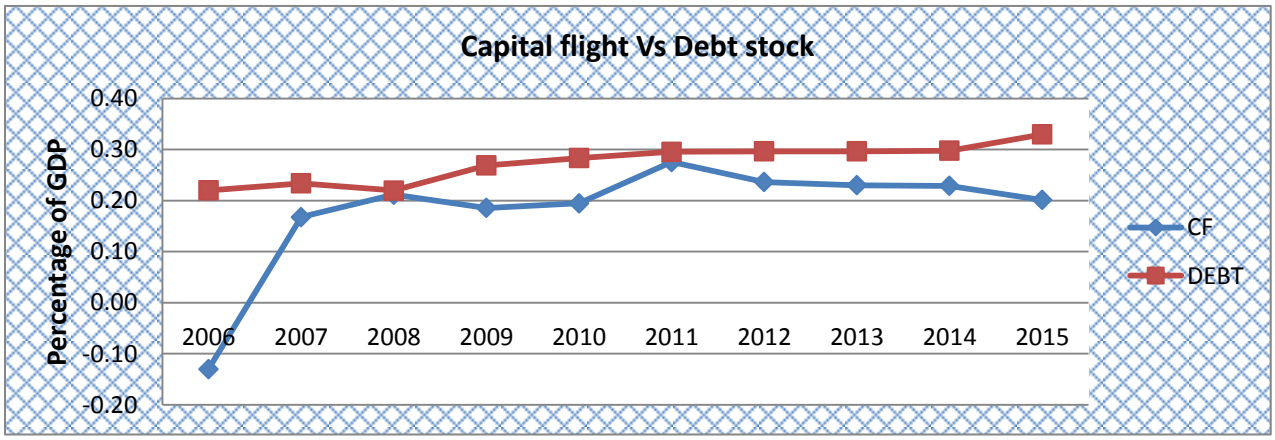
Data from World development indicators for the years 2006 - 2015, shows that on average Tanzania received which amounts 9.586 billion USD from external borrowing and 765 million USD from Foreign direct investment. Panel A demonstrate capital flight tend to increase up to the year 2011 and then starts to fall, while foreign direct investment moves steadily in horizontal fashion implying that no relation could exist among the two variables. The other panel depicts that capital flight and external debt stock are moving in the same direction, an increase in external debt is related with a rise in capital flight which implies a positive relationship between external debt and capital flight persistent to the theory.

Figure 4.1.2X: Relationship between Capital Flight and Sources of Funds

Panel: A



Panel: B



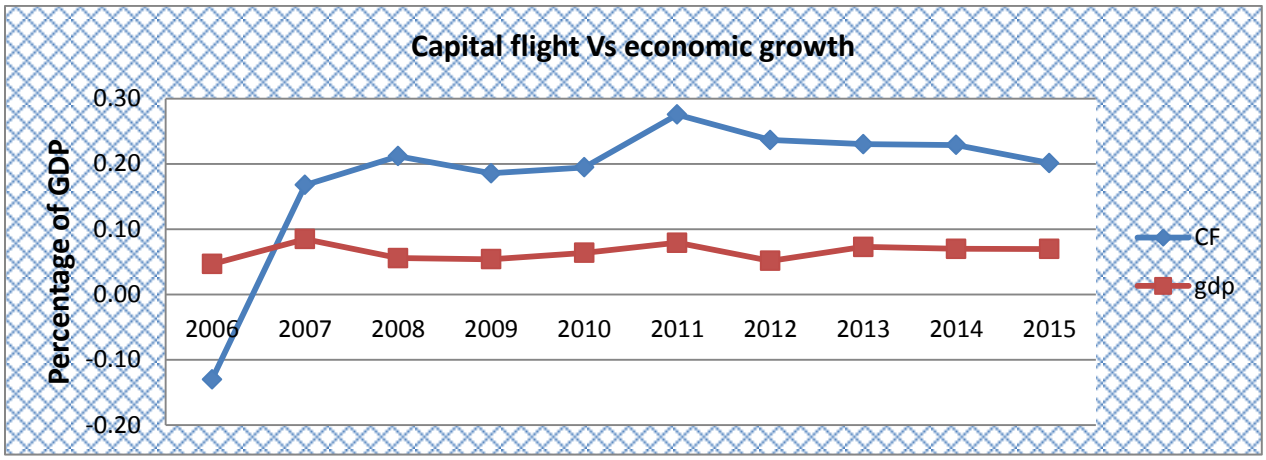
Source: Author computation from data IMF, WDI

Capital flight Versus Economic growth and Budget deficits

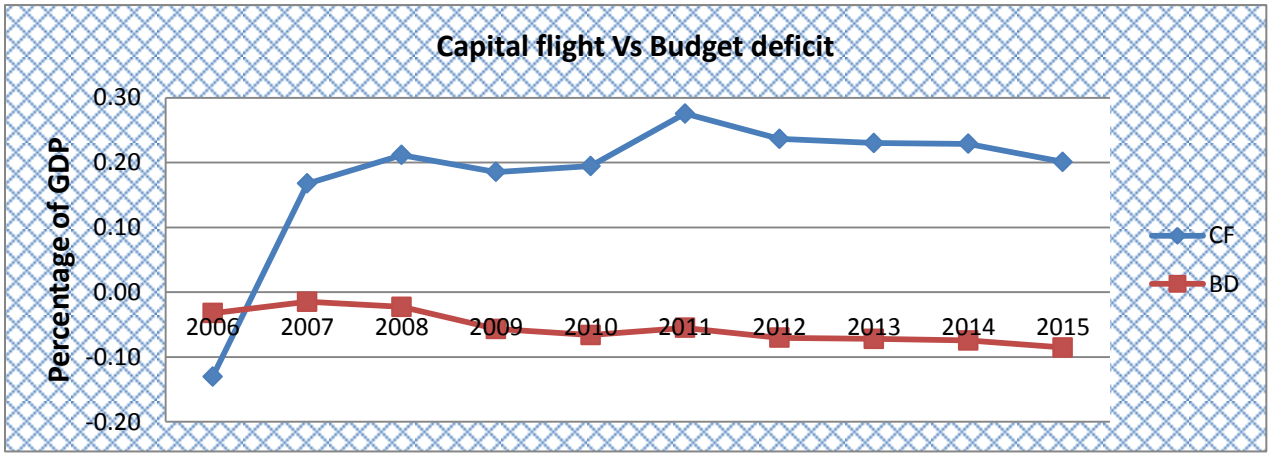
From the first panel Capital flight was moving upward trend for the initial years while it falls then after. It is not easy defining relationships among the two variables because economic growth is fluctuating in consecutive years. On the other hand, Panel B depicts that, an increase in budget deficit leads to an increase in capital flight for the year interval 2006-2011. But for the years on wards an increase in budget deficit associated with a decrease in capital flight which is inconsistent with the theory.

Figure 4.1.2Y: Relationship between Capital Flight and some Macroeconomic Variables

Panel: A



Panel: B



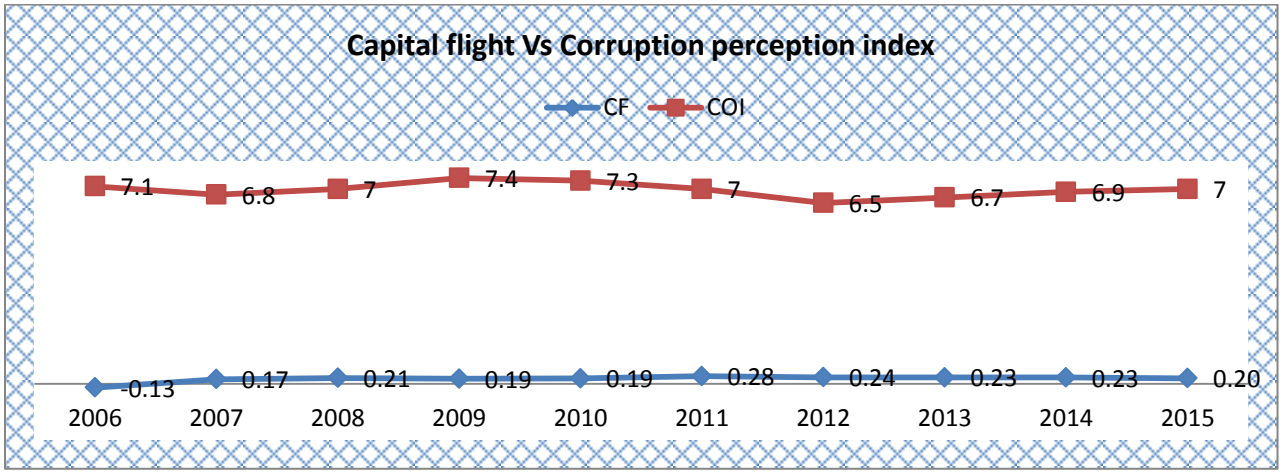
Source: Author computation from data IMF, WDI

Capital flight Versus Political variables

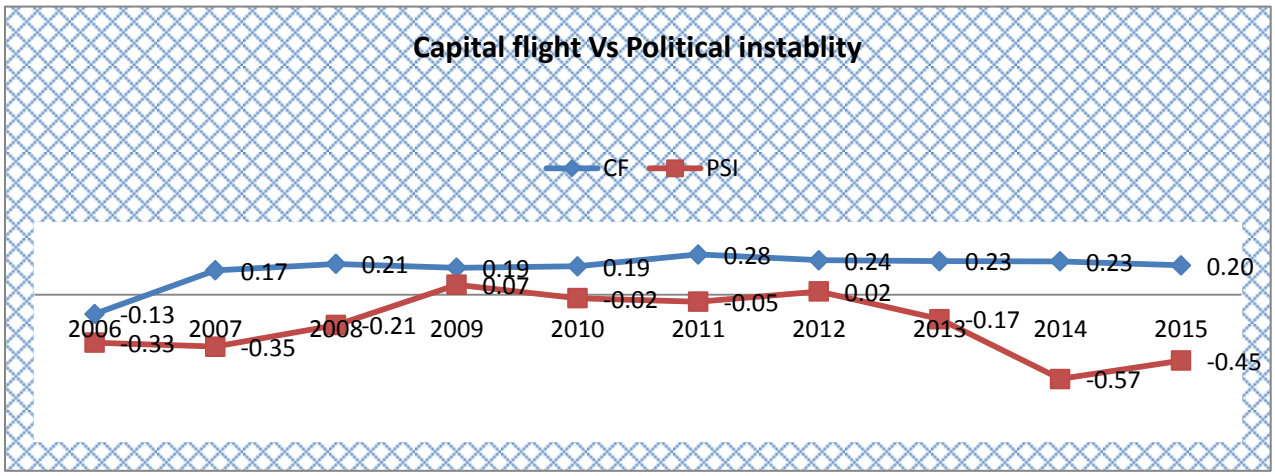
Figure 4.1.2Z has shown Capital flight is moving parallel to trends of perceived corruption index, it seems both variables are steadily increasing which implies one variable induces the other variable. Panel A depicts the same trends among the variables.

Figure 4.1.2Z: Relationship between capital Flight and Political variables

Panel: A



Panel: B



Source: Author computation from data IMF, WDI

Panel B shows that the negative values of corruption index represent political instability and it is directly related to capital flight for the years 2007-2012. All the while, for the year 2013 onwards political instability increases and the capital flight tends to decrease.

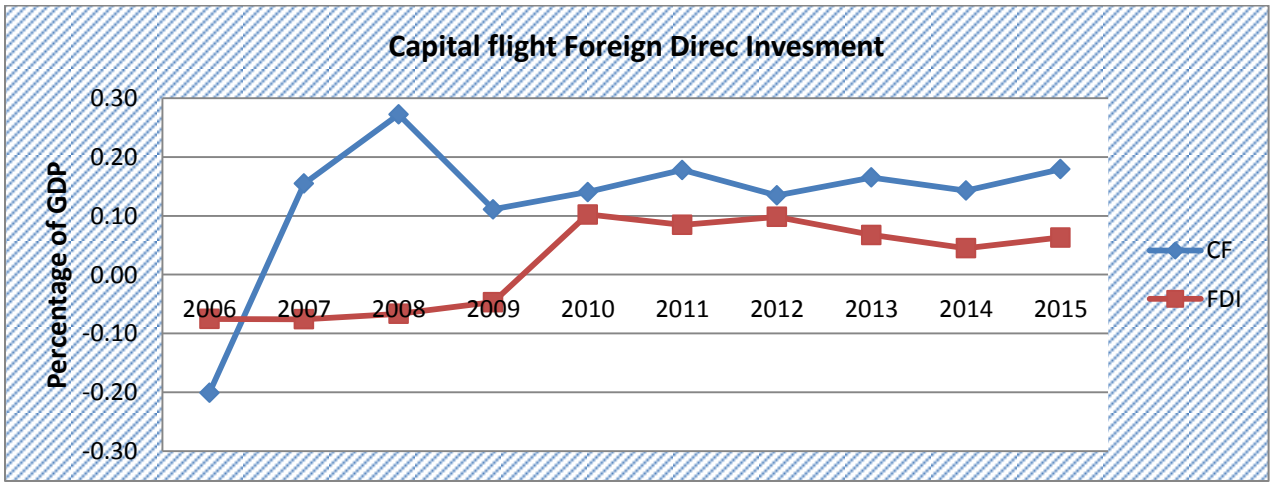
I. Uganda

Uganda is one of the eastern African countries with the total population of 39.032 million which ranks 35th in the world. According to World Bank (2015) report, Uganda is ranked 98th in the world with a total of 27.529 billion USD in terms of economic size. On average 2.846 billion USD worth capital flew out of the country annually.

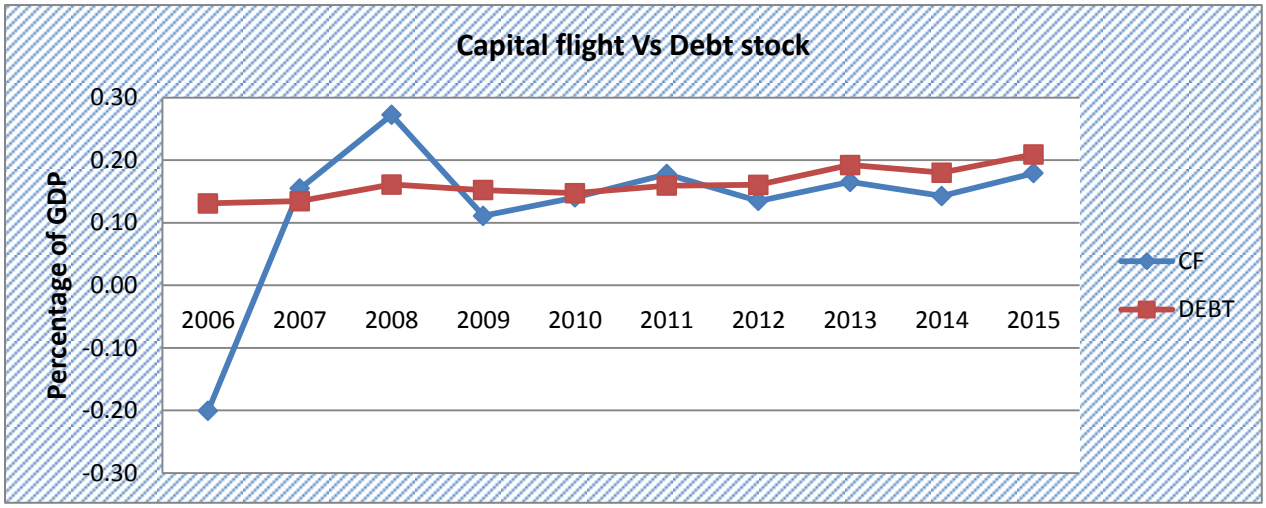
Capital flight Versus Debt and Foreign direct investment

Data from world development index 2006 - 2015, shows that on average Uganda received 3.358 billion USD from external borrowing and 683 million USD from Foreign direct investment. Panel A below, depicts that capital flight is induced by Foreign Direct Investment at the initial stages for the year 2006-2008 and trends after 2008 could not define the relationship due to the inexistence of comparable variable trends. The other panel shows that debt stock is steadily increasing while capital flight is not. It is only for these years 2006-2008, 2009-2011, 2014-2015 capital flights show increasing trends. Therefore, for these years the level of debt is associated positively with capital flight.

Figure 4.1.2AA: Relationship between Capital Flight and Sources of Funds
Panel: A



Panel: B



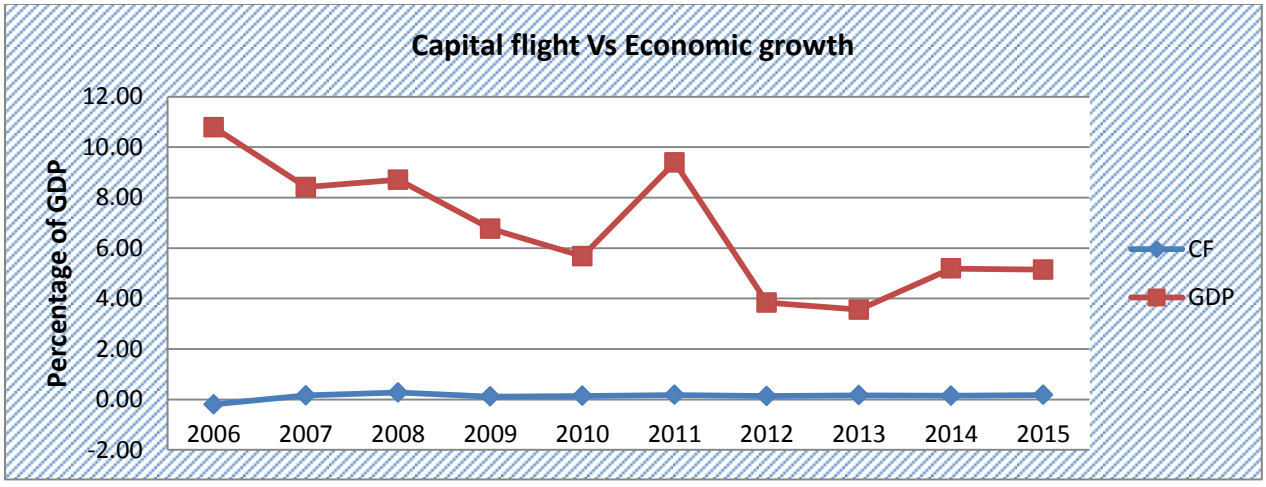
Source: Author computation from data IMF, WDI

Capital flight Versus Economic growth and Budget deficits

Capital flight was moving in unpredictable fashion for Uganda and economic growth shows a decreasing trend which makes difficult defining relationships graphically. On the other hand,

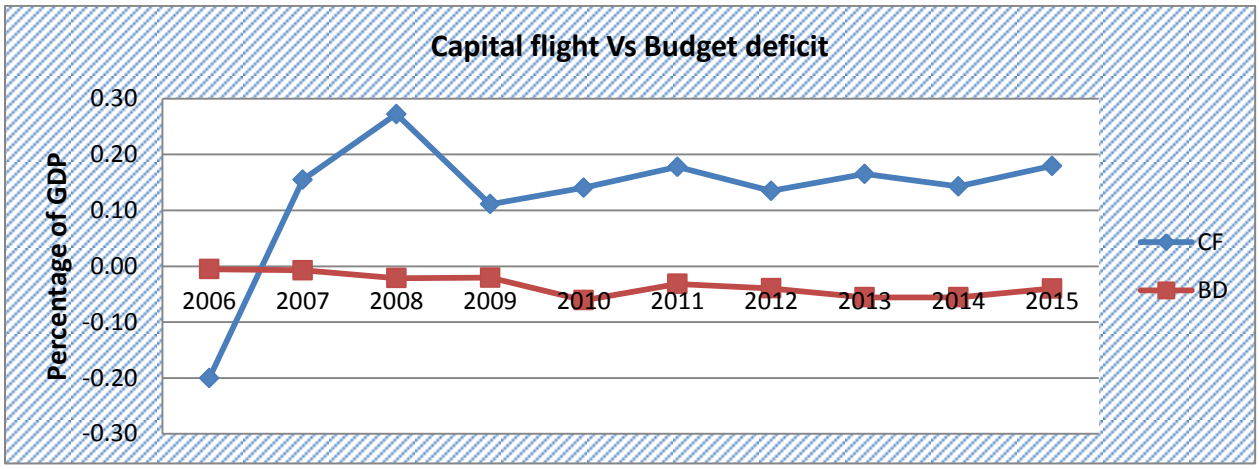
Figure 4.1.2AB: Relationship between Capital Flight and some Macroeconomic Variables

Panel: A



Source: Author computation from data IMF, WDI

Panel: B

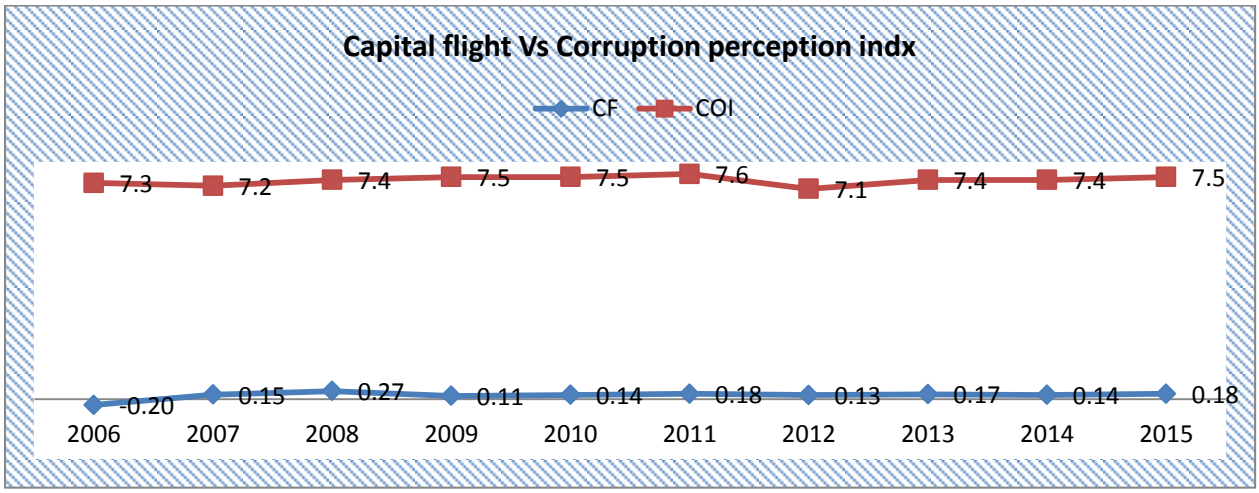


Source: Author computation from data IMF, WDI

Panel B depicts increasing trend in budget deficit. From theoretical perspectives increasing capital flight expected but, capital flight moves in predictable manner from year to year except for the years 2006-2008. For these years a positive relationship exists consistent to the theory.

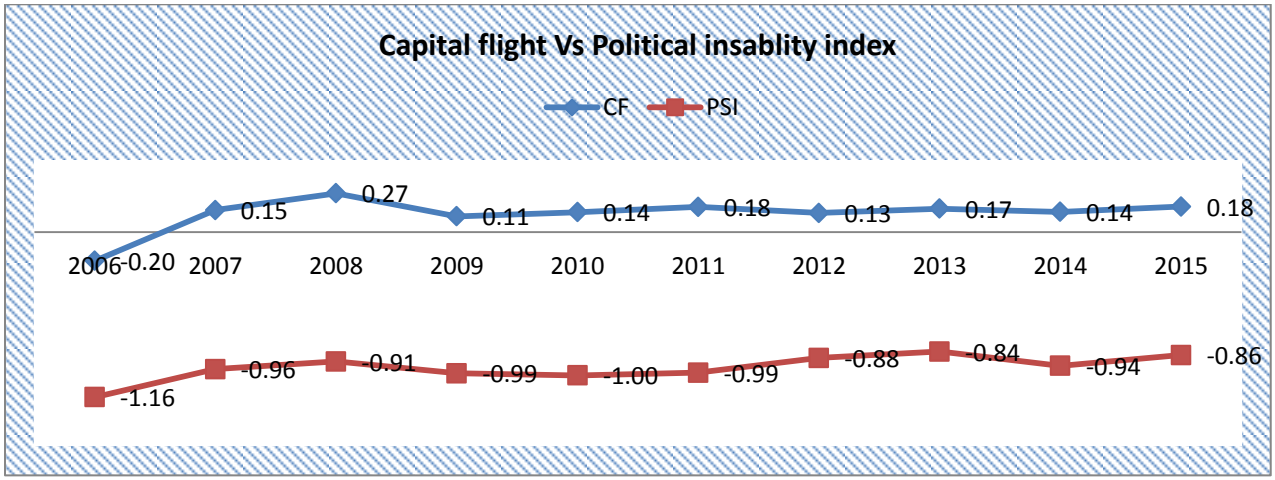
Figure 4.1.2AC: Relationship between Capital Flight and Political Variables

Panel: A



Source: Author computation from data IMF, WDI

Panel: B



Source: Author computation from data IMF, WDI

Capital flight Versus Political variables

The above Figure reminds, like most Eastern African countries there is higher corruption perception index in Uganda. Capital flight is moving upward trends except for the years 2009 and 2013, it seems both variables have relationships in the same direction implying that one variable induces the other variable and this relationship is depicted by Panel A. The trend comparison between the level of political instability and capital flight in Panel B shows the higher political instability which could be associated with increasing capital flight for some years.

4.2. Pre diagnostic tests

Before embarking on estimating the regression it is important testing the stationarity of the variables. The Levin–Lin–Chu (2002), Breitung (2000; Breitung and Das 2005), and Im–Pesaran–Shin tests have as the null hypothesis that all the panels contain a unit root. Whereas The Hadri (2000) Lagrange multiplier (LM) test has as the null hypothesis that all the panels are (trend) stationary. Stationarity tests have been conducted using the above four different alternatives ways. The results of the tests indicated that, most of the variables are stationary after first difference. See Appendix D-1.

4.3. Econometrics result and analysis

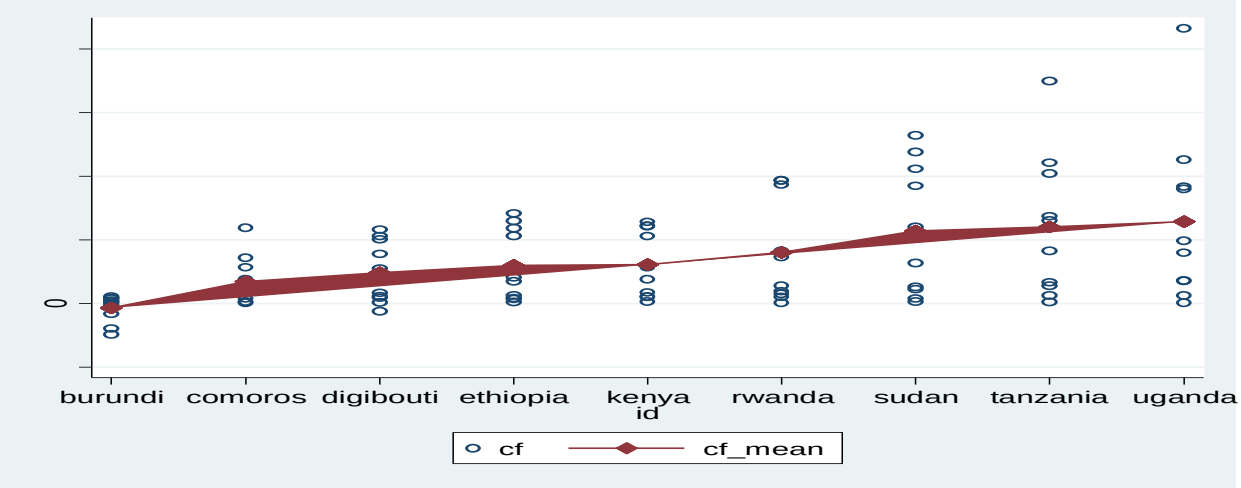
The paper uses two ways of interpreting econometric results. First it provides descriptive interpretation, stating how the dependent variables differ across time and among cross sections. The other is causal interpretation which discusses the causes of a unit percentage change in independent variables on the dependent variable.

4.3.1. Descriptive interpretation

The heterogeneity of capital flight across Eastern African Countries shows the distribution of capital flight around the mean. The first panel of Figure 4.3.1A shows the capital flight gets variability in reference to the mean values. With these respect, Burundi has the lowest variation of capital flight which is closer to the mean, whereas, Uganda has shown the highest variation around the mean.

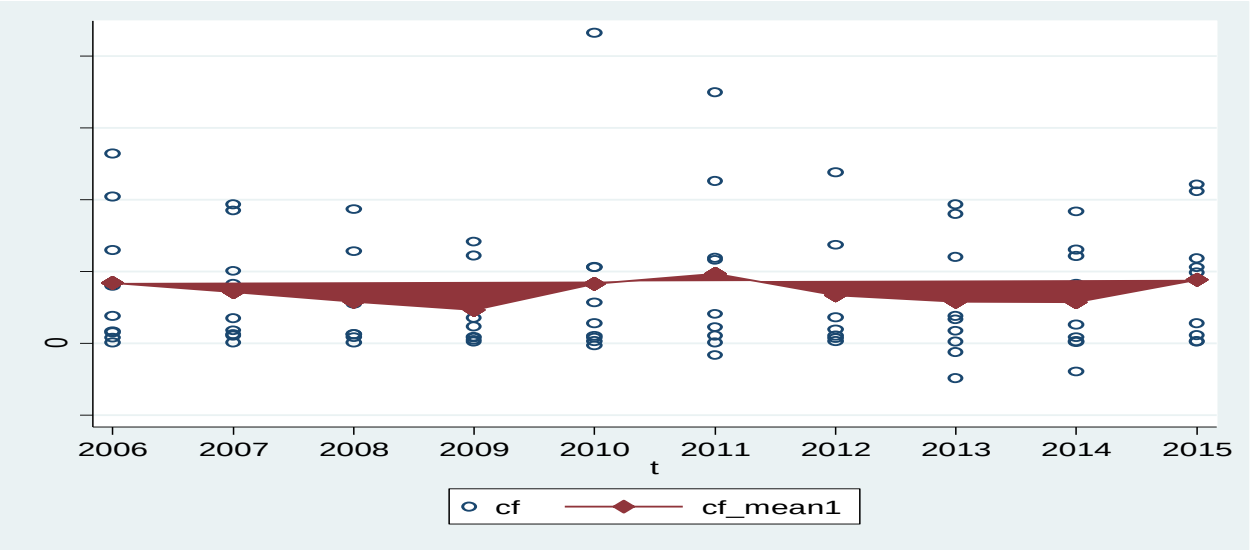
The next panel, Figure 4.3.1B shows the heterogeneity of capital flight across the study years 2006-2015 demonstrating that there is high variance in the distribution of capital flight against the mean for the entire study year.

Figure 4.3.1A: Heterogeneity across countries



Source: Authors computation using STATA Based on data from IMF and WDI

Figure 4.3.1B: Heterogeneity across years



Source: Authors computation using STATA Based on data from IMF and WDI

On the other hand Appendix: D-2 shows a descriptive statistics of central tendency and measure of variability. The standard deviation points out how the data over the study years was distributed around the average value. For capital flight, debt stock and budget deficit, most of the variation comes from within the cross section while for exchange rate, credit availability for private sector, political stability, economic growth and corruption status emanates from between cross sections.

4.3.2. Causal interpretations

4.3.2.1. Fixed effect model of capital flight

Fixed effects model delivers consistent estimates of the countries specific technical efficiency by considering heterogeneity among countries. The fixed effect is assumed to capture all phenomena that vary across countries but these are time invariant for each country.

The regression result in Table 4.3.2.1 shows the percentage of variations in the dependent variable capital flight explained by the independent variables, this is shown by the overall R^2 which is 5 percent. R2 for the within and between effect model is the same 18 percent. Therefore, both individual country specific effect and time effects are equally important in explaining capital flight in the Eastern African countries. The corr (u-i, xb) = -0.9805 affirms the existence of correlations between error terms and explanatory variables in the fixed effects model. The F- test with the probability is less than five percent implying that the model is good and all explanatory variables are jointly statistically significant at 5 percent level of significance and adequate enough to explain change in capital flight.

Table 4.3.2.1: Regression Result of Within Effect Method

Fixed-effects (within) regression	Number of obs = 90
Group variable: id	Number of groups = 9
R-sq: within = 0.1854	Obs per group: min = 10
between = 0.1870	avg = 10.0
overall = 0.0503	max = 10
corr(u_i, Xb) = -0.9805	F(8,73) = 2.08
	Prob > F = 0.0490

lcf	Coef.	Std. Err.	t	P > | t |	[95% Conf.	Interval]
lexr	4.626725	4.26234	1.09	0.281	-3.868107	13.12156
ldebt	1.030068	0.3110632	3.31	0.001	0.4101198	1.650016
lcra	-0.8083858	2.950395	-0.27	0.785	-6.688515	5.071743
lgdp	-5.451212	2.891296	-1.89	0.063	-11.21356	0.3111335
lbd	0.0406308	0.0442634	0.92	0.362	-0.047586	0.1288476
psi	-1.748664	2.175059	-0.80	0.424	-6.08355	2.586223
pfii	0.8595371	2.497796	0.34	0.732	-4.118563	5.837637
coi	-1.52934	1.430281	-1.07	0.288	-4.379885	1.321206
_cons	112.4025	51.15009	2.20	0.031	10.46055	214.3445
sigma_u	18.194436					
sigma_e	4.0450045					
rho |	.95290132 (fraction of variance due to u_i)					

Source: STATA output using data from WDI and IMF

Appendix D-8.1 has shown that, we accept the null which states that dummies for all years are jointly equal to zero. Therefore, Time fixed effect is not considered in our case and there is no temporal variation that occurred as a result of the set of explanatory variables.

4.3.2.2. Random effect model of capital flight

The Random effect model provides simultaneously the overtime and across countries information, and considered to be more efficient. Therefore, we could have coefficients that can be used to predict changes over time and explain countries difference, including both within individual effects and between individual effects.

The Wald chi2=58.17 with a probability of zero indicate that all explanatory variables are able to jointly and statistically explain the dependent variable capital flight We can also understand that the R2 for within, between, and overall effect model is 13 percent, 93 percent, and 41 percent, respectively. As R2 for the between effect is highest, it tells that the time effect is more important than individual effect, Controlling the effect of heterogeneity and autocorrelation, the rho shows that zero percent of variance is due to difference across panels, heterogeneity effect.

Table 4.3.2.2: Regression Result of Random-effects GLS regression

Random-effects GLS regression	Number of obs = 90
Group variable: id	Number of groups = 9
R-sq: within = 0.1327	avg = 10.0
between = 0.9327	max = 10
overall = 0.4180	Wald chi2(8) = 58.17
corr(u_i, X) = 0 (assumed) theta = 0	
	Prob > chi2 = 0.0000

lcf	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lexr	-2.391875	0.4962135	-4.82	0.000	-3.364435	-1.419314
ldebt	1.137022	0.3024475	3.76	0.000	.544236	1.729809
lcra	-5.632163	1.603012	-3.51	0.000	-8.774008	-2.490318
lgdp	-0.9533975	0.591055	-1.61	0.107	-2.111844	0.205049
lbd	0.044023	0.0360408	-1.22	0.222	-0.0266157	0 .1146618
psi	1.128443	1.153522	0.98	0.328	-1.13242	3.389305
pfii	4.224762	1.091034	3.87	0.000	2.086374	6.363149
coi	0.096677	0.7443201	0.13	0.897	-1.362164	1.555517
_cons	56.38266	20.58219	2.74	0.006	16.0423	96.72302

sigma_u	0
sigma_e	4.0450045
rho 0	(fraction of variance due to u_i)

Source: STATA output using data from WDI and IMF

The fixed effects approach has a substantial advantage over the random effect approach. This is because in fixed effect approach there is little justification for treating the individual effects as uncorrelated with the other regressors, as is assumed in the random effects model Green (2002).

The random effects treatment, therefore, may suffer from the inconsistency due to this correlation between the included variables and the random effect [Ibid].

Hausman's essential result is that the covariance of an efficient estimator with its difference from an inefficient estimator is zero [Ibid.], which implies that the null hypothesis states that fixed effects and random effects coefficients are significantly the same. If we could reject the null then we take the fixed effect as our model [Ibid.]. This is because if the two estimates differ systematically we pick the fixed effect as the random effect could suffer from inconsistency.

The test checks the more efficient model as a null hypothesis against the less efficient model as the alternative hypothesis. With this regard as it is shown in the appendix A-1 we found that the prob. > chi2 is larger than 0.10, so that we cannot reject the null hypothesis. Therefore, we accept the null hypothesis which states that fixed effects and random effects coefficients are significantly the same so that we can pick the efficient one the Random effect.

Further, Breusch and Pagan Lagrangian multiplier test is made for random effect model to decide whether a random effects regression or a pooled OLS regression is appropriate for our data. The null hypothesis states that variances across countries are zero. From the test in Appendix: D-7 it is evident that the P-value is large so that we cannot reject the null hypothesis and therefore, we conclude that there is no significant difference across countries. If the test confirms the absence of panel effect then pooled OLS regression could be an option.

Before proceeding to the analysis and interpretation of the output, it is preferable to make some post diagnostic test with the given data. The Breusch-Pagan Lagrange multiplier shows that we accept the null hypothesis and suggest that random effect model is not suitable for our cases, reflecting the nonexistence of significant difference across countries. With respect to the time

dimensions we can diagnosis whether the coefficients at all times are jointly significant or not. The null hypothesis states that time fixed effects are not important if the dummies for all years are jointly equal to zero. The probability of F-test value in Appendix D-1 is 0.2533; thus we cannot reject the null hypothesis therefore implying that time fixed effect is not important to our analysis.

Most macro panel data faces cross-sectional dependence. Conventional panel estimators such as fixed or random effects can result in misleading inference and even inconsistent estimators, depending on the extent of cross-sectional dependence and on whether the source generating the cross-sectional dependence is leading to a bias in test results (Phillips and Sul, 2003). Correlation across units in panels could have serious problems for the reason that most of the panel unit root tests assume independence across units. Therefore, there would be significant size distortions, whenever the test is applied to cross-sectional dependent panels. Following from the Breusch and Pagan Lagrangian multiplier test of independence which is found in Appendix D-7, we can reject the null hypothesis that states residuals across countries are not correlated implying, there is cross-sectional dependence. This is affirmed by the Pasaran CD (cross-sectional dependence) test with a small P-value rejecting the null hypothesis that residuals are not correlated.

Pooled OLS regression provides consistent estimation if it is assumed no contemporaneous correlation of the errors and explanatory variables. But from the Pesarn test of cross sectional independence, existence of cross sectional dependence is affirmed. Erroneously ignoring cross-sectional correlation in the estimation of panel models can lead to severely biased statistical results. Therefore, we should compute robust standard errors correcting for the possible presence of heteroscedasticity.

The test revealed that pooled OLS is an option for our estimation. Accordingly Table 4.3.2.3 shows that capital flight from Eastern African countries are well explained by the model. The Wald statistics with the probability zero confirms that capital flight is jointly explained by the independent variables.

Table 4.3.2.3: Regression Result of Linear regression, correlated panels corrected standard errors (PCSEs)

Linear regression, correlated panels corrected standard errors (PCSEs)	Number of obs = 90
Group variable: id	Number of groups = 9
Time variable: t	Obs per group: min = 10.0
Panels: correlated (balanced)	Avg =10
Autocorrelation: No autocorrelation	Max =10
Estimated covariance: 45	R-squared = 0.4180
Estimated autocorrelations: 0	Wald chi2(8) = 38.00
Estimated coefficients: 9	Prob > chi2 = 0.0000

lcf	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
lexr	-2.391875	0.7189987	-3.33	0.001	-3.801086	-0.982663
ldebt	1.137022	0. 2399329	4.74	0.000	0.6667625	1.607282
lcra	-5.632163	1.712691	-3.29	0.001	-8.988977	-2.27535
lgdp	-0.9533975	0.3850372	-2.48	0.013	-1.708056	-0.1987385
lbd	0.044023	.0230824	1.91	0.056	-0.0012177	0 .0892638
psi	1.128443	1.125235	1.00	0.316	-1.076977	3.333863
pfii	4.224762	1.330265	3.18	0.001	1.61749	6.832034
coi	0.096677	0.498786	0.19	0.846	-0.8809257	1.07428
_cons	56.38266	17.94347	3.14	0.002	21.2141	91.55122

Source: STATA output using data from WDI and IMF

Political factors

The political variable, absence of political freedom and good institutional quality which is represented by the aggregate index of freedom of voice and accountability, rule of law and state regulatory quality has positive and significant effect on capital flight for Eastern African countries at 1% level of significance. While, political stability and absence of violence is not

statistically significant to explain capital flight for eastern African countries implying meaningfully that, far more than the effect of the existence of political instability and the burst of violence on the capital flight, inexistence of political freedom and good institutions positively and significantly affect capital flight. Therefore, the inexistence of good perceptions and confidence on the rules of the law, the state enforcement ability of contracts, property rights, the police, and the courts are the prime determinants of capital flights.

Corruption has also shown statistically insignificant effect on capital flight for Eastern African countries. This may be due to the nature of the data we have. Though there is high level of corruption for eastern African countries as Transparency international corruption perception index (2016) indicated, the corruption indexes exhibited similar values with smaller magnitude. Therefore, the existence of smaller or no change among corruption indexes may contribute for the existed inconsistency with the theory. The result is consistent to the finding forwarded by Eshete (2014). But, on his analysis the author found a positive relationship while taking the intensity of corruption. Therefore, he conclude that high level of corruption causes capital flight but in our paper due to the revealed level of high corruption index and difficulties in disaggregating the index the same arguments were not followed in this paper.

Economic factors

As against our expectation, we have a negative and 1% significant level effects of exchange rate on capital flight in the case of Eastern Africa countries. This could have embedded explanation as literature indicates the result has shown negative relationship implying devaluing the exchange rate have positive effect on countries Balance of Payment by improving export performance. As Imoisi [2012] forwarded, increase in exports by depreciating exchange rate

provided adequate foreign exchange for the country and improved the balance of payments. In the formulation of capital flight in this paper the World Bank (1985) residual method incorporate the current account which is a constituent of Balance of Payment account as part of uses of funds to be deducted from the source of funds. Therefore, if current account improved due to export performance which is triggered by the exchange rate devaluation then it amounts to reduction on the capital flight for the fact that capital flight to be occurred due to mismatch between the source of funds and uses of funds. Therefore, increase in exchange rate can negatively affect capital flight by directly minimizing the residuals

Debt also has a positive relationship with capital flight for eastern African countries. Keeping all other things as it is, a 1% increase in debt stock fueled capital flight on the average by 1.14%. The relation is consistent to the theory as it is indicated in the works of [Boyce, (1992), Ajayi, (1995 and 1997), (Ndikumana and Boyce, 2003) and (Ndikumana et al, 2015)].

GDP growth has negative effect on capital flight at 5% level of significance in the Eastern African countries. A 1% change in economic growth is associated with a 0.95% change in capital flight. The result shows that economic growth is an important factor to explain capital flight by curbing the intensity of capital flight and creating good opportunities and hope in the booming economy. Credit availability for private sector has negative effect on capital flight at 1% significance level. The result shows that a unit percentage increments on the availability of credit for private sector causes capital flight fall by 5.6% on the average. This implied that providing credit facilities for the private sector in Eastern African countries would encourage the domestic investors to do business in their own countries. Apart from these macroeconomic factors, budget deficit related positively with capital flight in the region with a 10% significance level. A 1% increase in budget deficit causes on the average a 0.044% increase in capital flight. This is an

important variable to explain the capital flight as it is a fueling factor of capital flight for the fact that if there is huge budget deficit it is expected that the government finance it with the higher taxation in the future.

Chapter Five

Conclusions and Policy Implications

5.1. Conclusion

The main purpose of this paper is to analyze the determinants of capital flight from east African countries. To that effect, the political and economic variables are used. The study used panel data model to determine whether there exist relationships between these variables and capital flight. The capital flight was estimated using the residual method of World Bank (1985) adjusted for exchange rate fluctuation and trade faking.

To formulate the magnitude of capital flight secondary data from World Development Indicators and IMF data for the years 2006 – 2015 has been employed. The average annual capital flight estimated for Eastern African countries amount to 24.8 billion US dollar in real values for the study years. Excluding Djibouti as an outlier whose capital flight on average accounts 73% of GDP, all Eastern African countries included in this study exhibit an annual average capital flight equivalent to 14% of their GDP. Implying that, for each dollar of GDP, Eastern Africa residents accumulated $0.14 dollar of external asset annually in foreign countries over the study years.

Pairwise comparison between dependent variable and selected independent variables were made for individual countries overtime. In the nexus analysis most independent variables preemptively projected to have relationships with the dependent variable consistent to the theory. These relationships are affirmed by empirical investigation with acceptable significance level except for corruption and political stability which exhibited a relationship with no statistical significance level.

Hausman test was used to choose the appropriate model for the study. With this respect the test confirms that the null hypothesis which states that fixed effects and random effects coefficients are significantly the same accepted. Therefore, we can pick the efficient one the Random effect model.

Breusch and Pagan Lagrangian multiplier test is made for random effect model to decide whether a random effects regression or a pooled OLS regression is appropriate for the data. The test result in accepting the null hypothesis states that variances across countries are zero confirming there is no panel effect for Eastern Africa countries therefore, pooled OLS regression used. Pooled OLS regression provides consistent estimation with the assumption of no contemporaneous correlation of the errors and explanatory variables. Contrary to this, Pesarn test affirmed the existence of cross sectional dependence. In order to avoid the problem of heteroscedasticity robust standard errors correcting model was used.

The linear regression panel corrected standard errors model has shown that Absence of political freedom and good institutional quality which is characterized by the aggregate index of freedom of voice and accountability, rule of law and state regulatory quality has positive effect on capital flight.

The macroeconomic environment has also affected capital flight. To begin, GDP growth has negative effect on capital flight cutting the amount of capital flight by providing conducive investment opportunities in the growing economy. Next, credit availability for private sector has shown a negative effect on capital flight by encouraging the domestic investors to do business at their own respected countries. Then, debt has a positive relationship with capital flight implying foreign borrowing provides resources as well as a motive for corrupt officials to divert borrowed

fund abroad. Finally, budget deficit affects capital flight positively by in intensifying the fear of expected rise in future taxation in financing the budget deficit.

The exchange rate on the other hand, has shown a negative effect on capital flight against the positive impact expected; the result has shown negative relationship implying devaluing the exchange rate have positive effect on countries Balance of Payment by augmenting export performance. If export performance improved then the value of current account become betters then the residual decline. Therefore, increase in exchange rate can negatively affect capital flight by directly minimizing the residuals whose values represent the capital flight.

5.2. Policy Implications

From the study, the following policy implications could be drawn at least for Eastern Africa countries so as to restrain the rapidly rising outflow of capital. First, the negative ramification of economic growth rate on capital flight entails that government of member countries should pay attention to work on removing barriers and accelerating the growth rate of the economy in order to curb the intensity of capital flight. Secondly, the negative relationship between credit availability for private sector and capital flight is paramount providing an opportunity increasing the domestic investment and encouraging effect to do business at home. On the third place, budget deficit is related positively with capital flight implying that government should focus on minimizing its budget deficit by widening the tax base while maintaining or reducing the tax rate so as to give confidence on the part of the private sector so that there will not be an increase in future period taxation. Then, the governments of eastern African countries may reconsider the devaluation option for the exchange rate given the Marshall-Lerner condition prevailed in their respected countries. Finally the positive relationship for lack of political freedom and good

institutions with capital flight urges governments of Eastern African countries establishing constructive institutions enhancing political freedom and ensuring political and civil liberties of citizens in order to minimize the unprecedented current level of capital flight.

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APPENDICES

Authors	Title	Tme	Dependent Variable	Independent Variable	Methodology	Findings	Data Source	
Leonce Ndikumana and Mare Sarr (2016)	Capital Flight and Foreign direct investment in Africa	1970-2013 sample of 32 Africaan Countries	Capital Flight	Foreign Direct Investment	The analysis uses Dynamic Panel data econometrics eestimation techniques	• There is no robust evidence that capital flight is fueled by annual FDI inflows. • Natural resource endowment is directly related positively to capital flight. • High-quality institutions somehow weaken the link between FDI and capital flight.	.UNCTAD World Development Indicators and World Bank's International Debt Statistics.	APENDEX A
Léonce Ndikumana, James K. Boyce and Ameth Saloum Ndiaye(2014)	Capital Flight: Measurement and Drivers	1970-2010 sample of 39 Africaan Countries	Capital Flight	macroeconomic environment, governance, risk and returns to investment,capital account openness, and financial development	GMM and Fixed effect model	capital flight is habit-forming and economic growth may serve as a deterrent to capital flight endowment in oil in the context of autocratic governance appears to make a country more prone to capital flight	IMF's BoP, DOTS, and IFS; and the World Bank's WDI and GDF.	Determinants of capital flight - selected emperical findigs
Maria E. de Boyrie,(2010)	Determinants of capital flight and capital movement through trade mispricing the African case	1990-2005 sample of 48 African countries	Capital Flight	NFDI,ED,Aid,Inflation Differential,Change in Inflation,GDP Growth Differential ,Risk and Return andF inancial Development Variables	Granger causality	economic blocs seem to have smaller amounts of capital flight than economic regions. variables that explain capital flight do not always explain capital movement and vice versa.	WDI and 2007 IMF's International Financial Statistics, Trade Mispricing from Dr. Simon J. Pak	
Abdilahi Ali (2012)	Essays on Capital Flows, Crises and Economic Performance	1980-2007 sample of 37 SSA countries	Capital .ight (% GDP)	Investment Inflation Financial depth Real per capita income Institutional quality Trade openness Government size	dynamic panel techniques, PVAR	FDI and remittances have a positive effect on domestic investment. With panel Granger causality analysis and effect of FDI on investment it crowd-in domestic investment. Remittances do not have causal effects on investment. And there is a bidirectional relationship between the two.	The current account decit and external debt and reserves from Global Development Finance database	

Authors	Title	Tme	Dependent Variable	Independent Variable	Methodology	Findings	Data Source	
Leonce Ndikumaana and James K. Boyce (2003)	Public Debts and Private Assets: Explaining Capital Flight from Sub-Saharan African Countries	1970-1996 sample of 30 sub-Saharan African countries	Capital Flight	Finflation, fiscal policy indicators, the interest rate differential, exchange rate appreciation, financial development, and indicators of the political envt and governance.	The analysis uses Panel data econometrics eestimation techniques	once capital flight begins, it tends to persist and it is negatively related to the growth rate differential between the African country and its OECD trade partners	World Bank 2000 a,b,c Easterly and Yu (2000) and Freedom House (2001), Political Risk Services (2000)	**APENDEX A**
Lensink, Bernardus; Hermes, Cornelis; Murinde, Victor (1998)	Capital flight and political risk	1971-1991 period all developing countries	Capital Flight	INSTAB and WAR,using CIVIL, RIGHTS, DEMOC and PARCOM	use a procedure that follows the so-called Barro tradition,	political risk variables do have a statistically robust relationship to capital flight once domestic and international macroeconomic circumstances are added	World Bank data set (the 1993-94 version), Polity III code book	**Determinants of capital flight - selected emperical findigs**
Keejae P. Hong and Simon J. Pak,(2016)	Estimating Trade Misinvoicing from Bilateral Trade Statistics: The Devil Is in The Details	2000-2014, 26 advanced economies compare with their trading partner	Capital Flight		trade mispricing	the validity of trade misinvoicing estimated in the existing literature using bilateral trade statistics	IMF's DOTS and COMTRADE data	
James K. Boyce and Léonce Ndikumana (2001)	Is Africa a Net Creditor? New Estimates of Capital Flight from Severely Indebted Sub-Saharan African Countries,	1970-1996, 25 low-income sub-Saharan African countries		Indebtedness	panel data analysis	many sub-Saharan African countries are net creditors vis-à-vis the rest of the world. For their private external assets, as measured by cumulative capital flight, are greater than their public external debts	World Bank's World Debt Tables, Global Development Finance 2000, IMF, Balance of Payments Statistics Yearbook	

Authors	Title	Tme	Dependent Variable	Independent Variable	Methodology	Findings	Data Source	
Liliana Rojas-Suarez (1990)	Risk and Capital Flight in Developing Countries	1977-88 for group of developing countries	Capital Flight	variables Inflation rate, Real GDP growth, fiscal deficits, Real effective exchange rate, ratio to foreign debt	regression analysis	The risks of large capital losses on the domestic assets of developing countries resulting from expropriation, inflation, or devaluations are identified as the major causes of capital flight	World Bank World Debt TablesIMF, Balance of Payments, and Fund staff estimates	**APENDEX A**
Victor A.B. Davies (2010)	Capital Flight and violent conflict		Capital Flight	variables capturing violent conflict and political instability	empirical literature	violent conflict and political instability are associated with increased capital flight	Davies (2008) dataset., and other litratures	**Determinants of capital flight - selected emperical findigs**
Elizabeth Asiedu, (2012)	The Paradox of Capital Flight from a Capital-Starved Continent	1970-2008, 33 countries in SSA	Capital Flight	FDI, and foreign aid	panel data analysis	FDI and aid are volatile,effect of foreign aid on economic growth is ambiguous and relying on FDI to fill the finance gap is unrealistic	WDI, Data series prepared for Ndikumana and Boyce 2011,	
S. Ibi Ajayi (1995)	Capital flight and external debt in Nigeria	1970-88 time series dat from nigeria	Capital Flight	external debt macroeconomic fects of capital flight. exchange rate misalignment,fiscal deficit	time series	domestic policy distortions can lead to capital flight,	World Bank, World Debt Tables 1989-1990 IMF (1990) IFS Statistics Yearbook	

Authors	Title	Tme	Dependent Variable	Independent Variable	Methodology	Findings	Data Source	
John T. Cuddington (1986)	Capital Flight: Estimates, Issues, and Explanations	1974-82 eight heavily indebted developing countries	Capital Flight	indebtedness, real exchange rate, inflation rates, Political or financial crises	econometric techniques	None of the regression equations attached a significant coefficient to the black-market premium and capital flight did depend importantly on the existence of capital controls, Overvaluation of the is a major contributor capital flight	indebtedness is obtained from Dooley et al. (1986). and Balance of Payments Yearbook data	**APENDEX A**
Douglass C. North 1991	Institutions		institution	institutional framework that has produced erratic economic growth	essays	innovations and institutional instruments evolved from economic forces: the economies of scale due to growing volume of trade, and the development of improved mechanisms to enforce contracts at lower costs	various litrature	**Determinants of capital flight - selected emperical findigs**
Kingsley Osei Domfeh (2015)	Capital flight and institutional governance in sub-saharan Africa: The role of coruption	2000-2012 32 countries in SSA	Capital Flight	coruption, rule of law, regime durablity, independence of the excutives, use of imf ceadit, inflation, GDP	pooled-OLS ,Static panel model of fixed effects and Generalised Method of Moments	corruption has a positive effect on capital flight,positive coefficient between corruption and regime durability indicating that regime durability is an important institutional variable that play a critical role in explaining the effect of corruption on capital flight in SSA. but, interaction between corruption and the rule of	Ndikumana and Boyce (2012), and data from: IMF, IMF, Bo, IMF, Direction of Trade WB GDF	
Zerayehu Sime Eshete (2004)	The Political Economy of Capital Flight: Governance Quality and Capital Flight in East Africa Community	1996- 2010 The East African Community (EAC)	Capital Flight	GDP, FDI,Ex.r,Corruption,Intensity of Corruption, Govt Effectiveness, Fiscal Deficit, Political Instability, State Fragility	panel data modelling	+vly related with CF. An aggregate index of poor regulatory quality and government ineffectiveness, state fragile index, and the political instability and +vly influence CF. perceived corruption level does not +vly related to CF, but an intensive corruption level +vly influences CF.	James K. Boyce and Leonce Ndikumana, Updated estimates, 1970-2010, WB WDI (2011) and IMF, WGI	

Authors	Title	Tme	Dependent Variable	Independent Variable	Methodology	Findings	Data Source	
Lusina .T. Garai_Murinda (2009)	An analysis of the determinants of capital flight in Zimbabwe 1987-2005	1987-2005 time series data	Capital Flight	exchange rate, inflation, foreign debt, interest rate, and real gross domestic product.	using econometric software package SPSS	foreign debt and interest rate are determinants of capital flight in zimbabwe	reserve bank of zimbabwe's monthely review, Zimbaabwe central statistics office and IMF publication.	**APENDEX A**
Nieles Hermes and Robert Lensink	capital flight and the uncertainity of government policy	1971-1991 all LDC countries	Capital Flight	inflation rate, overvalued exchange rate, high budget deficit, bank leanding, political varables likw instablity & civil librity	econometric analysis	policy uncertainty, measured by the uncertainty of budget deficits, tax payments, government consumption and the inflation rate, has a statistically significant positive impact on capital flight	World Bank, World development indicator Barro-Lee data set	**Determinants of capital flight - selected emperical findigs**
Auzairy et al (2016)	Dynamic relationships of capital flight and macroeconomic fundamentals in Malaysia	1992 to 2012 maleysia	Capital Flight	exchange rates, consumer price index, gross domestic products and interest rates	co-integration and vector auto-regression	macroeconomic fundamentals and capital flight are associated in the long run.In terms of short-run dynamics and interactions between capital flight and macroeconomic fundamentals, variations in capital flight are predominantly attributed to its own variations and exchange rate variations	Department of Statistic Malaysia and World Bank	
Arcade Ndoricimpa	Analysis of Capital Flight from Burundi	1970-2013 burundi	Capital Flight	external debt, external aid, Inflation Rate, ratio of money balances (M2), the ratio of credit to private sector (CPS) and the governance indicator (GOVERN)	method of robust least squares	embezzlement of public funds can feed capital flight, the main causes of capital flight from Burundi are external debt, political instability and wars, and exports. The findings confirm the phenomenon of debt-fuelled capital flight for Burundi	Boyce and Ndikumana (2012) data set, WDI, 2013)	

In absolute value

Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Burundi	167130000	50473000	17756000	56623600	16137300	204407000	172921000	116982400	123382900	120625900
Comoros	29018100	31843500	43012400	46688700	57368100	65636100	74541000	70587200	72518100	76457900
Djibouti	231245000	279388000	366387000	403064000	486522000	581091000	642659000	643693000	677817000	781068000
Ethiopia	1628526000	1834450000	2409640000	2464760000	3302290000	4127110000	4883290000	5716690000	6695060000	7501150000
Kenya	-294850000	-503570000	158840000	254000000	-493620000	37190000	-751670000	-363520000	-1872330000	2300950000
Rwanda	119056000	137291000	67834000	86191000	88511000	121546000	133924000	135936000	148186000	145635000
Sudan	-6389910000	1838040000	2271020000	2071400000	762800000	5613980000	3957370000	1874920000	2340920000	1514150000
Tanzania	356300000	751960000	1123730000	858430000	1081730000	1404440000	1554650000	1853190000	1953070000	1761850000
Uganda	585527000	947370000	1152830000	362700000	417460000	547550000	540950000	549490000	559510000	556650000

As a percentage of GDP

Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Burundi	0.131269672	0.037219828	0.011017388	0.032546386	0.007961706	0.086772999	0.069940971	0.043095287	0.039882666	0.03894519
Comoros	0.071453464	0.068857721	0.082220476	0.08907384	0.108141034	0.111953166	0.130575315	0.114096196	0.111958903	0.135158712
Djibouti	0.300758115	0.329498482	0.366715086	0.384195877	0.43108006	0.468945308	0.474766076	0.442400687	0.426836902	0.452268674
Ethiopia	0.106572916	0.0930833	0.089025299	0.075985154	0.110319808	0.129162852	0.112750142	0.119977012	0.120388271	0.121891211
Kenya	-0.011416999	-0.015757148	0.00442511	0.006860876	-0.012340605	0.000886459	-0.01491108	-0.006597366	-0.030496251	0.036293708
Rwanda	0.038277635	0.036364164	0.014142179	0.016234913	0.0155322	0.018971621	0.018549911	0.018071775	0.018728889	0.017988557
Sudan	-0.178377453	0.040045362	0.041649779	0.038972565	0.011622006	0.083383425	0.058089297	0.026016729	0.028495128	0.015584711
Tanzania	0.019145147	0.034972051	0.041059417	0.030042581	0.034441325	0.041455039	0.039773332	0.041801162	0.040522463	0.038613142
Uganda	0.058890746	0.077066978	0.080962697	0.019971685	0.020680159	0.026747465	0.023013083	0.021986483	0.02015467	0.020220311

Total capital flight as percentage of GDP

In absolute value

Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Burundi	364383632	146565179	161108425	-617301244	331619165	519215967	485845544	377180698	612894243.8	640135121.3
Comoros	50478210.1	41130537.52	108566776	72784229.6	107450811	133690612	67639067.6	149123465.7	127404055.3	38246525.89
Djibouti	407740074	878622258.8	805837535	556208769	390303579	842454466	955620122	1105077843	1383572687	1768531098
Ethiopia	211961971	2825143357	5011608078	6488050667	5900301039	6075680079	9686101572	11920693721	17483315975	21612100052
Kenya	-155710785	1156560447	2733961792	1729246250	1890156984	5265951335	4127230386	5995088278	6854733450	11286926736
Rwanda	-824515107	374338676.7	433160967	613225565	522574870	766424641	1375354931	1282265968	1653077506	1796414493
Sudan	529542971	5954885636	5284153326	7047498734	6395413703	9689474149	1.3151E+10	10569084058	6510502126	8992723571
Tanzania	-2.423E+09	3603326663	5791077839	5297934785	6111723693	9331217113	9240678005	10202235420	11030625768	9172930602
Uganda	-1.994E+09	1902665445	3876694363	2015447200	2834750529	3638701455	3165495603	4127130822	3960956335	4935703462

As a percentage of GDP

Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Burundi	0.28619949	0.108080176	0.09996587	-0.35481539	0.16361191	0.22041284	0.19650886	0.138950052	0.198113812	0.206673557
Comoros	0.12429632	0.088939818	0.20753113	0.13885953	0.20254884	0.22803133	0.11848503	0.241041154	0.196695974	0.067610426
Djibouti	0.53030827	1.036210218	0.80655913	0.53017167	0.34582627	0.67986782	0.70596695	0.759503672	0.871267435	1.024048117
Ethiopia	0.01387107	0.143352867	0.18515625	0.20001766	0.19711172	0.19014569	0.22364212	0.250181349	0.314378987	0.351189491
Kenya	-0.0060293	0.036189792	0.07616521	0.04670923	0.04725433	0.12551896	0.08187298	0.108802239	0.111648946	0.178032735
Rwanda	-0.2650894	0.099150804	0.09030633	0.115507	0.09170315	0.11962811	0.19050142	0.170468614	0.208928682	0.22188969
Sudan	0.01478245	0.129739042	0.09690968	0.13259588	0.0974404	0.143916	0.19304706	0.146658519	0.079249863	0.092559518
Tanzania	-0.1301736	0.167583013	0.21159734	0.18541248	0.19459187	0.27543076	0.23640855	0.230124973	0.228864365	0.201036225
Uganda	-0.2005468	0.154778678	0.27225838	0.11097843	0.14042804	0.17774822	0.13466645	0.16513693	0.142681574	0.179289429

Appendix C Data on Dependent and Independent variables

	Burundi											
		Independent Variables										
	CF	INF	EXR	IR	DEBT	FDI	CRA	GDP	COI	PSI	PFII	BD
2006	0.29	18.176	1028.684	13.834	1.078	0.000	15.833	5.385	7.6	-1.39	-0.970	-0.010
2007	0.11	7.938	1081.870	9.300	1.040	0.000	14.776	4.786	7.5	-1.31	-1.020	-0.028
2008	0.10	4.417	1185.691	-6.025	0.863	0.002	13.665	5.048	8.1	-1.63	-0.994	-0.037
2009	-0.35	5.553	1230.179	5.384	0.349	0.000	14.981	3.468	8.2	-1.27	-1.007	-0.077
2010	0.16	6.341	1230.748	0.104	0.306	0.000	16.871	3.786	8.2	-1.59	-1.080	-0.060
2011	0.22	9.377	1261.073	-0.929	0.257	0.001	18.886	4.192	8.1	-1.78	-1.014	-0.075
2012	0.20	6.211	1442.506	-0.950	0.270	0.000	17.810	4.019	8.1	-1.69	-0.969	-0.081
2013	0.14	4.72	1555.091	1.753	0.252	0.003	16.267	4.594	7.9	-1.31	-0.955	-0.041
2014	0.20	4.824	1546.687	6.800	0.223	0.015	15.360	4.661	8	-0.80	-0.893	-0.092
2015	0.21	4.989	1571.916	8.917	0.202	0.002	14.257	-3.905	7.9	-1.73	-1.034	-0.072
	Comoros											
2006	0.12	5.91	392.168	7.166	0.726	0.002	9.221	2.647	NA	-0.32	-0.926	-0.043
2007	0.09	1.571	359.450	6.717	0.625	0.017	9.786	0.800	7.4	-1.06	-0.992	-0.035
2008	0.21	1.348	335.854	4.964	0.531	0.009	11.641	0.400	7.5	-1.08	-0.979	-0.046
2009	0.14	2	354.140	6.630	0.550	0.026	15.110	1.950	7.7	-0.75	-1.029	0.012
2010	0.20	2.2	371.458	6.380	0.529	0.016	17.916	2.200	7.9	-0.50	-0.985	0.141
2011	0.23	2.2	353.900	7.674	0.474	0.039	18.522	2.600	7.6	-0.48	-0.930	0.030
2012	0.12	2.2	382.896	8.037	0.448	0.009	21.531	3.000	7.2	-0.38	-0.976	0.070
2013	0.24	2.2	370.530	9.053	0.244	0.007	23.097	3.500	7.2	-0.19	-0.896	0.394
2014	0.20	2.2	370.811	7.637	0.224	0.007	24.157	2.062	7.4	-0.13	-0.797	-0.006
2015	0.07	2.2	443.587	6.840	0.236	0.009	27.008	1.015	7.4	-0.11	-0.725	-0.029
	Djibouti											
2006	0.53	3.738	177.721	7.817	0.736	0.141	20.183	4.800	NA	-0.22	-0.890	-0.041
2007	1.04	2.399	177.721	5.726	0.958	0.230	22.522	5.100	7.1	-0.06	-0.860	-0.045
2008	0.81	2.936	177.721	0.012	0.847	0.228	24.336	5.800	7	0.30	-0.811	0.024
2009	0.53	2.104	177.721	11.474	0.855	0.092	29.347	5.033	7.2	0.50	-0.815	-0.114
2010	0.35	3	177.721	6.243	0.690	0.032	33.110	3.487	6.8	0.26	-0.862	-0.045
2011	0.68	3.5	177.721	6.080	0.629	0.064	30.909	4.468	7	0.18	-0.908	-0.022
2012	0.71	3.5	177.721	7.481	0.600	0.081	28.931	4.842	6.4	0.17	-0.871	-0.057
2013	0.76	3	177.721	9.345	0.569	0.197	31.118	5.000	6.4	-0.12	-0.912	-0.124
2014	0.87	3	177.721	9.447	0.598	0.096	30.956	6.000	6.6	-0.74	-0.930	-0.282
2015	1.02	3	177.720	9.306	0.708	0.072	30.467	6.501	6.6	-0.45	-0.997	-0.317

Ethiopia

		Independent Variables										
	CF	INF	EXR	IR	DEBT	FDI	CRA	GDP	COI	PSI	PFII	BD
2006	0.01	24.132	8.681	-4.081	0.149	0.001	23.661	10.835	7.6	-1.70	-0.922	-0.016
2007	0.14	8.071	8.794	-8.293	0.135	0.000	18.525	11.456	7.6	-1.76	-0.900	-0.018
2008	0.19	7.404	9.244	-17.122	0.107	0.001	17.710	10.789	7.4	-1.70	-0.929	-0.019
2009	0.20	10.115	10.419	NA	0.167	0.003	NA	8.803	7.3	-1.62	-0.992	-0.008
2010	0.20	7.705	12.891		0.245	0.003		12.551	7.3	-1.61	-0.973	-0.011
2011	0.19	8.195	16.120		0.269	0.001		11.178	7.3	-1.49	-1.005	-0.016
2012	0.22	8.195	17.255		0.242	0.001		8.648	6.7	-1.54	-0.991	-0.016
2013	0.25	8.195	18.194		0.264	0.001		10.582	6.7	-1.38	-1.005	-0.027
2014	0.31	8.195	19.075		0.298	0.001		10.279	6.7	-1.32	-0.919	-0.040
2015	0.35	8.195	20.096		0.332	0.001		9.608	6.7	-1.48	-0.900	-0.048
	Kenya											
2006	0.01	9.378	72.101	-8.010	0.259	0.021	22.888	6.472	7.8	-1.12	-0.401	-0.015
2007	0.04	5.717	67.318	4.819	0.236	0.007	23.045	6.851	7.9	-1.27	-0.483	-0.019
2008	0.08	6.878	69.175	-0.985	0.213	0.003	25.381	0.232	7.9	-1.38	-0.502	-0.030
2009	0.05	6.582	77.352	2.837	0.231	0.006	25.022	3.307	7.8	-1.43	-0.507	-0.043
2010	0.05	6.151	79.233	12.026	0.221	0.007	27.228	8.402	7.9	-1.17	-0.431	-0.045
2011	0.13	5.515	88.811	3.841	0.242	0.015	30.573	6.112	7.8	-1.24	-0.481	-0.047
2012	0.08	5.119	84.530	9.454	0.236	0.006	29.538	4.555	7.3	-1.32	-0.485	-0.062
2013	0.11	5.012	86.123	11.339	0.249	0.023	31.711	5.694	7.3	-1.15	-0.427	-0.074
2014	0.11	5	87.922	7.890	0.272	0.035	34.163	5.332	7.5	-1.29	-0.306	-0.095
2015	0.18	5	98.179	6.362	0.302	0.034	34.887	5.649	7.5	-1.29	-0.321	-0.114
	Rwanda											
2006	0.27	6.286	551.710	6.397	0.139	0.001	12.561	9.235	7.5	-0.68	-0.836	0.001
2007	0.10	4.223	546.955	3.832	0.164	0.176	12.974	7.613	7.2	-0.31	-0.809	-0.013
2008	0.09	1.784	546.849	1.963	0.144	0.005	14.432	11.162	7	-0.30	-0.758	0.008
2009	0.12	2.507	568.281	6.960	0.162	0.006	11.929	6.268	6.7	-0.47	-0.696	0.002
2010	0.09	5.33	583.131	13.935	0.159	0.016	12.351	7.313	6	-0.20	-0.597	0.004
2011	0.12	4.85	600.307	8.776	0.190	0.006	16.215	7.852	5	-0.14	-0.582	-0.018
2012	0.19	5	614.295	9.897	0.175	0.007	18.748	8.788	4.7	-0.20	-0.533	-0.017
2013	0.17	5	646.636	11.611	0.225	0.009	19.428	4.685	4.7	-0.08	-0.441	-0.028
2014	0.21	5	681.862	13.515	0.256	0.059	21.051	7.009	5.1	-0.27	-0.260	-0.041
2015	0.22	5	720.975	15.636	0.277	0.177	21.606	6.904	4.6	-0.08	-0.270	-0.025

	Sudan											
		Independent Variables										
	CF	INF	EXR	IR	DEBT	FDI	CRA	GDP	COI	PSI	PFII	BD
2006	0.01	35.352	2.172		0.515	0.001	13.960	10.064	8	-2.11	-1.420	-0.049
2007	0.13	36.522	2.016		0.430	0.002	12.708	11.522	8.2	-2.34	-1.447	-0.135
2008	0.10	36.907	2.090		0.372	0.002	11.153	7.802	8.4	-2.47	-1.501	0.025
2009	0.13	16.91	2.302		0.396	0.002	12.682	3.242	8.5	-2.65	-1.384	-0.234
2010	0.10	13.485	2.306		0.340	0.001	11.866	3.469	8.4	-2.65	-1.451	0.016
2011	0.14	16.133	2.667		0.314	0.002	10.821	-1.968	8.4	-2.52	-1.430	0.014
2012	0.19	12.658	3.573		0.320	0.002	11.078	0.522	8.7	-2.27	-1.488	-0.276
2013	0.15	11.926	4.757		0.312	0.002	9.636	4.395	8.9	-2.20	-1.497	-0.253
2014	0.08	12.7	5.737		0.265	0.002	7.622	2.679	8.9	-2.38	-1.449	-0.151
2015	0.09	13.7	6.000		0.220	0.002	7.137	4.906	8.8	-2.17	-1.500	-0.258
	Tanzania											
2006	-0.13	16.001	1251.900	-0.703	0.220	0.005	9.811	4.661	7.1	-0.33	-0.341	-0.032
2007	0.17	7.87	1245.036	9.567	0.234	0.007	11.651	8.464	6.8	-0.35	-0.303	-0.015
2008	0.21	6.132	1197.182	-0.825	0.220	0.003	12.160	5.567	7	-0.21	-0.338	-0.023
2009	0.19	5.588	1320.330	5.279	0.269	0.004	11.468	5.382	7.4	0.07	-0.351	-0.057
2010	0.19	5.222	1395.700	4.851	0.283	0.004	11.944	6.359	7.3	-0.02	-0.343	-0.066
2011	0.28	5	1557.400	3.062	0.296	0.003	12.639	7.905	7	-0.05	-0.361	-0.055
2012	0.24	5	1571.700	4.261	0.296	0.003	13.003	5.141	6.5	0.02	-0.372	-0.070
2013	0.23	5	1600.444	7.579	0.296	0.010	12.895	7.263	6.7	-0.17	-0.343	-0.072
2014	0.23	5	1654.005	10.688	0.298	0.009	13.785	6.965	6.9	-0.57	-0.308	-0.075
2015	0.20	5	1991.391	8.952	0.330	0.011	15.174	6.959	7	-0.45	-0.333	-0.085
	Uganda											
2006	-0.20	12.865	1831.453	15.909	0.131	-0.075	10.109	10.785	7.3	-1.16	-0.325	-0.005
2007	0.15	5.029	1723.492	10.981	0.134	-0.076	10.232	8.412	7.2	-0.96	-0.353	-0.007
2008	0.27	3.132	1720.444	13.243	0.161	-0.067	13.901	8.709	7.4	-0.91	-0.363	-0.021
2009	0.11	5.523	1929.941	-9.740	0.152	-0.047	11.399	6.765	7.5	-0.99	-0.355	-0.020
2010	0.14	5.512	2028.881	8.678	0.147	0.102	13.341	5.674	7.5	-1.00	-0.349	-0.061
2011	0.18	5.113	2323.347	14.768	0.159	0.085	15.284	9.394	7.6	-0.99	-0.333	-0.032
2012	0.13	5	2557.145	3.777	0.161	0.098	13.522	3.834	7.1	-0.88	-0.352	-0.040
2013	0.17	5	2591.116	18.475	0.192	0.068	13.324	3.559	7.4	-0.84	-0.374	-0.056
2014	0.14	5	2538.030	17.486	0.180	0.045	13.971	5.184	7.4	-0.94	-0.389	-0.056
2015	0.18	5	2827.727	16.675	0.209	0.063	14.584	5.144	7.5	-0.86	-0.390	-0.040

Appendix D Econometrics outputs

Appendix D-1: Unit Root test

At level				
variable	LLC	Breiture	IPS	Hadri
lcf	-6.33*	-3.45*	-2.06**	1.14
lexr	0.29	3.87	1.68	13.82
ldebt	-5.44*	-3.91*	-2.06**	0.87
lcra	-4.97*	1.42	-1.7858	2.38*
lgdp	48.72	2.88	-1.29	12.46*
lbd	-4.96*	4.53	-2.200***	13.96*
psi	4.12*	-1.6***	-2.07***	4.12*
pfii	0.7	0.14	-1.15	11.1*
coi	-4.42*	0.12	-1.57	12*
At First Difference				
variable	LLC	Brits	IPS	Hadri
Δ lcf	-9.02*	-3.31*	-4.68*	-1.66
Δ lexr	-3.97*	-1.02	0.6046	1.95**
Δ ldebt	-5.56*	-3.6*	-2.5910*	-0.986
Δ lcra	45	-2.61**	10.83	-0.465
Δ lqdp	-23.19*	-2.11**	-7.04*	1.68**
Δ lbd	-9.19*	-3.88*	-3.68*	-1.61
Δ psl	-5.93*	-2.265**	-4.63*	-0.16
Δ pfii	-3.36*	-2.98*	-1.37***	0.511
Δ coi	-7.67*	-4.37*	-3.33*	-1.04

* 1% significance level
** 5% significance level
* ** 10% significance level

Appendix D-2: Descriptive statistics

Variable		Mean	Std. Dev.	Min	Max	Observations	
id	overall	5	2.596454	1	9	N =	90
	between		2.738613	1	9	n =	9
	within		0	5	5	T =	10
t	overall	2010.5	2.888373	2006	2015	N =	90
	between		0	2010.5	2010.5	n =	9
	within		2.888373	2006	2015	T =	10
lcf	overall	19.98622	5.122074	0	23.79652	N =	90
	between		3.295165	11.53393	21.83105	n =	9
	within		4.059007	1.021865	28.53981	T =	10
lexr	overall	5.305556	2.138859	.701165	7.947228	N =	90
	between		2.245534	1.123538	7.683942	n =	9
	within		.2054342	4.872933	5.973778	T =	10
ldebt	overall	21.70203	1.488506	18.70922	23.83551	N =	90
	between		.3475744	21.24508	22.10958	n =	9
	within		1.451572	18.32509	24.16304	T =	10
lcra	overall	2.799121	.3747617	1.965344	3.552101	N =	90
	between		.3358985	2.36522	3.337173	n =	9
	within		.1975553	2.203937	3.278582	T =	10
lgdp	overall	22.92658	1.685241	19.82214	25.29959	N =	90
	between		1.748989	20.10537	24.8487	n =	9
	within		.3006815	22.1413	23.53438	T =	10
lbd	overall	-14.47035	13.50934	-23.94464	21.03552	N =	90
	between		8.017859	-21.39083	.5156938	n =	9
	within		11.16768	-31.99102	17.3481	T =	10
psi	overall	-.9558611	.7725012	-2.65486	.5006028	N =	90
	between		.7783007	-2.377744	-.0181338	n =	9
	within		.2286088	-1.680384	-.3073314	T =	10
pfii	overall	-2.307728	1.081521	-4.501743	-.7788717	N =	90
	between		1.110616	-4.369928	-1.018087	n =	9
	within		.2468865	-3.082412	-1.351889	T =	10
coi	overall	7.308889	.8417003	4.6	8.9	N =	90
	between		.7545768	5.85	8.52	n =	9
	within		.4434543	6.058889	8.958889	T =	10

Appendix D-3: Fixed effect regression

```
Fixed-effects (within) regression               Number of obs      =        90
Group variable: id                              Number of groups   =         9

R-sq:  within  = 0.1854                         Obs per group: min =        10
       between = 0.1870                                        avg =      10.0
       overall = 0.0503                                        max =        10

                                                F(8,73)            =      2.08
corr(u_i, Xb)  = -0.9805                        Prob > F           =    0.0490
```

lcf	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lexr	4.626725	4.26234	1.09	0.281	-3.868107	13.12156
ldebt	1.030068	.3110632	3.31	0.001	.4101198	1.650016
lcra	-.8083858	2.950395	-0.27	0.785	-6.688515	5.071743
lgdp	-5.451212	2.891296	-1.89	0.063	-11.21356	.3111335
lbd	.0406308	.0442634	0.92	0.362	-.047586	.1288476
psi	-1.748664	2.175059	-0.80	0.424	-6.08355	2.586223
pfii	.8595371	2.497796	0.34	0.732	-4.118563	5.837637
coi	-1.52934	1.430281	-1.07	0.288	-4.379885	1.321206
_cons	112.4025	51.15009	2.20	0.031	10.46055	214.3445
sigma_u	18.194436					
sigma_e	4.0450045					
rho	.95290132	(fraction of variance due to u_i)				

F test that all u_i=0: F(8, 73) = 1.26 Prob > F = 0.2792

Appendix D-4: Random effect regression

```
Random-effects GLS regression                   Number of obs      =        90
Group variable: id                              Number of groups   =         9

R-sq:  within  = 0.1327                         Obs per group: min =        10
       between = 0.9327                                        avg =      10.0
       overall = 0.4180                                        max =        10

                                                Wald chi2(8)       =     58.17
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000
theta          = 0
```

lcf	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lexr	-2.391875	.4962135	-4.82	0.000	-3.364435	-1.419314
ldebt	1.137022	.3024475	3.76	0.000	.544236	1.729809
lcra	-5.632163	1.603012	-3.51	0.000	-8.774008	-2.490318
lgdp	-.9533975	.591055	-1.61	0.107	-2.111844	.205049
lbd	.044023	.0360408	1.22	0.222	-.0266157	.1146618
psi	1.128443	1.153522	0.98	0.328	-1.13242	3.389305
pfii	4.224762	1.091034	3.87	0.000	2.086374	6.363149
coi	.096677	.7443201	0.13	0.897	-1.362164	1.555517
_cons	56.38266	20.58219	2.74	0.006	16.0423	96.72302
sigma_u	0					
sigma_e	4.0450045					
rho	0	(fraction of variance due to u_i)				

Appendix D-5: The Hauseman test

```
. hausman fixed random
```

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
lexr	4.626725	-2.391875	7.0186	4.233357
ldebt	1.030068	1.137022	-.1069545	.0727034
lcra	-.8083858	-5.632163	4.823777	2.476931
lgdp	-5.451212	-.9533975	-4.497814	2.830238
lbd	.0406308	.044023	-.0033922	.0256964
psi	-1.748664	1.128443	-2.877106	1.843981
pfii	.8595371	4.224762	-3.365225	2.246916
coi	-1.52934	.096677	-1.626017	1.221348

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 7.71
Prob>chi2 = 0.4624
(V_b-V_B is not positive definite)

Appendix D-6.1 Panel corrected standard errors (PCSES)

```
Linear regression, correlated panels corrected standard errors (PCSEs)

Group variable:   id                              Number of obs      =        90
Time variable:    t                               Number of groups   =         9
Panels:           correlated (balanced)           Obs per group: min =        10
Autocorrelation:  no autocorrelation                                 avg =        10
                                                                     max =        10
Estimated covariances      =         45           R-squared          =    0.4180
Estimated autocorrelations =          0           Wald chi2(8)       =     38.00
Estimated coefficients     =          9           Prob > chi2        =    0.0000
```

lcf	Panel-corrected Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lexr	-2.391875	.7189987	-3.33	0.001	-3.801086	-.982663
ldebt	1.137022	.2399329	4.74	0.000	.6667625	1.607282
lcra	-5.632163	1.712691	-3.29	0.001	-8.988977	-2.27535
lgdp	-.9533975	.3850372	-2.48	0.013	-1.708056	-.1987385
lbd	.044023	.0230824	1.91	0.056	-.0012177	.0892638
psi	1.128443	1.125235	1.00	0.316	-1.076977	3.333863
pfii	4.224762	1.330265	3.18	0.001	1.61749	6.832034
coi	.096677	.498786	0.19	0.846	-.8809257	1.07428
_cons	56.38266	17.94347	3.14	0.002	21.2141	91.55122

Appendix D-6.2 Panel corrected standard errors (Driscoll-Kraay)

```
Regression with Driscoll-Kraay standard errors   Number of obs     =        90
Method: Pooled OLS                               Number of groups  =         9
Group variable (i): id                           F(  8,     8)     =    484.10
maximum lag: 2                                   Prob > F          =    0.0000
                                                 R-squared         =    0.4180
                                                 Root MSE          =    4.0961
```

lcf	Drisc/Kraay Coef.	Drisc/Kraay Std. Err.	t	P>|t|	[95% Conf.	Interval]
lexr	-2.391875	.7912699	-3.02	0.016	-4.216546	-.5672029
ldebt	1.137022	.2332342	4.88	0.001	.5991833	1.674861
lcra	-5.632163	1.616665	-3.48	0.008	-9.360199	-1.904128
lgdp	-.9533975	.3663184	-2.60	0.031	-1.798129	-.1086658
lbd	.044023	.021998	2.00	0.080	-.0067045	.0947505
psi	1.128443	1.029846	1.10	0.305	-1.246386	3.503272
pfii	4.224762	1.480904	2.85	0.021	.8097917	7.639732
coi	.096677	.4278938	0.23	0.827	-.8900479	1.083402
_cons	56.38266	15.01241	3.76	0.006	21.76398	91.00134

Appendix D-7: Breusch and Pagan (LM) test

```
Breusch and Pagan Lagrangian multiplier test for random effects

        lcf[id,t] = Xb + u[id] + e[id,t]

        Estimated results:
                     |         Var     sd = sqrt(Var)
             ---------+-----------------------------
                 lcf |    26.23564        5.122074
                   e |    16.36206        4.045004
                   u |           0               0

        Test:   Var(u) = 0
                             chibar2(01) =     0.00
                          Prob > chibar2 =   1.0000
```

Appendix D-8.1: **Parm test**

```
. . testparm lcf _It_2007 _It_2008 _It_2009 _It_2010 _It_2011 _It_2012 _It_2013 _It_2014 _It_2015

 ( 1)  _It_2007 = 0
 ( 2)  _It_2008 = 0
 ( 3)  _It_2009 = 0
 ( 4)  _It_2010 = 0
 ( 5)  _It_2011 = 0
 ( 6)  _It_2012 = 0
 ( 7)  _It_2013 = 0
 ( 8)  _It_2014 = 0
 ( 9)  _It_2015 = 0

           chi2(  9) =   11.34
         Prob > chi2 =    0.2533
```

Appendix D-8.2: **Parm test**

```
Correlation matrix of residuals:

            __e1     __e2     __e3     __e4     __e5     __e6     __e7     __e8     __e9
__e1      1.0000
__e2     -0.7402   1.0000
__e3      0.2386  -0.6341   1.0000
__e4     -0.5585   0.7367  -0.7267   1.0000
__e5     -0.8590   0.8524  -0.5915   0.6573   1.0000
__e6     -0.4929   0.7892  -0.8265   0.6493   0.6783   1.0000
__e7     -0.7473   0.6446  -0.4683   0.3270   0.7318   0.7467   1.0000
__e8     -0.8429   0.7120  -0.5953   0.8098   0.8023   0.6375   0.7128   1.0000
__e9     -0.8805   0.5773  -0.4044   0.5846   0.8666   0.4317   0.6768   0.8872   1.0000

Breusch-Pagan LM test of independence: chi2(36) =   170.420, Pr = 0.0000
Based on 10 complete observations
```

Appendix D-9: **Pesaran cross sectional dependence test**

```
. xtcsd, pesaran abs

Pesaran's test of cross sectional independence =     4.261, Pr = 0.0000

Average absolute value of the off-diagonal elements =     0.393

Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

chi2 (9)  =    10772.35
Prob>chi2 =      0.0000
```

Appendix D-10: **Woodridge test for autocorrelation in panel data model**

```
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,        8) =     18.451
           Prob > F =      0.0026
```

Declaration

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in any other university, and that all source of materials used for the thesis have been duly acknowledged.

The examiners' comments have been duly incorporated.

Declared by:

Name: Bekele Mekonnen

Signature: _____

Date: _____

Confirmed by Adviser:

Name: Worku Gebeyehu (Ph.D.)

Signature: _____

Date: _____

Place and date of submission: _____