THE MINISTRY OF EDUCATION OF THE REPUBLIC OF AZERBAIJAN

AZERBAIJAN STATE UNIVERSITY OF ECONOMICS

INTERNATIONAL GRADUATE AND DOCTORATE CENTER

MASTER DISSERTATION

On the topic

"THE MAIN DETERMINANTS OF CAPITAL FLIGHT AND IMPACT ON ECONOMIC GROWTH IN DEVELOPING COUNTRIES"

Ahouandjinou Mahugnon Aurel-Marie

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Master's Student:
Ahouandjinou Mahugnon Aurel-Marie
_____signature

Supervisor: Ph.D in Econ.
Anar Mammadov
_____signature

Program Manager: Ph.D in Econ.
Valiyev Jabrayil Khalil
_____signature

Head of the Department: Dr. of Econ.
Prof. Kalbiyev Yashar Atakishi
_____signature

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Elm andı

Mən, Mahugnon Aurel-Marie Ahouandjinou, and içirəm ki, "The main determinants of capital flight and impact on economic growth" mövzusunda magistr dissertasiyasını elmi əxlaq normalarına və istinad qaydalarına tam riayət etməklə və istifadə etdiyim bütün mənbələri ədəbiyyat siyahısında əks etdirməklə yazmışam.

ABSTRACT

Actuality of research: For many years now, capital flight is a significant problem for all the countries throughout the world in general and developing countries in particular. This phenomenon affects not only the whole economy but also the population by depriving them of optimal living conditions. However, the phenomenon is still widely unknown therefore it makes this research actual.
Purpose of research: The purpose of the research is to explain what capital flight is, highlight the main determinants of this scourge according to the litearture and describe its effects on economic growth.
Used research methods: For our research, we run a fixed effects panel regression using data collected on eleven countries from 2000 to 2018.
The information base of the research: The data used for our analysis have been obtained from the World Bank database. Additionally, the informations about the various models we have applied are retrieved from previous researches.
Restrictions of the research: The first limitation of our research is that it only covers eleven countries for a short time period. The second problem associated with our research is that there is no consensus on the model or method to use for capital flight so our estimates may not be perfect because of errors.
The novelty and practical results of investigation: We found out that capital flight had a positive and significant effect on researched countries' economic growth.
Scientific-practical significance of results: The results from our researches can be used first for a better understanding of capital flight. Second, it allows future researchers to approach capital flight from a new perspective.

Keywords: capital flight, economic growth, panel regression

“İNKİŞAF EDƏN ÖLKƏLƏRDƏ KAPİTAL QAÇIŞIN VƏ İQTİSADİ BÜYÜMƏYƏ TƏSİRİNİN ƏSAS QƏRARLARI”

XÜLASƏ

Tədqiqatın aktuallığı: Uzun illərdir ki, kapital qaçışı ümumiyyətlə bütün dünya ölkələri və xüsusilə inkişaf etməkdə olan ölkələr üçün əhəmiyyətli bir problemdir. Bu fenomen yalnız bütün iqtisadiyyatı deyil, həm də əhalini optimal yaşayış şəraitindən məhrum edərək təsir göstərir. Bununla birlikdə, fenomen hələ də geniş bilinmir, buna görə bu tədqiqatı aktual edir.

Tədqiqatın məqsədi: Tədqiqatın məqsədi kapital qaçışının nə olduğunu izah etmək, ədəbiyyata görə bu bəlanın əsas müəyyənedicilərini vurğulamaq və iqtisadi böyüməyə təsirlərini təsvir etməkdir.

İstifadə olunmuş tədqiqat metodları: Tədqiqatımız üçün 2000-2018-ci illər arasında on bir ölkədə toplanan məlumatları istifadə edərək sabit effektlər paneli reqressiyasını həyata keçiririk.

Tədqiqatın məlumat bazası: Analizimiz üçün istifadə olunan məlumatlar Dünya Bankı məlumat bazasından əldə edilmişdir. Əlavə olaraq tətbiq etdiyimiz müxtəlif modellər haqqında məlumatlar əvvəlki araşdırmalardan alınmışdır.

Tədqiqatın məhdudiyyətləri: Araşdırmamızın ilk məhdudiyyəti, yalnız on bir ölkəni qısa müddətə əhatə etməsidir. Araşdırmamızla əlaqəli ikinci problem, kapitalın uçması üçün istifadə ediləcək model və ya metodla bağlı bir fikir birliyinin olmamasıdır ki, səhvlər səbəbindən təxminlərimiz mükəmməl ola bilməz.

Araşdırmanın yeniliyi və praktiki nəticələri: Kapital qaçışının tədqiq olunan ölkələrin iqtisadi böyüməsinə müsbət və əhəmiyyətli təsir göstərdiyini öyrəndik.

Nəticələrin elmi-praktik əhəmiyyəti: Araşdırmalarımızın nəticələrindən əvvəl kapital uçuşunu daha yaxşı başa düşmək üçün istifadə etmək olar. İkincisi, gələcək tədqiqatçılara kapital qaçışına yeni bir perspektivdən yanaşmağa imkan verir.

Açar sözlər: kapital qaçışı, iqtisadi böyümə, panel regressiyası

ABBREVIATIONS

GDP	Gross Domestic Product
IMF	International Monetary Fund
OLS	Ordinary Least Square
FDI	Foreign Direct Investment
GMM	Generalized method of moments

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INTRODUCTION

Relevance of the research topic: Capital refers to the set of financial resources or assets employed for investment to produce goods and services to generate income and create value. For any economy, it is impossible to achieve economic development without capital investments as it is the linchpin of all economic activities. Capital largely contributes to improve the living conditions of the population as it allows the policymakers to invest massively to create jobs, build infrastructures or social amenities, and implement policies that will increase the economic growth prospect. Roughly speaking, more capital available means more wealth because capital connotes purchasing power and liquid assets or funds that can be expended on procurement of capital goods (Chapman 2012). According to Delchev et al. (2015), exploring the contribution of different factors that impact economic growth in 20 developing countries, although capital accounts for around 40% of the overall economic growth, it is not sufficient to achieve economic growth. Indeed, the capital needs to be controlled and invested efficiently. This condition is not always fulfilled and often leads to the phenomenon termed capital flight.

Capital flight is the flow of capital leaving a country illegally. When the aggregate level of money leaving a country is higher than the aggregate level of money coming in, we have what is known as capital flight. It is a complex phenomenon that arises from political and economic instability. The phenomenon became of interest during the 1980s after various financial crises that caused a significant exodus of capital (Cervena 2006). Capital flight harms the economy as it deprives the economy of essential financing options hindering investment and economic growth. Cuddington (1986) asserts that capital flight destabilizes interest rates, exchange rates and reduces monetary control. He added that capital flight reflects discrepancies between the private and social rate of return, contributes to the erosion of the domestic tax base, reduces

domestic investment, drives up the marginal cost of foreign borrowing, and erodes the legitimacy of a hybrid Economic system. All these contribute to heightening poverty, canceling investment, and thwarting economic development (Kar and Curcio 2008). More, most countries experiencing high capital outflow end up being dependent on foreign aid, and they are usually not able to control their external debt. From 1970 to 2010, 33 sub-Saharan African countries registered a total loss of 814 Billion dollars which is much higher than the amount of official development aid they receive (Boyce 2012). Over the period 2000-2008, developing countries lost between US$725 Billion-US$810 Billion per annum (Kar and Curcio 2008). A significant part of the Latin American economies has also been affected. Indeed, from 1973 to 1987, capital flight from Latin America added up to $151 billion, or about 43 percent of the total external debt acquired during those same years (Pastor 1989). Asian countries also recorded a high outflow of capital, especially during the Asian countries' crisis at the end of the year 1997. The capital outflow recorded between the end of 1997 and early 1998 for Thailand, Malaysia, Philippines, Korea, and Indonesia together was over 80 billion dollars.

Statement of the problem and learning level: Gradually, because of the high level of capital flight recorded in developing economies, capital flight has been labeled as the scourge of developing countries. For Darryl M. (2002): "Since the third world crisis in the eighties, the term capital flight has been applied more broadly to capital outflows from residents of developing countries." However, the complexity of the capital flight lies in its various causes and affects all the countries without distinction. Everyone is affected, from developed and more advanced economies with muscular political and government bodies to least developed and poor economies with weak institutions.

Even though developing economies are more likely to face high escape of capital, there is evidence of a high level of capital flight recorded from developing and more advanced economies. For example, between 1988 and 2007, France recorded 200

billion euros of capital flight due to the wealth tax law introduced in 1989 (Pichet 2007). Meanwhile, in Russia, the capital flight is estimated to be over 20 billion dollars a year (Loungani and Paolo 2001). This amount has even considerably increased after the oil crisis experienced by the country in 2014. China has also recorded a high amount of cumulative capital flight between 2000 and 2008 (the most elevated amount globally); the total capital flight for that period is around $2,176 billion (Kar and Curcio 2008).

Despite its well-documented harmful effects on the economy and the relative interest, it has attracted throughout the years; there is still a particular mystery surrounding the phenomenon of capital flight and its exact consequences on the long-term economic growth prospect. There is neither a wholly accepted definition of capital flight nor a complete consensus on the most suitable method to measure and what types of capital should be regarded as capital flight. This imbroglio has been summarized by a famous quote from Kanitz C. (1984): "Why is it when an American puts money abroad it is called Foreign Investment, and when an Argentinian does the same it is called Capital Flight? Why is it when an American company puts 30 percent of its equity abroad it is called Strategic Diversification, and when a Bolivian businessman puts only 4 percent abroad, it is called Lack of Confidence?"

Purposes and objectives of the research: In the paper, we will explain what capital flight is, highlight the main determinants of this scourge according to the literature, present the different models developed to measure it, and describe its effects and the mechanisms through which it affects the economy and economic growth.

Object and subject of the research: Our work analyses the effect of capital flight on economic growth for 11 developing countries namely Azerbaijan, Bangladesh, Benin, Cameroon, Costa Rica, Georgia, Haiti, Honduras, Indonesia, Kenya, and Ukraine.

Research methods: Our research first estimates the capital flight from selected developing countries using annual data from 2000-2018 and secondly evaluates the

impact of capital flight on development growth. The analysis will be possible by collecting and treating data from different authors and institutions that already provide statistics, models, and sometimes estimates of the phenomenon. For the study, we derived our methodology from work previously done by the researchers, so the results obtained from our analysis are clear and not ambiguous. It also allows us to formulate insightful suggestions to tackle the issue of the study. More, the data of the research has been obtained by officials and trustworthy entities. In extreme cases where there was no ready-to-use data, we managed to estimate capital flight ourselves by applying the formulas and models suggested in the literature.

Research limitations: The study evaluates the impact of capital flight on economic growth using GDP and capital flight data from specific economies (11 countries from 2000 to 2018). Therefore, even though we expect the capital flight to impact the long-term growth prospect significantly negatively, it will be hard to generalize our findings to all other economies without more research systematically. Each country or economy has its specificities, so the impact of capital flight on the GDP may differ or even not be significant from one country to another. However, the paper gives a clear overview of the possible consequences of capital flight on economic growth and draws people's attention to a very harmful phenomenon.

Also, for our study, we use our estimate of capital flight based on the different models identified in the literature. Our estimates should not be considered perfect estimates of the phenomenon as the error margin could be significant in some instances but instead, as a way to evaluate the impact of the phenomenon on the economy.

Scientific novelty of the research: Our research is based on recent estimates and the model used for our analysis includes new variables.

Scientific and practical significance of the results: The results from our researches can be used first for a better understanding of capital flight. Second, it allows future researchers to approach capital flight from a new perspective.

Internally, the paper is organized as follows. Chapter I presents the different definitions of capital flight, its various causes identified in the literature, and its effect on economic growth according to previous empirical studies. The following Chapter II goes on to present the different methods of measurement of capital flight and an estimate of the phenomenon for three chosen African countries of our dataset. In the last chapter, we present our methodology, model, and findings. The conclusion will follow this chapter.

CHAPTER 1: LITERATURE REVIEW

1.1 The concept of Capital Flight

After the different debt crises in the eighties, where an extremely high level of capital outflows was recorded from developing economies, capital flight became a topic that attracted a lot of interest. However, today, there is still no general agreement on what

exactly constitutes capital flight or the types of capital that should be considered as capital flight. With globalization, the integration of financial markets, and the critical development in transport and communication, capital is internationally mobile. There is fast growth in the volume of daily transactions (Schneider 2001). It is tough to keep track of the movement of capital and distinguish one 'normal' capital outflow from a 'fleeing' capital. Every researcher has his own opinion about the phenomenon, and there are many contradictions in the literature. This situation is highlighted by Deppler and Williamson (1986) when they state: "One difficulty in formulating an acceptable definition is that "capital flight" in its broadest sense covers capital outflows that are motivated by widely different considerations that cannot easily be distinguished empirically." It is easy to notice that most definitions of capital flight therefore heavily depend on how each author apprehends the phenomenon. Schneider (2003), however, noticed that the different definitions of capital flight could be separated into three main groups. We have the broad meaning of capital flight, the definition of capital flight as a response to discriminatory treatment of domestic capital, and capital flight as an illegal transaction.

The broad definition of capital flight results from the idea that the outgoing capital is a loss for the country. Using this idea, (Eggerstedt, Hall, and Van Wijnbergen 1995) defined capital flight as the unreported private accumulation of private assets that can be seen as a result of personal portfolio decisions. However, some authors are challenging that simple definition of capital flight in the literature. They argue that capital flight should be different from ordinary portfolio decisions and domestic activities, including portfolio investment, working capital of firms held in foreign currency, and trade currency (Eggerstedt 1993). Erbe (1985) defends the idea that even "perfectly legal exports of private capital" should be considered when discussing capital flight as it deprives the economy of capital and causes serious problems. For Eggerstedt (1993), this raised a problem: "How would one deal with (capital from) migration, tourism, workers

remittances, intrafirm trade, etc.?" Therefore, it becomes crucial to establish clear criteria to distinguish 'normal capital outflow' from 'abnormal capital outflow.' Kindleberger C. (1987) attempted to develop those criteria.

Moreover, some authors still using the main idea of the broad definition of capital flight considered as capital flight, the capital outflow that is harmful to the local country. Timothy (2000) perfectly sums up this idea when he asserts: "The justification for using the emotive term 'capital flight' is in the extent of damage that resident's capital outflows inflict on the home economy. If the damage is small, one may be content with using the term 'resident capital outflows'; otherwise, 'capital flight' is the preferred alternative".

Nevertheless, the broad definition of capital flight is rejected by some authors in the literature because it implies a contradiction with what is prescribed by the economic theories. Indeed, the economic theory assumes that when the conditions for maximizing both the consumer utility and the producer profit are satisfied and followed by an optimal distribution, it leads to maximum national welfare. But for capital flight, the research of utility and profit maximization results in a decrease in the national interest (Varman-Schneider 1991). More, Cervena (2006) stressed that associating capital flight to dropping domestic utility has a severe downside since it takes into account all stated and unstated rises in foreign assets of both domestic and public sectors. She added that it is an extensive measure and is believed to overvalue the actual size of the phenomenon.

Faced with this situation, some authors tried to present capital flight as a response to discriminatory treatment of domestic capital. In Ng'eno's (2000) point of view: "Capital flight is the movement of capital from a country to another motivates by a differential in return to capital across countries." According to Cuddington (1986), the term 'capital flight' refers to short-term speculative capital outflow and should not be confused with

the other type of capital export that he refers to as 'gross capital outflow.' For Epstein (2011), capital flight is the transfer of assets abroad to reduce the loss of principal, loss of return, or loss of control over one's financial wealth due to government-sanctioned activities like the fear of wealth confiscation, an increase in taxes on wealth or the imposition of regulations that limit the privileges of wealth holders. These definitions include the idea of asymmetric risk. As far as Beja (2007) is concerned, "capital flight is the movement of capital from a resource-scarce country developing country to avoid social control." However, this definition is restricted to developing countries. Its accuracy could be discussed because of the various motives that can explain the movement of capital from one place to another. One example is the 200 billion euros of capital flight recorded in France (a developed country) due to the tax on wealth (Pichet 2007).

The last group of authors defends the idea that the term "capital flight" should depend on whether the capital outflow is legal or not. Capital flight from the point of view of an illegal transaction only occurs when the supposedly 'fleeing capital' results from the issuance of false trade documents where exports are over invoiced and imports under invoiced. This definition is very narrow because it assumes that the capital can only be channeled outside of a country through trade. It doesn't capture the movement of capital transferred abroad by the mean of banks, briberies, corruption, or the smuggling of goods (Schneider 2001).

For our study, we will consider capital flight as a rapid and significant outflow of assets and money from an economy to another or from a region to another, usually in a context of political and economic instability due to events like inflation or hyperinflation, a sharp loss in value of a currency (which triggers fear of future devaluation), a fall in the price of an essential commodity, an adverse law enactment like an increase in the tax or income profit.

1.2 The main determinants of capital flight

Throughout the years, many studies have tried to highlight the main determinants of capital flight. Mainly, they couldn't find a consensus. From one study to another, the determinants identified as crucial for expanding capital flight are different. Indeed, the main determinants for a country vary from one country to another, from year to year, or from period to period. This situation makes it difficult to assert with certainty which determinants identified in the literature are the most important in expanding the capital flight. Nonetheless, various studies have identified some determinants considered good indicators of how capital flight takes roots and develops.

A. Ndiaye (2009), using the data from 15 countries in the franc zone, found out that poor government and inferior institution quality are significant determinants of capital flight through channels like external debt, aid, and natural resources. The author also found out that the level of development of the financial system and past capital flight could arise capital flight.

Lensik (1992), using the data from six African countries, found out that the rise of government and government-guaranteed foreign debt and the overvaluation of the real exchange rate are the most critical factors that explain capital flight in African countries.

Davies (2007), using a panel dataset of at least 77 countries in which at least 35 experienced one episode of war between 1971 and 2000, found that post-war inflation increases annual capital flight flows by about 0.005 to 0.01 percentage points of GDP.

Anetor O. (2019), using data from sub-Saharan African countries covering the period from 1981- 2015, found out that external debt is the main factor that drives up the capital flight.

Suhas and Kusum (1989), using quarterly data from Argentina, Brazil, and Mexico covering the period from 1977 to 1986, discovered that factors like interest and inflation rates, the degree of currency overvaluation and the environmental risk embodied in frequent regime changes, and the debt crisis of 1982 are the main factors that could explain capital flight.

Marcella (2002), working on capital flight in Russia, found out that the main determinants of capital flight in Russia are macroeconomic instability, variability of government policy, weak protection of property rights and savings, a fragile banking system, high and unevenly enforced taxes, and corruption.

Ajayi (2012) and Pastor (1990) observed that four theories were the key to capital flight research. They were the investment diversion theory, debt-driven capital flight theory called debt overhang theory, and tax depressing theory, and Austerity generating theory.

Cheung and Qian (2010) considered the empirical causes of China's capital movement by using trimestral data covering 1999 to 2008. The practical outcome showed that the outflow of capital could be perceived as a result of alterations due to the political structure.

Choong et al. (2010) examined the influence of debts and economic growth in Malaysia for an empirical period of 1970 to 2006. They similarly used different forms of obligations other than external debt especially long-term debt, short-term debt, total debt service, and multilateral debt. The empirical results explained that a surge in the level of external debt impacted the economic performance of countries with established financial systems and higher success in captivating private capital influxes rather than capital outflows.

Brada et al. (2011) assessed capital flight from seven Commonwealth countries. They used data from 1995 to 2005 and Ordinary Least Square (OLS) panel regression to

conduct the study. They found out that political factors affecting the expected return on domestic investments could be grasped from the country's policy score variable.

Kueh et al. (2010) used the Dickey-Fuller unit root test, the Johansen and Juselius cointegration test, and the Granger causality test based on the error correction model studied between direct investment away of Singapore and a few of the causes under the research. The outcomes of the analysis showed that the exchange rate could explain the capital outflow in Singapore.

Using a panel of 29 African countries, Effobi and Asongu (2016) investigated the consequences of terrorism on capital flight based on data from 1987 to 2008. They found out that terrorism has a positive effect on capital Flight.

With the same idea, Alam and Rahim (2010), running a study on Bangladesh, identified political instability as the distinct major cause of capital flight while growths in corporate income taxes increase real interest rate differentials between the capital heaven countries and Bangladesh and reduce GDP growth rates and consequently contributing to capital flight.

Makochekwanka (2007) analyses the determinants of capital flight from Zimbabwe, covering 1980 to 2005 using the Ordinary Least Square (OLS) model. He found out that external debt, foreign direct investment inflows, and the change in foreign reserves are the main determinants of capital flight in Zimbabwe.

Erbe (1985), investigating capital flight from developing countries, identifies overvalued currency, High taxes, fear of expropriation, Price controls, Import restrictions, political instability as the main determinants in those countries.

From all the information collected from past articles and researches on the critical determinants of corruption, we can conclude that the most frequent determinants

highlighted by the studies are macroeconomic instability, rate of return differentials, government and institutional quality, political risks and war, external debt and uncertainty of public policies. Factors like past capital flight, capital inflows, financial development, exchange rate overvaluation, and inflation rate are often encountered (A. Ndiaye 2009). Table 1 recapitulates the different determinants that we were able to find in the literature.

Table 1: Determinants of Capital Flight identified by previous researchers

Authors	Years	Determinants of Capital Flight Identified
Khan and Haque	1987	Overvaluation of the exchange rate, fiscal deficits, risk factors, and external incentive
Cuddington	1986	Overvaluation of the exchange rate, foreign debt
Dooley	1986	Inflation
Cern, Rish, and Saxene	2005	Macroeconomic policy variables, Institutional quality
Eaton	1987	Budget constraints, tax obligations
Conesa	1987	Lack of economic growth, exchange rates, high foreign interest rates, inflation, fiscal deficit, low domestic real interest rate
Mohan Jr.	1991	Exchange policies, financial crises
Mohammed and Finoff	2004	Net capital flows, racism, fear, loss of power
Ajayi	1992 1997	Inflation, fiscal deficit, exchange rate misalignment, financial repression, trade faking
Salisu	2005	Oil and mineral resource wealth
Lester	1996	Foreign debt, real interest differentials, socio-political instability
Almounsor 2004)	2004	Natural resource exporting rents, trade misinvoicing,

		military-controlled government
Gunter	1991	The inward flow of drug money
Gibson and Tsakalotos	1993	Political risk, expected depression
Fatehi	1994	Political Instability
Lensik, Hermes and Murinde	1998	Political risks, real effective exchange rate
Onwioduokit	2000	Domestic inflation, availability of capital, Parallel market premium, competitive growth rate
Dornbusch	1985	exchange rate misalignment, sizeable fiscal deficit
Walter	1987	national policy shortcomings, political, economic instability unfavorable tax climate
Pastor	1989	exchange rate misalignment
Schineller	1997	Financial and current account deficit, appreciated exchange rate, high inflation rate, unclear and overreaching deregulations
Alam and Quazi	2003	Political uncertainty, an increase of corporate income taxes, higher real interest rate differentials between countries, and worse growth of domestic product
Beja	2007	political crises, lack of confidence in government, corruption, the unwillingness of investors to domestic investing
Ndikumana and Boyce	2011	Existence of widespread debt, budget deficit, taxation
Abduzayed	2012	Lagged of capital flight, external debt, FDI, real GDP growth rate, and uncertainty
Maski and Wahyudi	2012	FDI
Fisher	1993	Inflation, fiscal Balance, economic growth, current

		account position, and exchange rate movements
Olopoenia	2000	Inflation
Nyoni	2000	Inflation, growth rate differentials
Hermes and al.	2002	Economic growth rate
Boyce	1992	External debt
Collier et al.	2001	External debt
Murinde et al.	1996	Overvaluation of interest rate
Cheung and Qian	2010	Distortions due to the political structure
Choong et al.	2010	External debt
Brada et al.	2011	Political risks
Kueh et al.	2010	Exchange rate
Effobi and Asongu	2016	Terrorism
Liew et al.	2016	Political risk
Kunieda, Okada and Shibata	2014	Capital flight
Puyn and An	2016	The global financial crisis, business cycle co-movements, local fundamental factors, investment channels
Ndiaye	2011	Poor government, bad institution quality, external debt, aid, and natural resources
Victor A.B. Davies	2007	Post-war inflation
Anetor F.	2019	External debt
Suhas and Kusum	1989	Interest and inflation rates, currency overvaluation, political risk, a debt crisis
Marcella M.	2002	Macroeconomic instability, variability of government policy, weak protection of property rights and savings, fragile banking systems, taxes, and corruption
Seung-Gwan B. and Doo Yong Y.	2008	Political Risks, Financial Incentive for Capital Flow
Erbe	1985	Overvalued currency, Rumor of devaluation, High taxes, Fear of expropriation, Price controls, Import restrictions, political instability

Makochekanwa Albert	2007	External debt, foreign direct investment inflows, foreign reserves
Waleru	2016	political instability, high fiscal deficits, high interest rate, and high profile external debt servicing GDP ratio

Sources: (Bakare 2011), (Zobeiri et al. 2015), (Zainad Said 2009), (Lawal et al. 2017),(OKOLI, M. and AKUJUOBI 2009), author's research

1.3 Economic growth and capital flight in the literature

Economic growth can be defined as the increase in goods and services in a country over a specified period. It is the most used measure to assess the performance of an economy because it is a vital indicator of the health of the economy. Capital flight is believed to harm economic growth as it deprives the economy of necessary capital that can be invested to produce goods and services. Nevertheless, it is only recently that the relationship between capital flight has attracted the interest of researchers. Before that, the majority of the studies performed only scrutinized the main determinants of capital flight. However, for many years now, many researchers have been investigating the relationship between capital flight and economic growth using various methods and subjects of interest. We noticed that the great majority of the studies have been focused on developing countries, namely African economies.

Ndiaye A. (2014) has examined the effect of capital flight on the countries' economic growth performance from the franc zone in Africa covering the period from 1970-2010 and using the generalized methods of moments. The results showed that capital flight significantly decreases economic growth in the franc zone and considerably endangers future growth prospects.

Maski and Wahyudi (2012) have applied the Granger causality test to evaluate the causality relation between capital flight and economic growth in Indonesia from 2000-2009. They found that capital flight has an impact on economic growth.

Akanni (2014) investigates how indebtedness and capital flight have influenced the growth of 14 western African countries from 1970 to 2008. The used method is the generalized methods of moments (GMM). The estimates were significant and negative, which proves the negative effect of capital flight.

Refai, Abdelhadi, and Aqel (2015) analyzed the relationship between illicit financial flow, economic and capital flight over the period 2000-2014. They used the granger causality model. The results obtained display a negative and significant relationship between economic growth and capital flight.

Ndikumana (2014) examined the impact of capital flight and tax havens on investment and growth. The results of the study exhibit a negative relationship between capital flight and investment, which in turn affects the overall development.

Bredino (2018) inspected the impact of capital flight on economic growth in Nigeria using an econometric approach. They find out that capital flight adversely impacts the GDP while exchange rates positively impact the GDP, according to apriori expectation.

Gusarova (2009) explored the impact of capital flight on economic growth for a set of 139 countries covering the period 2002-2006. She found out that capital flight hurts economic growth even though the results are not robust because of the region or year effects.

Cervena (2006) also investigates the effect of capital flight on long-term economic growth for selected 75 developing countries. The author performed a pooled cross-section analysis controlling for the fixed effects with the generalized least squares method. The study results showed that countries with more capital flight have a slower growth rate than others.

Zobeiri, Roshan, and Shahrazi (2015) conduct a study to evaluate the impact of capital flight on economic growth in Iran using the ARDL model. They found out that capital flight negatively impacts the economic growth in Iran.

The following table summarizes the different studies on the impact of capital flight on economic growth and their results:

Table 2: Capital Flight and Economic growth in the literature

Author	Year	Model	Impact of capital flight on economic growth
Ndiaye	2014	Generalized method of moments	Capital flight reduces economic growth
Wahyudi	2016	Granger Causality test	Capital flight has an impact on economic growth
Akanni	2014	Generalized method of moments	Capital flight is significant and harms economic growth
Refai	2015	Ordinary Least Square and Granger Causality Test	Negative significant relationship between economic growth and capital flight
Ndikumana	2014	Panel Regression	Negative relationship between capital flight and economic growth
Bredimo	2018	Artificial Neural Network and Ordinary Least Square	Capital flight harm GDP
Gusarova	2009	Panel Regression	Capital flight has a negative but not robust impact on economic growth
Cervena	2006	Generalized Least Square	Countries with higher capital flight have a slow rate

Zobeiri et al.	2015	Auto Regressive Distributive Lag Model	Capital flight negatively impacts economic growth
Beja	2007	Comparative analysis	Capital flight reduces the quality of long-run economic growth
Forgha	2008	Two stages least square	Capital flight harms economic growth
Bakare	2011	VAR model	Capital flight limits economic growth
Okoli	2008	Ordinary Least Square model	Capital flight negatively impact the economic development

Source: (Zobeiri, Roshan, and Shahrazi 2015)**,** Author's research

CHAPTER 2: THE MAGNITUDE OF CAPITAL FLIGHT

2.1. The Measurement of Capital flight

Knowing what capital flight is and its main determinants in the literature, we have to examine how to measure capital flight from a country. It is interesting to remark that the estimates of capital flight will heavily be influenced by the underlying aspect of the

definition considered for the calculation. So different models have been developed for calculating capital flight as there is no consensus on a general model for quantifying the phenomenon. According to Yalta (2009), there are five methods available for the calculation of capital flight. Those methods are the world bank residual model (World Bank and Erbe 1985), the Dooley method (Dooley 1986), the trade misinvoicing model (Bhagwati 1964), the hot money model (Cuddington 1986), the asset method (Hermes and Lensink 1992). But to the five models identified by the author, we can add The Morgan Guaranty Trust model (Morgan Guaranty 1986), the Net Errors and Omissions model, and the modified World Bank residual model (Ndikumana and Boyce 2008). It is conceivable to classify these methods into two groups: the direct and indirect method group. First, the direct method group comprises the Hot Money model, the asset method, and the net errors and omissions model. Second, the indirect method group encompasses the World Bank Residual model, the Dooley method, the trade misinvoicing model and the modified World Bank residual model.

The indirect methods allow the calculation of capital flight using the balance of payments statistics. They evaluate capital flight indirectly by comparing the sources of capital entering the country (i.e., net rises in foreign indebtedness and net inflows of FDI) on the first hand with its usages on the other (i.e., current account deficit, building up of official foreign reserves, and outflows of private capital).

The direct methods are more straightforward as capital flight is obtained directly from the Balance of payments.

Table 3: The methods of measurements of capital flight and classification

Methods	Classification	Author	Year
The World Bank Residual Model	Indirect Method	The World Bank and Erbe	1985
The Dooley Method	Indirect Method	Michael P. Dooley	1986

The trade misinvoicing model	Indirect Method	Bhagwati	1964
The Morgan Guaranty Trust Model	Indirect Method	Morgan Guaranty	1986
The Hot Money Model	Direct Method	Cuddington	1986
The asset method	Direct Method	Hermes and Lensink	1992
Modified World Bank residual model	Indirect method	Ndikumana and Boyce	2008

Source: (Yalta 2009)

2.1.1 The World Bank and Erbe Residual Model

The residual model developed by the World Bank (1985) is the most famous and used method by the different researchers in the literature. It is based on the databases of the World Bank and the International Monetary Fund (IMF) to estimate the size of illicit financial flow. The idea of the model is to compare the capital inflows (foreign direct investment, external indebtedness) of a country against their uses knowns as capital outflows (current account deficit, foreign reserves variations). The gap between the capital inflows and their services is considered as the amount of capital flight. When the sources of capital exceed the uses, we have an outward capital flight, and in the reverse case, we have an inward capital flight. The formula of the model is as follow:

$$KF = (\Delta ED + FDI) - (CAD + \Delta FR)$$

Where KF is capital flight, ΔED is the change in the gross external debt from the World Bank, and CAD is the current account deficit, ΔFR is the increase in foreign reserves.

We have found different variants of the formula in the literature:

- $KF = \Delta ED + FDI + CAS + \Delta FR$
- $KF = \Delta ED + FDI + CAB + \Delta FR$

Where CAS refers to current account surplus and CAB is the current account balance.

2.1.2 The Morgan Guaranty Model

This model developed in 1986 is a variant of the World Bank Residual Model. The only difference in this model is that it includes a new element; the change in short-term foreign assets of the domestic banking system. This addition allows controlling for the capital flight that could originate from the domestic banks. According to the Morgan Guaranty model, capital flight can be calculated as follow:

$$KF = \Delta ED + FDI + \Delta FR + \Delta B$$

Where KF is capital flight, ΔED is the change in the gross external debt from the World Bank, CAD is the current account deficit, ΔFR is the change in foreign reserves, and ΔB denotes the difference in the short-term foreign assets of the domestic banking system.

2.1.3 The Dooley Method

The main objective of the Dooley Method is to separate 'normal' capital flows from 'abnormal' capital flow. Dooley (1986) defines capital flight as all the outgoing capital movements motivated by a desire to escape the control of local authorities and generate no profit for them. This method is based on the capital outflows identified in the balance of payments accounts. The model is performed gradually through different stages. The first step consists of subtracting errors and omissions. The next step is to calculate the difference between the stock of external debt (obtained from the World Bank data) and

the external borrowing flows (retrieved from the Balance of payments). The difference is then added to the income in private sector foreign assets (estimates), and the absolute difference represents the acquisition of foreign assets by the private sector. Finally, the last stage is the computation of the stock of external assets based on a market interest rate. The gap between the two measures of external assets is the total stock of capital flight, and the year-to-year difference is the estimation of capital flight. The different steps and formulas used for the calculations are as follow:

First stage: Amount of total Capital Outflow

$$TKO = FB + FI - CAD - \Delta FR - NEO - \Delta WBIMF$$

TKO represents total capital outflows, FB is foreign borrowings, and NEO is Net Errors and Omissions. WBIMF is the difference between external debt stock by the World Bank and foreign borrowing by the IMF (data from BOP statistics).

Second stage: Stock of external assets

The stock of external assets is:

$$ES = INTEAR/r_{us}$$

ES is external assets, r_{us} is the US deposit rate, and INTEAR is interest earnings.

Third stage: Total Capital flight

The total Capital Flight with the Dooley method is then expressed as:

$$KF = TKO - ES$$

KF is the total Capital Flight, TKO the total capital outflow, and ES the change of external assets.

2.1.4 The Hot- Money Model

The Hot Money model developed by Cuddington (1986) results from the observation that the overall measure of capital flight as the gross sum of foreign assets detained by residents is too large. For Cuddington (1986), capital flight refers to short-term speculative capital outflows. These outflows include 'Hot Money' as a response to financial crises, higher taxes burdening, an anticipated strengthening of capital controls, or devaluation of the domestic currency and hyperinflation. The researcher developed a model based on the 'Net Errors and Omission' and short-term capital. However, this model is particular because the formula used to estimate capital flight can slightly vary depending on the country and the information contained in the descriptive footnotes in the 'Balance of Payments Yearbook.' For example, in his estimation of the capital flight from Argentina, Brazil, Chile, Korea, Mexico, Peru, Uruguay, and Venezuela, (Cuddington 1986) used three variants of the model. The variant is as follow:

$$KF = NEO + STC$$

Where KF= Capital Flight and STC= Short term capital flow.

The second variant can be written as follow:

$$KF = NEO$$

The third variant used by the author is:

$$KF = NEO + STC + B$$

Where B stands for Other Bonds: Assets.

It is important to note that Hot Money refers to the money that investors quickly and regularly move between economies and financial markets to profit from the maximum short-interest rate (Chen 2020).

2.1.5 The Asset Model

The asset method is a direct method to measure capital flight. According to this method, capital flight is equal to the total stock of assets of non-bank residents at foreign banks. The data needed to calculate capital flight from this method is provided by the International Monetary Fund (IMF). This method, however, has critical flaws because it is too restrictive and is believed to underestimate the actual value of capital flight seriously. Moreover, the data for applying this model has not been released by the IMF for several years (Hermes, Lensink, and Murinde 2002).

2.1.6 The trade misinvoicing model

The trade misinvoicing model is a model based exclusively on trade statistics. It helps capture the discrepancies emerging from a wrongful report of a country's net import and net export in terms of volume, value, or commodity type. Capital flight is recorded when there is an under-invoicing of exports and over-invoicing imports (Mahmoud, Samer, and Said 2015). The trade misinvoicing model has severe drawbacks identified in the literature. On the first hand, the model is limited as it is only restrained to trade and fails to consider other aspects of capital flight through bank transfer.

On the other hand, the model is quite porous because even though it seems to record the irregularities in imports and exports perfectly, it is complicated to capture all the discrepancies in practice. As perfectly highlighted by Cuddington (1986), if the foreign-currency incomes from smuggled goods are kept overseas and cannot be detected by the local authorities, neither the smuggling of goods nor the equivalent increase in domestic possessions of assets away will be recorded. Furthermore, with falsified invoices, the actual value of the contract is not registered.

After identifying all the methods to estimate capital flight and the respective drawbacks and data availability, we will adopt the World Bank (1985) residual model for our study for the following stages in the paper.

2.1.7 The modified World Bank residual model

Boyce and Ndikumana (2001) and Boyce and Ndikumana (2003) developed a modified version of the World bank residual model by including to the original model some adjustments for trade misinvoicing and controlling for the effects of the variations in the exchange rate on the dollar value of external debt. More, their model also takes into account debt write-offs and the underreporting of remittances. The following formula expresses the model:

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

Where $\Delta DEBTADJ_{it}$ The change in the country's stock of external debt (adjusted for exchange rate variations), DFI is the net foreign direct investment, CA is the current account deficit, ΔRES is the change in foreign reserves, and MISINV is the net trade misinvoicing.

This model is very inclusive and helps to capture both the capital flight that could arise from the movement of capital and the one that results from discrepancies in trade invoicing.

2.1.8 The modified Net Errors and Omissions model

Net Errors and omissions constitute a residual category needed to ensure that the accounts in the balance of payments sum to zero (https://datacatalog.worldbank.org, 2021).

It is the difference between the financial account and the current and capital account. According to the Net Errors and Omission model, capital flight negates the Net Errors and Omissions from the Balance of payments. The formula is as follow:

$$Capital\ Flight = -NEO$$

2.2 The estimated measure of capital flight for selected eleven developing countries:

In this part of the study we will evaluate the magnitude of capital flight for eleven developing countries from Africa, Asia, Europe and Latin America. The selected countries are Azerbaijan, Bangladesh, Benin, Cameroon, Costa-Rica, Georgia, Haiti, Honduras, Indonesia, Kenya, and Ukraine. Our data cover the period from 2000 to 2018. In the previous section, we have already presented the different models that have been developed to estimate capital flight. For our study, having considered the past studies, we have opted for using two distinct models. We first estimated capital flight using the World Bank residual model (World Bank and Erbe 1985) and then the NEO (Net Errors and Omission) model. In recent studies, The World Bank and Erbe's (1985) model has been used the most. For example, Zobeiri et al. (2015), Cervena (2006), Gusarova (2009), and Lawal et al.(2017) have all used the residual model in their research to calculate capital flight.

Meanwhile, Refai, Abdelhadi, and Aqel (2015) used the Net Errors and Omissions estimates to evaluate the impact of capital flight on economic growth in Jordania. The formulas we used for all the calculations can be found in the previous section. These two models have the advantage of allowing us to apply simple measures on top of very accessible data. It was essential for us to estimate the capital flight from selected countries from

2000-2018 to obtain the data needed for the next part of the study. The following tables recapitulate the results of our calculations for Benin, Kenya, and Cameroon country.

2.2.1 Estimates with the World Bank Residual Model

In this section, we present the results of our estimates of capital flight for the eleven countries included in the study. The results of our calculations are displayed in the following tables:

Table 4: Capital Flight from Azerbaijan- World Bank Residual Model

YEAR	CURRENT ACCOUNT BALANCE	FOREIGN DIRECT INVESTMENT	EXTERNAL DEBT	CHANGE IN EXTERNAL DEBT	FOREIGN RESERVE	CAPITAL FLIGHT
2000	-167773000	129937000	1585215993	296152384,3	132890028,50	125426355,80
2001	-51755000	819579000	1515370498	-69845495,7	325587886,70	372390617,60
2002	-768373000	2024577000	1691663803	176293305,3	73374965,11	1359122340,19
2003	-2020854000	4007330000	1941119870	249456067,4	34210516,14	2201721551,26
2004	-2589213000	4719107000	2169229387	228109517	123822595,03	2234180921,97
2005	167315000	4476396000	2247015897	77786509,9	316979201,06	4404518308,84
2006	3707605000	4485966000	2796572674	549556776,6	160501406,54	8582626370,06
2007	9018885000	4594234000	3899058337	1102485663	1342587793,41	13373016869,49
2008	16452805000	3986807000	4490454222	591395885,2	1781322446,26	19249685438,94
2009	10174876000	2900030000	4548547550	58093327,6	2459504299,46	10673495028,14
2010	15040436000	3352997000	7251435123	2702887573	-962986222,24	22059306795,34
2011	17144935000	4485120000	7687663766	436228643,2	1370028919,29	20696254723,91
2012	14975987000	5293250000	10826841366	3139177600	4185529225,39	19222885374,81
2013	12231737000	2619437000	10573141207	-253700159,4	1105832066,89	13491641773,71
2014	10208803000	4430466000	12097565024	1524423817	2232675908,06	13931016909,04
2015	-222495000	4047630000	13318815777	1221250753	213520808,65	4832864944,35
2016	-1363404000	4499666000	14590007639	1271191862	-8428845766,94	12836299629,14
2017	1684559000	2867487000	15300924032	710916392,8	-992410843,61	6255373236,41
2018	6051077000	1402998000	16211029570	910105537,8	1294781737,07	7069398800,73

Source: World Bank (https://databank.worldbank.org/) and Author's calculations

Table 5: Capital Flight from BENIN- World Bank Residual Model

YEAR	CURRENT ACCOUNT BALANCE	FOREIGN DIRECT INVESTMENT	EXTERNAL DEBT	CHANGE IN EXTERNAL DEBT	FOREIGN RESERVE	CAPITAL FLIGHT
2000	-80783378,75	-12794843,61	1399684852	-88804347,2	-20321991,63	-202704561,2
2001	-74992412,6	16739539,34	1470316527	70631675,3	-68800321,61	-56421519,57
2002	-156932556,3	-19395622,7	1608563111	138246583,8	-261783355	-299864950,3
2003	-331950912,9	10638088,26	1485978703	-122584407,4	-100234208,8	-544131440,8
2004	-289010635,8	-40774605,06	1620347439	134368735,8	-299300091	-494716596,1
2005	-226174696,2	-8788860,127	1559629285	-60718154,4	-51634026,02	-347315736,8
2006	-217198381,2	-12363482,36	662231196,3	-897398088,4	-1117068686	-2244028638
2007	-534763829	139189943	904957119,7	242725923,4	-177542022,1	-330389984,7
2008	-538190533	48210757,85	999435672	94478552,3	-148887022,2	-544388245
2009	-651546427,8	-18807407,38	1327553869	328118197	-423251960,6	-765487598,8
2010	-530854983,7	53507087,74	1598555777	271001908,1	-294432496,9	-500778484,7
2011	-516838833,5	161302390,8	1866403076	267847298,9	-531817791	-619506934,7
2012	-576935937,9	281548556,3	1697688750	-168714325,8	-394844096	-858945803,4
2013	-673366862,3	360343380,3	2024309007	326620257	-52731019,25	-39134244,21
2014	-886093255,8	405737328,6	2055433484	31124476,9	106114616,4	-343116833,9
2015	-679200532,3	149755663,3	2191225853	135792368,6	79565511,33	-314086989,1
2016	-354241236	131790853,8	2277862242	86636389,5	-564894687,6	-700708680,3
2017	-531029511,4	200902719,3	2816963964	539101722,1	444307544,2	653282474,3
2018	-648780156,1	194073683,2	3607450244	790486279,6	234779044,8	570558851,4

Source: **World Bank (https://databank.worldbank.org/) and Author's calculations**

Table 6: Capital Flight from Bangladesh- World Bank Residual Model

YEAR	CURRENT ACCOUNT BALANCE	FOREIGN DIRECT INVESTMENT	EXTERNAL DEBT	CHANGE IN EXTERNAL DEBT	FOREIGN RESERVE	CAPITAL FLIGHT
2000	-305831650,6	280384629,7	15600564697	-849098652,2	-30740499,77	-905286172,9
2001	-535424727,7	78527040,08	14978802401	-621762296,3	-143915948,4	-1222575932
2002	739250272	52304931,04	16687587182	1708784781	497431950,2	2997771935
2003	131637632	268285231,8	18440377575	1752790393	888506580	3041219837
2004	-278679383,7	448905400,7	19714073692	1273696116	503432530,4	1947354664
2005	-173741536	813321971,9	18503086056	-1210987635	-416086934,8	-987494134,2
2006	1196063083	456523167,7	20160027978	1656941921	865292692,9	4174820865
2007	856792635	651029738,1	21522562894	1362534916	1372797873	4243155163
2008	926185438,6	1328422987	23341694040	1819131146	1018740926	5092480497
2009	3556126394	901286583,1	25372390871	2030696832	4334647796	10822757605
2010	2108502537	1232258247	26566693370	1194302499	1019718688	5554781970
2011	-161842538,7	1264725163	27041276970	474583599,5	-1813883048	-236416823,9
2012	2575500681	1584403460	28273136807	1231859837	3543374757	8935138735
2013	2058473420	2602962095	31502704575	3229567768	5276779004	13167782288
2014	755790761,7	2539190940	32661869973	1159165398	4571033813	9025180913
2015	2579621009	2831152765	35959560327	3297690354	5416753490	14125217618
2016	931393868	2332724781	38474306271	2514745944	5094740777	10873605370
2017	-5984992476	1810395804	46812349419	8338043149	628278669,5	4791725146
2018	-7095172568	2421626238	52131554986	5319205566	-1057683832	-412024595,8

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Source: **World Bank (https://databank.worldbank.org/) and Author's calculations**

Table 7: Capital Flight from Cameroon- World Bank Residual Model

YEAR	CURRENT ACCOUNT BALANCE	FOREIGN DIRECT INVESTMENT	EXTERNAL DEBT	CHANGE IN EXTERNAL DEBT	FOREIGN RESERVE	CAPITAL FLIGHT
2000	-218400391,2	159708006,2	10561281361	-204103408,2	-265736573,9	-528532367,1
2001	-347657566,8	-11668387,38	9748844313	-812437048,4	-118582261,6	-1290345264
2002	-439310637,8	505256043,3	10285903206	537058893	40026265,61	643030564,1
2003	-597885392,1	334888535,9	11408147626	1122244420	-271066055,8	588181507,6
2004	-416181816,1	67984855,64	10855782708	-552364917,4	-435085557	-1335647435
2005	-495561604,2	243601636,5	7700089818	-3155692890	-396859294,3	-3804512152
2006	193518455,4	59122291,34	3418558776	-4281531042	1617793142	-2411097153
2007	286074705,4	189581294,6	3085552121	-333006655	820451310,7	963100655,8
2008	-451560496,2	20995513,74	2835553588	-249998532,3	268122927,4	-412440587,3
2009	-1123176668	746276649	3237320907	401767318,5	230383778	255251077,9
2010	-857140093,1	536265313,2	3190178369	-47142538,2	7049320,524	-360967997,6
2011	-749196879,8	653266626,6	3094521348	-95657020,3	-326152368,7	-517739642,3
2012	-955933681	527363935,6	3887910777	793389428,1	118703003,4	483522686,1
2013	-1128087432	547404749,8	5177990626	1290079850	-70693305,61	638703861,7
2014	-1401974732	725854540,9	5765541169	587550542,9	130472733,8	41903086,05
2015	-1173691255	694336734,9	7304904667	1539363498	738006925,8	1798015903
2016	-1037444249	663893595,2	7826795642	521890975,2	-1224950809	-1076610488
2017	-949763043,4	814458940,9	10009769230	2182973587	407624203,3	2455293688
2018	-1409334284	765092012,8	10863980453	854211223,4	287137472,9	497106425,3

Source: **World Bank (https://databank.worldbank.org/) and Author's calculations**

Table 8: Capital Flight from Costa Rica- World Bank Residual Model

YEAR	CURRENT ACCOUNT BALANCE	FOREIGN DIRECT INVESTMENT	EXTERNAL DEBT	CHANGE IN EXTERNAL DEBT	FOREIGN RESERVE	CAPITAL FLIGHT
2000	-684555193,4	723426415,26	4692408664	477317848,4	-152934812,7	669123883,00
2001	-514265066,2	621846413,16	4886538322	194129658,4	12989979,43	288721025,95
2002	-860075342,2	723172624,77	5070865565	184327243,4	162980966,3	-115556440,38
2003	-899691788,4	774386239,76	5650888483	580022918	338854612,2	115862757,19
2004	-675040285,8	1083718486,50	5710643832	59755348,3	80288691,07	388144857,89
2005	-860047056,6	1528787464,12	6485430912	774787079,9	393470428,2	1050057059,20
2006	-938716203,6	1801002598,42	6993562814	508131902,2	1030824649	339593647,79
2007	-1498808913	2241492021,20	8410942484	1417379670	1147708626	1012354152,91
2008	-2580547378	2436112218,27	8838788690	427846206,7	-347950334,3	631361381,34
2009	-560580957,6	1614614468,45	7760168637	-1078620054	259887798	-284474340,77
2010	-1213874254	1906923793,45	8154409880	394241243,4	561140937,1	526149845,31
2011	-2265057621	2733268839,98	10271452442	2117042562	132357332,3	2452896447,92
2012	-2411089981	2696295210,68	14310369556	4038917114	2109603840	2214518503,71
2013	-2431168563	3205384976,80	17134573111	2824203555	460895581,7	3137524387,48
2014	-2453096345	3242149796,97	19722088699	2587515588	-113205657,3	3489774697,74
2015	-1921262983	2955521680,84	23588779506	3866690807	644015213,5	4256934291,09
2016	-1257276124	2620435490,62	25562670955	1973891449	-235166369,1	3572217184,30
2017	-2139761568	2868934829,44	25615909361	53238405,6	-418729652,8	1201141319,91
2018	-1890331928	2763898445,34	28369002758	2753093397	389863087,1	3236796827,45

Source: World Bank (https://databank.worldbank.org/) and Author's calculations

Table 9: Capital Flight from Georgia- World Bank Residual Model

YEAR	CURRENT ACCOUNT BALANCE	FOREIGN DIRECT INVESTMENT	EXTERNAL DEBT	CHANGE IN EXTERNAL DEBT	FOREIGN RESERVE	CAPITAL FLIGHT
2000	-175899687,6	131466678,3	1825515849	-25525842,3	10880830,73	-59078020,83
2001	-197094537,6	109871635,5	1909485070	83969221,7	-231339246,7	-234592927
2002	-216912821,5	160398660,5	2034422947	124937876,8	-200584673	-132160957,2
2003	-382208826,1	334891041,6	2148630818	114207871,1	374061120,4	440951207
2004	-356204277,4	492732940	2316620171	167989352,9	255228923,8	559746939,4
2005	-695658032,2	453107292	2151260501	-165359670,1	47059817,35	-360850593
2006	-1191302771	1171394522	2573385096	422124595,3	398883740,2	801100086,4
2007	-1992056361	1892093991	2986949884	413564788,1	321426838	635029256,4
2008	-2811210944	1602232456	7721515062	4734565178	-927398472,7	2598188217
2009	-1141145836	660800885,3	8672797230	951282168	274427688,5	745364905,7
2010	-1198803819	920915812,7	8790390910	117593680,5	-212357887,6	-372652213,9
2011	-1843079774	1170087550	10817606103	2027215193	-132262666,8	1221960302
2012	-1882741234	968196197,6	12624714164	1807108061	-848596894,4	43966130,44
2013	-955492553,2	1046562195	13603272483	978558318,2	-17021093,89	1052606866
2014	-1784183122	1836879043	14157391180	554118697	-197856127,3	408958491,1
2015	-1767022015	1735285392	14874617981	717226801,8	-459993828,4	225496350,2
2016	-1885853892	1658403920	16320114022	1445496041	-874983143,4	343062925
2017	-1305986785	1918136481	16423920740	103806717,5	-22388732,37	693567681,7
2018	-1191685474	1259706699	17326170641	902249901,2	-142086261,3	828184865,4

Source: **World Bank (https://databank.worldbank.org/) and Author's calculations**

Table 10: Capital Flight from Haiti- World Bank Residual Model

Source: World Bank (https://databank.worldbank.org/) and Author's calculations

YEAR	CURRENT ACCOUNT BALANCE	FOREIGN DIRECT INVESTMENT	EXTERNAL DEBT	CHANGE IN EXTERNAL DEBT	FOREIGN RESERVE	CAPITAL FLIGHT
2000	-59820000	13250000	1203393476	18348101,6	-56942660,87	-85164559,3
2001	-114210000	4400000	1285544239	82150762,8	-5184642,258	-32843879,5
2002	-131900000	5700000	1280698139	-4846100,2	-181406814,2	-312452914
2003	-88950000	13800000	1364909987	84211848,1	-140385989,6	-131324142
2004	-44780000	5900000	1284484872	-80425115,4	-66126997,08	-185432112
2005	-62380000	26000000	1333931158	49446286,4	-330568129	-317501843
2006	7048000	160600000	1416972000	83040842,5	-277300231,3	-26611388,8
2007	-85029000	74500000	1601590631	184618631	-190650307,8	-16560676,8
2008	-85773000	29800000	1964488511	362897879,8	-384426292	-77501412,2
2009	-204814583,8	55470000	1448420668	-516067843,5	-1128051397	-1793463824
2010	-122185676,9	178000000	959066834,3	-489353833,4	-1670357155	-2103896665
2011	-101824279,2	119000000	775845587,7	-183221246,6	-1814113210	-1980158736
2012	-323623966,9	156000000	1163440489	387594901	-729750994,1	-509780060
2013	-431148219,8	161918586,3	1569393195	405952706,5	-738983844,1	-602260771
2014	-560837856	99000000	1951930400	382537204,7	-1046046645	-1125347296
2015	-750652437,4	105680000	2096138364	144207964,3	-719960232	-1220724705
2016	-270775987,5	104900000	2167818423	71680058,8	-293413922,2	-387609851
2017	-72459348,34	374855000	2169815133	1996710,3	-343378016,9	-38985654,9
2018	-265013110,3	105000000	2219747747	49932613,2	-431431701,8	-541512199

Table 11: Capital Flight from Honduras- World Bank Residual Model

YEAR	CURRENT ACCOUNT BALANCE	FOREIGN DIRECT INVESTMENT	EXTERNAL DEBT	CHANGE IN EXTERNAL DEBT	FOREIGN RESERVE	CAPITAL FLIGHT

2000	-508263274,3	349978000	5616776613	32920443,8	-160354810,9	-285719641
2001	-478666907,6	309826700	5159558393	-457218219,8	-72836169,87	-698894597
2002	-281571254	287314900	5491495664	331937271,1	-5005418,306	332675499
2003	-552820451,2	390166272,9	5656942755	165447091	-194196259,5	-191403347
2004	-683390969,5	592120092,9	6205542461	548599706,3	505284337,3	962613167
2005	-304335008,5	601059572,2	5170226184	-1035316278	411305230,4	-327286484
2006	-382653481,2	717591908,2	3987694942	-1182531242	399879946,8	-447712868
2007	-1116156503	966926354,3	3010680924	-977014017,4	-85360309,31	-1,212E+09
2008	-2129853584	1200798087	3517193356	506512432,2	-107698502,9	-530241568
2009	-556653464,8	494497450,5	3835948443	318755086,6	-278014584,6	-21415512
2010	-804073094,4	607376418,1	4008010904	172062460,6	588400004,6	563765789
2011	-1408660827	1042571021	4419294950	411284046,7	101644460,5	146838701
2012	-1580746022	1081346796	5086125314	666830363,3	-265105387,1	-97674250
2013	-1762523570	1069029263	6867621207	1781495893	490887978,6	1578889564
2014	-1372124152	1704790710	7369414616	501793409,1	471704928,4	1306164895
2015	-979945387	1316679827	7626993494	257578878,1	307240077,5	901553396
2016	-682674236,4	1147030450	7614296900	-12696593,4	64592078,19	516251698
2017	-288253383	949955941,5	8741578894	1127281994	896563286,4	2685547839
2018	-1350217717	1442587576	9166829328	425250434,1	53058733,29	570679027

Source: **World Bank (https://databank.worldbank.org/) and Author's calculations**

Table 12: Capital Flight from Indonesia- World Bank Residual Model

YEAR	CURRENT ACCOUNT BALANCE	FOREIGN DIRECT INVESTMENT	EXTERNAL DEBT	CHANGE IN EXTERNAL DEBT	FOREIGN RESERVE	CAPITAL FLIGHT

2000	7992074100	-4550355286	1,44049E+11	-7757505874	3925597314	-390189745,4
2001	6900901091	-2977391857	1,3271E+11	-11338906798	-15039360,4	-7430436925
2002	7823542185	145085548,7	1,28444E+11	-4265889244	4957891658	8660630149
2003	8106793838	-596923827,8	1,34373E+11	5928431659	3647263947	17085565617
2004	1563009904	1896082770	1,38042E+11	3669181704	-2198027386	4930246993
2005	277544828,9	8336257208	1,42132E+11	4089981568	-2111457365	10592326240
2006	10859493594	4914201435	1,3597E+11	-6161784483	14957784452	24569694998
2007	10491041827	6928480000	1,47827E+11	11857326647	12705798860	41982647334
2008	125992416,5	9318453650	1,57916E+11	10088857008	-1918149930	17615153145
2009	10628489686	4877369178	1,79405E+11	21488510739	12505566721	49499936324
2010	5144284990	15292009411	1,98278E+11	18873647345	30342468775	69652410521
2011	1685068008	20564938227	2,19629E+11	21351030552	11855644236	55456681023
2012	-24417850938	21200778608	2,52623E+11	32993489650	214805849	29991223169
2013	-29109199017	23281742362	2,63644E+11	11020691792	-7325155116	-2131919980
2014	-27509865798	25120732060	2,92565E+11	28921613791	15248334597	41780814649
2015	-17518744569	19779127977	3,07749E+11	15184100995	-1098196626	16346287776
2016	-16952255385	4541713739	3,18942E+11	11192910282	12088691613	10871060249
2017	-16195634380	20510310832	3,53564E+11	34621830349	11585123171	50521629972
2018	-30633120324	18909826044	3,79589E+11	26024959392	-7133028387	7168636724

Source: **World Bank (https://databank.worldbank.org/) and Author's calculations**

Table 13: Capital Flight from Kenya- World Bank Residual Model

YEAR	CURRENT ACCOUNT BALANCE	FOREIGN DIRECT INVESTMENT	EXTERNAL DEBT	CHANGE IN EXTERNAL DEBT	FOREIGN RESERVE	CAPITAL FLIGHT
2000	-199391622,2	110904550,4	6147150098	-377754520,1	-7210340,454	-473451932,4

2001	-320276833,9	5302622,939	5495276586	-651873511,6	9956313,691	-956891408,9
2002	-117669073,5	27618447,06	6095869528	600592941,9	-16376846,88	494165468,6
2003	132419234,8	81738242,64	6715084651	619215122,8	425237930,8	1258610531
2004	-131773010,5	46063931,45	6916593411	201508759,8	-13118746,03	102680934,7
2005	-252316724,2	21211685,4	6489733476	-426859934,7	117199418	-540765555,5
2006	-510433478,2	50674725,18	6691670450	201936974	581298572,3	323476793,3
2007	-1032063134	729054667	7549036617	857366167,6	811321396,9	1365679097
2008	-1982580959	95584970,67	7669044524	120007907	-495285703,5	-2262273785
2009	-1688531647	116259381	8558933887	889889362,4	1117977180	435594276,7
2010	-2368666520	178064198,6	8856240084	297306196,8	141599297,7	-1751696827
2011	-3819265449	1450460112	10155961501	1299721417	-1211685467	-2280769387
2012	-4216125399	1380167160	11873346635	1717385134	1215853074	97279968,56
2013	-4842121338	1118819097	13798577601	1925230966	393724269	-1404347006
2014	-6377902130	820934459,3	16911889740	3113312139	1377941689	-1065713842
2015	-4420779165	619719962,3	19776929997	2865040257	-292950668,1	-1228969614
2016	-4034814087	678803417	21061327085	1284397088	103968419,2	-1967645164
2017	-5687486284	1266137283	26197804744	5136477659	-122840444,7	592288213,1
2018	-5047669613	1625921131	30688081446	4490276702	852669145,5	1921197366

Source: **World Bank (https://databank.worldbank.org/) and Author's calculations**

Table 14: Capital Flight from Ukraine- World Bank Residual Model

YEAR	CURRENT ACCOUNT BALANCE	FOREIGN DIRECT INVESTMENT	EXTERNAL DEBT	CHANGE IN EXTERNAL DEBT	FOREIGN RESERVE	CAPITAL FLIGHT
2000	1342000000	595000000	13915483185	-1837561443	1003774246	1103212803
2001	1324000000	792000000	22209140729	8293657544	1695231931	1,2105E+10
2002	3180000000	693000000	23485797435	1276656705	1228512276	6378168981
2003	2901000000	1424000000	25866011946	2380214512	2247564579	8952779091
2004	6911000000	1715000000	32109497694	6243485748	2523262638	1,7393E+10
2005	2534000000	7808000000	35100157139	2990659445	10724432758	2,4057E+10
2006	-1619000000	5604000000	54269247858	19169090719	2409280328	2,5563E+10
2007	-5251000000	10193000000	80811501427	26542253569	9406413575	4,0891E+10
2008	-12781000000	10700000000	99522725087	18711223661	-3025226219	1,3605E+10
2009	-1736000000	4769000000	1,05306E+11	5782973647	-11715296858	-2899323211
2010	-3016000000	6451000000	1,24527E+11	19221199070	5044903780	2,7701E+10
2011	-10233000000	7207000000	1,37134E+11	12607078143	-2453994566	7127083576
2012	-14335000000	8175000000	1,33747E+11	-3386848925	-4174244444	-1,3721E+10
2013	-16518000000	4509000000	1,46636E+11	12889127023	2004946564	2885073587
2014	-4596000000	847000000	1,26816E+11	-19820093949	-13306790960	-3,6876E+10
2015	5035000000	-369000000	1,1745E+11	-9366122830	792569040,1	-3907553790
2016	-1866000000	3967000000	1,14998E+11	-2452527963	1367995787	1016467824
2017	-3473000000	3918000000	1,22684E+11	7686361164	2561004022	1,0692E+10
2018	-6432000000	4576000000	1,2104E+11	-1644205876	2878761889	-621443986

Source: **World Bank (https://databank.worldbank.org/) and Author's calculations**

2.2.2 The estimation of capital flight from Benin, Cameroon, and Kenya with the Net Errors and Omissions model:

This section presents the measure of capital flight for our three chosen developing countries based on the Net Errors and Omissions model. We will then give a brief comparison of the results obtained. The results of the estimates are presented in tables 15 and 16

Table 15: Estimates-Net Errors and Omissions (first part)

YEAR	AZERBAIJAN	BANGLADESH	BENIN	CAMEROON	COSTA RICA	GEORGIA
2000	-	- 271 153 601,68	- 7 694 929,06	- 84 889 640,71	- 196 598 085,13	- 5 545 559,05
2001	-	96 099 826,53	- 4 362 752,68	162 745 597,23	- 135 248 646,52	- 11 095 813,12
2002	114 318 000,00	356 122 465,80	- 3 111 069,41	147 424 463,16	- 256 738 801,41	- 12 567 821,24
2003	135 060 000,00	- 76 436 788,87	- 182 800 397,48	- 117 683 226,24	- 249 861 049,68	3 364 777,70
2004	54 090 000,00	- 39 652 667,37	10 326 772,71	- 64 286 089,61	137 466 009,57	- 15 288 406,05
2005	84 601 000,00	552 562 824,86	- 31 444 735,97	46 352 986,94	313 413 379,86	- 26 519 384,89
2006	260 220 000,00	1 825 697 133,88	- 47 461 301,32	- 183 128 459,71	- 333 166 486,48	60 595 675,88
2007	372 220 000,00	1 520 020 733,29	- 104 641 603,94	- 180 501 282,43	- 242 786 534,35	38 365 978,24
2008	834 293 000,00	3 519 321 740,19	- 41 733 179,98	- 205 091 909,20	418 304 399,62	65 367 272,84
2009	1 455 833 000,00	2 238 088 631,83	- 12 196 640,90	- 165 529 850,38	- 127 856 823,32	- 22 860 838,31
2010	975 287 000,00	4 458 855 981,50	- 38 379 588,14	- 183 870 361,78	481 603 805,05	76 511 373,03
2011	- 586 648 000,00	2 518 695 058,32	- 18 746 813,29	96 948 823,84	629 185 320,95	51 712 049,48
2012	1 919 407 000,00	2 269 028 684,42	- 18 398 557,21	159 897 539,64	- 330 702 057,19	135 381 372,46
2013	1 888 993 000,00	1 770 764 570,62	- 16 412 869,35	147 724 922,97	660 267 837,70	72 265 213,93
2014	2 810 283 000,00	1 090 845 482,92	- 14 651 063,51	86 047 277,29	530 837 907,38	110 382 571,20
2015	2 087 791 000,00	749 598 513,52	- 3 842 278,51	4 042 158,79	717 249 084,06	72 512 646,08
2016	- 3 625 857 000,00	1 223 203 141,43	- 3 985 281,17	13 744 006,19	376 207 975,33	- 8 043 727,41
2017	- 387 789 748,10	494 274 490,17	- 6 866 862,40	31 530 031,96	466 110 324,04	29 355 519,28
2018	- 646 396 918,49	772 210 703,46	- 5 992 296,74	25 991 273,17	7 584 437,03	91 963 146,51

Source: Author's calculations and World Bank (https://databank.worldbank.org/)

Table 16: Estimates-Net Errors and Omissions (second part)

YEAR	HAITI	HONDURAS	INDONESIA	KENYA	UKRAINE
2000	- 82 759 000,00	29 959 980,05	- 3 821 907 925,47	126 694 121,84	- 76 000 000,00
2001	- 48 240 000,00	31 688 708,36	- 713 605 956,51	- 129 977 796,60	92 000 000,00
2002	- 40 739 550,00	- 33 384 044,58	1 693 513 756,90	- 178 629 364,65	897 000 000,00
2003	- 98 943 890,00	- 22 920 663,72	3 502 927 922,52	256 911 749,56	860 000 000,00
2004	- 62 287 890,00	- 47 470 853,24	3 106 044 724,47	68 905 177,71	- 128 000 000,00
2005	- 13 552 510,00	189 363 521,66	178 796 317,08	233 546 192,63	- 104 000 000,00
2006	- 39 470 150,00	322 690 496,48	- 625 269 959,58	- 242 288 040,02	- 76 000 000,00
2007	- 141 514 600,00	319 197 843,14	1 368 070 000,00	257 949 938,10	480 000 000,00
2008	13 011 542,85	- 482 765 400,76	238 323 912,78	- 300 514 919,71	- 526 000 000,00
2009	167 714 988,35	122 296 784,69	2 974 813 183,91	- 74 460 994,82	- 343 000 000,00
2010	- 128 143 579,16	140 593 472,93	1 327 191 796,65	- 175 442 246,74	- 1 351 000 000,00
2011	73 485 089,22	- 236 979 578,41	3 464 656 329,84	736 486 347,51	- 971 000 000,00
2012	- 7 869 363,06	189 129 525,68	977 585 123,83	379 148 704,60	- 1 393 000 000,00
2013	455 777 706,51	290 439 810,27	186 658 197,88	150 429 500,33	640 000 000,00
2014	- 18 348 268,53	- 24 314 628,62	2 184 229 890,26	- 159 614 319,43	- 533 000 000,00
2015	145 856 991,71	143 757 721,20	439 039 680,92	- 10 632 825,54	339 000 000,00
2016	- 142 234 739,37	259 646 006,49	305 233 472,61	1 243 752 466,98	575 000 000,00
2017	181 799 229,88	531 629 008,39	950 363 908,94	177 525 159,09	- 422 000 000,00
2018	54 535 297,53	- 324 766 840,28	1 717 347 343,00	897 490 495,77	- 1 671 000 000,00

Source: Author's calculations and World Bank (https://databank.worldbank.org/)

Comparing the estimates of capital flight obtained from using the two different methods allows one to note that there is in most cases a big gap between the two values predicted by the models. We can see that the estimates of capital flight obtained with the Net Errors and Omissions are often undervalued.

However, in the rest of our study, we will use both estimates to compare our results. Interestingly, the method used by most of the researchers in the literature is the World Bank Residual model.

CHAPTER 3: EMPIRICAL FRAMEWORK

3.1 Methodology and Data Description

This work is built on the ideas developed by previous researchers on our topic. Our research aims to assess the effects of capital flight on the economic growth prospect of a country. In the preceding chapter, we calculated the capital flight from three developing African countries each year from 2000 to 2018 because there are no capital flight estimates from those countries covering the whole period of interest, and the measures of the phenomenon were needed to conduct our analysis. The next phase in our study is to choose a model that will allow us to connect capital flight to economic growth.

The model designed for the study is inspired by the works from Gusarova (2009) and Cervena (2006). We will run our model using data from 11 selected countries: Azerbaijan, Bangladesh, Benin, Cameroon, Costa-Rica, Georgia, Haiti, Honduras, Indonesia, Kenya, and Ukraine. For each selected country, we calculated capital flight using both the World Bank Residual model and the Net Errors and Omissions model. Our analysis will be conducted for the first time with the results obtained from the calculations from the World Bank Residual model and the second time with the results from the Net Errors and Omissions model. The last part of our work will be a comparison of the results obtained with each model.

3.2 Econometrical model and Data sources

Our data consist of observations for eleven countries throughout eighteen years. This type of dataset is named panel data. A panel data is a kind of data in which observations on different subjects called ‘entities’ are made at different periods.

Based on the studies previously developed in the literature, the most suitable econometrical model is the 'Panel Regression model.' This model has been used by (Cervena 2006), (Gusarova 2009), and (Ndikumana 2014) in their analysis. It helps to monitor the dependencies of unobserved, independent variables on a dependent variable allowing us to control omitted variables. The general model specification is as follow:

$$\boldsymbol{Y_{it} = X_{it}\beta + \alpha_i + u_{it}}$$

t=1, 2, 3…..T is the time, and i=1, 2, 3……N refers to the entities

Where:

Y is the dependent variable

X is the independent variable

β is a coefficient

α is the personal effects, and μ represents the idiosyncratic error.

There are three forms of regression for panel data:

- The first type of regression is the pooled Ordinary Least Square regression Pooled OLS (Ordinary Least Square) model. It analyses a dataset like ordinary cross-sectional data and doesn't consider the time and individual dimension (Alam 2020).
- The second type of data is the fixed effects regression. A type of regression employed in a panel data frame that permits the control of time-invariant unobserved individual characteristics correlated with the independent variable (Nunziata 2019).
- The third type is the random effects regression. This type of regression, also named variance components model, is a type of panel regression where parameters

are random variables. It supposes that the data under analysis are drawn from a hierarchy of different populations whose dissimilarities relate to that hierarchy. A random-effects model helps control for effects that are invariant over time but change from one individual to another.

For our study, we had the choice between the fixed effect regression and the random effects regression. To choose the model that will better fit our needs, we ran the Haussmann test.

Table 17: Haussmann Test results

Chi-square	Degree of freedom	p-value
46.614	8	0.0000001817

Source: R-studio calculations

The results show that we cannot accept the null hypothesis suggesting that the random effects regression model is the best model for our data analysis. Therefore, we will use the fixed effects regression for our study to control variables that change among entities but are constant over time. The model we are going to estimate has been designed by (Gusarova 2009). It can be written as:

$$GGDP_{it} = \beta(X_{it} - \bar{X}_i) + (\mu_{it} - \bar{\alpha}_i)$$

Source: Gusarova (2009)

However, our model differs slightly from the one used by Gusarova (2009) on the first hand because we have included new variables like money supply and fixed capital accumulation in our model. These variables have been retained by (Cervena 2006) in her analysis. Other explanatory variables like the percentage change in terms of trade, the literacy rate, index of Economic right freedom, and political right index have been

excluded from the model primarily because of the lack of data. On the other hand, Gusarova's (2009) study covers 136 countries covering 2002-2006, while our study only considers 11 countries for 18 years.

3.2.1 The variables in the model and their expected effects

- **Capital flight** is a proxy of capital flight, and it measures the annual capital flight. As shown by previous studies, this variable supposedly endangers the economic growth prospect of an economy, so we are expecting this variable to have a negative coefficient.
- **GDP growth** is a proxy variable that captures the annual percentage change of the GDP of a country. It is the dependent variable in our model.
- **Population** measures the annual percentage change in population growth. It is a proxy variable for the labor force. According to the economic theory, an increase in population growth is expected to benefit an economy, predicting a positive coefficient from this variable.
- **Inflation** is a variable that represents the annual inflation rate of a country. It measures the annual inflation rate in the land of interest. It is expected to harm the economy as prescribed by the economic theory.
- **The openness of trade** is a measure of a country's total exports and imports as a share of GDP. If a country's overall imports are more than the exports, this could negatively impact economic growth. However, based on previous studies, we are expecting this variable to have a positive effect.
- **Gross Capital Accumulation** is a proxy variable for capital. Previously called investment, it is expected to affect economic growth as an increase in investment positively has a positive impact on the growth of the GDP. We take this variable with

the lag because the capital accumulated in a year will affect the growth the following year (Gusarova 2009).

- **Government general consumption expenditure** captures the annual general government expenditure as a percentage of GDP. An excessive increase in government expenditure leads to a decrease in economic growth.
- **Fixed capital accumulation** is also a proxy variable for capital. This variable is believed to have a positive impact on economic growth. We take this variable with the lag because it is assumed that the capital accumulated in a specific year will affect GDP growth the following year.
- **The broad money supply** is a measure of the amount of money circulating in an economy. It is a complete method to calculate a given country's overall money supply. It comprises little money and other assets that can be effortlessly converted into cash to buy goods and services. The increase in the money supply is expected to harm economic growth.
- **The initial level of GDP** is the GDP recorded in the year 2000, taken with the logarithm. We are not expecting this variable to affect the long-term growth because it is kept constant for each year and each country. Gusarova (2009), citing Demchuk (2003), highlights that this variable helps to control for heterogeneity among the nations as it captures the original state of the economy.
- **The initial level of life expectancy** is the life expectancy recorded in 2000. This variable will be dropped out in the fixed effects regression because we will keep it constant throughout the study as recommended by Gusarova (2009).

We can rewrite the model to estimate as follow:

$$g\_growth_{it} = \beta_1 capital\_flight_{it} + \beta_2 ms_{it} + \beta_3 pop_{it} + \beta_4 inf_{it} + \beta_5 openness_{it} + \beta_6 investment_{it} + \beta_7 fixed\_capital_{it} + \beta_8 gov\_exp_{it} + \beta_9 Log\_GDP_{it} + \beta_{10} life\_expectancy_{it} + \alpha_i + \mu_{it}$$

With i=1, 2, 3, 4……, 11 and t=1, 2, 3, 4……, 18.

3.2.2 Data Sources

Table 18: Variables specifications and data sources

Variables	**Notations**	**Specifications**	**Data Sources**
Economic Growth	g_growth	Annual percentage growth of GDP	World Bank
Capital Flight	capital_flight	Annual percentage of Capital flight per GDP	World Bank, Central Banks (Balance of Payments), and author's calculations
Broad money Supply	ms	The total currency outside banks plus demand deposits different from the central government; savings and foreign currency deposits of resident sectors other than the central government; bank and traveler's checks; and other securities such as certificates of	World Bank

		deposit and commercial paper. Measured per GDP	
Population Growth	Pop	Annual population growth	World Bank
Inflation Rate	Inf	Annual Inflation rate	World Bank
Trade Openness	openness	Addition of exports and imports of goods and services measured per GDP	World Bank
Gross capital accumulation	investment	Add-ons to the fixed assets of the economy plus net changes in the level of inventories. It is measured per GDP.	World Bank
Fixed capital accumulation	fixed_capital	It encompasses land improvements, plant, machinery, equipment acquisitions, roads, railways, and the like, with schools, offices, hospitals, personal residences, and commercial and industrial edifices.	World Bank

		It is measured per GDP.	
Government general expenditure	gov_exp	government final consumption expenditure per GDP	World Bank
The initial level of GDP	Log_gdp	The initial level of GDP measured at the year 2000	World Bank
Initial life expectancy	life_expectancy	The expected life expectancy at birth measured annually	World Bank

Sources: **Gusarova (2009), Cervena (2006) and World Bank (https://databank.worldbank.org/)**

3.3 Findings

The estimation results from our model (with the estimate of capital flight from the World Bank residual model) exhibits overall sound effects for most of the variables. As the economic theory prescribes, inflation, broad money supply, and government expenditure are significant and negative. The same goes for the openness of trade and fixed capital accumulation which is both positive and significant. It is pretty surprising to observe that our model predicts a positive effect of capital flight on long-term economic growth. Indeed, the model suggests that a percent increase in capital flight benefits the economy by 0.18. This result is different from what most authors have found in the literature. However, Cervena (2006) found in her research that capital flight exhibits a positive effect on the long-run economic growth of African, East European, and Central Asian countries. Considering that most of the countries in our dataset are

from Africa, East Europe, and central Asia, this could explain our results. It is remarkable to note the dissimilarity in our results, and the other findings in the literature could arise from the differences in calculation methods, countries, and periods of interest.

Table 19: Fixed effects estimates with the World Bank Residual Model

Explanatory Variables	Estimates	Standard Error	t-value
cf_g	0.182439***	0.027242	6.6971
accumulation	-0.396042*	0.184947	-2.1414
inflation	-0.150504***	0.044596	-3.3748
population	0.158891	0.247172	0.6428
openness	0.133052***	0.025037	5.3143
money	-0.153081***	0.033818	-4.5266
gov_exp	-0.694906***	0.157101	-4.4233
fixed	0.620049**	0.197913	3.1329
R-squared	0.51207		

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

Source: **R-studio calculations**

The results obtained from the fixed effects estimates with the Net Errors and Omissio ns show a positive impact of capital flight on the countries' economies in our dataset. The model predicts that a one percent increase of capital flight per GDP will lead to a 0.559 increase in economic growth, everything else kept constant. Apart from the dive rgent result for our variable of interest, the model performs well for most of the other explanatory variables except the gross capital accumulation, which negatively affects growth according to our model.

Table 20: Fixed effects estimates with the Net Errors and Omissions Model

Explanatory Variables	Estimates	Standard Error	t-value
cf_g	0.559232**	0.183404	3.0492
accumulation	-0.242554	0.200231	-1.2114
inflation	-0.123457*	0.049438	-2.4972
population	0.091462	0.269239	0.3397
openness	0.147289***	0.027180	5.4190
money	-0.197674***	0.036244	-5.4540
gov_exp	-0.755229***	0.170918	-4.4187
fixed	0.484755*	2.2584	3.1329
R-squared	0.41995		

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

Source: **R-studio calculations**

The comparison of the results from the two regressions shows that they both exhibit similar results, a positive and significant impact of capital flight on economic growth. But, there is a difference in the magnitude of the effect predicted. What is essential to notice is that the impact of capital flight using the Net Errors and Omissions is higher than the effect predicted from the World Bank Residual Model. However, the regression model with the World Bank capital flight seems to explain the dependent variable's variations better because it has a higher R-squared.

Both of the models were tested to detect the presence of heteroscedasticity using the Breush-Pagan test. In each case, we fail to reject the null hypothesis, which means

that our models don't suffer from heteroscedasticity—tables 14 and 15 display the results of the different tests.

Table 21: Results of the Breush-Pagan test-World Bank Residual model

Breusch-Pagan	Degree of freedom	p-value
54.61	9	0.00000001445

Source: R-studio output estimations

Table 22: Results of the Breush-Pagan test-Net Errors and Omissions

Breusch-Pagan	Degree of freedom	p-value
54.61	9	0.00000001445

Source: R-studio output estimations

Similarly, we test our model for serial autocorrelation using both the Dublin-Watson test. We found out that there is a serial correlation in our model. The results of the test are shown in tables 16 and 17.

Table 23: Results of the Durbin-Watson Test-World Bank Residual Model

Durbin-Watson	p-value
1.5518	0.0004339

Source: R-studio output estimations

Table 24: Results of the Durbin-Watson Test-Net Errors and Omissions Model

Durbin-Watson	p-value
1.2877	0.0000001168

Source: R-studio output estimation

As stated above, the results obtained from our panel regression are counter-intuitive. Our assumption here is that the magnitude of capital flight from the countries in our dataset increases when there is an increase in their GDP. Naturally, we can easily assume that more capital is available when a country's GDP increases, which means more potential fleeing capital is available. This assumption raises the question of the causality between capital flight and the growth of GDP. "Does capital flight cause GDP growth?" or "Does GDP growth cause capital flight?" We were able to answer those two questions through the Granger causality test. We performed two Granger causality tests to answer our questions. The results for each test are shown in tables 14, 15, 16, and 17. The null hypothesis for each test are:

- Test 1

  H0: Capital flight does not granger cause economic growth

- Test 2

  H0: Economic growth does not granger cause capital flight

Test 1

Table 25: Test 1 Granger causality test-World Bank Residual Measure

Z-tilde	p-value
1.2766	0.2017

Source: R-studio output estimation

From the results of test 1 presented in the table above based on the World Bank residual measure estimates, we accept the null hypothesis and conclude that capital flight does not granger cause economic growth. We obtained similar results from the Net Errors and Omissions model.

Table 26: Test 1 Granger causality test-Net Errors and Omissions model

Z-tilde	p-value
1.2573	0.2086

Source: R-studio output estimation

We admit the null hypothesis and conclude that capital flight does not granger cause economic growth.

Test 2

The objective of the second Granger causality test is to check if GDP growth granger causes capital flight. The results of the test are as follow:

Table 27: Test 2 Granger Causality-World Bank Residual measure

Z-tilde	p-value
2.5496	0.01079

Source: R-studio output estimation

From the results of table 16, we reject the null hypothesis and conclude that economic growth Granger causes capital flight. The conclusion from Table 17 with the Net Errors and Omissions is the same.

Table 28: Test 2 Granger causality-Net Errors and Omissions

Z-tilde	p-value
2.5496	0.01079

Source: R-studio output estimation

Table 17 allows us to reject the null hypothesis and concludes that economic growth Granger causes capital flight.

The conclusions derived from tables 14, 15, 16, and 17 confirm our previous assumption. An increase in the GDP growth from the countries in our analysis also increases their capital flight. We think that this remark explains the result from our panel regressions.

CONCLUSION

Capital flight is one of the biggest scourges for an economy. Many authors have proved that the phenomenon is especially harmful to developing economies as it deprives them of essential financing options. Nevertheless, there is still confusion surrounding the leading causes of the problem. The objective of our study was first to identify the main determinants of capital flight and second to analyze its effects on economic growth. To achieve our goal, in the first part, we estimated capital flight for eleven selected developing economies using the World Bank residual model and the Net Errors and Omissions model. In the following part of the investigation, we ran a fixed-effects panel regression to evaluate the effect of capital flight on economic growth.

Our results clearly showed that capital flight has a positive and significant effect on the economic growth in our dataset. This conclusion differs from most of the results previously obtained in the literature.

This remark led us to question the causality relation between capital flight and economic growth. We concluded that economic growth causes capital flight and not the reverse.

As in the literature, there is no consensus on what exactly should be considered as capital flight and the method to measure its magnitude. The value of the measurement varies from one study to another. The values also depend significantly on the country of interest. Therefore, one of the limitations of our research is that it only covers eleven economies for a short period and fails to include more explanatory variables in the model. We believe that the next step should be conducting our study with new models of estimations covering a more significant number of economies through a more extended time.

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INTERNET RESOURCES

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