SAINT MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

The Impact of Illicit Financial Flow on Economic Growth of Ethiopia

A Time Series Empirical Analysis, 2000-2015

By:

Alula Nerea

May, 2017

Addis Ababa, Ethiopia

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The Impact of Elicit Financial Flow on Economic Growth of Ethiopia
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By:

Alula Nerea

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DECLARATION

I, the undersigned, declare that this Thesis is my original work; prepared under the guidance of Gemoraw Adinew (PhD). All the sources of materials used for this thesis have been dully acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

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ENDORSEMENT

This thesis has been submitted to Saint Mary's University, School of Graduate Studies for examination with my approval as a university advisor.

_____ _____

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DEDICATION

To: My Mom, Lemlem Teka

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Table of Contents

Page

Acknowledgment i
List of Tables v
List of Figures vi
Acronyms vii
Abstract viii
CHAPTER ONE 1
INTRODUCTION 1
1.1 Background of the Study 1
1.2 Statement of the problem 3
1.3 Objective of the study 4
1.3.1 General objective 4
1.3.2 Specific objective 4
1.4 Data Source and Methodology 4
1.5 Significance of the study 5
1.6 Scope and limitation 5
1.7 Organization of the Study 6
CHAPTER TWO 7
LITERATURE REVIEW 7
2.1 Theoretical literature 7
2.1.1 A Glance on a concept and definition of Economic growth 8
2.1.2 Economic growth and its socio - political implication 9
2.1.3 Challenges of raising capital for economic growth 11
2.1.4 Growth Theories 12
2.1.5 Political economy review of Ethiopia 16
2.1.6 Review of other exogenous variables 19

2.1.6.1 Capital formation/ Investment 19
2.1.6.2 Education 20
2.1.6.3 Inflation 21
2.1.6.4 Population growth 22
2.1.6.5 Terms of trade 23
2.1.7 Illicit finance 24
2.1.8 Determinants of IFF in Ethiopia 25
2.1.9 Measurement types of IFF 26
2.2 Empirical literature review 29
2.2.1 IFF Globally 29
2.2.2 IFF in developing countries: Africa 31
2.2.3 IFF in Ethiopia 33
CHAPTER THREE 35
RESEARCH DESIGN AND METHODOLOGY 35
3.1 Research design, data source and type 35
3.2 Methodological approach for Data Analysis 35
3.3 Model specification 36
3.4 ECM model 37
3.5 Definition and measurement of variables 37
3.6 Description of variables 40
3.7 Diagnostics Test 41
CHAPTER FOUR 44
RESULTS AND DISCUSSION 44
4.1 Descriptive Summary 45
4.2 Total amount of IFF using different estimation methods 47
4.3 Diagnostic check 48

CHAPTER FIVE 57
CONCLUSION AND RECOMMENDATION 57
5.1 Conclusion 57
5.2 Recommendation 59
REFERENCES 61
APPENDIX 64

List of Tables **page**

Table 3.1: Expected sign of independent variables 41

Table 4.1: Descriptive statistics 44

Table 4.2: Variance Inflation factor results 48

Table 4.3: Breusch-Godfrey Serial Correlation LM Test 48

Table 4.4: Breusch-Pagan-Godfrey Heteroskedasticity Test 49

Table 4.5: Summary of Augmented Dickey-Fuller/ Unit Root Test 51

Table 4.6: Long run regression result 52

Table 4.7: Parameterized ECM regression results 54

List of Figures

page

Figure2.1: Cumulative Non-Normalized Illicit Financial Flows by Region ……29

Figure 2.2: Real Illicit flows from Sub Saharan Africa (1970-2004)……31

Figure 2.3: Findings and methodology of other studies on IFF.....33

Figure 4.1: IFF trend (2000-2015)…….....45

Figure 4.2: IFF total and yearly average value.....47

Figure 4.3: Normality Tests result 50

Acronyms

ADF: Augmented Dickey-Fuller

DF: Dickey-Fuller

DSP: Differenced stationary process

ECA: Economic Commission for Africa

EPRDF: Ethiopian People's Revolutionary Democratic Front

ETB: Ethiopian Birr

GDP: Gross Domestic Product

IMF: International Monetary Fund

NBE: National Bank of Ethiopia

GDP: Gross Domestic Product

VIF: Variance inflation factor

WGB: World Bank group

HMN: Hot Money Narrow

MENA: Meddle East and North Africa

MOFED: Ministry of finance and economic development

GFI: Global Financial Integrity

SAP: Structural adjustment program

Abstract

The objective of this study was to investigate the impact of illicit financial flow on economic growth of Ethiopia. The study used secondary data, particularly from 2000 to 2015 years.

The study used varies internationally recognized estimation models (Hot money narrow and Trade miss-invoicing) to get the magnitude of illicit financial flow in Ethiopia. Moreover, it employed ECM (error correction model /mechanism) to get a short and long run velocity and magnitudenal effect of IFF on GDP.

The study found that IFF has Significant and negative impact on Gross domestic product. Based on research findings, establishing controlling and auditing mechanisms for trans-boundary trade activities, creating effective institution and building collaborative approach are recommended to curve down the magnitude of IFF and its impact on economic growth.

Key Words: *IFF,HMN and Trade Miss-invoicing*

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Though Ethiopia had been contextualized by starvation, poverty, backwardness and ignorance for many centuries; still the county is described as one of the poorest country in the world. However, this days Ethiopia is becoming more visible to the world in a "half full" perspective and more expounded as a "fastest growing economies." According to World Bank's economic review the economy has experienced strong and broad based growth over the past decade, average of 10.8% per year in between 2003/04 - 2014/15 compared to the regional average of 5.4% (World Bank, 2016). Therefore, to sustain economic growth through advancement of software and hardware infrastructure there must be capital attraction, retention and acceleration within countries economic and political bonders and sphere of influence.

Despite the fact highlighted above, capital is flowing out illegally. Different researches conducted using different estimation models inferred that the existence and the degree of illicit financial out flow from developing countries are very high when it's compared to their needs and available of capital stock. According to estimation made by one of prominent NGO on this area of study, depicted that "In the years between 2001 and 2010, illicit financial flows from developing countries totaled as much as USD 5.8 trillion" (OEDC, 2014). Though, there are some intellectual critiques on estimation models. However, there is disagreement on the approach of Estimation modes, the researcher couldn't find any literature which deny or theoretically justify that the scale of IFF were insignificant. Especially in developing countries like Ethiopia, despite the discrepancy in figures and model choice, the scale of IFF and its impact on economic growth is difficult to ignore. A research conducted by Boyce & Ndikumana, (2012) shows that "Ethiopia was also ranked 8th in sub-Saharan Africa in terms of cumulative real capital Flight, which amounted to $25 billion in 2010"(Alemayehu & Addis, 2016). From all this redundant findings depiction, we can make analogy of IFF's scale and its impact on growth, macroeconomic stability, and income inequality and peace and security issues.

Scholars and literature suggests the existence of acute reasons behind to reach IFF to this level. In general, policy and regulatory inconstancies, weak institutions, limited oversight, accountability and rule of law, entrenched vested interests, and the absence of transparent economic and governance processes. Most often which are the best possible explanatory variables of LDCs. Even more, those macro level problems can be illustrated through practice like Corruption, Organized crime, illegal exploitation of natural resources, fraud in international trade and tax evasion (WBG, 2016). Correspondingly, in Ethiopia also macroeconomic instability (budget deficits and exchange rate deprecation) the interest rate differential vis-a-vis the rest of the world, political instability, and corruption are found to be reasons for IFF (Alemayehu & Addis, 2016).

From Similar literatures chronological approach on studding impact or determinant of IFF on economic growth it's understood that it's necessary to get a better picture on the scale of IFF to comprehend intensity/ level to its impact on economic growth. To insure these some foot print literature had done their own estimation after identifying mainstreams of IFF, data availability and selecting a best fit IFF estimation model which can capture IFF to their research context.

According to Cumby since "capital flight is an illegal transaction, which aims at avoiding being recorded in official documents, there is no definite measure of the overall amount of capital flight. Thus, researchers have come up with different ways to estimate capital flight. At the moment, there are around five main measures of capital flight, which differ significantly in the methodology used and sometimes diverge significantly in their estimates (Gusarova, 2009).

Thus, there are different IFF estimation models deployed to track IFF in different channels like World Bank residual, IMF's trade- trade miss invoicing, Hot money narrow and Dooley models (Claessens & Naude, 1993). This research would like to emphasize on Trade miss invoicing and Hot money which are chosen to estimate IFF for this literature.

Trade miss invoicing is a type of model, developed by IMF. The model captures trade-miss invoicing using IMFs DOT data. A logic deployed to find IFF in trade miss

invoicing is finding "Export under invoicing and import over invoicing that can hide capital flight. Differences in records of the reporting country and its trading partners can help to identify it (Claessens & Naude, 1993). This models ability to capture Trans – boundary trading activities would power it to blend to Ethiopia's context, since Ethiopia has 13 billion import and 5 billion export trade.

Hot money narrow is also able to track IFF which is executed by private sector to get benefit or to protect their money from changes in interest rate, exchange rate and other monitory policy measures. Thus in this research context it will help us to capture IFF in private capital flow by capturing error and omission section of balance of payment.

Since a final objective of getting a clear picture on the scale of IFF in this paper context is to see its impact on economic growth. To simulate its impact ECM error correction model will be deployed as an econometric model.

1.2 Statement of the problem

Insuring Economic growth is not only a necessary to progress human lives in developing countries like that of developed ones. Rather, its necessity extends beyond that; the speed and level of economic growth determines the existence of less developed economies even as a country. Thus, under the globalized world where competition for growth is tough, it's difficult to attract, retain, and expand elements of economic growth. Actually, Capital is one of the most important components for growth, spatially in LDC where there is low capital labor ratio (Campbell and Ahmed, 2012)

Taking capital scarcity and importance in to consideration, developing countries like Ethiopia are expiated to attract, retain, expand and protect it not to be taken away illegally from their political and economic boundaries.

Despite its necessity and importance, different literatures had gave their testimonies on the existence of illicit financial flow in Ethiopia. However, estimation results on the scale of IFF vary in figures due to estimation model and data source employed. According to a literature on African development review, Ethiopia had lost on average 974.4 million USD between years 1991 to 2012 (Alemayehu & Addis, 2016). Other Similar Publications made by different international institutions like GIF had also reaffirmed the

existence of illicit financial flow in Ethiopia (GIF, 2013).IFF has huge impact on economic growth (Ajayi, 2012). However, this effect is not investigated in detail using different IFF estimation and econometric models. Particularly, to the best of researcher's literature investigation, there are very few studies which had investigated the scale and impact of IFF on economic growth of Ethiopia. Thus, this research identified it as a gap to be filled.

In response to the problem, this study propose to investigate the scale of illicit financial flow using Hot money narrow and trade miss invoicing models. The researcher considers those models can track streams of IFF in Ethiopia, contemplating data availability and potential country out bound economic activities. Fundamentally, this research will address the gap by assessing the impact of illicit financial flow on economic growth of Ethiopia; using the scale of IFF which are derived from researcher's own computation and using ECM as an econometric model.

1.3 Objective of the study

1.3.1 General objective

In general the objective of the study is to measure the magnitude and assess the impact of illicit financial flow on economic growth of Ethiopia. By doing so, the study would help the country to enumerate the level of illicit financial flow and its effect on economic growth of the country.

1.3.2 Specific objective

- To describe illicit financial flow in the country.
- To analyze the impact of illicit financial flow on economic growth of Ethiopia.

1.4 Data Source and Methodology

Investigation of the matter under study is constructed on Secondary data source. Major data sources to estimate the scale IFF is extricated from IMF DOT data and NBE; for Trade Miss Invoicing and NHM estimation models consecutively. Data sources for other exogenous variables are manly from MOFED (Ministry of finance and economic development) and World Bank. The research deployed error correction econometric

model to analyze IFF's impact by employing a time serious data from the Base year 2000 to 2015.finally endogenous variable which depicts impact level will be presented in GDP.

1.5 Significance of the study

The result of this study is useful to enumerate the magnitude of IFF and to understand intensity of its impact on economic growth. The result of the study also becomes a stepping stone for researchers, students, policy makers and other organization that are in need to use its result as an input in their organization to address the gap. Specially, it would help the government to design a mechanism to fight IFF. By doing so, it can curb down its impact on provision of hardware and software infrastructure and other public services, which will insure economic growth

1.6 Scope and limitation

Threats to validity for the study are manly limitation of data availability from solitary source. Especially on exhausting estimation models like IMF's trade miss invoicing was difficult to find data on trade executed by the trade partners against Ethiopia reported by the international trade partners. Thus, such data can only be found from international organizations that has such interest. Therefore, there may be differences which arise because of data treatment difference.

The other most changing limitation in this study was CFI/FOB ratio adjustment. To correctly measure all DOT data there must be equal bases. Thus, all exports have to be adjusted to FOB through extracting deducting Fright and Insurance costs. Therefore, exports and imports can be compared at fright on board. To execute the adjustment, there must be fob ratio especially for exports reported by trading partners and exports reported by Ethiopia. However, it's almost unlikely to get CFI/FOB ratio for all countries who had imported from Ethiopia.

Finally this study analyzes the impact of IFF on economic growth of Ethiopia using a time serious data from 2000-2015. This period is chosen base on availability of data

1.7 Organization of the Study

This thesis is structured in five chapters. Introduction is included in the first chapter. Chapter two contains theoretical and empirical literature review and it's organized in a way to provide readers a comprehensive and deep understanding throughout methodology, analysis techniques and interpretation parts of the research. Chapter three provides an insight on how the research is designed. Definitions, measurements and expected signs of variables, model specification, diagnostic and variables testing techniques, econometric analysis are also included in this chapter. Results of empirical analysis and descriptive statics are discussed in the fourth chapter. Chapter five presents conclusion and policy implication.

CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical literature

This literature review is organized in a way to provide readers a Comprehensive and deep understanding throughout methodology, analysis techniques and interpretation about two fundamental cornerstones of the research, which is main exogenous variable (IFF) and endogenous variable of (GDP).

Thus, to achieve its objective it's constructed in two main parts. The first section gives a detail on theoretical views and some experiences in Ethiopia's context, such as, a comprehensive glance on economic growth. Which includes, why capital? At what cost? , is fast economic growth a must condition to survive for developing countries? In addition, this section also highlights growth theories, even though, it's believed that many economists are familiar with growth theory, the researcher found it necessary to give a glance about economic growth theories for readers who are interested in the subject matter but are not familiar with economics. These enables them to get a holistic understanding about economic growth and the role of capital which leads them to know how the IFF intensely affects GDP and its elements such us import- export. The other element visited in this section is Ethiopia's economic growth path and how lack of finance had stifled economic growth in the last 15 years. To magnify and contextualize the type of relationships b/n IFF and GDP. Factors affecting economic growth are discussed independently in the last two points of the first section.

The second and final section of the literature review explores what other researchers and publications has said about the intensity or size of IFF and its impact on economic growth and macroeconomic variables at global, continental and regional level.

2.1.1 A Glance on a concept and definition of Economic growth

The term Economic growth[1] is familiar for many of us including non-professionals to the discipline, so this study wouldn't go in to detail. But, since economic growth has been one of a key governing factor which influence and be influenced by dynamic non – economical and socio-political interactions. The researcher found it important to review this conceptual and theoretical view to get a better understanding about economic growth; which is an endogenous variable of the research under investigation. Furthermore, it will enable the readers to understand the researcher's conceptual vantage point.

As per Shearer, (2006) One of the measure conceptual blocks which is a point of deviation on defining growth is "The one, economic growth, has essentially objective content. It relates to phenomena which can be defined and identified in terms of potentially measurable criteria." The other definition stream considers economic growth as integral part of "economic development which has essentially subjective content. It implies an appraisal of economic performance in terms of criteria which reflect personal and social values. Deductively economic performance or growth is measured in social and personal values. Since these values are highly subjective to quantify, it is rather explained in qualitative terms.

Though there are different scholars who have different views on the objective view of economic growth it has been essentially expressed in quantitative connotation, this idea was well expressed in 1985 by S. Kuznet"... economic growth is essentially a quantitative concept" thus if we want to take a leap forward for a better progress in performing empirical and theoretical analysis of growth phenomena "...we must consider the quantitative aspect as basic". Many scholars accepted and implemented this in a mainstream economics today. However, some scholars have different views on how the quantitative measurement definition can define economic growth objectivity. Since many of them believe subjective measurements have also a part in defining growth even though they don't take a major stake defining it. "Indeed, about the only unifying element in the various quantitative" definitions of economic growth is agreement that

[1] Economic growth is defined as the increase in the market value of the goods and services produced by an economy over time. It is conventionally measured as the percent rate of increase in real Gross Domestic Product (IMF, 2012).

what ideally should be measured is the contribution of economic activity to the achievement of higher states of human welfare" (Shearer, 2006)

The other block in defining growth from measurement point of view argues that "Economic growth has subjective dimensions. Since growth evolves and changes in the complex situations of individuals in a society are inevitable, it will be the object of affective evaluations, it will be judged as "good" or "bad", as "desirable" or "undesirable" (Shearer, 2006). In addition, since such judgments are highly vary from person to person it would make objective measurability more difficult.

Even though there are many complex narratives on defining growth, for the purpose of this research. The study will be based on a concept of definition and measurement of economic growth which is stated by Shearer, (2006) "broad aggregate welfare concept of economic growth, the measurement of growth and hence the operating definition of growth must involve the evaluation of economic activity in terms of its contributions to the flow of welfare generating want-satisfactions".

Highlighting the conceptual base above in 1947 an Australian economist Colin Clark has suggested that "the primary measure of economic growth must be real income obtained per hour worked". The other definition made by Robert [2]Kuz- NETS in 1955 states that "Economic growth of a nation may be defined as a sustained increase in its population and product per capita."

To specifically fit to this research, definition of economic growth inscribed by Paul Samuelsson in 2010 "Economic growth is explanation of countries Potential GDP or national output, to put it differently it occurs when production possibility frontier PPF curve shifts outward"

2.1.2 Economic growth and its socio - political implication

Growth has been a necessary factor to insure peace and sustain sociopolitical life of a country. In many developing countries lack of economic growth had lead them to instability which adversely affects socio political life of a countries. Even many African

[2] S. KUZNET"ST, oward a Theory of Economic Growth", *National Po l ivf or Economic Welfare at Home and Abroad,* R. Lekachman, ed. (Garden City, Doubledayand Co., 1955), p. 16.

countries who has a better potential of growth because of their natural resources had gone to socio- political crises since they were not able to fasten economic growth.

Since these concepts are highly interconnected they also have reversed course and effect relations, other researchers argue that uncertainty which arises by Social and political causes would lead to sluggish economic growth. According to a journal from school of economics at Harvard on Political instability and economic growth "One strong theoretical argument underlying this relationship is based on the effects of uncertainty on productive economic decisions, such as investment, production or labor supply. A high propensity of a change of government is associated with uncertainty about the new policies of a potential new government; risk-averse economic agents may hesitate to take economic initiatives or may exit the economy, by investing abroad. Conversely, foreign investors prefer a stable political environment, less policy uncertainty and property rights" (Alesina et al, 1996).

Similarly other literatures also reaffirm the idea highlighted above According to Alesia et al. (1996) use data on 113 countries from 1950 to 1982 to show that GDP growth is significantly lower in countries and time periods with a high propensity of government collapse. In a more recent paper, Jong-a- Pin (2009) also finds that higher degrees of political instability lead to lower economic growth. With regard to private investment, Alesina & Perotti (1996) show that socio-political instability generates uncertain politico-economic environment, raising risks and reducing investment.

Thus, to conclude from literatures highlighted above, it undoubtedly it is well known what will happen if economic growth is slows down, as we can understand from many literatures, it will lead to unemployment, low consumption, poor saving and investment. Therefore, problems in macroeconomic dynamics are highly intertwined with socio – political phenomena in adverse manner. Especially for poor countries like Ethiopia who cannot sustain with the poverty level they have and rapidly increasing population growth; economic growth is a must condition to survive as a country.

2.1.3 Challenges of raising capital for economic growth

Since this research is all about the impact of illicit financial flow on growth, it's necessary to give a glance on what developing countries sacrifice to get this capita which is mainly lost through IFF. By doing so, we can understand the intensity of the problem which are not explained in economic terms.

An official Source of finance development / growth for many developing countries are aid and development assistance. As it is known this money comes with conditionality. Especially finances sourced in a form of aid have conditionality's which serve the interest of the donor. Because of this the cost of raising capital outwits the benefit generated so far. Some literatures suggest that even though we have received so much aid we didn't get the expected growth results. According to Dambisa (2009), "even the most queries look in the data suggest that as aid has increased, Africa's growth has increased with an accompanying higher incidence of poverty…so there we have it: sixty years, over $ 1 trillion USD of African aid, not much to show for it."

Even financing growth through economic assistance has a cost. To understand this scenario, it's good to look at the financial reformation or liberalization paradigm that took place after world war two in 1975 by Ronald Reagan and Margaret Thatcher through Bretton Woods's institutions, like World Bank and IMF. The main intent was to liberalize incompetent economies for international market using short term financial assistance and long term development assistance as a means of control. SAP approach was criticized as it was more politically motivated than bringing economical change. "From this perspective, the Washington Consensus development was seen as apolitical overly economic approach, characterized by its excessive conditionality as well as the absence of genuine ownership by the countries concerned" (Heidhues & Obare, 2011). Thus, SAP resulted an "overall disappointing performance in Africa" (Ibid).

From highlighted paragraphs above, we can understand the cost of capital; starting from swallowing policy prescription for our economic matters to the extent of renting political and social policies to serve the interest of donors. Thus it's clear that it's very vital to accumulate, preserve and make efficient and effective use of capitals which we get after

challenging scarifications. Besides, this also implies to some extent protecting our capital from IFF means, not only to minimize our exposure to adverse socio political results of policy rent but also insuring a countries Sovereignty.

2.1.4 Growth Theories

In this day and age we live in a world economy that is accompanied by many and sophisticated problems which many of them lies on unlimited need and wants which are growing faster than our economic growth. Thus, all this conditions make economic growth the central part to the answers of many and sophisticated questions. Therefore to get this key many economists came up with their assumptions and theories. I will try to give highlight on some of them.

- **Robert Solow**

The year from 1950-1960 were a time for the emergence of neo-classical theorists to resurrect the classical theory sensitized by Adam Smith in 1977. "dynamic equilibrium weakened and to the fore came the problem of achieving potential growth not so much due to unused capacity, as through the introduction of new technology, improving productivity and improving the organization of production" (sharipov, 2015).

An article which was published in 1956 by the name of "A Contribution to the Theory of Economic Growth" explained it in a clear manner. The core of his theory is making all factors in a cop daggles production function substitutable so equilibrium can be achieved. Solow's theory can reveal interconnections between three sources of economic growth - investments, workforce and technological progress.

His theory also states that saving rates are important factors in enhancing capital stock which results in production increment. However, it means, it's a net capital stock which is Capital less Depreciation. Slow works under the assumption of full employment and by considering technical progress as exogenous.

In regard to labor or population growth, to sustain capital labor ratio or per capital income population growth should be commensurate with investment. But if population grows faster or capital stock decreases it would result in low capital labor ratio.

The other important variable in Solow's growth model is technical progress such us increasing the educational level of workers, the improvement of the organizations, growth of production scales and so on. Solow suggested that if the economic growth is a continuous phenomenon it's because of technical progress, since it insures economic efficiency via continuously progressing technical skills to increases productivity or output.

To this simple mathematical model, economic growth can be measured as follows.

$$\Delta Y_t = \frac{\Delta \alpha Y \Delta Kt}{\alpha K} + \frac{\Delta \alpha Y \Delta Lt}{\alpha L} + \frac{\Delta \alpha Y \Delta At}{\alpha A} \text{----------[2.1]}$$

When we divide both sides of [1] by Yt, it becomes that:-

$$\frac{\alpha Y * \Delta Kt}{\alpha K \quad Y_t} = \frac{\alpha Y * Kt * \Delta K}{\alpha K \quad Y_t \quad K_t} \text{----------[2.2]}$$

The above equation decomposes GDP growth into portions that can be attributed to growth in the capital stock, the labor force, and the technology level. Then

$$\frac{\alpha Y * \Delta Kt}{\alpha K Y_t} = \frac{\alpha Y * Kt * \Delta K}{\alpha K \quad Y_t \quad K_t}$$

$$= \beta_k \frac{\Delta K}{Kt}$$

$$= \beta_k g_k$$

Using same methodology for labor and technology, reduced form of Equation [2.2] in growth form is as follows.

$g_y = \beta k g k + \beta L g L + \beta A g A$---------- [2.3]

Or $\beta A g A = \beta k g k + \beta L g L$---------- [2.4]

Since Solow's growth model assumption was constant return to scale and perfect competitive market, the summation of the share of capital and labor is a unity. So if share of capital is βk, then the share of labor is 1-βk =βL and the above equation can be rewritten as

$\beta_A g_A = g_y - (\beta_k g_k + (1 - \beta_k) g_t)$

gk=Growth rate of physical capital

gL= Growth rate of human capital

gA= Growth rate of technology and βk , βL, βA are the marginal elasticity of capital, labor force and technology respectively. So if we have observations on the growth rate of output, the labor force, and the capital stock, we can have an estimate on the growth rate of total factor productivity. Equation [2.3] defines as the "Solow residual" in its long run growth model.

Where gy= Growth rate of Real GDP

Finally, Solow's model predicts that in order for poor or developing countries to catch up with developed countries by taking the assumption of exoguninity of technical progress and rate of saving and investment would be equal. Besides diminishing returns of capital would also be a factor for developing countries to converge with developed countries through time.

- **Endogenous growth model**

As the name implies this model tries to amend technical skill by indigenizing the growth process. This model appeared for the first time, in formal mathematical and economic models, the American economists Paul Romer and Robert Lucas hypothesized about the endogenous character of the most important technological innovations based on investment (contribution) in technological development and in human capital.

Endogenous growth models look similar to the neo-classical ones, but they differ significantly in initial assumptions and conclusions (UN, 2011).

In the theories of endogenous growth, though technological progress is important it's not the only possible cause of economic growth in the long term. The value of intensive, high-quality determinants of economic growth such as quality of human capital, state investment on research and development play a crucial role.

There are two sub streams "The first group includes theories in which human capital emerges as an important determinant of economic growth. These are the theories of P. Romer (1989b) and R. Lucas (1988). A key factor in the endogenous growth theory of Paul Romer is the variable called "knowledge "or "information". It assumes that the information contained in the inventions and discoveries are available to everyone and can be used at the same time. The Romer's theory assumes that the total amount of human capital remains constant during the considered time interval. It is only possible its redistribution between the sphere of production and R & D (research and development activities) in accordance with the function of consumer preferences. The basic idea of the theory of Romer is as follows: "there is an exchange between consumption today and knowledge that can be used for the expansion of consumption tomorrow." He formulates the idea as "research technology," which produces "knowledge" from the past consumption. Thus, the rate of economic growth in the theory of Romer is directly dependent on the value of human capital, focused in obtaining new knowledge." (Sharipov, 2015).

In the other block, a theory of Robert Lucas says, "accumulation of human capitals a strong economic process that requires certain resources, and is the cause of alternative costs. Lucas suggests that people can choose one of two ways to spend their time, one to participate in current production or two to accumulate human capital. In fact, the allocation of time between these alternative ways determines the rate of economic growth. For example, a decrease in time spent on production, leads to a reduction in the current product output, but at the same time accelerated investment in human resources which increases output growth.

Endogenous theory argument doesn't recognize the catching up of developing countries with developed countries, this is mainly because technology is developed internally within an economic system. Thus, since technology evolve to satisfy consumption dynamics; even if poor countries copy the technology after passing humpers of property right, they will still lag behind to cope up with new technology developed by wealthy nations to satisfy a new consumption pattern. Therefore, there is no convergence. However, in reality we can observe countries like japan, S. Korea and Malesia which have grown fast who had low saving rate, midi-walker population growth rate and with lower capital stock had grown fast. It's supported by a reconstruction hypothesis.
From both theories we have observed that capital is essential factor for economic growth. Thus, in latter section of this paper I have established the model conducted analysis based on endogenous model.

2.1.5 Political economy review of Ethiopia

Somehow Ethiopia's long aged situation can be described in terms of political revolution, destitute economic situation, underutilization of resources and poor governance. During the past 100 years Ethiopia were not able to answer basic political, economic and social questions, and because of this civil war, instability and poverty were the best explanatory variables of Ethiopia.

In terms political economy our country had passed through different economic and political practices through the past 100 years. The land lord (feudal) economy which were backed by monarchic political system. Following this was the brutal socialist regime which butchered the cream generation of the nation and finally the current government which is challenged by ethnic violence signals and free mobility of factors of production. There is one thing which make all the regimes similar, disarming the democratic power and freewill of the people and manipulating the nation's uneducated segments as a plus. The so-called elites were and are the ''Father of the nation.''

During the imperial Haileselase regime (1930-1974) the economy was characterized by'' Accusation by possession'' of land by the Noble families of the time, subsistent farming, and the political dominance over the economy. Farmers revolution against tax increment

in different areas of the county were also exemplary scenario of the big superseding hand of land lord structured economy of the government.

Even though these characteristics were there, we can also cite market economy platform, and some modernization efforts in different economic sectors. According to figures as per (EEA, 2007/08) from 1960 to 1974 average per capita growth per annum were 1.4 percent… and sector wise sectorial growth performance for agriculture, Industry and service were 2.1, 6.9 and 7.6 percent, respectively.

The darkest period of the nation's economy in the past 100 years would be from (1974 - 1991) the PMAC (Provisional Military Administrative Council) or Derge regime. Command economy and dictatorial socialist political structure were major characteristics of the regime. The first citable economic phenomena was a land reform '' Meret larashu'' or "Land to tiller", which was initiated internally by the farmers of Ethiopia from Gojam, Bale and Tigray and also supported by students. Though, theoretically land distribution was expected to play an important role in enhancing productivity through pledging a better property right which motivates farmers to work and benefit. Practically the result was not as expected even after redistribution; farmer's productivity was not progressed as such because of lack of support from coordinated modern agricultural technologies.

The other feature of this regime is restriction on production distribution and wealth or capital accumulation. " Proclamation No. 76, which established a 500,000 birr ceiling on private investment and urged Ethiopians to invest in enterprises larger than cottage industries during this period (Alemayehu and Befekadu, 2005; Tadesse, 2011.this regimes Command economy policy had destroyed the economic platform which was designed during the imperial regime. Hence we can corner this regime as a dark age of Ethiopian economy since "average rate of growth of gross domestic product (GDP) and the per capita term was 1.6% and -0.7%, respectively (Eshetu & Mekonnen, 1992).

EPRDF regime 1991-20__) the economic land cape had been changed fundamentally two times, the first period scenes 1991 to 1997 the economy were too sluggish and GDP were growing by less than five percent. The major contributors to the GDP were also too traditional.

Additionally Redistribution of land were also critical phenomenal. Taking ethno linguistic federalism into consideration, spatially in the late 1991 land distribution also included women In terms of political term the country were fragile and the government was also in capable to protect national sovereignty after dismantling the former regime military infrastructure. In general low export subsistent and non-commercialized farming, high population growth rate, diseases, unskilled labor was a good explanatory economic variable of the EPRDF regime.

The second phase: 1997 to20 – were too different, we can say this time was a take off point for economic growth. But before jumping in to explaining the economic characteristics it would be good to highlight some political factors which can be considered as immediate Cause. The Election of 1997 EC. This election was a turning point for the government. Following this the political land scape becomes too narrow but in economic terms the country accelerated by taking 1995 Policy discussion taking as a spring board.

In regarding Growth rate figures there was controversy between the Ethiopian government and other international financial institutions. "Statistics produced by the central government data sources which often show double-digit economic growth and a very rapid decline in poverty. Whereas the official numbers have been quoted in double digits for the past decade, estimates by the International Monetary Fund (IMF) and a careful examination of the same by various academic researchers consistently show a lower GDP Growth rate (Geda & Yimer, 2014). Thus, depending on the source of data, one can find different narratives of GDP growth and poverty prevalence in Ethiopia (Ibid).

During EPRDF regime, there were Strategic economic programs to stimulate and accelerate growth in EPRDF regime. Such us PASDEP (Plan for Accelerated and Sustained Development Plan to End Poverty, SDPRP (sustainable development and Poverty Reduction Program). Gtp1 and GTP 2. Which resulted real GDP growth on average by 10.9 percent in the past decade NBE (2003/04-2012/13, equitable wealth distribution 0.33 by Gini coefficient) and which enabled poverty to decline from 60.5% to 20.7% in 2011 within six years (IMF,2013).

Because of strategic programs highlighted above this period were, a period which economic platform were built, like small and micro finance and enterprises were established, the government stared to provide modern agricultural assistant to farmers, health care extension programs were implemented, rural infrastructure were built, road's. Foreign direct investment were also flowing in, small industries were also built. In addition the government put his hand in the economy in almost all sectors of the economy. Even though this scenarios are there some, scholars believe that the government should pull off unselective intervention in the economy to sustain the development in addition they also recommend the government to be selective in FDI to protect the environment. Not only this but also wealth distribution in the economy continue to be a major challenge for the government to sustain economic growth, peace and stability.

2.1.6 Review of other exogenous variables

2.1.6.1 Capital formation/ Investment

Physical capital formation has been mentioned almost in all exogenous or endogenous growth theories as a fundamental means of realizing economic growth. However, "in the neoclassical model investment has impact on the transitional period, while the endogenous growth models argue for more permanent effects. The importance attached to investment has led to an enormous amount of empirical studies examining the relationship between investment and economic growth" (Arvanitidis et al, 2009).

Theoretical relationship of capital formation and growth are enlightened by Tobin's 'Q'[3] theory of investment. "As per this theory capital formation acts as the main driving force of economic growth. Capital formation refers to the proportion of present income saved and invested in order to enhance future output and income. It usually results from acquiring of new factory, machinery, equipment and all productive capital goods. The rate of accumulation of physical capital is one of the main factors determining the level

[3] Tobin's q is defined as the ratio of the market value of installed capital to it's replacement cost. i.e. q = market value of installed capital/ replacement cost of installed capital

of real output (GDP). Basically capital acts as the most fundamental input in a production system. It provides the base of growth of an economy. There exists a non-linear positive relation between capital formation and growth in general depending on the degree of efficiency of the capital use within the economic system. So the level of capital used within the economy is not only important but also the way it is used is also an important determinant of economic growth."(Tewodros, 2015).

According to Mbaye (2012) capital accumulated mainly channeled from two sources. In the first mechanism, the capital accumulation operates exclusively in the tradable goods sector whose share in GDP increases, while in the second, the stock of capital in the economy increases through the expansion of overall savings and investment. Here we can emphasis that trade is one channel of capital accumulation since this research investigates IFF channels.

2.1.6.2 Education

As per Solow Swan, recommendation of "Since , there is a diminution rate of capital labor ratio in long run increasing capital will not result growth rather it will only have a level effect. Thus to sustain economic growth the only left variable is technical progress which can be represented by education. In addition as per Jacob Mincer in 1989 "human capital is a link which enters both the causes and effects of these economic—demographic changes." Endogenous model also clearly stipulated that human capital is a source of sustaining economic growth through indigenizing and segregating labor and human capital, this was explained by Romer (1990) as "human capital is the major input to the research sector, which generates the new products or ideas that underlie technological progress."

In another dimension, the importance of this variable to economic growth at Macro and micro level was demonstrated by Jacob Mincer in 1989, he argues that "At the macroeconomic level, the social stock of human capital and its growth are central to the process of economic growth. At the microeconomic level, differences in individual human capital stocks and in their growth can explain much of the observed variation in the wage structure and. in the personal distribution of income."

Herein both models human capital were expressed in different ways, essentially the concept is the same, "human capital refers to the abilities and skills of human resources of a country, while human capital formation refers to the process of acquiring and increasing the number of people who have the skills, good health, education and experience that are critical for economic growth. Thus, investment in education and health are considered as human capital development."

For this research purpose education is taken as exogenous representative of human capital. Though education doesn't include informal source of acquiring and transferring knowledge like trainings and specialized education like military trainings.

2.1.6.3 Inflation

It's a very familiar word for many people who are not in a field of economics. This wide awareness was created because of its direct and swift impact on our income and consumption. There were highly polarized views on the type of impact of inflation on growth "from a positive one, as some interpret the Tobin (1965) effect, to a negative one, as Stockman's (1981) cash-in advance economy with capital, has been interpreted."(Gillman et al, 2009).

A mainstream block who argues inflation have negative effect on growth provides sound theoretical attest." Inflation can lead to uncertainty about the future profitability of investment projects (especially when high inflation is also associated with increased price variability). This leads to more conservative investment strategies than would otherwise be the case, ultimately leading to lower levels of investment and economic growth. Inflation may also reduce a country's international competitiveness, by making its exports relatively more expensive, thus impacting on the balance of payments. Moreover, inflation can interact with the tax system to distort borrowing and lending decisions. Firms may have to devote more resources to dealing with the effects of inflation (for example, more vigilant monitoring of their competitors' prices to see if any increases are part of a general inflationary trend in the economy or due to more industry specific causes). (Gokal, & Hanif, 2004).

However, recently many empirical evidence show that there is a negative relationship between inflation and Economic growth as sighted by (Asmamaw, 2012). (Khan & Senhadji, 2000; Michael and William, 1996; Barro, 2013; Bawa & Abdullahi, 2010; Saliand & Gopakumar, 2008; Veiga et al, 2014 . A bit differently some literatures argue positive relationship at minimum inflation rate. Ghosh & Phillips (1998) find out in their research for IMF member countries, at low inflation rates there exists a positive inflation-growth correlation, and for higher inflation rate a negative inflation-growth relation.

In regard to the magnitude of inflation and its impact on growth stated by Barro (2013), classified the threshold of inflation in to three categories namely below 15% low inflation, 15 up to 40% medium rate and above 40% is high inflation rate and affected the growth rate negatively. Furthermore in same research Barro , …… 100 countries of the world including Ethiopia from 1960 -1990, indicates that an increasing in average inflation by 10% are likely reduce the growth rate of real per capita GDP by 0.2 to 0.3 percentage and reduce the ratio of investment to real GDP by 0.4-0.6 percentage per year.

2.1.6.4 Population growth

This is one of highly debatable variables in either from economics or political pointes. Since it's a cross-section point for both politics and economics. For this paper I will only provide literatures from economic growth point of view. There are different views about population growth even from economic growth point of view some theoreticians consider it as it has positive effect and others the other way round.

Malthus narrates about Malthusian Population Trap theory on his Essay published in 1798 "the principle of population" argues that the rate at which the means of subsistence which are agricultural products growth increases only in arithmetical while population growth is Increases in geometric ratio.

Similar way of proposition argued by Coale & Hoover (1958), "About the number of people is to abstract from the total size and the population density, and examine the effect of the rate of growth of population on economic growth. The theoretical basis is that a higher rate of growth implies a higher dependency rate, with greater need for housing and other "demographic capital" which is provided at the expense of "productive capital".

The other way of thinking narrated by Easter Boserup (1965) "has rejected classical (Malthusian trap) theory and rather basically argued that we would never out strip out food supply (Dejene, 2011… since technology will continue to improve and keep up with demand since she argues that population growth will give to the society opportunity to invent new technology in the intensification of agriculture with socioeconomic change that results in improving soil fertility. (Kasahun 2014).

From the positive native block the other way of thinking about the effect of the number of people abstracts from the spatial dimension of a country and the rate of change of population, and considers total population size as an independent variable. The implicit theoretical justification is that .there are economies to scale in infra-structure and specialization, and benefits / from a larger domestic market, independent of the physical size of the country, which promote economic growth. L. Simon,1997).

2.1.6.5 Terms of trade

International trade enhances the economy of both importing and exporting countries. There is a positive relationship between international trade and economic growth. Kavoussi (1984) found that higher rates of economic growth were strongly correlated with higher rates of export growth. He found that the positive correlation between exports and growth holds for both middle and low income countries. Sachs and Warner (1995) found that open developing economies outperformed closed developing economies every year in terms of real GDP growth. Even in poorer countries, openness to trade enhances growth in productivity, and thus, human capital (Harrison 1996). Least developed countries, however, are heavily dependent on primitive agriculture and are more vulnerable to shocks. Upreti 2015.

1950 article, Hans Singer proposed that fluctuations in the terms of trade dramatically affected the funds available to poor countries for capital formation, and hence growth. Similarly reaffirmed its positive impact in growth. As Hadjimichael (1994) states: "an improvement in the terms of trade were to reduce input prices relative to output prices, firms would have an incentive to raise quantity supplied."

2.1.7 Illicit finance

In The term “Illicit Financial Flows” (IFF) began to appear in the 1990s to describe a number of cross border activities. The term was initially strongly associated with capital flight……. However, later on this phenomena was considered as illegal and the term was used to express “cross-border movement of capital associated with illegal activity or more explicitly, money that is illegally earned, transferred or used that crosses borders” .this definition is based on considering illicit flow illegal act by itself, results of illegal acts and funds are used for illegal purposes.”(WBG, 2016).

Though, naming and defining illegal outflow of money or capital differ from one research to another on illustrating their nature but essentially the definitions have the same meaning. As par definition by (Ajayi, 1997) a term capital flight is term is related to capital which is shifted out of developing countries. However, if capital shifts out of the developed country, it is usually referred to as capital outflow. Investors from developed countries are seen as responding to investment opportunities while investors from developing countries are said to be escaping the high risks they perceive at home.

The other definition says “acquisition or retention of a claim on non-residents that is motivated by the owner's concern that the value of his asset would be subject to discrete losses or impairment if his claims continued to be held domestically” (Deppler and Williamson, 1987). This definition is similar to Dooley et al. (1994) who defines capital flight as the “accumulation of claims on nonresidents by residents that escape control of the domestic government”. For Cuddington (1986) capital flight is short-term private capital outflow which occurs in the response “not only to political crisis but also to economic policy failure”.

From the above definitions we can clearly distinguished Capital flight from the capital export or legal outflow of capital, which consists of conveyance of capital in the full accordance with the law. While capital export is a normal economic phenomenon, which does not harm the economy significantly from the global perspective (capital finds its optimal allocation), capital flight presents a danger and leads to the impoverishment of

the economy, worsening the possibility of investments and prospects for further development of the economy. (Gusarova, 2009)

2.1.8 Determinants of IFF in Ethiopia

In general capital flight is manifested bottle pushing and pulling factors. Usually capital flight from developed countries to developed countries are manifested by puling factors, such as seeking a better interest rate and exchange rate. But from different literatures, performed in developing countries, pushing factors outwait than puling factor. Lack of political stability and good governance. Besides weak bureaucracy and controlling mechanisms made IFF easy.

In regarding to determinants, "genially list of determinants includes past capital flight, capital inflows, and capital stock (measured by debt inflows, debt stock, and aid flows), macroeconomic instability (measured by exchange rate overvaluation, government deficits, the inflation rate, and current account deficits), rate of return differentials, financial development, governance and institutional quality, political risks and war, and the uncertainty of public policies (measured by government consumption expenditures, taxes, budget deficits, and real interest rates" (Aelayehu Geda ,Addis 2016).

In Ethiopia's context in addition to issues highlighted above, (Alemayehu Geda and Addis, 2015). Had investigate the potential determinants of capital flight from Ethiopia by estimating an auto-regressive distributed lag model (ADL). The results where nominal exchange rate (NEXR) is not statistically significant in the long run, The effect of total exports on capital flight is found to be positive and statistically significant both in the long and short run. This result implies that exports are one of the important factors that facilitate capital outflows from the country by providing foreign exchange. The other determinant variable coefficient of budget surplus variable has a statistically significant negative effect both in the short and long run. And this implies deficits invariably lead to inflation in Ethiopia, as a result of macroeconomic instability might prompt economic agents to move capital abroad to escape future direct taxation and indirect taxation via monetization of the deficits.

Other variables which are related to finance are aid and debt. “Aid is found to have a statistically significant positive effect on capital flight both in the long and short run. As Ethiopia is one of the highest recipients of aid in the continent (with an average annual value of about $3 billion in the period 2008–2012), part of this must have found its way out of the country. It is also found that its effect is much stronger in the short run than in the long run, perhaps pointing to its more important role in availing foreign exchange. Both external debt flows and debt stocks are also found to affect capital flight positively in the short run. And also debt flows are found to be important in the long run.

2.1.9 Measurement types of IFF

IFFs are difficult to estimate statistically due to the fact that many illicit transactions tend to be settled in cash, as parties involved in such transactions take great pains to ensure that there is no incriminating paper trail. Hence, economic methods and data sources tend to significantly understate IFFs. In order to avoid understating the problem of illicit flows, we shall always use the robust (non-normalized) estimate of IFFs rather than the conservative or normalized (GIF, 2013).

World Bank residual

World Bank Residual Method is computed by taking the difference of recorded on source of funds and uses of funds in the official record of BOP. (Gusarova, 2009). Source of funds includes increases in net external indebtedness and the net inflow of foreign direct investment. Use of funds includes the current account deficit that is financed by the capital account flows and additions to central bank reserves. Illicit outflows (inflows) exist when the source of funds exceeds (falls short of) the uses of funds. Traditionally, economists have netted out illicit inflows from outflows thereby understating the adverse impact of illicit flows on developing countries. As illicit inflows are also unrecorded, they cannot be taxed by the government and are generally unusable for legitimate productive purposes. Hence, only gross outflows are considered in the Change in External Debt (CED) method.(Freitals, 2002)

Doly

This seeks to measure the stock of privately held foreign assets that do not generate income reported to the domestic authorities. It does so by accumulating the identified capital outflows in the balance-of-payments accounts arid making three adjustments to capture unreported capital flows. The first is to add errors and omissions.

The second is based on a comparison of the World Bank data on the stock of external debt and the external borrowing flows reported in the balance-of-payments accounts. Dooley adds the difference between each year's change in external debt (according to the World Bank) and the lows as officially recorded to his estimate of the increase in private-sector foreign assets. Dooley assumes thus that the entire difference is private-sector acquisition of foreign assets. The third adjustment is to calculate the stock of external assets needed to give the (balance-of-payments) investment income, by using an international market interest rate. If investment income is underreported, then the imputed stock of external assets will less than external assets using balance-of-payments figures (and after making the previous two adjustments). The difference between the two is the stock of flight capital; and difference from year-to year is the measure of capital flight. (Claessens and Naude, 1993).

These similarities also imply that the Dooly estimate can be made more easily by taking the World Bank residual flow measure and the subtracting the flow of capital corresponding to the series for the imputed stocks of reported assets (Claessens and Naude, 1993)

Trade miss-invoicing

Trade miss invoicing has long been recognized as a major conduit for illicit financial flows. By overpricing imports and under pricing exports on customs documents, residents can illegally transfer money abroad. To estimate trade miss invoicing, a developing country’s exports to the world are compared to what the world reports as having imported from that country, after adjusting for insurance and freight. Additionally, a country’s imports from the world are compared to what the world reports as having exported to that country. Discrepancies in partner-country trade data, after adjusting for insurance and

freight, indicate miss invoicing. However, this method only captures illicit transfer of fund abroad through customs re-invoicing; IMF Direction of Trade Statistics cannot capture mispricing that is conducted on the same customs invoice. (Smith & Kar 2013).

Hot money narrow

During that period Cuddington (1986), focused on the short-term movements of capital offered a Hot Money measure of estimating capital flight. The main claim made by Cuddington is that the regular capital flows, explained by portfolio diversification goals corresponded to long-term flows, while the short term flows consisted the capital flight. In the broadest form, this measure is calculated as a sum of net errors and omissions (NEO) and the recorded capital outflows from the private sector. The narrow measure is defined simply as net errors and omissions from the balance of payments statistics. However, this method is criticized for not capturing the most part of illegal capital flows. There are countries which should have high levels of illegal capital outflow due to the economic and political instability. However, they have zero net errors and omissions entries in the balance of payments (Gusarova, 2009).

As per Claessens & Naude, (1993) the measure of private short-term capital varies (from country to country) in some of the studies employing this method and three different hot money measures has thus developed.

Hot Money 1 = - (G + C1)

Hot Money 2 = - (G + C)

Hot Money 3 = - (G + C + D1 + D2).

Where

G Net errors and omissions

C Other short-term capital of other sectors

Of which: C1. Other assets

DI Portfolio investment: other bonds

D2 Portfolio investment: corporate equities

I would conclude my theoretical review by a speech of Kenya Central Bank governor which I found from GFI report. "The costs of this financial hemorrhage have been significant for African countries. In the short run, massive capital outflows and drainage of national savings have undermined growth by stifling private capital formation. In the medium to long term, delayed investments in support of capital formation and expansion have caused the tax base to remain narrow. Naturally and to the extent that capital flight may encourage external borrowing, debt service payments also increased and further compromised public investment prospects. Furthermore, capital flight has had adverse welfare and distributional consequences on the overwhelming majority of poor in numerous countries in that it heightened income inequality and jeopardized employment prospects. In the majority of countries in the sub-region, unemployment rates have remained exceedingly high in the absence of investment and industrial expansion." (Ndung'u (2007).

2.2 Empirical literature review

2.2.1 IFF Globally

In 2010 "Illicit financial flows involve capital that is illegally earned, transferred, or utilized and are unrecorded, unlike broad capital flight which consists of a mix of licit and illicit capital. Our estimates show that the developing world lost US$946.7 billion due to illicit financial flows, up 13.7 percent from US$832.4 billion in 2010" (gif 2010).

We estimate that illicit financial outflows from the developing world totaled a staggering US$946.7 billion in 2011, with cumulative illicit financial outflows over the decade between 2002 and 2011 of US$5.9 trillion. This gives further evidence to the notion that illicit financial flows are the most devastating economic issue impacting the global South (Gif, 2013).

We find that the pattern of illicit outflows, trend rate of growth, and impact in terms of GDP all vary significantly among the five regions. Asia accounts for 39.6 percent of total illicit outflows from developing countries compared to 61.2 percent of such outflows in the 2012 IFF Update. Asia's much larger share of total illicit outflows in the 2012 IFF

Update resulted from an overestimation of China's trade miss-invoicing due to the "Hong Kong effect." Correcting for the Hong Kong effect sharply reduces the share of outflows from Asia. Nevertheless, Asia still has the largest share of illicit flows among the regions, and six of the top 15 exporters of illicit capital are Asian countries (China, Malaysia, India, Indonesia, Thailand, and the Philippines).

Developing Europe (21.5 percent) and the Western Hemisphere (19.6 percent) contribute almost equally to total illicit outflows. While outflows from Europe are mainly driven by Russia, those from the Western Hemisphere are driven by Mexico and Brazil." Gif " According to another estimate, for Ukraine, from 2004 to September, 2006 the capital flight according to the narrowest Hot Money Method totaled 12.9 billion US Dollars" (Gusarova, 2009).

With the rise of the external debt of transition countries, capital flight out of these countries has also increased. According to the World Bank Residual measure of capital flight, ….capital flight from developing European countries reached 145 249 million US dollars in 2006, which constituted 44.8% rise to the value of 2005 (Kar, 2008). Similarly, a report of World Financial Integrity Fund, indicates that for the majority of the countries in transition, capital flight exceeds ten percent of GDP (Kar, 2008).

The ranking of various regions based on their respective IFFs to GDP ratios looks quite different from the ranking based on the volume of outflows for instant "in developing Europe Illicit outflows had an impact on GDP at an average of 4.5 percent, which is significant. Outflows per annum from Asia amount to an average of 4.1 percent of regional GDP, and leakages of illicit capital from MENA and the Western Hemisphere equal about 3.5 percent of regional GDP. However, in the case of MENA, outflows as percent of GDP increased significantly from 1 percent in 2002 to 6.8 percent in 2009, before declining to 3.9 percent in 2011. In contrast, barring a few upticks, outflows from the Western Hemisphere as a share of regional GDP have declined steadily from 4.1 percent in 2002 to 2.6 percent in 2011 (GIF, 2013).

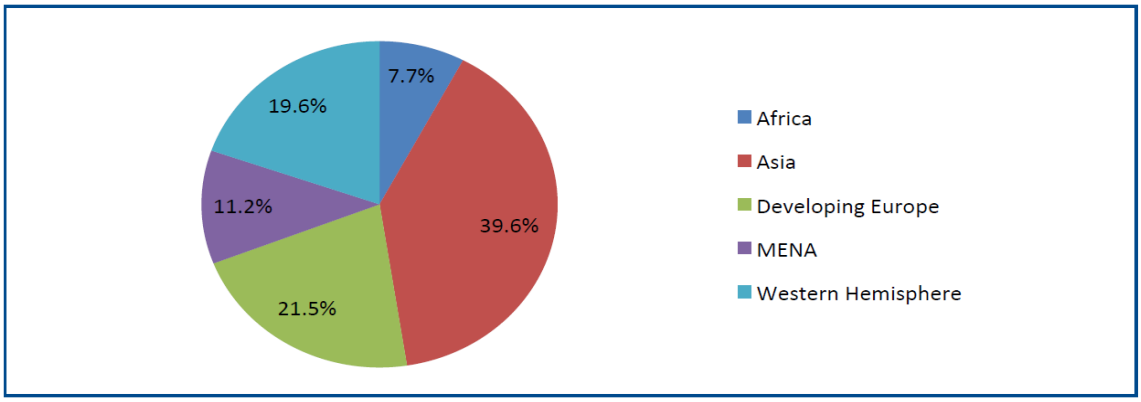


Figure 2.1 Cumulative Non-Normalized Illicit Financial Flows by Region (in percent)

Source: GIF 2014

2.2.2 IFF in developing countries: Africa

" Global Financial Integrity (GFI) estimates that developing countries lose almost US$ one trillion per year—a number that is perhaps most usefully seen as suggesting the scale of the phenomenon.1 The Economic Commission for Africa of the United Nations (ECA) has used trade statistics to estimate that between 2001 and 2010 African countries lost up to US $407 billion from trade mispricing alone.2 While these estimates are difficult to verify (and are not always consistent), they indicate that the amounts involved are significant and pose widespread problems, particularly in resource-rich countries and fragile and conflict-affected states.3 Regardless of the exact numbers, both GFI and ECA estimates show an upward trend for IFFs from 2001 to 2013." (WBG, 2016).

Ndikumana and Boyce (2003, 2008) among others find that the continent as a whole has turned into a net creditor to the world. "The irony is not lost on bilateral and multilateral creditors who have together provided Africa with substantial and growing amounts of external aid over several decades. Other researchers such as Collier, Hoeffler and Pattilo (2001) point out that many African investors seem to prefer foreign over domestic assets to the extent that the continent now has the highest share of private external assets among developing regions with serious ramifications for self-sustaining economic growth which allow countries to graduate from aid dependence." (Cartwright-Smith, Dev Kar 2013)

"In 39-year period (1970-2008) Africa lost an astonishing US$854 billion in cumulative capital flight—enough to not only wipe out the region's total external debt outstanding of around US$250 billion (at end-December, 2008) but potentially leave US$600 billion for poverty alleviation and economic growth. Instead, cumulative illicit flows from the continent increased from about US$57 billion in the decade of the 1970s to US$437 billion over the nine years 2000-2008" (GIF 2013)

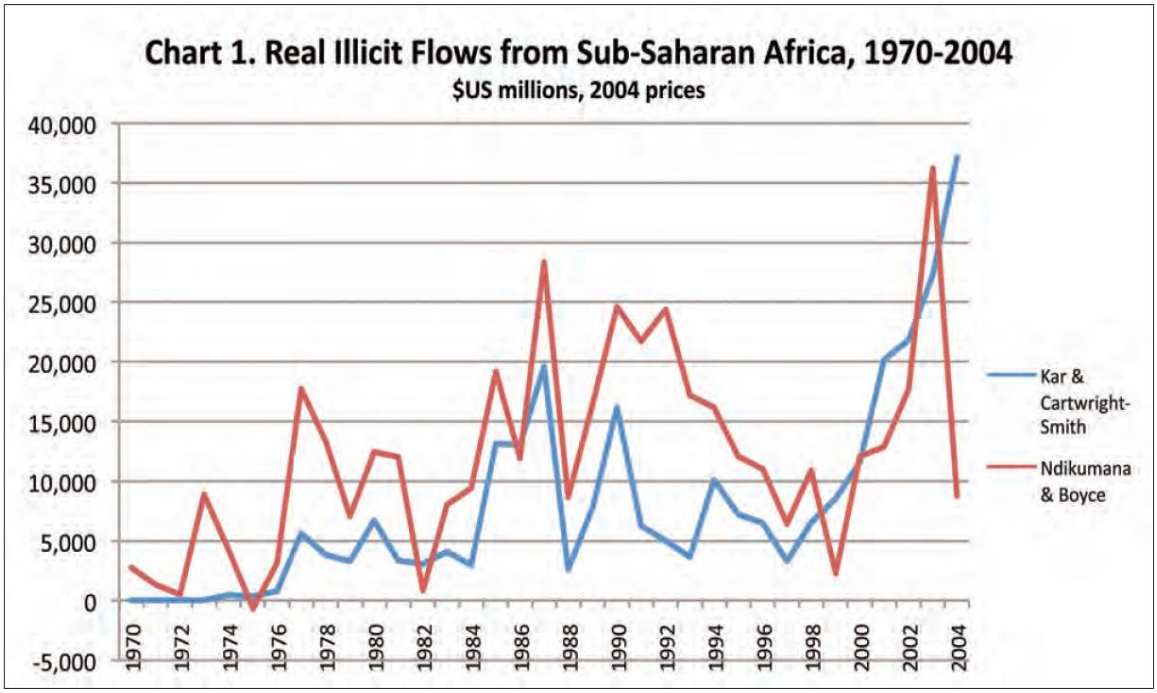


Figure 2.2 Real ILLICIT flows from Sub Saharan Africa (1970-2004)

Source: GFI

Growth rate of IFF oil based economies of west and central Africa growth rate of IFF was higher in a year between 1970-1983 "Some of the acceleration in illicit outflows was undoubtedly driven by oil price increases and increased opportunities to misprice trade that typically accompany increasing trading volumes due to globalization. The rates of outflow in illicit capital for West and Central Africa (14.5 percent) as well as Fuel-exporters (21.8 percent) over the entire period 1970-2008 reflect substantial outflows from Nigeria and Sudan. The acceleration of illicit outflows in 2000-2008 from both these regions coincides with unprecedented increases in oil prices. This seems to in corroborate Almounsor (2005), who found a significant link between oil price increases

and capital flight."…..Which is even higher from African average 12.1 percent" (Cartwright-Smith, Dev Kar 2013).

2.2.3 IFF in Ethiopia

In Ethiopia IFF put a colossal and wide Black hand on country growth and poverty reduction, as per (Alemayehu and Addis, 2017) " Over the period 1970 to 2012, the total capital flight from the country is estimated at USD 31 billion. Based on a simple ICOR based growth model simulation, the average growth lost owing to the capital flight is found to be about 2.2 percentage points per annum, between 2000/01-2012/13. Using an elasticity of poverty to income and inequality, we have also found the effect of capital flight on total poverty. Had it not been for capital flight, poverty would have been reduced by about 2.5 percentage points in the last decade."

The other literature published at GIF which exhibits" Country Rankings by Largest Average Non-Normalized IFF Estimates between a year from 2002 to 2011, Ethiopia ranked 39th by 202,400,000 dollars (Smith & Dev Kar 2013)

As noted by (Deppler & Williamson, 1987). "The fundamental economic concern about capital flight is its tendency to reduce welfare in the sense that it leads to a net loss in the total real resources available to an economy for investment and growth. That is, capital flight could be viewed as a diversion of domestic savings away from financing domestic real investment and in favor of foreign financial investment. ….As a result, the pace of growth and development of the economy is retarded from what it otherwise would have been." (Alemayehu &Addis, 2017).

Similarly another literature by (Gusarova, 2009) provides a theoretical notion that "the flight of capital is a lost opportunity for the money to work in the country's economy. Moreover, when the capital leaves the country legally, it enters another country legally and can improve its economic condition. However, capital which leaves the country illegally, will not appear in the national accounts of any other country, but rather will settle down in somebody's pocket. The money fled from the circulation cannot produce any additional money in either country."

At last different researchs conducted in different countries which aimed to assess the impact of IFF on economic growth using various econometrical models and literatures resulted in the same findings which are negative and significant as showed below

Authors	Countries Studied	Estimation Technique	Findings
Nkurunziza (2015)	35 African Countries (2000-2010)	simulation using ICOR	Significant Negative
Vincent et al. (2014)	Nigeria (1970-2010)	OLS	Significant Negative
Ndiaye(2014)	African Franc Zone (1970-2010)	System GMM	Significant Negative
Ndikumana (2013)	39 African Countries	simulation using ICOR	Significant Negative
Henry(2013)	Nigeria (1980-2011)	OLS	Significant Negative

Figures 2.3: Findings and methodology of other studies on IFF

Source: Alemayehu & Addis (2017)

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

A mere intent of this chapter is to give insight on how the research is designed, besides, theoretical foundation and imperial model for both IFF estimation and impact analysis are also incorporated. Apart from that, definitions, measurements and table expected signs of variables, diagnostic and variables testing techniques are also included.

3.1 Research design, data source and type

This time serious impact analysis research mainly follows a quantitative type of research approach, it implies both descriptive and econometrical analysis, mainly to assess IFF's impact on GDP. It's designed to pass through stages estimating the level of IFF using Hot money narrow and trade mess-invoicing using BOP (balance of payment) from national bank of Ethiopia and direction of trade data from IMF's Direction of trade statistics respectively. In regarding to other exogenous variables which are inflation rate, TOT, capital accumulation, education, population growth and consumption. This research applied secondary data originated from Ministry of Finance and Development, National Bank of Ethiopia and World Bank for a time period of 15 years, (2000-2015).

3.2 Methodological approach for Data Analysis

As highlighted above, in this research for result discussion and analysis purpose descriptive and econometrical techniques are deployed. For the descriptive part, means, standard deviations, maximums and minimums are used to show trend characteristics of GDP with response to IFF and other exogenous variables across time. Econometrically crosswise, impact analysis is performed using ECM model, taking natural logarithmic form of exogenous variables, and reviews 7 to see long run and short run response.

3.3 Model specification

GDP= *f*(IFF, δTOT, GCAPF, CON, INF, EDU POPGRATE, μ)

Or GDP= β_0+ β_1 IFF + β_2δTOT + β_3GCAP + β_4CONS + β_5INF+β_6EDU+β_7POPGR+ μ

……..……..……..3.1

Where;

IFF= Ilicit finance outflow; δTOT= *Percentage change in terms of trade;* GCAPF= *gross physical capital formation;* CONS= *Gross Consumption;* INF =Inflation rate; EDU education; POPGR= population growth rate and **μ=** Stochastic Error term.

β_0: Intercept

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, and \beta_7$,: Coefficients of the explanatory variables: μ is disturbance error term. For the purpose of removing effects of outliers and to get elasticity coefficients, the variables have to be transformed to natural logarithms.

As flows

GDP$_t$=β_0+$\beta_1 ln$IFF$_t$+$\beta_2 ln$δTOT$_t$+$\beta_3 ln$GCAP$_t$+$\beta_4 ln$CONS$_t$+ $\beta_5 ln$INF$_t$+$\beta_6 ln$EDU$_t$+$\beta_7 ln$POPGR$_t$+ μ$_t$……..3.2

Where:

GDP_t=Gross domestic product

lnIFF$_t$= *Illicit finance outflow;*

lnδTOT$_t$ = *Percentage change in terms of trade ;*

lnGCAP$_t$ = *gross physical capital formation;*

lnCONS$_t$ = *Consumption*

lnINF$_t$=Inflation rate;

lnEDU$_t$ =Education;

lnPOPGR$_t$= population growth rate

μ_t =Disturbance error term

3.4 ECM model

Error Correction term in ECM model corrects the disequilibrium of the system. The coefficient tallest us the speed at which the system or equation corrects itself from disequilibrium to equilibrium annually or in one period. In other words, it means speed of adjustment.

If ECM term is negative and significant it tells the existence of short run relation within in the system or equation. However, before running ECM model, the existence of long run relationship has to be checked either directly using testes like Johansson co-integration and granger co integration or indirectly by testing error terms stationarity at level for long run equation which contain all stationary variables at level or at first deferential. In short "μ_i error term of long run equation has to be stationary at level." (Hosni, 2013)

Mathematically ECM is represented as below:

$GDP_t = \beta_0 + \beta_1 ln IFF_t; \ \beta_2 ln \delta TOT_t \ ; \ \beta_3 ln GCAP_t \ ; \ \beta_4 ln CONS_t; \ \beta_5 ln INF_t; \ \beta_6 ln EDU_t; \ \beta_7 ln POPGR_t + (\mu_{t-1})$

Where

(μt-1) = One period lag of the residual or error term

3.5 Definition and measurement of variables

- **Capital Flight**

This is a main exogenous variable, which the researcher would like to see its magnitude and directional effect on. In different literatures we have seen that the magnitude of IFF is very high in general and specific to Ethiopia.

Even though there are different estimations made by various scholars on the level of illicit financial flow the researcher found it necessary to perform my own estimation for the following reasons:

1 Sources of data used to estimate IFF is originated from different institutions which have made their own assumptions or re consideration of the original data for example the data's generated by IMF, World Bank and NBE on some part of BOP elements deviate one from another. Thus, to avoid this confusion, I used an official data which can be found at any government office. Additionally this would also help to make estimates to relay on what government has confirmed.

2 Type of estimation model: - based on my learnings from literatures written on the subject matter during the course of investigation, the researcher considered to use different estimation model. Since, outlets of IFF differ from country to country and there was no country specific study on estimating IFF using this model and government data up to 2015. The researcher decided to use trade miss invoicing because many of cross-border capital movement is made through trade platform.

Furthermore I also deployed a narrow form of WBG Residual model; which is Hot money narrow. Though, usually this model is not used alone because it's believed that it could understate the level of IFF. But as recommended in many literatures, it's added on Trade miss-invoicing estimation model to estimate the total amount of IFF.

3 Time: - In regard to time, other estimates didn't include the IFF starting 2013, which led to possible understatement of magnitude of IFF. Apart from that, different elements or variables which are necessary to estimate the model didn't tally over the time which is in a year between 2000 and 2015.

IFF Estimation Model

- **Trade miss-invoicing**

GIF 2013 "a rationale behind this estimation model is that residents can acquire foreign assets illicitly by over-invoicing imports and under-invoicing exports. In order to capture such illegal transactions, a developing country's exports to the world (valued free on-board, or exports f.o.b. in U.S. dollars) are compared to what the world reports as having imported from that country, after adjusting for the cost of transportation and insurance. Similarly, a country's imports from the world after adjusting for freight and insurance costs are compared to what the world reports as having exported to that country. In transferring money abroad, the importer declares a higher import value to the customs

department than the value of goods recorded by the exporting partner country. Similarly, an exporter would understate the value of goods actually exported (in relation to the imports recorded in the importing partner country) and keep the balance of funds abroad. Therefore, discrepancies in partner country trade data implying over-invoicing of imports and/or under-invoicing of exports indicate the transfer of illicit capital abroad. The world figures for exports to and imports from a particular country are derived based on partner-country trade data reported to the IMF by its member countries for publication in its Direction of Trade Statistics (DOTS).

Additional point on estimation in this model is exclusion of gross reversals, it assumes capital flow from developed countries to developing countries is considered as capital export not as IFF. But, capital flows from developing to developed countries is considered as IFF. In other word this filter is emplaced to insure that estimation results only include a direction or sign of flow from developing to developed countries. This concept is well defined in (GIF, 2013) GER as "method of calculating gross illicit outflows defined as export under-invoicing and import over-invoicing. In other words, GER calculations are based on the sum of discrepancies between (i) a country's exports and world imports from that country and (ii) a country's imports and world exports to that country. The absolute value of the export under-invoicing, which is a negative estimate under (i), is added to import over-invoicing to arrive at a GER estimate"

The other most important concept of trade miss invoicing is normalization, it explains illicit outflows must be greater than or equal to 10 percent of that country's total exports valued free on board (f.o.b.) for that year. In other words it gives a threshold of ten present for possible export-under invoicing by Considering Fright and Insurance are incurred in exporting country are part of a trade. Thus, Normalized estimates represent the lower bound (conservative estimate) of the possible range of illicit flows.

- **Hot money narrow**

Hot money narrow is the error and omission part of balance of payments statistics (BOP). In this research all data for calculating HMN are originated from NBE.

3.6 Description of variables

Illicit financial flow: it's a cross-border movement of capital associated with illegal activity or more explicitly, money that is illegally earned, transferred or used that crosses border. It's also expected to have negative relationship.

Gross capital formation this variable reflects the positive effect of physical capital on growth, as stated by the theory of growth in classical and endogenous growth models.

Change in TOT: it's expected to have a positive relationship between international trade and economic growth. Since, an improvement in the terms of trade were to reduce input prices relative to output prices, firms would have an incentive to raise quantity supplied.

Population growth rate: Theoretically it's believed that a higher rate of growth implies a higher dependency rate, with greater need for housing and other "demographic capital" which is provided at the expense of "productive capital".

Education: In this research Education is taken as a proxy of human capital which is a source of sustaining economic growth. It's also expected to have a positive impact on economic growth.

Gross domestic product: It refers to the value of all final goods and services produced within the territory of a given country in a given period, usually a year.

Inflation rate: It's expected to have negative effect on growth and it has sound theoretical attest. Since Inflation would lead to uncertainty about the future profitability of investment projects.

Consumption: This variable expresses about goods and services that are used for the direct satisfaction of individual needs or collective needs of members of the community. It includes all government expenditures and household consumption expenditures.

Table 3.1: Expected sign of independent variables

Variables	Expected signs
IFF	- Negative
Gross Capital Formation	+ Positive
Population Growth rate	- Negative
Consumption	+Positive
Education	+Positive
Inflation Rate	-Negative
Growth in Terms of Trade	+ Positive

3.7 Diagnostics Test

- **Heteroscedasticity**

Heteroscedasticity is a condition where by homoscedasticity assumption is violated. In other word heteroscedasticity occurs when $\boldsymbol{U_i}$ or residuals does not affect each observation equally or constantly across time. Statically OLS assumes, $V(\varepsilon_j) = \sigma^2$ for all j.

- **Residual normality Test**

Residual normality is a measurement of distribution of residuals horizontally and vertically across time. It includes skewness and kurtosis. This Jarque-Bera test (JB).

Normality assumption: $\varepsilon_t \sim N(0, \sigma^2)$

H_0 : α_3 =0(if $\alpha_3 < 0$ then f (y_t/x_t) is skewed to the left)

$\alpha_4 = 3$ (If $\alpha_4 > 0$ then f (y_t/x_t) is leptokurtic)

Accept Null hypothesis: distribution series is symmetric

Reject Null hypothesis: either significantly skewed or leptokurtic

- **Autocorrelation Lm Tests**

Autocorrelation lm tests serial autocorrelation of μ_i (error terms or residuals) between observations. In other word it means error term of one observation at time t_0 occurs on another observation at t_1. To test Autocorrelation, we use Durbin-Watson (DW), it ranges from 0 to 4. Any result near to 2 indicates no serial correlation.

- **Unit Root Tests**

It's a problem which applier when linearity or stationarity doesn't exist between variables. Under normal situation we assume linearity of each and every variable across time which is expressed by same standard deviation and mean of variables over time. According to (Challis and Kitney, 1991) none stationary of variable which is expressed by high R^2 and low Durbin-Watson (dw) statistic or R^2>DW statics. This leads to spurious or irrelevant regression. Thus, a unit root test is a test which aim to check weather variables are stationary or not.

- **Augmented Dickey-Fuller (ADF) test**

This test is a modified test of Dickey and Fuller originated in 1979. ADF test is postulated to overcome a biasedness and inefficiency on OLS, which arises because of being not able to consider autocorrelation in error process of a dickey-fuler test.

The aim of the Dickey Fuller theory was to test the hypothesis that $\emptyset = 1$ in:

$$y_t = \emptyset y_{t-1} + \mu_t \quad \text{.....3.3}$$

Hypotheses H_0: Series contains a unit root

H_1: Series is stationary

Reject: null hypothesis means, no runt root

The standard Dickey Fuller test estimates following equation:

$$\Delta y_t = \beta_1 + \beta_{2t} \varphi y \varepsilon_{t-1} + \mu_t \quad \text{.....3.4}$$

Where y_t is the relevant time series, Δ (Change) is a first difference operator, t is a linear trend and μ_t is the error term. The error term should satisfy the assumptions of normality, constant error variance and independent error terms. According to (Gujarati, 2004) if not

the error terms are not independent in equation (1), results based on the Dickey-Fuller tests will be biased.

The weakness of the DF test is that it does not take account of possible autocorrelation in the error process or term(μ_t). Clemente, et al (1998) noted that a well–known weakness of the Dickey–Fuller style unit root test with I(1) as a null hypothesis is its potential confusion of structural breaks in the series as evidence of non-stationarity.(Muluken, 2016)

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter analyzes and discusses the long-run and short run relationships between IFF and economic growth. Econometric techniques that are discussed in the previous chapter are employed in this chapter and the results are discussed in detail.

The first chapter deals with descriptive summary of the data which helps to use each variable for advanced statistical analysis and for easy understanding. Consecutive subsection is unit root tests are performed using the Augmented Dickey Fuller (ADF) test. Based on the results of stationarity we will move to check weather co-integration exist or long-run relationships between the variables understudy backed through theorems.

Following that error correction method ECM will be used to capture the short-run dynamics in the relationship of IFF and GDP. Though the research highlights functional relationship between all exogenous and endogenous variables. It's also emphasized on discussing relationships of main exogenous variable which is IFF and its impact on growth. Furthermore, the research has put stationarity test results in appendix. Besides short and clear discussion of results and interpretation are presented in this section.

Estimations and diagnostic tests are carried out using Econometric Views (E-Views) version 7.0 statistical software. Since, it's advised by many scholars for time serious data analysis.

4.1 Descriptive Summary

4.1 Table: Descriptive statistics

	GDP	logIFF	logCAPFORM	logCONS	logEDU	logINFRATE	LogPOPGRATE	logTOT
Mean	2.41E+10	9.006659	9.989711	10.43351	8.950695	12.51159	2.697603	0.713652
Median	2.13E+10	9.167752	10.00236	10.43433	8.999417	9.301225	2.685146	2.897155
Maximum	5.94E+10	9.773725	10.29671	10.63494	9.278282	44.39128	2.891884	7.766037
Minimum	7.11E+09	7.702604	9.545853	10.28000	8.593210	-8.237845	2.477361	-20.00000
Std. Dev.	1.69E+10	0.676926	0.177701	0.106664	0.187949	12.81199	0.144027	7.100855
Skewness	0.701188	-0.792065	-0.714491	0.185322	-0.250483	0.967827	0.023493	-1.639508
Kurtosis	2.313207	2.398142	4.098174	2.211999	2.150864	3.846188	1.619560	5.477325
Jarque-Bera	1.625561	1.914465	2.165317	0.505549	0.647999	2.975191	1.271881	11.25939
Probability	0.443623	0.383954	0.338694	0.776643	0.723251	0.225915	0.529437	0.003590
Sum	3.86E+11	144.1065	159.8354	166.9362	143.2111	200.1854	43.16164	11.41843
Sum Sq. Dev.	4.30E+21	6.873432	0.473665	0.170657	0.529875	2462.207	0.311158	756.3322
Observations	16	16	16	16	16	16	16	16

Source: Own Computation (2017)

Mean and median value shows the average value of the series at meddles. In all the series, the value of means and medians are close to each other. This indicates minor symmetry but if they are far from each other they show the other way round.

Maximum and minimum values of the series are also given for each series under the row maximum and minimum, respectively.

The measure of dispersion around the mean in the series is calculated as the standard deviation. In other word, it tells how the observations are deviate or disperse from the mean. In regarding to interpretation of its results usually it's used in comparison with another distribution. This is interpreted as distribution with smaller standard deviation exhibits less dispersion and larger standard deviation shows higher dispersion. From our descriptive statistics which is sited in table 4.1, logCONS is a less dispersed series with the value of 0.106664 while logINFRATE is the highly dispersed series with a value of 12.81199. The larger the dispersion between the values is the higher the standard deviation that shows greater volatility or oscillation in inflation rate which ranges

between -0.17 to 1.64 under natural log. This may directly link to the inflation which arises because of IFF using trade as a means since we are heavily dependent on import.

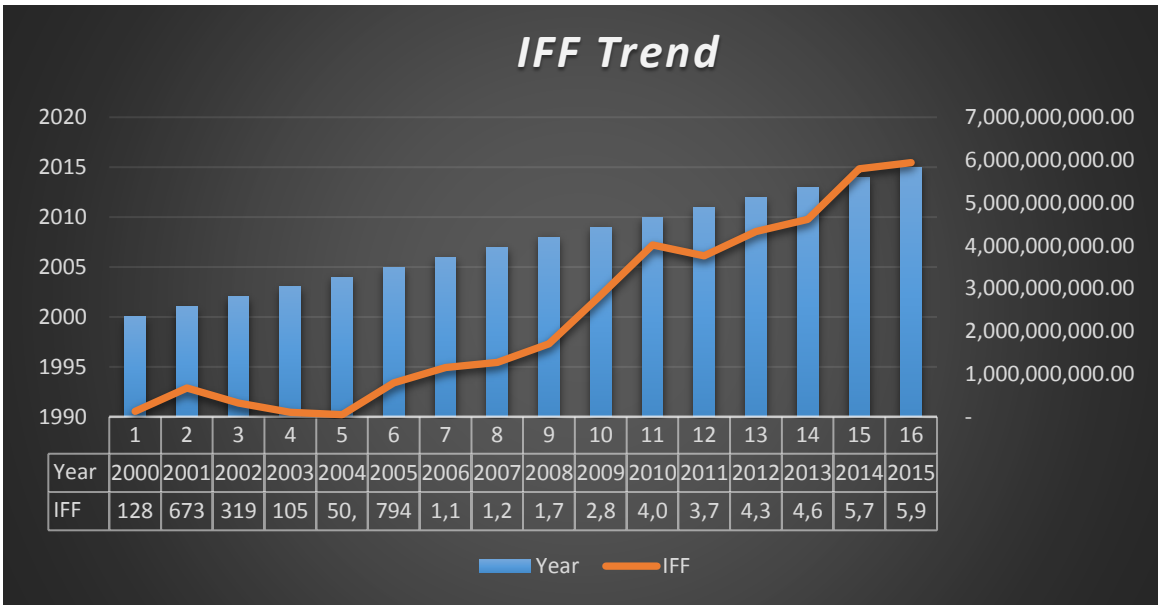
Skewness measures the lopsidedness of the distribution of the series around the mean. Symmetric distribution has zero skewness value. Among the values of skewness in Table 4.1 only LogPOPGRATE is close to symmetric distribution with the value of ***0.023493***. Series such as log IFF, log CAPFORM, logEDU and log TOT are negatively skewed by implication these distributions have a long left tail or resembled to the left sphere from zero value which contains negative values like GDP log CONS logINFRATE, logPOPGRATE are skewed to the right sphere by 0.701188, 0.185322, 0.967827, and 0.023493 accordingly.

Another major descriptive statics measurement of is distribution is kurtosis which measures the flatness and peakedness of the distribution of the series. Or in short it measures distribution of series vertically. A distribution of series which has. A kurtosis value of 3 is assumed to be normal. In this research, hence log (IFF) is near to the normal distribution with the kurtosis value of 2.398. Other series variables such as GDP logCONS and log EDU logPOPGRAET are platykurtic (flat) with kurtosis value less than 3 which ranges from 2.3132 to 1.6195.Variable series' like log INFRATE log POPGRATE and logTOT are leptokurtic or peaked with kurtosis value higher than 3 which ranges from 3.8461 to 5.4773.

With regard to normality there is statistically a better way of testing distribution of series in a variable using Jarque Bera (JB) test of normality. It follows a chi-square (x^2) distribution with two degrees of freedom. Significant p value will result undesired outcome or it tells the existence of abnormality in the distribution at significant level. And the other way round, if p value is insignificant or greater than 0.05, it infers that there is no abnormality in a distribution at significant level. Taking this into account table A exhibits except log TOT which has P value of 0.0035 of significant level, all other variables all other variables which are logCONS , GDP, log POPGRAET, log EDU, log IFF, log CAPFORM and log INFRATE have insignificant level of abnormality which ranges from p value of logCONS 0.7766 to p-value of log INFRATE 0.225915.

4.2 Total amount of IFF using different estimation methods

As indicated in the methodology part of the research different international estimation was employed to get magnitude of IFF in Ethiopia.



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
IFF	128	673	319	105	50,	794	1,1	1,2	1,7	2,8	4,0	3,7	4,3	4,6	5,7	5,9

Figure 4.1: IFF trend (2000-2015)

Source: Own computation (2017)

As highlighted in Fig 4.1 generally IFF has shown an increasing trend. Between a year's 2003/2004 IFF has reached to the lowest level, which is about 50 million USD. To Contrary, Staring from 2010 to 2011 the magnitude of IFF has increased from 2.1billion to 4.1 billon which is a record high between 2000 and 2015.

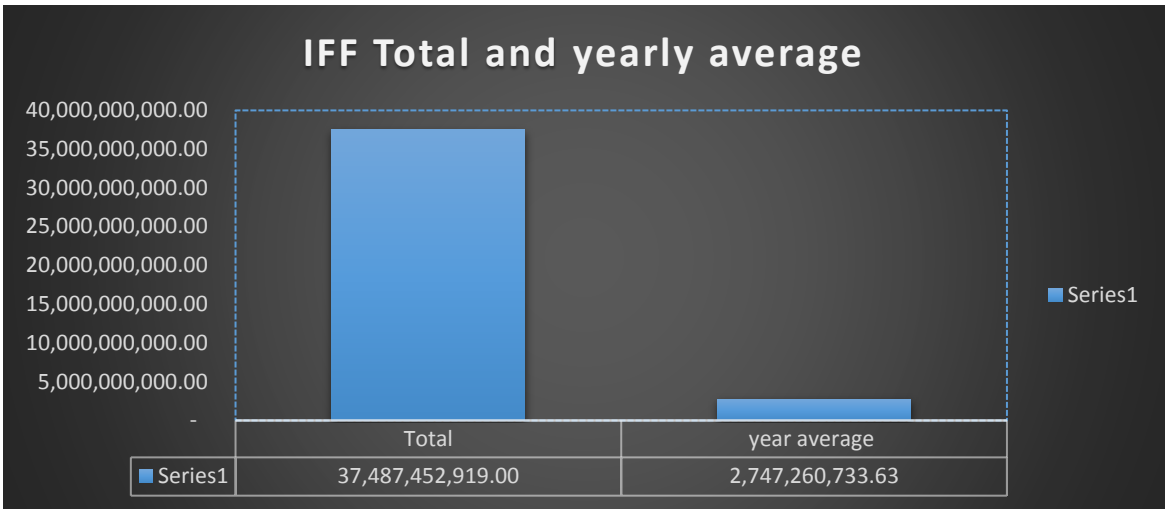


Figure 4.2: IFF total and yearly average value

Source: Own computation (2017)

As indicated in Fig 4.2 based on HMN and Trade Miss-invoicing estimation models the magnitude of IFF on average is about 2.7 billion a year and in total Ethiopia had lost around 37.8 billion USD with in fifteen years starting from 2000.

4.3 Diagnostic check

Test for Multicollinearity using Variance inflation factor

This test tells us how much the variance of a coefficient is "inflated" because of linear dependence with other predictors. Variables which has a VIF value less than 10 or a 1/VIF value greater than 0.1 are considers as free from a problem of multicronialty. If the other way round happens it's considered us multicoranil. Thus based on table 4.2 coefficient all independent variables are free from multicorolinity.

Table: 4.2 Variance Inflation factor results

Variable	VIF	1/VIF
IFF	6.399188	0.15627
CAPFORM	4.207372	0.23764
CONS	6.419958	0.15576
EDU	4.969230	0.20123
INFRATE	2.158493	0.46328
POPGRATE	5.313208	0.18820
TOT	1.597983	0.625788

Source: Own computation (2017)

Test for Serial Correlation

Serial correlation occurs in a presence of violation of a regression assumption which states the error term is uncorrelated with each other. When serial correlation exists, it causes the estimated variances of the regression coefficients to be biased. This in turn leads to unreliable hypothesis testing.

On the other hand, in a presence of serial correlation, the t-statistics appear be more significant than they actually are. A number of diagnostics tests are available for to check whether serial correlation exists in the model or not. In this study, Breusch-Godfrey Lagrange multiplier (LM) test for serial correlation/autocorrelation was applied.

The result indicates that the existence of serial correlation in the model. To deal with problem arei estimation technique is applied.

Table: 4.3 Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	18.38626	Prob. F(2,1)	0.1627
Obs*R-squared	10.70878	Prob. Chi-Square(2)	0.0047

Source: Own computation (2017)

Test for heteroskedasticity

It occurs when the variance of the disturbance terms differ across observations. In a presence of heteroskedasticity, the result obtained will be inefficient and produce unstable regression. Graphical and statistical tests were available for checking a presence of hetrocdasitcity.

In this study Breusch-Pagan-Godfrey method was used to check a presence of hetroskedasticty. The result indicates that there exists no heteroscedasticity

Table 4.4 : Breusch-Pagan-Godfrey Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.182763	Prob. F(7,3)	0.9702
Obs*R-squared	3.288535	Prob. Chi-Square(7)	0.8571
Scaled explained SS	0.354801	Prob. Chi-quare(7)	0.9998

Source: Own computation (2017)

Test for Normality

Normality test is used to determine whether a data set is well-modeled by a normal distribution or not. To compute how likely it is for a random variable underlying the data set to be normally distributed. If the residuals are non-normal, intervals to be predicted may be incorrect. Graphical and statistical method was available for assessing whether the data is normally distributed.

However, in this study a test for normality is tests using Histogram. The result indicates that the data is normally distributed since P-value is insignificant.

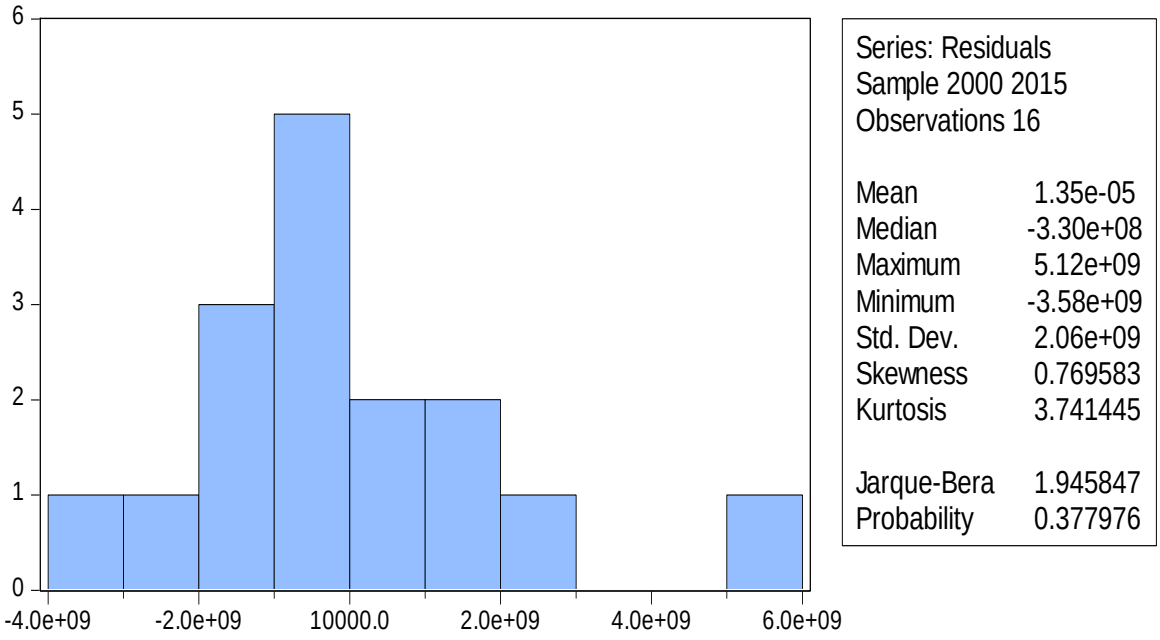


Figure 4.3: Normality Tests result

Source: Own computation (2017)

Tests for Stationary

Since existence of linearity relationship is a necessary condition to study variables across time. However this may not happen in short run or variables may have not equilibrium relation in short run, and statistically this wouldn't lead to infer there is no equilibrium at all. Thus, there is a need to check whether there is equilibrium relationship between variables in long run or not. If there is, we can keep running the regression because there is co integration but if that is not the case we don't run regression. Since "there is great chance of engaging in spurious (or nonsense) regression analysis. "(Gujarati, 2010)

Thus, the researcher would check a unit root problem to infer weather stationarity exist or not using ADF Augmented Dickey-Fuller test.

Table 4.5 Summary of ADF /Unit Root Test

Variables	ADF test statistics	Critical vale @ 5%	No of the time differences	Decision
GDP	5.143594	-1.966270	I(1)	STATIONARY
IFF	-4.723968	-3.144920	I(1)	STATIONARY
CONS	-2.336353	-1.968430	I(1)	STATIONARY
EDU	-1.699054	-1.604392 @ 10%	I(1)	STATIONARY
INFRAT	-5.246488	-3.119910	I(1)	STATIONARY
POPGRATE	-3.843904	-3.175352	I(1)	STATIONARY
TOT	0.5401679	-3.175352	I(1)	STATIONARY
CAPFORM	-3.985779	-1.968430	I(1)	STATIONARY

Source: Own computation (2017)

The results of unit root test as indicated above the variables used in the study are integrated of order I (1) respectively. This means that the variables are stationary at their respective first Difference.

Co- Integration and Error Correction Model

After checking the existence of equilibrium relationship or established stationary of variables at same order either at D (I) or D (II). Then, it's valuable to determine what type of relations they have. So a first stapes is to check whether there exists long-run equilibrium relationships among individually non stationary variables at level using Johansson test of co integration test. This technique would enable us to test stationary of all variables at least at their first difference. Then, if, the error term of regression result is found to be stationary, it infers that combinations of variables which were stationary at first difference but non stationary at level would be considered us stationary at level.

I. LONG RUN RELATIONSHIPS

Table 4.6 Long run regression result

Variable	Coefficient	Std. Error	P-Statistic
C	1.52E+11	2.84E+11	0.537418
CAPFORM	-5.09E+09	8.19E+09	0.5512
CONS	-4.35E+10	1.57E+10	0.0244
EDU	6.25E+10	1.70E+10	0.0061
IFF	-2.79E+08	2.43E+09	0.0127
INFRATE	-1.59E+08	87736839	0.1074
POPGRATE	-6.62E+10	2.32E+10	0.0213
TOT	-4.08E+08	1.28E+08	0.9112

Source: Own computation (2017)

The long run impact of IFF on economic growth as presented in Table is illustrated by Equations below:

GDP – 2.79 LNIFF – 5.09E LNCAPFORM –4.35LNCONS +6.25LNEDU – 1.591LNINFRATE-6.62LNPOPGRATE – 4.08LNTOT +1.52E = 0…..4.1

This can be rewritten as,

GDP = 6.25LNEDU –2.79 LNIFF – 5.09E LNCAPFORM –4.35LNCONS– 1.591LNINFRATE-6.62LNPOPGRATE – 4.08LLNTOT +1.52E …….....….4.2

The above Equations depicts that EDU (LNEDU) have a positive long run relationship with GDP (LNRGDP). On the other hand, CONS (LNCONS), EDU (LNEDU) and IFF (LNIFF) and POPGRATE (LNPOPGRATE) show a negative long run relationship with GDP (LNRGDP). All the variables are statistically significant in explaining economic growth except CAPFORM, INFRATE and TOT since they have absolute p-value greater than 5%.

(LNIFF) has negative sign and is statistically significant in explaining the economic growth in the long run. Thus, IFF has a long run effect on economic growth of Ethiopia.

An increases/appreciation of illicit financial flow by 1% decreases economic growth by 2.79%.

The other finding depicts that, CONS has a negative and significant effect on economic growth of Ethiopia. A 1% increases in consumption would result a deprecation or decreases of GDP by 4.35%. Theoretically this result may not be much supported. Though using the data's available from 2000-2015 and a model deployed this result has come out.in addition, high consumption may adversely affect saving level. Thus, additional domestic investment would reduce; in effect GDP would be affected negatively.

Based on results on the table above Education has a positive and significant effect on economic growth of Ethiopia in a long run. Thus long run responsiveness of GDP to education by 6.25%. . It means that a one percent increase in investment on Education will increases GDP by 6.25 percent over time.

The other significant variable which is population growth rate has a negative impact on economic growth or GDP in the long run. A results shows that the magnitude of population growth rate affects GDP is 6.62%. It means a 1% increase in population growth rate decreases GDP by 6.62%.

II. SHORT RUN RELATIONSHIPS

Short Run Error correction model results

Using this mode we can see interaction of variables in short run. Usually it's represented by ui-1 which is one period lag of co-integrated regression residual value. And it tells that the speed of adjustment of a variable to get back to equilibrium or speed of adjustment towards long run relationship. Usually it helps to capture short run dynamic economic changes which arise from institutional and political changes.

Table 4.7 Parameterized ECM regression results

Variables	Coefficient	Std. Error	P-statistics
IFF	-0.27908	0.012324	0.0000
CONS	-0.43510	0.079807	0.0000
EDU	0.62510	0.086069	0.0000
INFRAT	-0.15908	0.000445	0.0000
POPGRATE	-0.66210	0.117702	0.0000
TOT	-0.4080	0.000648	0.0000
CAPFORM	-0.509009	0.041561	0.0000
Ui-1(ECM)	-0.112581	0.272430	0.0000

Source: own computation.

In table 4.7 variables represent their respective impact on GDP in short run and coefficients represent a speed of adjustment from previous period dis equilibrium to current period equilibrium.

“Error correction model (ECM) is significant if it has a negative sign in either over parameterized or parsimonious ECM. This implies that the level at which present value of dependent variable adjust itself to changes in the independent variable” (Muluken, 2016). A higher percentage of ECM Coefficient indicates a fast feedback of a variable or an adjustment of a variable from previous period disequilibrium to reach to present level of dependent variable. In short, it miens endogenous variable can recover fast to its long run equilibrium from a shocks in exogenous variables in short run.

From results on the above table we can understand that GDP adjusts itself by a speed of 27 % from a negative shock of IFF. This implies that GDP can only recover 27% a year or each period from a negative effect of IFF. Thus, GDP to recover 100% from the negative impact of IFF it takes around 3.5 periods or 3.5 years to reach to its long ran equilibrium.

Speed of adjustment of GDP to its long run equilibrium for a change in consumption is around 43.5%. Thus GDP recovers faster from a shock in consumption than IFF. Since a

recovery span for GDP is around 2.2 years. However, a negative sign of consumption is not anticipated result. This may happen because consumption may reduce saving and minimum saving may lead to minimum investment. Therefore, gross domestic product would be negatively affected. Since from Micro economic point of analysis we can conceive that Marginal Propensity to Save = 1- Marginal Propensity to Consume.

From the result we can see that a short run speed of responsiveness of GDP to a change in inflation and all variables other than mentioned in the research which are represented by error term is 0.15908 and 0.112581 respectively. It means that an effect from a percentile change in inflation and u_i would take to GDP around 6 and 9 periods or years respectively to recover to its long run equilibrium position.

Education variable has a positive sign, from this we can deduce that GDP would responded in a positive and fast way for a shock which comes from education. We can also see from the coefficient how fast the speed of adjustment for GDP; which is 62.5% or around half year. In other way 62.5% of disequilibrium would be corrected within half a year.

Even though gross capital formation is expected to have a positive and significant value on economic growth the research output depicted gross capital formation had a negative effect on economic growth of Ethiopia and it is found statistically significant effect.

Population growth and TOT results are negative since Ethiopia is characterized by high population growth rate and negatively skewed terms of trade. Results showed that a time for GDP to adjust itself from a shock in Population growth rate and rate of changes in TOT is 60.2% and 40.6 % respectively. This implies that GDP can recover 60.2% a year or a period from shocks of population growth. This fast recovery time may happen because population may also be an engine for economic growth. In regarding to changes in terms of trade, GDP recovers by 40% each year for changes in TOT which can be considered as fast. This may happen because of most imported goods are Capital items. So that, they add value to the economy.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

This thesis was motivated by a striking moment of observation in my work place which leads me to question and investigate the level of illicit financial low and its impact on economic growth in Ethiopia.

Since there are no plenty of country specific researches in regard to Ethiopia context, the researcher set objective for this study to add value to the existing empirical literatures on estimating the magnitude of IFF and its impact on economic growth in the country.

This study is based on annual time series data which centers from 2000 to 2015.This paper has made use of error correction model after confirming the existence of co integration to see how and at what speed GDP responds to get to equilibrium from previous period dis equilibrium for changes or shocks in exogenous variables, which are illicit financial flow, capital formation, consumption, education, inflation rate, population growth rate and change in terms of trade. For the empirical investigation this study has preferred to make use of its own estimation model using trade miss invoicing and hot money narrow after identifying a main trance boundary economic activities which opens a channel for Illicit finance flow and officially unrecorded capital outflow using a narrow form of World Bank residual model. For estimation model developed by IMF which is trade miss invoicing, Direction of trade data was used and for HMN estimation BOP Data were implied from National bank of Ethiopia data set.

During estimation of IFF using IMF's trade miss invoicing model the researcher used a normalized or conservative estimation approach. This considers 10% of capital out flow is a legal out flow related to fright and insurance costs. So that we can compare all imports and exports at FOB or free on board. In other words Costs are adjusts to insurance and fright at 10% to reach at free on board value. Thus, after excluding Fright and Insurance cost which are exceeds 10% from the export side we can compare them to imports which doesn't have Cost and Fright at the same level.

Estimations of IFF using trade miss invoicing depict that on average Ethiopia is losing more than 2.1 billion a year and in total 33, billon from 2000-2015. The other estimation result using hot money narrow which only captures a minimum amount of IFF shows the magnitude of IFF on average around 646.9 million USD and in total 3.8 billion during years from 2000-2015.Thus, in general from our calculation using both trade miss-invoicing and HMN models the total amount of IFF on average is 2.7 billion USD and in aggregate 37.4 billon.

Apart from that the most interesting finding of this estimation results is a trend of IFF. Since, trend is moving up time to time specially from a year 2011 to 2015 it's increasing in alarming rate without interruption. Therefore, from the above discussion we can conclude that IFF exists with a very high magnitude and has increasing trend.

The second objective of this research is to assess IFFs impact on economic growth or GDP. So, after identifying other time serious variables in regression analysis. The next step was diagnosis of variables to avoid problem of finding spurious relationships which leads to invalid inferences.

Major findings of the research are negative sign of ECM value which shows that the ECM is significant. This implies that the present value of GDP adjusts how fast to changes in IFF, CONS, INFRATE, POPGRATE, TOT, CAPFORM and RES. The ECM value of -0.112581 shows a feedbacks of about 11.25% from the previous period disequilibrium would be corrected in one period or each year. This tells us GDP would only adjust at a speed of 11.25% a year or each period which arises from previous year disequilibrium except IFF, CONS, INFRATE, POPGRATE, TOT, CAPFORM and EDU to catch-up present level of GDP or long run equilibrium. So, from this we can explicitly understand that negative shock in error term or residual or all variable which affect GDP except other exogenous variables included in the research would result to wait around nine periods or nine years to reach to its long run equilibrium.

To put the main variable in to light, the study has found that, with significant level of assurance, a shock which was raised by IFF from 2000 to 2015 at each year Ethiopia's GDP can only correct or recover 27.9% at each year. This means, Ethiopia's GDP can only recover by 27.9% for each year illicit financial flow between 2000 and 2015.

Therefore, 3.54 years are needed to totally recover from negative impact of illicit financial flow of each year between the years spanning from 2000 to 2015.

In relative terms the economy or GDP can recover very fast from shocks which raised because of education, population growth or demographical changes and capital formation or investment. On average it takes only half a period or a year to recover GDP to its long run equilibrium position. Here a shock in education would result positive impact on GDP. This may arises because education variable was taken as a proxy of total spending for education.

This research also found consumption has negative but insignificant effect on GDP. In regarding to change in terms of trade, GDP would take around two periods or years for shock which ascends from change in terms of trade.

5.2 Recommendation

Based on the findings, this study points out three important policy recommendations. As indicated in the research IFF has a significant negative impact on economic growth. Besides, trends are increasing in alarming rate. Because of this it curves down a country's effort to reduce poverty and to enhance equitable wealth distribution. Hence, government should give focus to tackle this problem by establishing institutions which study the channels for IFF and contextualize or develop a better model which can capture the magnitude of IFF. By doing so proxy data's would decrees. So that they can give a better information on the magnitude and streams of IFF. Furthermore, they can also be a center of excellence in these area of study. Therefore, institutionalized approach is important.

Other important approach to fight IFF is to design controlling and auditing mechanizes which promotes traceability and openness of Trance boundary trade activities. By doing so we can avoid illegal activities which are intended to generate money. As a consequence, in addition to using capital to energize development activities, it would also help a country to secure peace and stability to sustain economic growth.

The final recommendation which this research can offer is to use a holistic and collaborative approach. As I have learnt through different literatures, establishing global dynamic collaboration with capital flight destination countries is a necessary condition to tackle IFF. Since it's not feasible by any individual country resource and executive capacity. Domestically it's also important to have a holistic approach. An approach to be holistic, it must understand the motives for IFF which can be classified as pushing and pulling factors. Pushing factors may include illegal activities such as corruption and tax evasion, inflation and macro-economic instability etc. apart from that puling factors are factors which motivate actors to engage on act of IFF like seeking advantage for exchange rate or to avoid inflation. Therefore addressing this problem with a holistic and dynamic collaboration is necessary to tackle IFF.

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APPENDIX

year	HMN	Trade miss -invoicing Normalized @ 10%	HMN+ Trade miss -invoicing Normalized @ 10%
2000	66,100,000.00	62,002,540	128,102,540
2001	0	673,633,550	673,633,550
2002	0	319,304,577	319,304,577
2003	0	105,158,627	105,158,627
2004	0	50,420,095	50,420,095
2005	0	794,119,229	794,119,229
2006	0	1,148,911,055	1,148,911,055
2007	0	1,270,375,436	1,270,375,436
2008	0	1,704,400,467	1,704,400,467
2009	907,325,585.10	1,931,360,087	2,838,685,672
2010	1,401,098,749.44	2,613,508,429	4,014,607,178
2011	478,045,646.17	3,284,594,737	3,762,640,383
2012	517,418,135.21	3,809,339,964	4,326,758,099
2013	0	4,616,952,529	4,616,952,529
2014	511,243,179.88	5,282,979,456	5,794,222,636
2015	0	5,939,160,845	5,939,160,845
Total IFF	**3,881,231,295.80**	**33,606,221,623**	**37,487,452,919**
Average year	**646,871,882.63**	**2,100,388,851.00**	**2,747,260,733.63**

ADF test Results at first difference I (1)

Null Hypothesis: D(CAPFORM) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.985779	0.0007
Test critical values:	1% level	-2.740613	
	5% level	-1.968430	
	10% level	-1.604392	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 14

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CAPFORM,2)
Method: Least Squares
Date: 05/27/17 Time: 10:30
Sample (adjusted): 2002 2015
Included observations: 14 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CAPFORM(-1))	-1.102639	0.276643	-3.985779	0.0016

S.E. of regression	0.177421	Akaike info criterion	-0.551838
Sum squared resid	0.409215	Schwarz criterion	-0.506191
Log likelihood	4.862866	Hannan-Quinn criter.	-0.556063
Durbin-Watson stat	2.056097		

Null Hypothesis: D(CONS) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.336353	0.0236
Test critical values:	1% level	-2.740613	
	5% level	-1.968430	
	10% level	-1.604392	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 14

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CONS,2)
Method: Least Squares
Date: 05/27/17 Time: 10:32
Sample (adjusted): 2002 2015

Included observations: 14 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CONS(-1))	-0.584451	0.250155	-2.336353	0.0361

S.E. of regression	0.051589	Akaike info criterion	-3.022262
Sum squared resid	0.034599	Schwarz criterion	-2.976615
Log likelihood	22.15583	Hannan-Quinn criter.	-3.026488
Durbin-Watson stat	1.925643		

Null Hypothesis: D(EDU) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.699054	0.0839
Test critical values:	1% level	-2.740613	
	5% level	-1.968430	
	10% level	-1.604392	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 14

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EDU,2)
Method: Least Squares
Date: 05/27/17 Time: 10:35
Sample (adjusted): 2002 2015
Included observations: 14 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EDU(-1))	-0.424071	0.249592	-1.699054	0.1131

S.E. of regression	0.056785	Akaike info criterion	-2.830331
Sum squared resid	0.041919	Schwarz criterion	-2.784684
Log likelihood	20.81232	Hannan-Quinn criter.	-2.834557
Durbin-Watson stat	1.678260		

Null Hypothesis: D(IFF) has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.723968	0.0038
Test critical values:	1% level	-4.121990	
	5% level	-3.144920	
	10% level	-2.713751	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 12

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IFF,2)
Method: Least Squares
Date: 05/27/17 Time: 11:10
Sample (adjusted): 2004 2015
Included observations: 12 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(IFF(-1))	-2.224253	0.470844	-4.723968	0.0015
D(IFF(-1),2)	0.836772	0.316042	2.647660	0.0294
D(IFF(-2),2)	0.502614	0.206676	2.431895	0.0411
C	0.283527	0.100364	2.824972	0.0223

R-squared	0.795188	Mean dependent var	0.044434
Adjusted R-squared	0.718384	S.D. dependent var	0.557036
S.E. of regression	0.295605	Akaike info criterion	0.661620
Sum squared resid	0.699061	Schwarz criterion	0.823255
Log likelihood	0.030282	Hannan-Quinn criter.	0.601776
F-statistic	10.35341	Durbin-Watson stat	2.169404
Prob(F-statistic)	0.003959		

Null Hypothesis: D(INFRATE) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.246488	0.0014
Test critical values:	1% level	-4.057910	
	5% level	-3.119910	
	10% level	-2.701103	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 13

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INFRATE,2)
Method: Least Squares
Date: 05/27/17 Time: 11:11
Sample (adjusted): 2003 2015
Included observations: 13 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INFRATE(-1))	-2.127724	0.405552	-5.246488	0.0004
D(INFRATE(-1),2)	0.599780	0.246144	2.436700	0.0350
C	1.629227	3.945390	0.412944	0.6884

R-squared	0.790411	Mean dependent var	-0.549944
Adjusted R-squared	0.748493	S.D. dependent var	28.23908
S.E. of regression	14.16203	Akaike info criterion	8.338180
Sum squared resid	2005.632	Schwarz criterion	8.468553
Log likelihood	-51.19817	Hannan-Quinn criter.	8.311383
F-statistic	18.85619	Durbin-Watson stat	2.010835
Prob(F-statistic)	0.000404		

Null Hypothesis: D(POPGRATE) has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.843904	0.0174
Test critical values:	1% level	-4.200056	
	5% level	-3.175352	
	10% level	-2.728985	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 11

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(POPGRATE,2)
Method: Least Squares
Date: 05/27/17 Time: 11:14
Sample (adjusted): 2005 2015
Included observations: 11 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(POPGRATE(-1))	-0.523905	0.136295	-3.843904	0.0085
D(POPGRATE(-1),2)	0.589645	0.130310	4.524928	0.0040
D(POPGRATE(-2),2)	-0.066087	0.162422	-0.406885	0.6982
D(POPGRATE(-3),2)	0.255970	0.108986	2.348636	0.0572
C	-0.015356	0.004107	-3.739195	0.0096

R-squared	0.958377	Mean dependent var	0.000449
Adjusted R-squared	0.930629	S.D. dependent var	0.003832
S.E. of regression	0.001009	Akaike info criterion	-10.65595
Sum squared resid	6.11E-06	Schwarz criterion	-10.47509
Log likelihood	63.60771	Hannan-Quinn criter.	-10.76995
F-statistic	34.53797	Durbin-Watson stat	3.224992
Prob(F-statistic)	0.000279		

Null Hypothesis: D(TOT) has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		5.401679	1.0000
Test critical values:	1% level	-4.200056	
	5% level	-3.175352	
	10% level	-2.728985	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 11

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOT,2)
Method: Least Squares
Date: 05/27/17 Time: 11:16
Sample (adjusted): 2005 2015
Included observations: 11 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOT(-1))	12.77999	2.365930	5.401679	0.0017
D(TOT(-1),2)	-9.805321	2.132736	-4.597531	0.0037
D(TOT(-2),2)	-9.813675	1.489454	-6.588773	0.0006
D(TOT(-3),2)	-6.706458	1.460874	-4.590718	0.0037
C	-58.97055	10.08030	-5.850077	0.0011

R-squared	0.902164	Mean dependent var	-13.12957
Adjusted R-squared	0.836940	S.D. dependent var	40.45519
S.E. of regression	16.33609	Akaike info criterion	8.727585
Sum squared resid	1601.206	Schwarz criterion	8.908447
Log likelihood	-43.00172	Hannan-Quinn criter.	8.613578
F-statistic	13.83177	Durbin-Watson stat	1.811012
Prob(F-statistic)	0.003471		

Null Hypothesis: GDP has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		5.143594	1.0000
Test critical values:	1% level	-2.728252	
	5% level	-1.966270	
	10% level	-1.605026	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 15

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP)
Method: Least Squares
Date: 05/27/17 Time: 11:23

Sample (adjusted): 2001 2015
Included observations: 15 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	0.153773	0.029896	5.143594	0.0001

R-squared	0.320057	Mean dependent var	3.46E+09
Adjusted R-squared	0.320057	S.D. dependent var	3.64E+09
S.E. of regression	3.00E+09	Akaike info criterion	46.54762
Sum squared resid	1.26E+20	Schwarz criterion	46.59482
Log likelihood	-348.1071	Hannan-Quinn criter.	46.54711
Durbin-Watson stat	1.984381		