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CURRENCY DEPRECIATION AND ITS IMPACT ON MACRO ECONOMIC VARIABLES IN THE SUB-SAHARAN AFRICA CONTEXT: EVIDENCE FROM THE REPUBLIC OF GHANA

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STRESZCZENIE

DEPRECJACJA WALUTY I JEJ WPŁYW NA ZMIENNE MAKROEKONOMICZNE W KONTEKŚCIE AFRYKI SUBSAHARYJSKIEJ: DOWODY Z REPUBLIKI GHANY

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W badaniu tym zbadano wpływ deprecjacji Cedi (waluta w Ghanie) na zmienne makroekonomiczne w tym kraju, na szerszym tle gospodarek Afryki Subsaharyjskiej. Badanie zostalo podjętę ze względu na to, że chociaż wszystkie kraje regionu subsaharyjskiego, inne niż kraje należące do strefy franka CFA (CommunautéFinancièreAfricaine – „Afrykańska Wspólnota Finansowa"), w swoich wysiłkach na rzecz rozwoju gospodarczego borykają się z problemem deprecjacji waluty, badania empiryczne dokumentujące wpływ takiej deprecjacji na wyniki makroekonomiczne są ograniczone. Niniejsze badanie ma na celu przyczynienie się do wyjaśnienia dynamiki wpływu deprecjacji waluty krajowej w afrykańskim (Afryka Subsaharyjska) kontekście na wyniki makroekonomiczne. W badaniu przeprowadzono ilościową procedurę analityczną za pomocą analiz statystycznych. Zakres czasowy danych wynoszący 36 lat obejmuje okres od 1984 r. do 2019 r., przy czym do analiz zastosowano metodę autoregresyjnego rozproszonego opóźnienia (ARDL) w celu oszacowania krótko- i długoterminowej zależności deprecjacji waluty oraz wybranych zmiennych makroekonomicznych takich jak inflacja, bilans płatniczy, bezpośrednie inwestycje zagraniczne (BIZ), bilans handlowy i realna stopa wzrostu produktu krajowego brutto (PKB). Założono, że ze względu na syndrom małej gospodarki eksportującej głównie surowce, wpływ deprecjacji waluty w Ghanie na kluczowe zmienne makroekonomiczne jest inny (przynajmniej w niektórych przypadkach) niż w gospodarkach bardziej zróżnicowanych. Hipoteza ta została pozytywnie zweryfikowana przez badanie w odniesieniu do BIZ i bilansu handlowego, a w pewnym stopniu również w odniesieniu do wzrostu PKB i bilansu płatniczego. Deprecjacja Cedi nie wykazała znaczącego (statystycznie) wpływu na bilans handlowy i BIZy.

Słowa kluczowe: Deprecjacja waluty, Cedi, Ghana, sytuacja makroekonomiczna

ABSTRACT

CURRENCY DEPRECIATION AND ITS IMPACT ON MACRO ECONOMIC VARIABLES IN THE SUB-SAHARAN AFRICA CONTEXT: EVIDENCE FROM THE REPUBLIC OF GHANA

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This study examined the effect of currency depreciation on macroeconomic variables in Ghana with Sub-Saharan countries providing a broader background. The study was conceived on the grounds that although all the countries in the sub-Saharan region other than the countries in the CFA (Communauté Financière Africaine–"African Financial Community") Franc zone have been facing the problem of currency depreciation in their economic development efforts, empirical studies documenting the implications of such depreciation on macroeconomic performance is limited. This study seeks to contribute in explaining the dynamics of the implications of depreciation of national currencies of aforesaid countries on macroeconomic performance. The study followed quantitative analytical procedure through higher order statistical analyses. The data span of 36 years covers period from 1984 to 2019 with monthly data frequency. Autoregressive distributed lag (ARDL) approach was employed for the analyses to estimate the short and long run relationship of currency depreciation and selected macroeconomic variables (inflation, balance of payment (BOP), foreign direct investment (FDI), balance of trade (BOT) and real gross domestic product growth rate (GDPG)). It has been assumed that due to the syndrome of small economy exporting mainly raw materials the impact of currency depreciation in Ghana on key macroeconomic variables is different (at least in some cases) than in more diversified economies. This hypothesis was positively verified by the research with regard to BOT, FDI, and to some extend also in relation to GDP growth and BOP. Depreciation of Cedi has not showed statistically significant impact on BOT and FDI.

Keywords: Currency depreciation, Cedi, Ghana, macroeconomic situation

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LIST OF ABBREVIATIONS AND ACRONYMS

AfCFTA	Africa Continental Free Trade Area
AGOA	African growth and opportunity Act
ARDL	Autoregressive Distributed Lag
BDC	Bulk Oil Distribution Companies
BOG	Bank of Ghana
BOP	Balance of payment
BOT	Balance of trade
BRICS	Brazil, Russia, India, China and South Africa
CD	Currency depreciation
CFA	African Financial Community
Covid 19	SARS Cov2
CPI	Consumer price index
CPP	Convention People's Party
CPS	Credit to private Sector
ECM	Error correction model
ECOWAS	Economic Community of West Africa States
EEC	European Economic Community
EMS	European Monetary System
EMU	Economic and Monetary Union
ERP	Economic Recovery program
EU	European Union
FDI	Foreign Direct Investment
FII	Foreign Institutional Investment
FPI	Food Production Index
FPI	Foreign Portfolio Investment
Galamsey	Gather them and sell. Illegal small scare gold mining
GBP	Great British Pound
GETFund	Ghana Education Trust Fund
GHS	Ghana cedis
GIPC	Ghana Investment Promotion Centre
GRR	Ghana Reference Rate

GSS	Ghana Statistical Service
GX	Government Expenditure
HIPC	Highly Indebted Poor Nations Initiatives
IDP	Investment development path
IMF	International Monetary Fund
IRP	Interest Rate Parity
IT	Inflation Targeting
Kalabule	Fraud, trying to make excessive profit and using political clout to gain unfair advantage
LCP	Local Currency Pricing
M2G	Broad Money Supply growth
MDRI	Multilateral Debt Relief Initiative
MIGA	Multilateral Investment Guarantee Agency
MNCs	Multinational Companies
MPC	Monetary Policy Committee
MPR	Monetary Policy Rate
NHIA	National Health Insurance Authority
OLI	Ownership, Location and Internationalization
OP	Oil Price
PAMSCAD	Program of Action to Mitigate the Social Cost of Adjustment
PCP	Producer Currency Pricing
PC-PEG	Post Covid Program for Economic Growth
PNDC	Provosional National Defense Council
PPP	Purchasing Price Parity
PRP	Poverty Reduction Program
RER	Real Exchange Rate
SAP	Structure Adjustment Program
SSA	Sub-Sahara Africa
TVET	Technical and Vocational education and training
UNTAD	United Nation Trade and Development Organisation
USA	United States of America
USD	United States Dollars
USSR	United Soviet Socialist Republics
VALCO	Volta Aluminum Company

VAT	Value Added Tax

INTRODUCTION

Background

The Currencies of most African countries started depreciating just after Independence when new currencies were introduced. These countries mostly broke from the currencies of their colonial masters just after gaining independence. Example is the Ghana Cedi which stability and overvaluation have become one of the most pressing economic problems faced by all post-independence Ghanaian Governments.

Statement of Problem

Currency depreciation is the loss of value of a country's currency with respect to one or more foreign reference currencies, typically in a floating exchange rate system. It is most often associated with the increase of the exchange rate due to market forces, though sometimes it appears as a result of a conscious policies of governments and/or central banks. This means that depreciation is typical for floating regimes but can be steered by public authorities. Currency depreciation has been defined by many economists in different ways but almost all of them have one common phrase which is related to decrease of the price of a given currency denominated in other currencies.

Due to its effects on macroeconomic variables including GDP growth, imports and export prices, interest and inflation rates. Exchange rate variation is a significant endogenous factor that influences economic performance (Iyoboyi & Muftau, 2014). Exports become more affordable and imports more expensive when local currency loses value, improving the trade balance (Musila & Newark, 2003). Unfortunately, this theoretical positive outcomes of currency depreciation boosting exports might not ease the economic situation in Ghana due to the inelasticity of both demand for imports and supply of exports in this country (exports prices are denominated in foreign currencies and determined at global market). The process of permanent or rapid and abrupt loss of value of a national currency brings many negative consequences of social and economic nature (Cooper, 1971). Among them is imported inflation, diminished purchasing power of the households, but also inability of a local currency to perform important function of a store of value and increased attractiveness of export in relation to domestic products. This was the case of Ghana as it suffers a lot from the permanent depreciation of cedi. It

seems that depreciation of the cedi might led mainly to artificial increase of the profits of multinational companies that operate mainly in the country's extractive industry (export of mineral resources and raw materials) (Zubairu et al., 2024). However, their calculation of profits are done rather in foreign than national currency so it seems that even for foreign investors depreciation accompanied with a high rate of inflation might act as discouraging factor (Akwetey, 2002)The pass-through effect of the Ghana cedi depreciation might also led to high inflation and the problems with country's balance of payment. However, all these processes have never been systematically researched.

Research Objectives

Many small economies especially those in sub-Saharan Africa depend on export of commodities and raw materials for generation of their foreign exchange. They mostly import finished products for domestic consumption which may include food and energy (fuel). Any shortfall in foreign exchange supply from exports will immediately impact negatively on the value of their currencies and the macroeconomic variables. Therefore, currency depreciation in any form has a very significant impact on the macroeconomic variables in Ghana. Most studies in the area of currency depreciation in Ghana have been examining the impact of currency depreciation on a particular macroeconomic variable or the influence of a particular microeconomic variable on the depreciation of a particular currency. But this research is aimed at analysing how the currency depreciation influences a number of microeconomic variables together:

1. How the currency depreciation affects the rate of inflation in Ghana? This will include the level of impact of currency depreciation on the prices of food, petroleum products and other imported products and how they affect prices and cost of local production.

2. The effect of Currency Depreciation on GDP Growth − The total impact of currency depreciation and how it affects employment of economic resources and GDP growth.

3. How currency deprecation affects financial relationship with other countries. This include seeking the causes of Ghana's balance of payment (BOP) disequilibrium and how the problem can be addressed.

4. The impact of currency depreciation on foreign direct investments (FDI). It includes how currency depreciation affects the decision of foreign investors to invest in the productive sectors of the Ghanaian economy.

5. How currency deprecation impact international trade balance of Ghana as part of the financial relationship with other countries.

These five macroeconomic variables were selected as a key indicators of macroeconomic stability and performance of any national economy in line with what one can find in the economic literature(Donovan, 1983; Shahzad & Al-Swidi, 2013; Sijabat, 2023; C. N. Wang & Le, 2018). In particular, they are of key importance to small open-economies dependent on foreign trade with underdeveloped domestic industrial sector as in the case of Ghana. The theories and economic models justifying this choice are presented in the chapters 3-6 of the thesis. Other important macroeconomic variables like unemployment rate or human capital accumulation have not been researched in depth, since according to the literature the currency depreciation does not have direct impact on them.

The main Hypothesis of the research has roots in the aforesaid peculiarities. It has been assumed that due to the syndrome of small economy exporting mainly raw materials the impact of currency depreciation in Ghana on key macroeconomic variables is different (at least in some cases) than in more diversified economies.

Significance of the research

The findings from this research will help Governments and Economists in sub-Sahara African countries to start the process of finding a lasting solution to the problem of persistent depreciation of their national currencies that has bedevilled their economies. Especially Ghana that has seen persistent depreciation of the Ghana cedi since its introduction in 2007 and its effect on inflation, balance of payment and GDP growth. It will also help Central Banks in implementation of their monetary policies (see the recommendation part). The research findings will also act as the basis for further research in finding solutions to the problem of low GDP growth and poverty in sub-Sahara African countries.

Research Methodology

Data Collection

The data needed for this research was collected mainly from secondary information from the Ghana statistical Service (GSS), World bank and IMF, Bank of Ghana and the commercial banks publications.

Quantitative Research

The quantitative research concentrated on thirty-six (36) years from 1984 to 2019 data of exchange rate, inflation, real GDP growth, balance of trade and FDI, balance of payment and other economic variables which are in a table as part of the Appendix 4.

Estimation Approach

Collected data was analysed using EViews statistical software. The results obtained are in tables in chapter eight. The research results tried to establish the correlation between currency depreciation and Inflation, GDP growth, BOP, FDI and BOT. The method used for estimating the long-run impact of currency depreciation on the macroeconomic variables is the cointegration analysis based on the autoregressive distributed lag (ARDL) approach. The short-run impact of currency depreciation is found using the corresponding error correction model (ECM) that is obtained from the long-run cointegration equations.

Organization of the study

This thesis document is made up of nine (9) chapters. The rest of this thesis is organized as follows: Chapter one looks at the history, structure and key drivers of economic policy implemented by the various Ghanaian Governments. Chapter two looks at theories of currency depreciation and presents currency depreciation in Ghana and sub-Saharan African countries. Next chapters analyse the dependent variables and factors influencing them. Chapter three presents inflation in Ghana, methodology of its measurement, its key pattern and mechanisms, including drivers of inflation in Ghana. Chapter four looks at theories of GDP growth and the influencers of GDP growth in Ghana. Chapter five looks at Ghana's financial relationships with other countries (BOP)

and the various theories of correction of BOP disequilibrium as well as factors affecting BOP and its sub-accounts. Chapter six presents trade and FDI stock in Ghana looks at the various trade theories, and factors driving trade and FDI in Ghana. Chapter seven presents the research approach (Fig. 1.1) the statistical methods employed and the result with their discussions. As depicted at Fig. 1.1 the thesis focus on researching relationship between currency depreciation and key macroeconomic variables taking into consideration other control variables, however without examining in depth the impact of currency depreciation on them and their contribution to currency depreciation. The conclusion and recommendations chapter then follows.

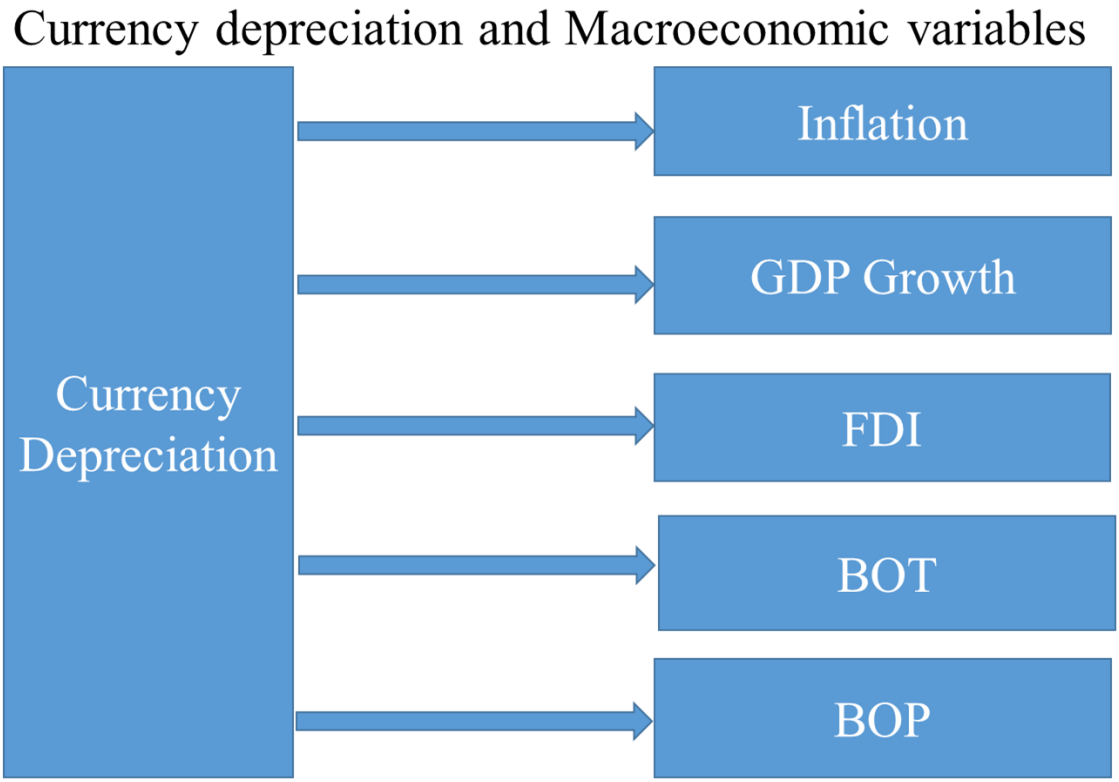

Figure 1.0Relationship of currency depreciation and macroeconomic variables

Source: own compilation by the Author

CHAPTER 1
ECONOMY OF GHANA

This chapter sets the scene by presenting key stylized facts that help to understand the mechanisms and patterns of economic development in Ghana. It also highlights key indicators illustrating both achievements and challenges along this path. This is important for familiarizing foreign readers with the primary subject of the research, which is the economy of Ghana.

1.1 Political framework and accompanying economic reforms

1.1.1. Key political directions.

After independence of Ghana in 1957 (Ghana was the first colony in sub-Saharan Africa achieving sovereignty), the new Government lead by Dr. Kwame Nkrumah embarked on industrialization to diversify the economy. The Convention People's Party (CPP) Government made import substitution and infrastructural development a priority. GDP growth was driven by industrialization and infrastructural development, the national currency "cedi" was introduced. This first period of formation of the sovereign Ghana's economy was under influence of the key ideas of central planning economic regime (originated in the Soviet Union) paying a lot of attention to the industrial development.

After the overthrow of the Nkrumah's Government in 1966, the economic direction changed. There was more emphasis on privatization and private sector-led development. There was proliferation of private sector businesses and activities in the areas of medical practice and education. Price control was eliminated. Agriculture policy led to the privatization of state farms and concentration on the production of local stables for domestic consumption. But the period after the overthrow of the Nkrumah's Government was also characterized by relatively high unemployment, high inflation, increasing amount of foreign debt service and devaluation of the national currency which became the main alibi for the 1972 coup.

After the overthrow of the second republic led by Dr. Kofi Busia, the new military regime revalued the national currency. The Government also repudiated on payment of foreign debts. Price control was re-introduced and import licensing was also introduced and money supply was increased. Agriculture policy was mainly based on the introduction of "operation feed

yourself" (a policy to grow and increase agricultural production to make the country self-sufficient in food production). By the time the Acheampong/Akuffo regimes was overthrown in 1979, the economy was suffering from high inflation, smuggling and what was known then as "Kalabule" (fraud, trying to make excessive profits, and using political clout to gain unfair advantage).

In order to control "Kalabule", the new government led by Flt. J. J. Rawlings which lasted for three months resulted to seizing of assets from those seen as cheats, enforced price control and tax code and also rationing of basic necessities.

The Government which took over from Flt. J. J. Rawlings in 1979 was overthrown after one year and three months in office. The main reasons for the overthrow of the third republic which started in 1979 led by Dr. Hilla Limann were the persistence of "Kalabule", high inflation, balance of payment problems and national currency devaluation.

In the early "days of the Revolution" that overthrew the Dr Hilla Limann regime, the Provisional National Defense Council (PNDC) government led by Flt. J. J. Rawlings in 1982 reintroduced price control, rationing of basic necessities and the withdrawal of the fifty cedi notes from circulation. The government asked citizens to send all the notes to banks and they were never returned or compensated. The economy started to suffer from high inflation, shortage of basic commodities, and bad relationship with foreign trade partners. Agriculture suffered the worst decline due to severe drought (worst in Ghana's history in 1983) associated with bushfires. In addition, over one million Ghanaians were expelled from Nigeria in 1983 which put more pressure on the already declining economy. Agriculture declined by 7%, industry declined 14.2% and the total GDP also declined by 4.8%. Inflation went up to 122.9% (*Ghana | Data*, n.d.).

In 1983, the Government of Ghana received support from the International monetary fund (IMF). The IMF assistance came with the Economic Recovery Program (ERP). The ERP which lasted till 1986 brought a huge support from the IMF and the World Bank. The implementation of the ERP led to free-market economic reforms in Ghana.

1.1.2. Key economic reforms

The Government of Ghana together with the IMF and the World Bank pursued various reform programs to the year 2000s. The reforms to some extent help the drivers of growth in the Ghanaian economy but it was a long way to achieve that.

Ghana's economic policies since independent have been formulated mainly along political lines. Depending on economic orientation of the Government in power, economic policy and partnerships were formed along that line. As stated in "Ghana's Post-Independence Economic Growth Performance" (Fosu & Aryeetey, 2006), four types of economic policies and partnerships can be identified in Ghana. The first was from independence in 1957 until the coup of 1966; the second, was between 1966 after the coup to the second coup in 1972; the third, from the second coup in 1972 to the ERP reform in 1983; the fourth, from the 1983 ERP reform to present (see also Aryeetey & Kanbur, 2010)

Economic policy can be divided into internal and external economic policies. These parts are mostly mutually exclusive in nature. However, the results of one economic policy can affect the other. Thus, external economic policies can have implications on internal economic policy and vice versa. Before independence in 1957, Ghana's economic and international trade relation was mainly with Great Britain (the colonial masters). Economic policies were design to produce raw materials for the metropolis in Europe. Ghana's exports were mainly minerals and timber until 1885 when the first cocoa was exported to Britain. Infrastructure development was geared towards the facilitation of movement of export products to the port. Railway and roads were built to connect the mineral, cocoa and timber producing areas to the port facilities.

The first economic policy and partnership which started from independence in 1957 was more designed in such a way that the state played a key role in production. The internal economic policy was characterized by huge investment in infrastructure (roads, schools, hospitals etc), also there was direct state participation in the productive sector with the establishment of many state-owned corporations in different sectors: manufacturing, power production, agriculture, banking and finance, hotels and hospitality and transport and communication. There was also a deliberate import substitution policy in place which helped in achieving significant economic growth during that period. All these were part of Dr Kwame Nkrumah's government five- year and seven-year development plans.

After independence, Ghana opted out of the currency of the British African colonies – the British West African pound. The new currency, the Ghanaian pound (1958–1965), was

subsequently replaced by the cedi (GHC or ₵) in 1965. This transition allowed Ghana to abandon the British monetary system and adopt the decimal one. Cedi notes and pesewa coins replaced the Ghanaian pounds, shillings, and pence.

Despite all these important measures strengthening country sovereignty, Dr Kwame Nkrumah's government also faced resistance from the opposition and some intellectuals about the development methods and systems he was using.

The external economic policy and partnerships was designed to follow the non-aligned position of the country at that time. Economic relations were kept with both the Western and the Eastern bloc countries. This point is made clear by the fact the in the first part of the 1960s, the West through the World Bank financed the construction of the Akosombo Dam, to produce electricity for industrial use and provide energy for the Keizer Aluminum smelter (VALCO) which was built in Tema. Ghana also maintained the traditional trade relationship with the Countries of Western Europe led by the United Kingdom (former colonial master), United States of America and Canada.

In 1960, Ghana signed a trade, economic and cultural cooperation with the Soviet Union (USSR) which was initially for a 5-year period. This was followed by the visits of Leonid Brezhnev to Ghana and Dr Kwame Nkrumah to USSR in 1961 (Kulkova, 1957).

Ghana also had economic and cultural relationship with The People's Republic of China which led to the establishment of the first experimental nuclear plant at the Nuclear Research Institute at the Ghana Atomic Energy site at Kwabenya, Accra.

The selection of Ghana's foreign policy niches as well as that of the African Union has been a matter of consensus among politicians, economics, and academia. These policy niches were developed by Dr Kwame Nkrumah's government and successive governments. Both military forces and civilians have followed the core elements of these policy objectives (Tieku & Odoom, 2020). The critics of Dr Kwame Nkrumah's regime accused him of being "more African than a Ghanaian" because of his Pan-African stance. In other words, he paid more attention to African continental issues than domestic problems.

The second economic policy and partnership arrangements started after the 1966 coup. It includes the elimination of price control, introduction of private participation in provision of medical service, introduction of students' loan at the university level instead of earlier free

education and devaluation of the local currency to manage trade deficit and balance of payment. There was also decline in capital expenditure during this period (Jebuni, 1995). But this period was also characterized by unemployment, foreign debt servicing issues and together with the fall in the value of the cedi formed a good excuse for the military intervention.

The external economic policy was more geared towards attracting private capital opposed to "Nkrumah's socialist policies". They involved the Bretton Wood institutions in economic management of the country and introduced IMF sponsored reforms (Aryeetey & Fosu, 2014).

The third economic policy and partnership arrangements started after the coup in 1972. The devaluation of the local currency and associated economic difficulties provided the pretext for the coup in January 1972 (Aryeetey & Fosu, 2014). The internal economic policy concentrated on developing agriculture and industry. Policies like "operation feed yourself" in agriculture and import substitution with participation of government in industrial production increased. Price control was implemented but because of increase in money supply inflation went up to over 116% in 1977.

This period may be described as the most politically unstable phase in the history of Ghana. It was characterized by four successful military coups and a number of unsuccessful ones. There were periods of negative economic growths. The worse economic performance was recorded in 1975 (Aryeetey & Fosu, 2014). The average GDP growth during this period (1972 – 1982) was -0.95%. This means that the total period produced reduction in the size of the Ghanaian economy.

The external economy policy was geared towards reduction in imports by employing import licensing which signalled the reversal from a market-oriented stance to an inward-looking protectionist regime. The local currency was revalued. The period was also famous for that fact that the country refused to service its debt obligation to multilateral and foreign government lenders during the General Acheampong regime. The latter part of this phase of economic policy and partnership arrangement saw more close relationship with countries with socialist orientation like Libya and Cuba.

The fourth economic policy and partnership started in 1983 with the ERP. The internal economic policy concentrated on halting the downward spiral of the economy and restoring

economic productivity at minimum cost to the government to stabilize and grow the economy (Aryeetey & Fosu, 2014). Stringent fiscal and monetary policies were implemented to help reduce the rate of inflation. Privatization of state assets and corporations, restructuring of the civil service, introduction of new taxes including VAT and improvement in tax collections were some of the internal economic policies introduced. The reforms also touched on the liberalization of exchange rates, financial market and international payments (Hutchful, 1997). This period also brought about political reforms which usher the nation into its "Fourth Republican dispensation". A lot has been achieved in terms of political stability which for the first time saw a democratically elected civilian president handing over peacefully to another(Booth et al., 2019). Private capital participation in the economy has been at the highest level and the discovery of oil in commercial quantities and achievement of record high GDP growth rate of 14.05% in 2011. This period has also been associated with elimination and in some cases reduction of subsidies on public utilities.

The government followed up with the IMF and the World Bank and pursued the Structural Adjustment Program (SAP) after the completion of ERP. The combined results of the ERP and SAP led to economic reforms that brought about laying-off of civil servants, floating of the Ghanaian currency, privatization of state-owned companies, the establishment of the independence of the Bank of Ghana in taking monetary policy decisions and boasting of exports.

In order to minimize the negative impact of the reforms like massive unemployment, high inflation and high interest rates another program, this time called Program of Action to Mitigate the Social Costs of Adjustment (PAMSCAD) was introduced with the help of the IMF. The program sought to create about 40,000 jobs over a two-year period starting from 1988. The program aimed at the poorest individuals, small-scale miners and artisans in particular, and communities were to be helped to implement labour intensive self-help projects. The program also made provision for rural and urban infrastructure. There was also provision for improvement in water supply, sanitation This period has also witness different economic initiatives to provide social reliefs to the citizenry: The Ghana Education Trust Fund (GETFund) – Established in the year 2000 (Act 581). The fund is financed from levies which are charged as part of the Value Added Tax (VAT) system. The aim is to enhance primary, secondary and tertiary education. The GETFund has invested in a variety of capital and programmatic efforts to elevate education in Ghana, and has increased spending on education,

especially tertiary levels, several times (Atuahene, 2009); National Health Insurance Fund – The object of the National Health Insurance Authority (NHIA) is to attain universal health insurance coverage in relation to persons resident in the country, Persons not resident in the country but who are on a visit to this country and to provide access to healthcare services to persons covered by the Scheme.

As part of the National Health Insurance Authority Act 852 of 2012 there was the need for the establishment of National Health Insurance Fund. The object of the fund is to pay for the cost of healthcare services for members of the National Health Insurance Scheme.

For the implementation the object, moneys from the Fund shall be expended as follows:

- to pay for the healthcare costs of members of the National Health Insurance Scheme;
- to pay for approved administrative expenses in relation to the running of the National Health Insurance Scheme;
- to facilitate provision of or access to healthcare service;
- to invest in any other facilitating program to promote access to health service as determined by the Minister in consultation with the Board.

Act also stated that, not more than ten percent of the annual funding amount shall be expended on non-core activities (non-core-activities include activities other than those listed in paragraphs above).

The following income sources for the Fund are envisaged:

- the National Health Insurance Levy provided for under section 47 (part of the National VAT system);
- two and one half percentage points of each person's contribution to the National Social Security Scheme;
- moneys that are approved for the Fund by Parliament;
- moneys that accrue to the Fund from investments made by the Authority;

- grants, donations, gifts and any other voluntary contributions made to the Fund;
- fees charged by the Authority in the performance of its functions(Ghana Statistical Service, 2019b);
- primary education and health care services.

Ghana's economy was seriously affected by the global crisis caused by COVID-19 (SARS-CoV-2). To mitigate its negative consequences, Ghana utilized the IMF-supported Post-COVID-19 Program for Economic Growth (PC-PEG) with a total value of US$3 billion. This program aims at sustaining macroeconomic stability and debt sustainability and is accompanied by reforms primarily in the areas of fiscal and industrial policies. The focus is on increasing the effectiveness of tax policy, improving revenue administration and public financial management, and addressing weaknesses in the energy and cocoa industries. According to the second review conducted in 2024, the program is yielding the expected results, putting the country on the right track once again and curbing the depreciation of the cedi.

The external economic policy has been geared in this period towards implementation of reforms emanating from the Bretton Wood institutions (World Bank and IMF). The Economic Recovery program was under the guidance of the World Bank and the IMF for the purpose of reducing Ghana's debts and to improve its trading position in the global economy (Hutchful, 1997).s

The external economic partnership in 1983 was redirected by Rawlings towards the West. Until 1983, foreign economic policy of Ghana has played second fiddle to the traditional ideological based. The change in political orientation and change in the focus of international economic relations was complete by the end of 1983(Boafo-arthur, n.d.). This shift to economic focused foreign policy direction was influenced by the efforts of members of the "New Democratic Movement" (influenced by Mao's "new Democracy") within Rawlings government(Kim, 2014).This turned Ghana's foreign policy toward the West and sought for aid from the Bretton Woods institutions (the World Bank, IMF) and "the Paris club of creditors" which helped the country to assess long term funds to implement its economic development strategies.

With the World Bank and IMF and other development partners support, Ghana has implemented a number of economic development programs beginning from 1983: Economic

Recovery program (ERP), Program of Action to Mitigate the Social Costs of Adjustment (PAMSCAD), Highly indebted Poor Nations Initiatives (HIPC), Poverty Reduction program (PRP) which have helped the economic to be regarded as one of the fastest growing in the world. Ghana has also developed trade and economic relations with counties in various parts of the Globe. The influence of China in the Ghanaian economy became more pronounced from the year 2000. China has invested in many areas of the economy. Chinese companies have undertaken a number of project in the area of infrastructure. Sports infrastructure, road construction, dam and electricity production, railway, offices and residential accommodations are some of the areas where Chinese funds have been invested. The only Natural Gas processing facility in the Western Region of Ghana (Atuabo Gas plant) owned by the Ghana Gas Company was financed with a loan from the Chinese Government and built by a Chinese company. Chinese investors have invested in the extractive as well as the telecommunications and manufacturing industries. According to the Ghana Investment Promotion Centre as published in its quarter four 2018 report, China, topped the investor countries list with 37 projects in its FDI list for 2018 (GIPC, 2018). The significant Chinese investment has also come with its own problems like environmental pollution, illegal mining and gold and rosewood (an endangered wood specie) smuggling. Apart from the traditional Western Countries and China, Ghana has also developed good economic relations with countries like India and Brazil in recent years. Companies from these Countries are investing in Housing, Agriculture, Manufacturing and trade. Under the auspices of the African Union, trade with other African countries is being improved, now that the implementations of Africa Continental free Trade Area (AfCFTA) has begun. The AfCFTA head office is based in Accra, Ghana. Also there are significant investments from countries like Nigeria, South Africa and Mauritius. Investors from these countries have investors in manufacturing, financial services, telecommunication, mining, trade and commerce.

1.2 Key factors driving economy of Ghana and resulting Macro-Economic trends

Several studies have tried to understand and explain the real causes of economic growth, especially in Africa and low-income countries (IMF, 2011; International Monetary Fund, 2011; Jaunky, 2013; Rodrik, 2008).

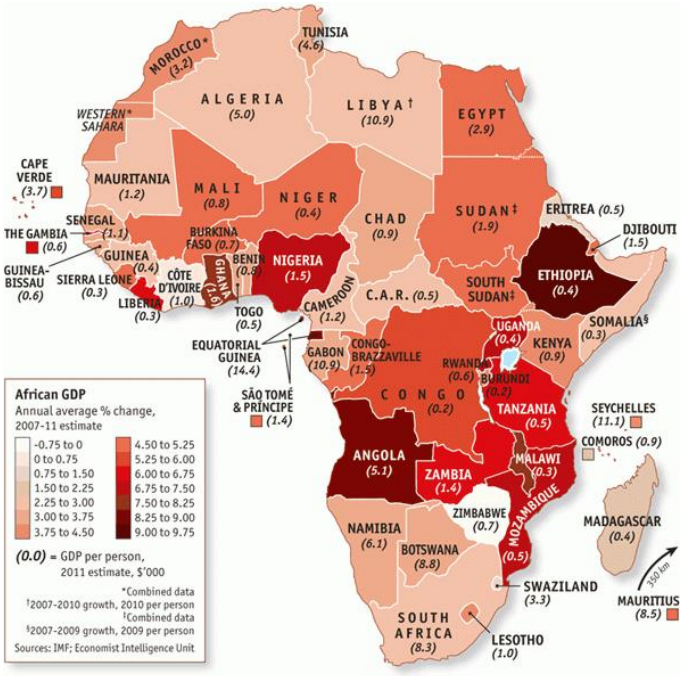

Figure 1.1Average economic growth of African countries from 2007 to 2011

Source: Source: The Economist.

The Figure 1.1 shows that, Africa's economies are growing but at different speed. At least a dozen of them have grown by more than 6% annually for five years starting from 2007. Also poor countries have slightly recovered. For instance, Ethiopia which was once associated with starvation is now the tenth greatest cattle producer in the world. Despite improvements in wealth distribution over the last ten years, embezzlement is still widespread in African nations. Although there are still significant wealth gaps throughout most of the continent, a true middle class is beginning to develop. The labour productivity of Africa has been increasing. It is now expanding by 2.7% year on average. Since 2000, trade between Africa and the rest of the globe has grown by 200% (*The Sun Shines Bright | The Economist*, n.d.).

Political institutions have improved significantly with democracy becoming the norm throughout the continent. Military conflicts have reduced significantly, reducing the number of civil wars except few pockets around the Sahel region.

Acemoglu, Gallego and Robinson (Acemoglu et al., 2014)as cited by Dani Rodrik in "The Ninth Annual Richard H. Sabot Lecture" (2014) claimed that difference in institutional quality account for as much as 75% of the variation in income levels around the world.

In International Monetary Fund (IMF) working paper (WP/12/236), the researchers identify Investment as a critical part of economic growth for developing countries in addition to the characteristics of foreign exchange regime and real exchange rate, institutional and political variables (Ghazanchyan & Stotsky, 2013).

In Africa, a key contributor to improved macroeconomic performance has been the reforms that various countries undertook and are undertaking to strengthen macroeconomic stability and in so doing liberalize their foreign exchange regimes. These reforms have been mainly led by the IMF, World Bank and other multilateral organizations. The Central Banks of most African countries are relatively independent from the politicians to pursue the needed economic policies. Institutions like the Independent Electoral commission and civil society organizations in Ghana have helped to deepen democracy which has reduced significantly the political risk associated with investing in the country. Barrack Obama, the former president of the United States of America on his official visit to Ghana in July 2009, when he was the President reiterated the need for good institutions in the following statement "….what Africa need is strong institutions and not strong Men".

The Economy of Ghana has been undergoing transformation since independence in 1957(see the previous subchapter). Institutional factors nowadays seem to be sound. As far as Rodrick model is concerned the main problems are related to geography and productivity. Increase of Ghana's well-being was possible due to incremental improvements implemented through the sequence of reforms that allowed Ghana to overcome the negative consequences of the colonial legacy. However, the reforms were not always coherent (sometimes two steps forward and one step back) and can be best described as a learning by doing effort, i.e. testing different economic and political paradigms.

Before independence, the Ghanaian economy was structured to produce raw material for industries in the metropolis in the United Kingdom. In an article titled "what are the drivers of change in Ghana?" published in CDD/ODI Policy brief No. 1 for November 2005, (Booth et al. 2005), the concept of "neopatrimonial" was discussed. The following statement in the article explained the concept: "In Ghana, as elsewhere in Africa, the modern state is accurately characterized as neopatrimonial" (Booth et al., 2005, p. 2). The concept of the patrimonialism is derived from the classic comparative studies of pre-industrial states in Europe and Asia by the German sociologist Max Weber (1864-1920). The prefix 'neo' is added in describing the current African version to indicate that the state has a hybrid character" (Booth et al., 2005). In

this instance, the state has very little autonomy to pursue public policy without considering the patronage interest. Many societies across the world are plagued by two different kinds of political conflicts of interest. A vertical conflict of interest which develops when individuals in charge of operating the government obtain and maintain rents while doing so and horizontal conflict occurs when various constituencies support various policies (Galiani et al., 2016).In the colonial era, economic policies were design to take into consideration horizontal interest groups.

Agriculture in Ghana was design for local peasant farmers to grow crops that will be used by the colonial masters in their home countries. These crops were termed “cash crops” because there was ready market for them to be exported. Peasant farmers therefore grew the “cash crops” for the colonial masters in exchange for payment at prices that were determined by the buyers. These methods prevented the European colonial rulers from directly participating in agricultural activities.

Industrial Activities were more into producing goods that were needed by the colonial rulers and also mining and logging. Mining Companies were mining minerals (gold, diamonds, manganese bauxite etc.) for export. None of them was processed locally. Timber was exported as raw logs to generate money for colonial rule.

The Ghana GDP was therefore dominated by agriculture and industry in this case mining and logging. Service contributed relatively small part to GDP growth (see chapter 4). This has been changed in the course of the years, however, the country still remains specialized as a raw materials and food producer. For instance, Ghana is the second largest producer of gold in Africa and the second-largest producer of cocoa globally (after Côte d'Ivoire) with a market share of about 20%. The country strongly remains one of the largest exporters of gold in the world, with cocoa playing a significant export commodity and foreign currency generating role in the country (Barro, 2006).

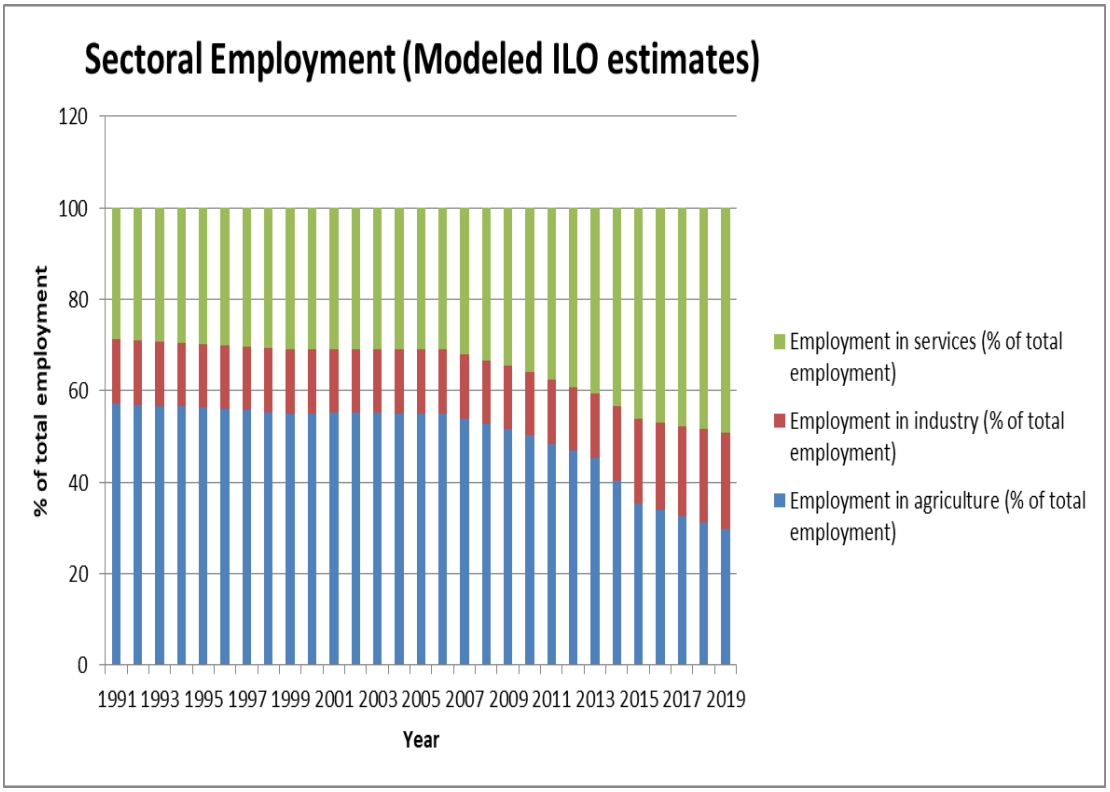

Figure 1.2Contribution of the various sectors to employment in Ghana in % in the years 1991-2019

Source: World Bank.

Figure1.2 shows the contribution of the various sectors to employment in Ghana in % in the years 1991-2019. As depicted in Figure 1.2 agriculture has been the biggest contributor to employment. In 1991, it employed almost 57% of the workforce but since 2015, it employs relatively lower share of the workforce i.e.29.75% in 2019. Prominent role is played by cocoa plantation which is among key Ghanaian export commodities (yearly production up to 1 million tons of cocoa). It is mainly grown in small privately owned farms covering 2-3 hectares on average. Its production fluctuates due to various factors mainly related to the weather conditions and external demand. However, despite being the second world-wide producer Ghana receives only 2% of the profit from this business, since the greatest value added occurs during chocolate manufacturing that is located in other more developed countries.

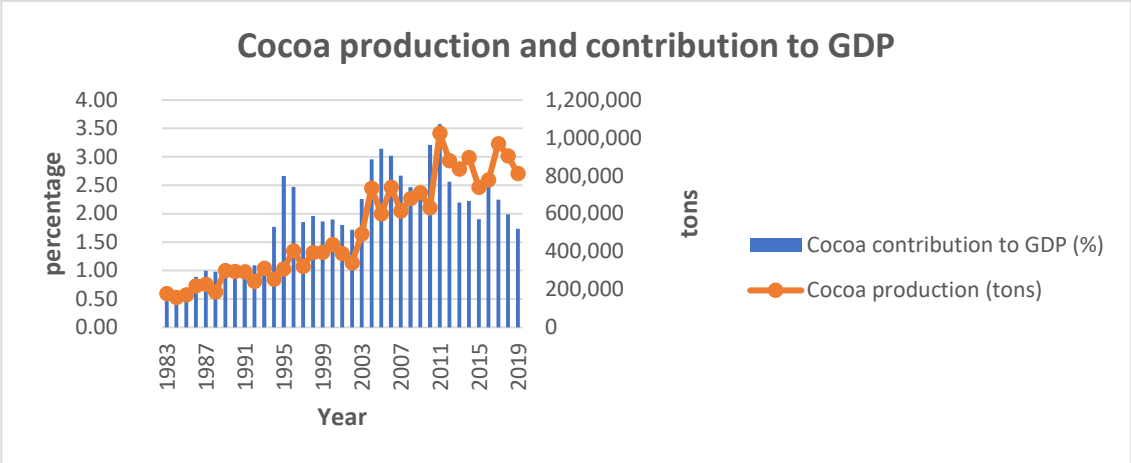

Figure 1.3Contribution of Cocoa to GDP from 1983 to 2019

Source: Ghana Statistical Service

From Figure 1.3 above, cocoa production and contribution of cocoa to GDP in Ghana for the period 1983 to 2019 were510,415 tons and1.92% on average respectively. The lowest cocoa production of 158,886 tons and contribution of 0.46% were recorded in 1984. This may be attributed to the effect of the worst drought suffered by Ghana in 1983and bushfires that accompanied which affected agriculture output in general. Cocoa production for 1984 (158,856 tons) and 1985 (172,514 tons) were less than that of 1983 (178,227 tons).Ghana recorded a huge production of over 1 million tons and largest cocoa contribution to GDP of 3.57% in 2011. This could be attributed to among other things, the effect of government free cocoa farm spraying program (pest control), free fertilizer supply, favourable weather and good price offered by Ghana cocoa board (producer price). Cocoa production and its contribution to Ghana's GDP has been volatile mainly because of the volatility in World market price of the commodity and exchange rate which affect the price offered at the farm gate (producer price) and weather conditions.

Industry, employed average of 14% from 1991 to 2013. But from 2013, it started increase the percentage of workforce employed and it has grown to 21% in 2018.The main industry sectors are export oriented (extraction of hydrocarbons and gold mining) and manufacturing (import substitution and goods for export).

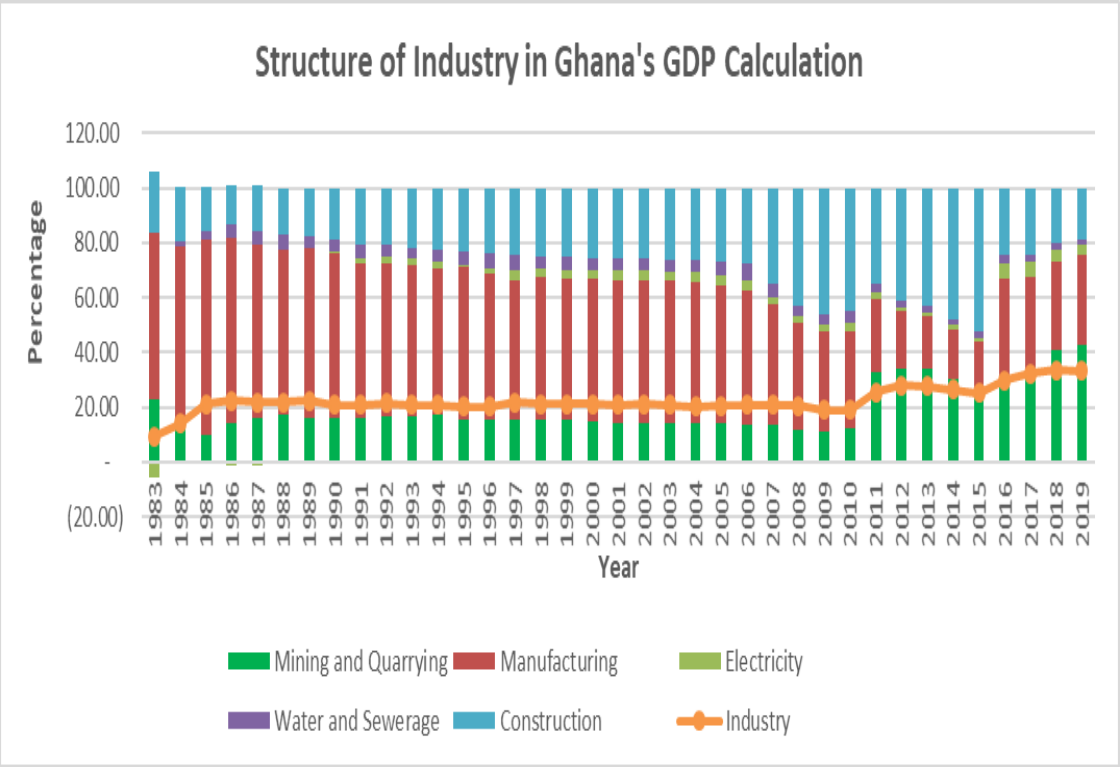

Figure 1.4Structure of Industry and contribution to GDP

Source: Ghana Statistical Service

From the above Figure 1.4 above, industry as classified in the National Accounting in Ghana consist of Mining and Quarrying (including crude oil, Gas extraction and mining of the various minerals e.g gold, bauxite, and manganese), Manufacturing, Electricity, Water and Sewerage and Construction. Industrial share of GDP in 1983 was 9.32% but have grown to 33.24% in 2019 with sparks in 1986 (22.55%), 2011 (25.56%), 2012 (28.025), 2017 (32.21%0) and 2018 (33.53%). The average share of industry in Ghana's GDP from 1983 to 2019 was 22.45%.

Mining and quarrying declined from 23.01% of total industrial share of GDP in 1983 to 9.64% in 1985. It increased to 32.86% and 34.06% in 2011 and 2012 respectively from 12.21% in 2010.This can be attributed to the start of oil production in commercial quantities. As a result of increase in oil and gold production in 2018 and 2019, the share of mining and quarrying increased further to 40.84% and 42.79% respectively. The average contribution of Mining and Quarrying to industry for the period 1983 to 2019 was 19.49%.

Manufacturing share of industry in 1983 was 60.47% and went up to 71.84% in 1985. Manufacturing share started to decline till it got to the low of 18.57% in 2014. But it went up

to 39.07% in 2016. Just like the share in industrial sector output, the value out manufacturing output was U.S dollars 0.16 billion and kept moving up to U.S dollar 7.3 billion in 2013. These upward movements could be attributed to inflow of FDI into that sector of the economy. And also the steady increase in the processing of raw commodities like cocoa into semi-finished and finished products (Ghana Cocoa Board, 2019). In 2014, the value of manufacturing was U.S dollars 6.04 billion and went down further to U.S dollars 5.5 billion in 2015. The value started to move up again to U.S dollar 6.08 billion in 2016 and by 2019, it has gotten to U.S dollar 6.9 billion. The average contribution of manufacturing to industry for the research period was 47.27%.

Electricity supply's contribution to industry was negative in 1986 (-5.68%) which can be attributed to the 1983 drought that Ghana suffered. The drought had a very negative effect on Hydro-electrical production. Hydro was the leading source of electricity production in Ghana at that time. The highest contribution of electricity production to industry recorded was 3.85% in 2006. This can be attributed to the new investments in the thermal power production. In 2007to 2009, Ghana suffered power crises and therefore made high investment in power production, the result was increase in the share of electricity in industrial production to 3.21% in 2010. Ghana again suffered power shortage in between 2011 to 2015 and here too, huge investment was made in power production (mostly thermal) and contribution to industry increased to 5.79% in 2016. The average contribution to industry between 1983 to 2019 was 2.09%.

Water and Sanitation contributed less to industry in 1983 (0.12%) in 1983 because of the drought. But it started moving up from then getting to the high of 5.60% and 6.06% in 1988 and 2006 respectively. The average contribution to industry for the research period was 3.90%.

Construction contributed 22.08% to industry in 1983, after which it declined to the low of 14.24% in 1986. But started to rise and got to 46.40% in 2009. This can be attributed to the use of HIPC benefit to improve infrastructure and the drive to for further infrastructure development (schools, hospitals, residential and office accommodation and roads), construction share of industry rose to 52.18% in 2015.

The service sector employed an average of 31.00% of the workforce from 1991 to 2006. After that, its share has increase and it was 48.47% of employed workforce as at 2018 showing that most of the workers from agriculture are moving into the service sector. The trend can be

attributable to the fact that mostly young people in Ghana prefer pursuing education in the humanities than the sciences or engineering. This is different from what happened in Asian economies like China and Vietnam, where most of the people that moved from agriculture went into manufacturing (industry). It helped in the reduction of unemployment and achievement of higher GDP growth in those economies.

1.2.1 GDP and per capita income growth

The growth in the per capita real income in Ghana has mimicked that of GDP of the country.

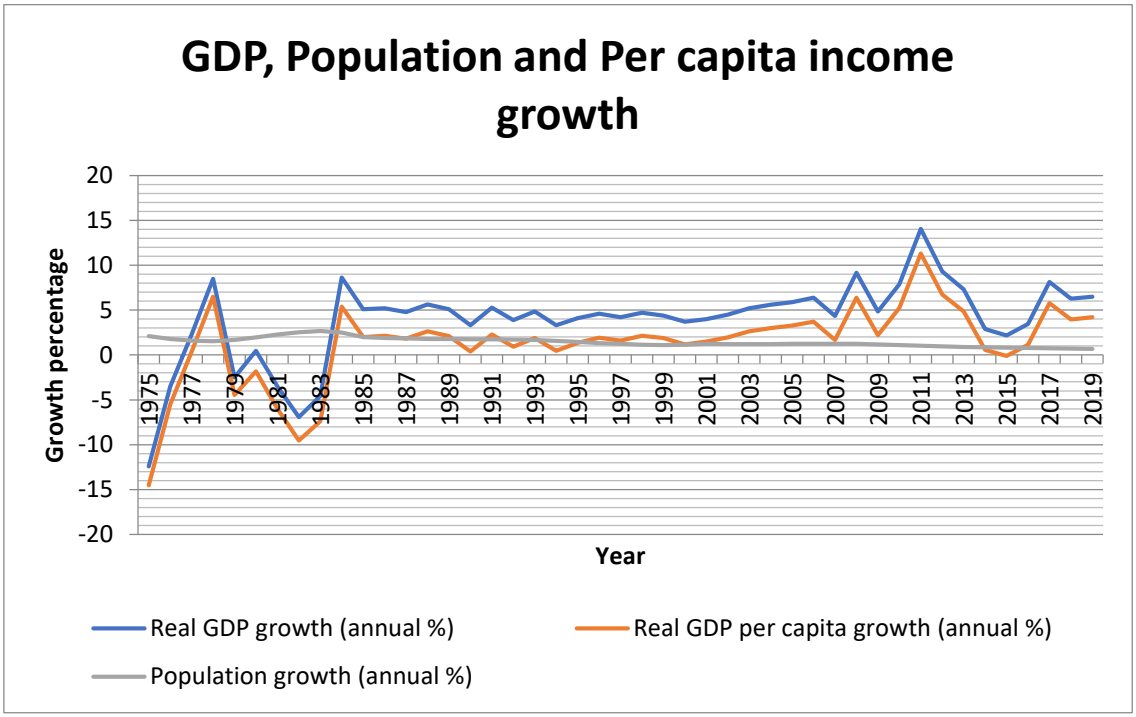

Figure 1.5Yearly growth of the real GDP, population and real GDP per capita in Ghanain the years 1975-2019

Source: World Bank.

Figure1.5shows the population growth, GDP growth and growth of the GDP per capita in Ghana in the years 1975-2019. Ghana's population growth since 1975 averaged about 2.5% annually and was rather stable, with a clear downward tendency in the recent years. The trend can be attributable to the fact that many more females are pursuing higher education which makes them delay marriage and also another reason is availability of information and services

in the area of the sexual and reproductive health. This therefore means that key changes in per capital income of Ghanaians should be attributed to the changes in GDP.

The per capita income growth from 1975 to 1977 and 1979-1983 was negative just like for the GDP. Than it started to be predominantly positive, it had a spike growth of 6.5% in 1978 and 11.32% in 2011 mimicking that of the GDP growth rate of 8.5% and 14.05%in those years respectively. Since 1984, the per capital income has been growing at an average rate of about 2% below the GDP growth except in 2015 when it grew by marginal negative 0.1%.

1.2.2 Inflation

Inflation rate in Ghana used to be one of the most unstable macro-economic variables in the second half of the 1970s and the first half of the 1980s (Fig. 1.6). This period was characterized by hyperinflation with the highest inflation rate of 122.87% in 1983. The year 1983 was beset by drought, poor agricultural yields, low productivity and most of all the repatriation of about 3 million Ghanaians from Nigeria.

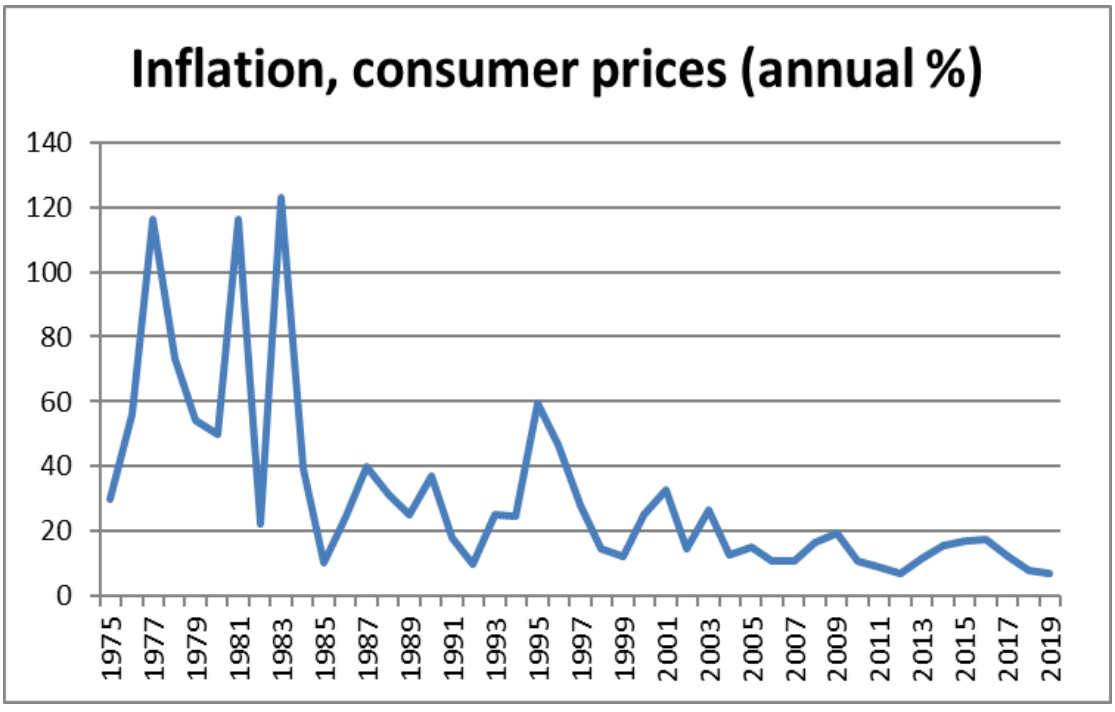

Figure 1.6Inflation in Ghana in % in the years 1975-2019

Source: World Bank.

Inflation rate came mostly under 40% for the period between 1984 and 1994. But in 1995 and 1996, it went up to 59.46% and 46.56%, respectively. Since 2004, inflation rate has stayed below 20%. Between 2004 and 2019, the average rate declined to 12.55%, with the lowest being 7.13% in 2012 and highest of 19.25% in 2009. The inflation rate in Ghana seems to go hand in hand with the depreciation of the local currency. For example, in 2007 when the currency depreciation was 1.91% inflation rate was 10.93%; when the currency depreciation went up to 12.83% in 2008, inflation rate also went up to 16.52%; in 2009 when the local currency depreciated by 33.52% inflation went up to 19.25% and when currency depreciation came down to 1.78% in 2010, inflation rate dropped to 10.71%.

1.2.3 Gross Domestic savings

Gross domestic savings are calculated by subtracting final consumption expenditure (total consumption) from GDP. Gross Domestic Saving consists of savings of households, private corporate, and public sector.

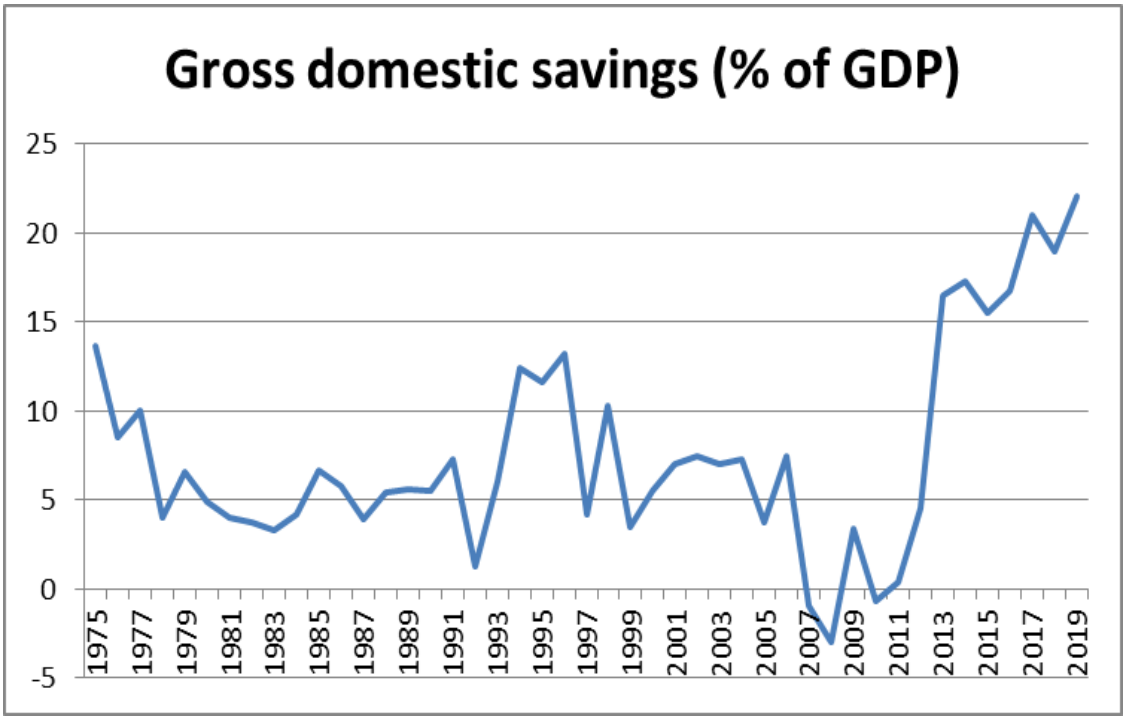

Figure 1.7Share of Gross Domestic savings in GDP in Ghana in the years 1975-2019

Source: World Bank.

Figure 1.7 shows the share of Gross Domestic savings in GDP in Ghana in the years 1975-2019. The gross domestic savings have been moving in various directions making it difficult to predict their level (Fig. 1.7). Ghana's gross domestic savings have mostly stayed below 20% of GDP except for 2017 when it was 20.98% and 2019 when it was 22.09%. In 2008, the gross domestic savings were negative resulting in the lowest share for the period 1975-2019 amounting 2.96%. In 2007 and 2010, this share was negative: -0.92% and -0.68% respectively. The average share of gross domestic savings in GDP for the period 1975 to 2019 was 7.62%. This indicates low savings propensity in the country and therefore difficulties to raise the necessary investment capital, thus the country needs to depend on funds from the international finance market and also on foreign direct investment (FDI) to create the necessary jobs and production for economic growth.

1.2.4 Social capital development: corruption

The topic of corruption has surface in almost every discussion on economic development of Ghana. In the past, every military intervention in the governance of the country has been justified on the issue of corruption by the former government. The two leading political parties in Ghana (The National Democratic Convention –NDC and the New Patriotic Party – NPP) has been accusing each other of corruption in governance of the country anytime they get the opportunity.

Corruption is defined as "is used as a shorthand reference for a large range of illicit or illegal activities" (E. Gyimah - Boadi, 2002, p. 1). In that same essay, E. Gyimah-Boadi quoted both the world bank and transparency International definitions as "the abuse of public office for private gain" and "Corruption involves behaviour on the part of officials in the public sector, whether politicians or civil servants, in which they improperly and unlawfully enrich themselves, or those close to them, by the misuse of the public power entrusted to them" respectively. In the above definitions, it is clear that corruption is an illegal activity that enriches the individual at the expense of the general public.

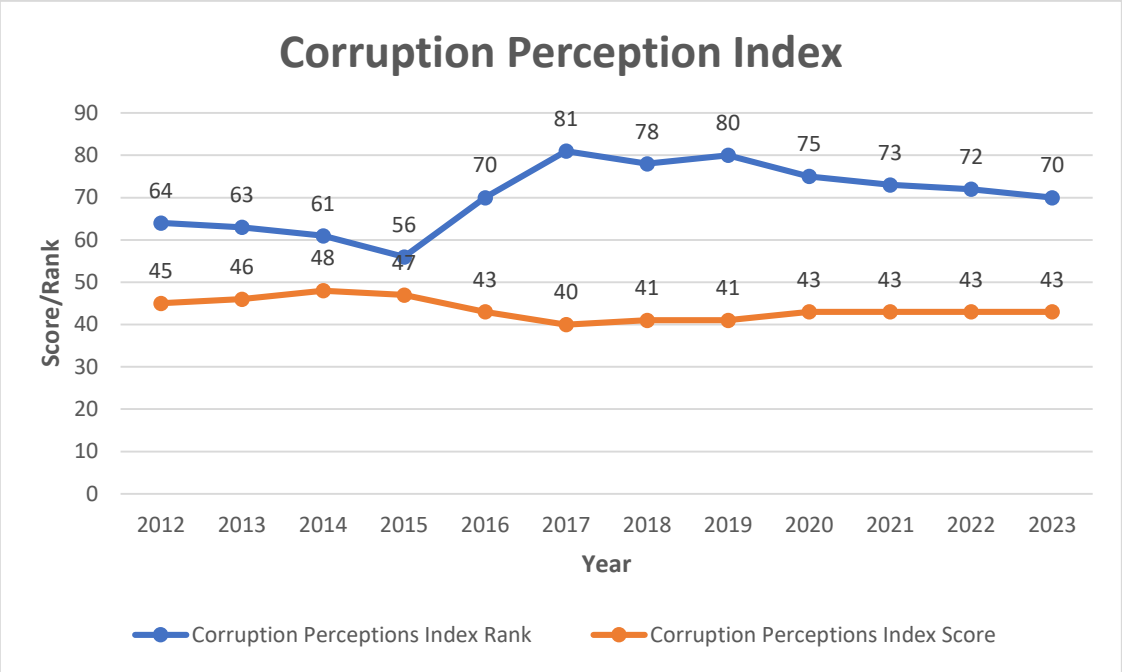

Figure 1.8Corruption perception index of Ghana

Source: World Bank

From Figure 1.8, above, Ghana's performance on the corruption perception "league table" has not been good. From 2012 to 2015, Ghana's position improved from 64th to 56th position in the perception index rankings. The correspondent index score also moved from 45% to 47% achieving a relatively high mark of 48% in 2014. From 2016 to 2019, Ghana's ranking has worsened and lied between 70th and 81st position with the worst position of 81st in 2017. The correspondence score has been between 43% and 40% (in 2017). In terms of corruption Ghana is perceived better than China at the level of Bulgaria and Romania in EU.

1.2.5 Human capital development: literacy rate

Currently Ghana possesses young, relatively well-educated labour force.

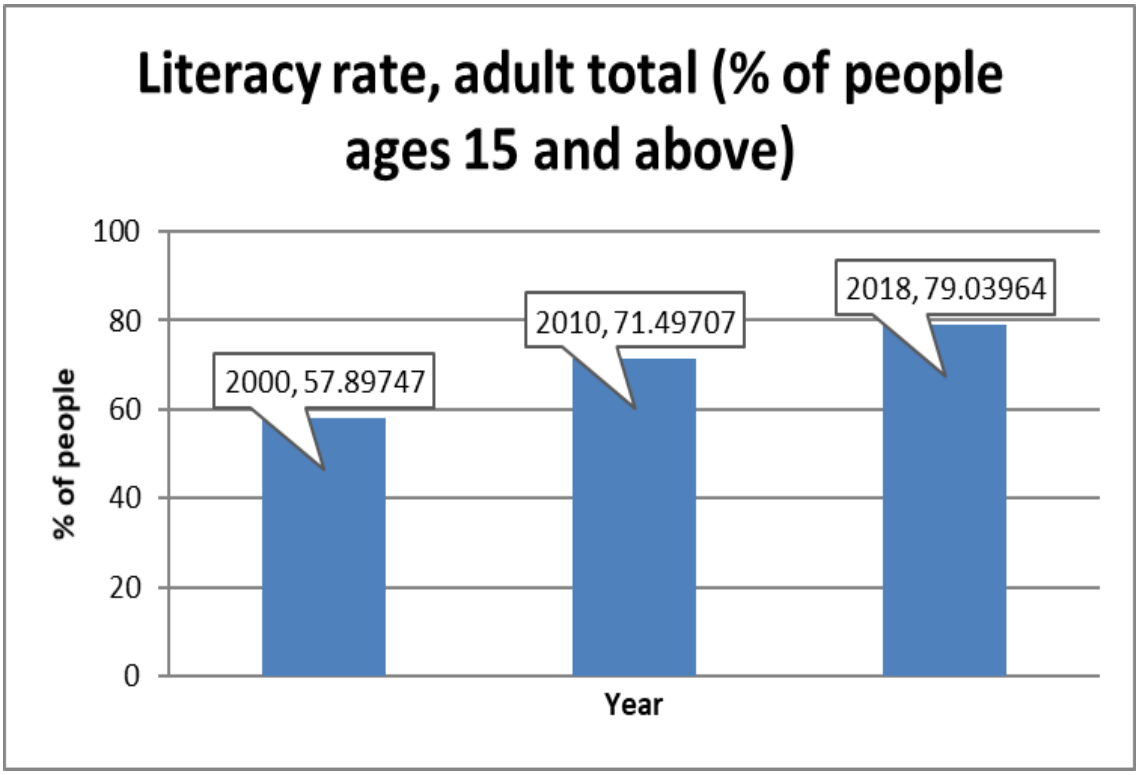

Figure 1.9Literacy rate in Ghana as a share of the population aged 15 years and above in the years 2000, 2010 and 2018

Source: World Bank

There has been increase in the level of literacy rate in Ghana over the period 2000 to 2018 (Figure1.9). Literacy rate moved from 58% of the population aged 15 years and above to a little over 79% in 8 years. This improvement can be attributable to programs like affirmative action for girl child education and free education to the senior secondary school level popularly called "Free SHS". Also the improvement in the literacy rate can be attributed to the educational reforms that started in the 1990s. Private sector investment in tertiary education has also increased. Private sector has also participated in public Universities through the provision of infrastructure (mainly hostels) and banks providing facilities for the construction of lecture halls.

1.2.6 Human capital development: mortality rate

There has been a significant improvement in the mortality rate in Ghana between 1975 and 2019.

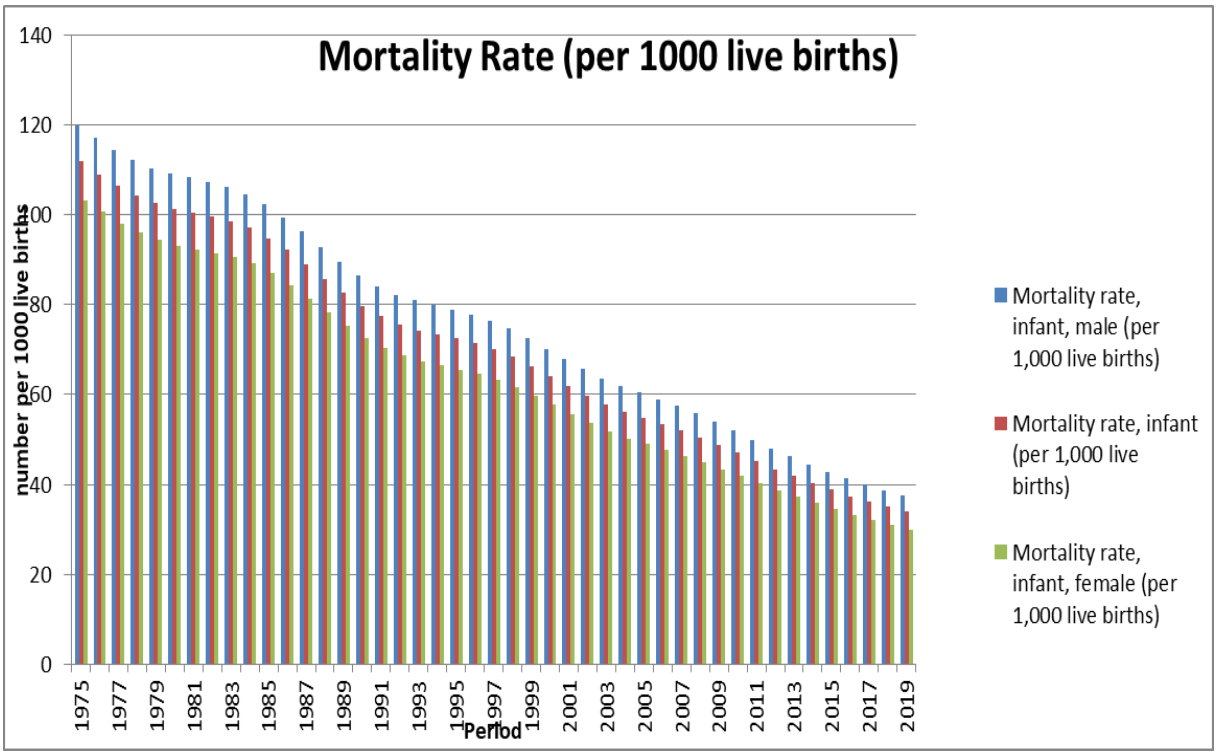

Figure 1.10Mortality rate in Ghana in the years 1975-2019

Source: World Bank

As shown at Figure 1.10 the infant mortality has reduced from 111.8 per 1000 live births 1975 to 33.9 in 2019. Female mortality rate has reduced from 103.2 to 30 per 1000 live births over the period while for males it has dropped down from 119.9 to 37.5 per 1000 live births over the same period. These positive outcomes can be attributed to improvement in mother and child care health systems, free medical care for pregnant women, antenatal and postnatal care and increased immunization rate against childhood killer diseases. The National Health Insurance scheme which started in the year 2004 has also facilitated access to the health care.

1.2.7 Human capital development: life expectancy

The demographic situation of the country is encouraging

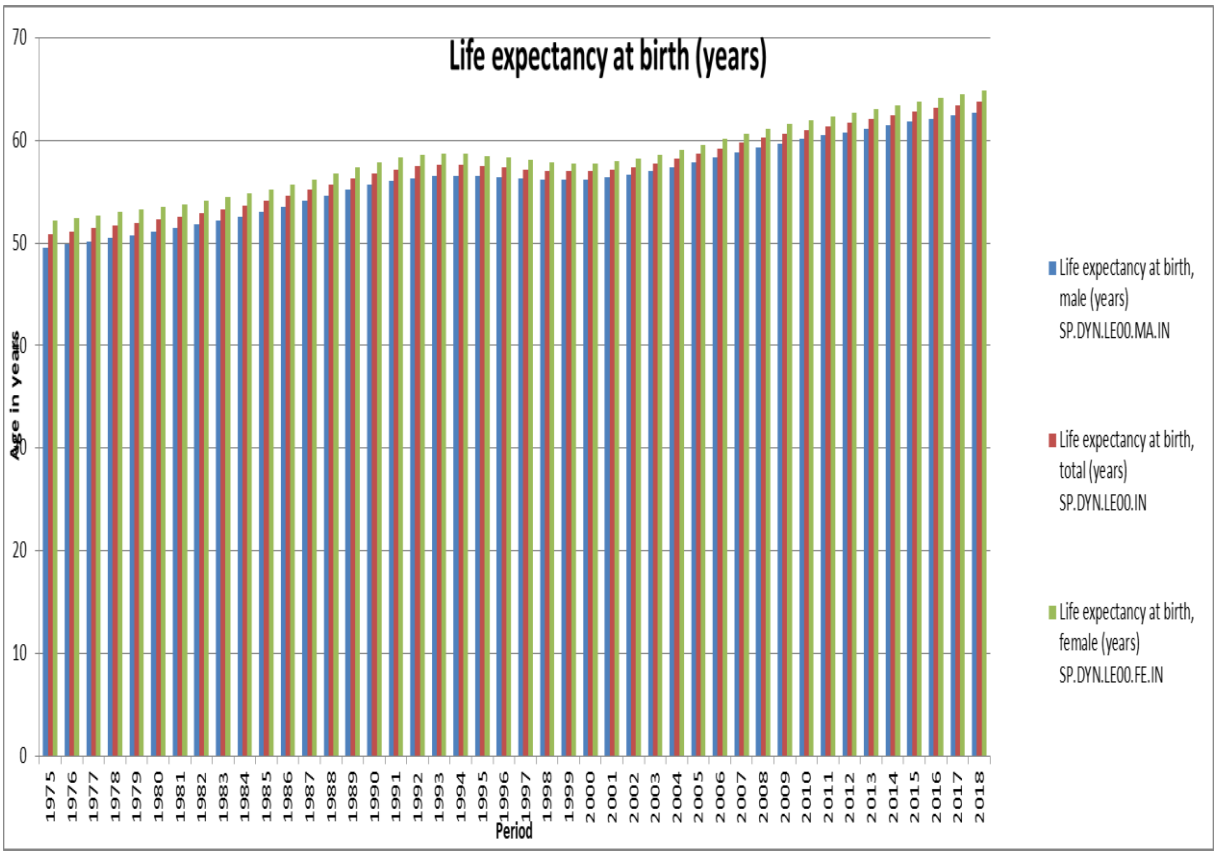

Figure 1.11Life expectancy in Ghana in the years 1975-2019

Source: World Bank

As shown at Figure 1.11 there has been a significant improvement in the life expectancy in Ghana in the analysed period. The life expectancy has increased from about 51 years in 1975 to 63.8 years in 2018. Female life expectancy increased from around 52 years to 64.9 years over the period whiles for males it has increased from about 50 years to 62.7 years over the same period. These positive outcomes can be attributed to improvement in health systems and literacy rate and the use of National Health Insurance to facilitate access to the health care services. Also, education on sexual and reproductive health by Non-Governmental Organizations (NGOs)like the United Nations population fund (UNFPA), The United States Agency for International Development(USAID), Japan International Cooperation Agency (JICA) and the Planned Parenthood Association of Ghana (PPAG) which started operations in 1968 has played significant role in these.

CHAPTER 2
CURRENCY DEPRECIATION IN GHANA

This chapter begins with an examination of Ghana's monetary policy, as this policy governs the creation of the cedi. In the subsequent sections, the analysis shifts to the currency exchange regime for the cedi and the mechanisms and patterns of its continuous depreciation. This will introduce readers to the main independent variable that will be explored in this thesis.

2.1Monetary Policy in Ghana

Monetary Policy plays a key role in stabilizing of the economy of any nation and ensuring it smooth functioning. Major role of central banks is to conduct monetary policy to achieve price stability and, in some countries (e.g. in USA), to help government in managing fluctuations in an economy. In recent years, there have been major changes in the policy framework within which central banks operate (Ito, 2019) to help in achieving economic stability.

The Taylor Rule by John Taylor, is a principle that help central banks in their formulation of monetary policy. The policy helps to formulate systematic method for setting and adjusting interest rates depending on economic conditions like inflation and output levels. According to Taylor, 1993 a good economic policy will call for changes in monetary policy rate in response to changes in price levels or changes in real income. In short the rule assumes that interest rates of the central bank should be increased when inflation or and real GDP growth rate are above target level, and vice versa the rates should be lowered in an opposite situation.

The Taylor Rule has been applied by different central banks in various parts of the world to stabilize economic activity. It serves as a benchmark in adjusting policy rates in response to changes in inflation and output. Through the application of Taylors rule, central banks aim to maintain price stability and enhance economic growth (Bernanke & Boivin, 2001; Wynne et al., 2003).From the perspective of at least one basic class of optimizing models, the Taylor rule combines a number of characteristics of an optimal monetary policy. It tends to stabilize the variables it prescribes in reaction to changes in the output gap or inflation, and stabilizing both variables is a goal that is appropriate, at least when the output gap is characterized correctly. Moreover, the recommended reaction to these variables offsets processes that may otherwise result in instability because of expectations that become self-fulfilling (Woodford, 2001). In the

rest of this subchapter we will try to examine in depth the Monetary Policy in Ghana, the extent its follows the Taylor Rule and its possible impact on currency depreciation.

In general, more democratic nations and those with high inflation rates benefit greatly from central bank independence. A central bank's level of independence and openness may be correlated with excellent regulatory quality. Ideally, a nation's central bank's amount of independence varies according to its regulatory structure and democratic system. Implementing stimulating monetary policies through an independent central bank assures low inflation without any political meddling. Three qualities set an independent central bank apart: (i) the capacity to decide on a comprehensive ranking and description of monetary policy goals; (ii) the institution's monetary policy's obvious transparency; and (iii) the clarity of responsibility assumption with regard to monetary policy. In a healthy financial and banking system with no government intrusion, regulation and oversight of financial organizations should ideally be limited to preventing fraud and upholding contractual commitments. There may be a link between the freedom and stability of the financial system and the independence of the central bank (Ding et al., 2021).

The primary objective of the Bank of Ghana (BOG) is to maintain stability in the general level of prices, as stated in Section 3(1) of the Bank of Ghana, (Act 612, 2002), as amended: "The primary objective of the Bank is to maintain stability in the general level of prices". The Act also gives the bank independence in conduction of monetary policy as well as setting of interest rates. Section 33(2) states that "The Bank, in counteracting unusual movements in the money supply and prices in the country shall, use any of the instruments of control conferred upon it under this Act or under any other enactment to maintain and promote a balanced growth of the national economy". The Bank also is supposed to support the general economic policy of Government, promote economic growth and effective and efficient operation of the banking and credit system in the country independent of instruction from Government or any other authority (*Bank-of-Ghana-Amendment-2016-ACT-918.Pdf*, n.d.).

The Act formulates the functions of the Bank of Ghana (objectives of the Central Bank). The bank should:

- formulate and implement monetary policy aimed at achieving the objects of the Bank;
- by monetary measures stabilize the value of the currency within and outside Ghana;
- institute measures which are likely to have a favorable effect on the balance of payments, the state of public finances and the general development of the national economy;

- regulate, supervise and direct the banking and credit system and ensure the smooth operation of the financial sector;
- promote, regulate and supervise payment and settlement systems;
- issue and redeem the currency notes and coins;
- ensure effective maintenance and management of Ghana's external financial services;
- license, regulate, promote and supervise non-banking financial institutions;
- act as banker and financial adviser to the Government;
- promote and maintain relations with international banking and financial institutions and subject to the Constitution or any other relevant enactment, implement international monetary agreements to which Ghana is a party; and
- do all other things that are incidental or conducive to the efficient performance of its functions under this Act and any other enactment.

In order to formulate and implement monetary policy aimed at achieving the objectives of the Bank, (section 27 of the Bank of Ghana Act 2002 (Act 612) as amended)the law foresees the establishment of a Monetary Policy Committee (MPC).

The composition of the committee as stated by the Act is the following:

- the Governor (Chairperson),
- the First and Second Deputy Governors,
- the Head of the Department responsible for economic research of the Bank,
- the Head of the Department responsible for Treasury operations of the Bank, and
- two external members – not employees of the Bank and appointed by the Board – with knowledge and experience, which is relevant to the functions of the Monetary Policy Committee.

As it is evident from the above, the majority of votes in MPC belongs to the BOG senior civil servants. The MPC meets bi-monthly over a three-day period to assess current economic conditions and the inflation outlook. At the end of deliberations, the monetary policy rate decision is made by a vote of the Committee on a one-person one-vote basis taking into consideration the prevailing conditions of the financial market and the economy as a whole. Each member has to give reasons for supporting a particular or specific decision.

BOG is responsible for money supply. In Ghana the M2 aggregate is used to depict the broad money supply. It contains the sum of currency outside banks; demand deposits other than those of the central government; the time, savings, and foreign currency deposits of resident sectors other than the central government; bank and traveler’s cheques; and other securities

such as certificates of deposit and commercial paper (Bank of Ghana, 2020; *Ghana | Data*, n.d.). BOG officially adopted inflation targeting (IT) in 2007 making it among the first emerging market economies and the first low income country to do so. Following the adoption of inflation targeting, the Bank of Ghana set a medium-term goal of 5% inflation within a band of +/- 1 percent, along with some intermediate inflation-reduction targets in 2007 but within a few months, after that, global food and fuel price shocks pushed up the inflation rate in Ghana. However, as the effect of these shocks began to reduce in 2008, expansionary fiscal policy also brought in further inflationary pressures making headline inflation to move away from the target (Alichi et al., 2009, p. 3). This was underpinned by flexible exchange rate regime which has been in operational in the country since the late 1980s. The Inflation targeting framework is to help in ensuring price stability in the medium term. Price stability remains one of the key macroeconomic objectives of any country. It helps in advancing the welfare of its citizenry in the era of the fiat money. Price fluctuations generally make economic valuation of goods, services and assets difficult (Onodugo et al., 2018). According to the IMF, the perception of success is dependent on moving to a forward-looking policy framework that would effectively anchor inflation expectations. This method is regarded as the most effective means of conducting monetary policy among many developing economies regardless of the fact that conditions differ in several aspects. The Bank of Ghana in coordination with the Government (Ministry of Finance) has been announcing the Inflation Targets at MPC meetings. These targeted rates are also announced by the Government through the budget reading process. The inflation targeting framework has also served as an analytical framework to respond to major macroeconomic shocks that have affected the economy ("Evolving Monetary Policy Frameworks in Low-Income and Other Developing Countries — Background Paper — Country Experiences," 2015).

Usually, the government through the Ministry of Finance and together with the Bank of Ghana will set the medium-term inflation target, and the Bank of Ghana is required to deploy its monetary policy tools to attain that target. The Bank of Ghana through monitoring of various indicators forecast inflation and works through its operational procedures to achieve the forecasted inflation rate. The level of deviations from the targeted inflation confirms or otherwise the accuracy of the method the central bank is using to forecast inflation. The method of inflation targeting, as practiced in Ghana has been much debated extensively, nevertheless, it has been positively rated worldwide (Goodfriend & King, 2015). The results are roughly the same in many countries that have followed the same strategy. According to Andrle et al., (2013), for the economies that practice inflation targeting regime, the rate of inflation has been

relatively low and that the inflation expectations have been fastened around the target without bringing about greater volatility in GDP growth (Ingves et al., 2017). It is important to note that, periodically, central banks change their policy rate to influence economic activities (Sims, 2016).

"The BOG targets headline CPI inflation. The main operational instrument is the short-term interest rate – the Monetary Policy Rate (MPR)" (Abradu-Otoo et al., 2003, p. 5). The MPC usually adopts the MPR as the main tool to point to the direction of monetary policy. This directs the short-term market rates to help achieve objective of price stability. In unusual times and circumstances, the MPC may announce additional policy measures to address perceived structural bottlenecks to current policies.

The Bank of Ghana uses its overnight repo and reverse repo facilities to protect the MPR through the operation of Interest Rate Corridor (IRC) system. By setting the floor and ceiling of the policy rates, it allows the interbank rate to move within the floor and ceiling. The upper limit being the reverse repo rate, that is, the rate at which BOG lends funds to the banks and the lower limit being the depo rate, which is the rate Bank of Ghana pays on deposited funds by banks.

The attainment of the desired goal of monetary policy has been influenced by both internal and external factors. These include fiscal deficits, weak financial markets, huge external debt and the volatility in commodity prices.

Since the inception of the Economic Recovery Program (ERP)in 1983, high inflation has been one of the economic troubles that has bedeviled the Country. Inflation rates went extremely high in some years, example 122.87% in 1983, 59.46% in 1995, 46.56% in 1996 and 32.91% in 2001. Inflation has been relatively kept under control after the shock of 1995 (Fig. 2.1). The monetary policy rate (MPR) went up to average annual of 45% and reduced marginally to 43.17% in 1998. This action by the BOG brought down inflation rate 12.41% in 1999 and the MPR to 28.25%. Unfortunately, in 2001, inflation went up to 32.91%, the annual average MPR was raised to 27%.

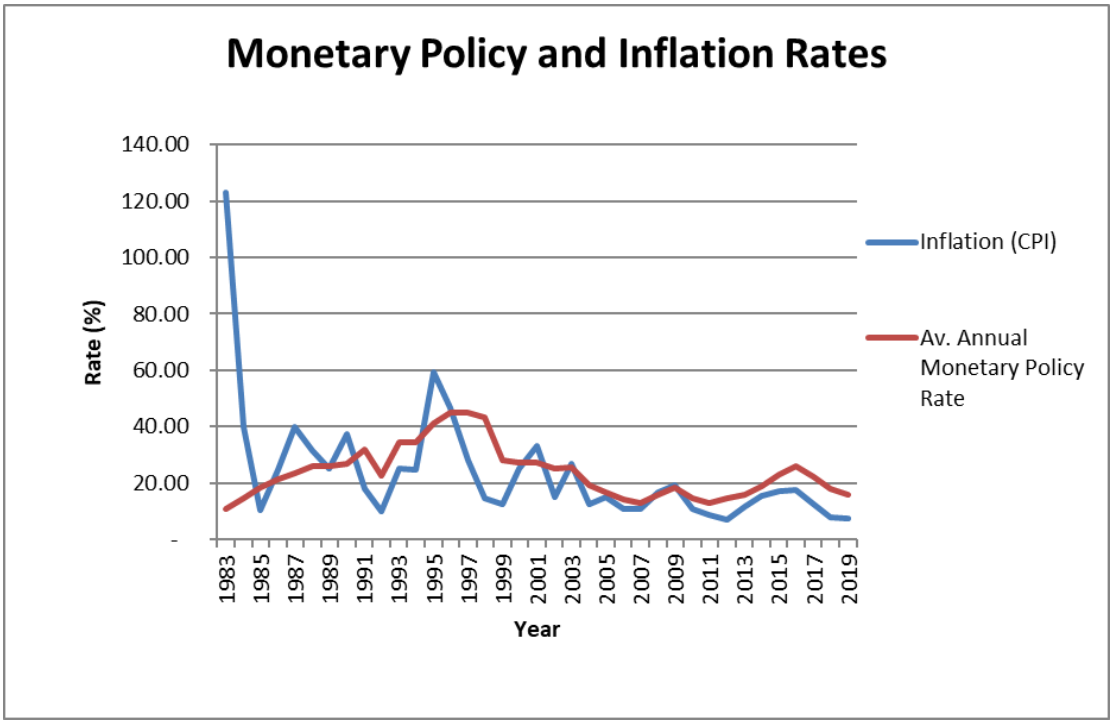

Figure 2.1 The Annual Average Monetary Policy rate and Inflation rate in Ghana in the years 1983-2019

Source: World Bank, BOG and Author's calculation

After the introduction of inflation targeting (IT) policy by the BOG in 2007, inflation rate has remained relatively stable below 20% annually, with single digit inflation rate between 2011 and 2012. It reached record low rate of 7.13% in 2012. Single digit inflation of 7.81% and 7.18% were also recorded in 2018 and 2019 respectively. The medium-term inflation target has remained 8% plus or minus a spread of 2% for many years beginning from 2014 to reflect the dynamics of the Ghanaian economic environment which includes increase in the core inflation, rise in food inflation and reasonable uncertainty in the issue of domestic foreign exchange market. (Bank of Ghana, 2023; Bleaney et al., 2020). Unfortunately, inflation for most of the years has been higher than the upper limit of 10%. Apart from 2011, 2012, 2018 and 2019, all the other years were above the target set by the central bank and the situation may to some extent be attributed to the pass-through effect of the Ghana cedi deprecation on imported goods and services, increase in production cost and increase in money supply.

The complete flexibility to utilize monetary tools to influence an economy without intervention from the in power government is known as central bank independence. Recent reforms in central bank operations all over the world have been focused in particular areas (Crowe & Meade, 2007, 2008). First, the legal statutes governing central banks' operations and

relations with other branches of government have been revised or rewritten in many countries, with a focus on increasing institutional independence from the executive. In Ghana's case, the ACT 918 have addressed many pertinent issues including the appointment of the Governors for the Bank of Ghana by the President of the republic. Second, as central banks have become more autonomous, efforts have been made to enhance their accountability. The Act 918, requires the Bank of Ghana to report to parliament twice a year. Third, central banks have attempted to become more transparent in their operations. This last change is both a complement to increased accountability and related to changes in how monetary policy is conducted, notably to the introduction of inflation targeting (Crowe & Meade, 2008). It has also been observed that, since the introduction of IT, the MPR has been higher than the inflation rate except 2008 and 2009. This indicates that the primary aim of the Bank of Ghana's IT is to reduce and maintain inflation rate to a single digit. The socioeconomic circumstances of economically marginalized groups can improve when a central bank fulfills its role, whether via traditional or unorthodox ways (Addison, 2021).

Because of the autonomy the Bank of Ghana is enjoying as a result of the Act 918, twice every year, the Bank of Ghana is required to submit to parliament, a monetary and financial stability report. This report provides details on the monetary policy course of action during the reporting period. By reporting to the people's representatives (parliament), it helps the Bank of Ghana to stay independent from the Governing executives and also the President cannot just dismiss the Governors of the Bank of Ghana whose jobs are protected by the constitution of republic of Ghana. Act 918, states that: "(1) the President shall in accordance with article 183(4) of the constitution appoints a Governor of the bank for a period of four years each". "(2) subject to subsection (2A), the President shall in accordance with article 195 of the constitution appoint two Deputy Governors of the bank on the terms and conditions specified in the letters of appointment". The Governor shall not be easily removed by the president. Sections 20A and 20B were inserted into the amended act – "Removal of Governor: 20A the Governor shall not be removed from office except on the same grounds and in the same manner as a Justice of a superior court of Judicature, other than the Chief Justice". "Removal of the Deputy Governor: 20B(1) The Deputy Governor shall not be removed from office except (a) for stated misbehavior or incompetence; or (b) for inability to perform the functions of the office arising from infirmity of mind or body"(*Bank-of-Ghana-Amendment-2016-ACT-918.Pdf*, n.d.).

Others also argue that the Bank of Ghana is after all not as independent as it may seem because: The Governor and the deputy Governors are appointed by the president; The Bank of Ghana Board of Directors as well as the members of the MPC are appointed by the president;

The Board of Directors and the Governors' appointment are coterminous with that of the political cycle. Also, the Minister of Finance is seen as the supervisory minister of the Bank of Ghana. Example during the covid-19 pandemic, at the request of the Government, the BOG suspended the fiscal stability act and lend to government above the legislative limit. The act still remains suspended to date and the BOG has been seen as one of the main financiers of Government budget deficit. Moreover, as stated by (Gyimah-Boadi & Yakah, 2012, p. 3) "the effectiveness of Ghana's public bureaucracy is undermined by politicization and persistent 'clientelization of the democratic politics'. Chief executives, chairs and other governing board members of the country, including public utilities, are typically appointed by presidential fiat, largely on the basis of partisan political criteria rather than merit". This also includes BOG Governors. The governments have usually managed to install their preferred candidates as BOG heads. They mostly achieve this through the use of negotiation procedures and offering solid perks to the governors in office who were asked to resign voluntarily.

Summing up one can note that Monetary Policy of Ghana, at least according to the existing legal framework cannot be seen as a main source of diminishing purchasing power of currency of Ghana. The Taylor rule has been obeyed, BOG has adjusted MPR to the changes in the inflation rate, although the instruments in its disposal seems not to be adequate and sufficient to achieve the desired inflation target. This might result in anchoring high inflation expectations in Ghana, lowering credibility of the monetary policy of the country. Moreover, in few cases BOG, under the pressure of the government, has decided to finance government spending above the agreed limits due to limited access of the government to the financial markets and low tax revenues. However, all these shortcomings and failures do not explain the reasons for permanent depreciation of cedi.

2.2 The essence of currency depreciation

Nominal exchange rate for a particular currency could be treated as the price of one currency in relation to another. The domestic price of the foreign currency is typically used to express it. Thus, the nominal rate is Ghana cedisGHS10.00 per dollar from the perspective of a holder of Ghana cedis if it costs a holder of U.S dollars 0.10 to purchase one Ghana cedi. Two exchange rates are distinguished by economists: the nominal exchange rate and the real exchange rate. The nominal exchange rate represents the relative value of the currencies of two countries. The real exchange rate is determined by how the prices of goods and services in two countries compare to one another. In other words, the real exchange rate gives information

about the rate at which goods and services of one country could be swapped for that of another country (Mankiw, 2010, pp. 135–136). Real exchange rate between two currencies is achieved by multiplying the nominal exchange rate by the ratio of prices in the two nations Bilateral exchange rate is the value of a currency in relation to another. Since the U.S dollar is the most widely traded currency internationally, bilateral exchange rates are often stated against it. There is also a cross rate – an exchange rate between to currencies which is determined by using a third currency. For instance, the exchange rate between the Ghana cedi and Euro (GHS/EUR) may be determined using the GHS/USD and EUR/USD rates. Once the exchange rates for the Ghana cedi (GHS) and the Euro (EUR) against the US dollar are known. Finally, there is also an effective exchange rate that measures a currency's strength in relation to a basket of other currencies of the main trading partners.

Currency depreciation or devaluation refers to the loss of value of a country's currency in relation to other currencies or currencies of other Countries. In this thesis, the direct exchange rates quotation has been used to express relationship between the US dollar and Ghana cedi as well as other currencies. The depreciation rate of the base currency relative to the quoted currency is calculated as:

Percentage change = $[(X_1\text{-}X_0)/X_0]$*100 percent

Where,

X_0 represent the previous period (month, year) exchange rate

X_1 represent the current period (month, year) exchange rate

A positive percentage change represents "depreciation" and negative "appreciation"

The depreciation or devaluation (as it used to be before the foreign exchange reforms in 1987) of the Ghana cedi is usually measured against currencies like the United States dollar, euro, British pound, Japanese yen and to some extent the Chinese yuan i.e. in relation to the basket of currencies – nominal effective exchange rate.

Devaluation or depreciation of a currency can have a favorable effect on some economies, while having a negative impact on other economies in other situations (Kumar et al., 2020). Currency depreciation can have both expansionary or traction effect on a country's economy. In Ghana significant currency depreciation might to leads to higher inflation as the pass-through effect is shown in the price of imported items demand on which is inelastic (Goldfajn & Werlang, 2005). Similarly, local production and supply of goods and services are also inelastic as well as the price of most of Ghana's exports are not priced in local currency but in US dollars and therefore cannot take full advantage of the reduction in price resulting

from the depreciation of the Ghana cedi. The general consensus is that possible positive effects of lowering currency value appear mainly in a short-run whereas in a long run negative repercussion dominate (such as inflation).

Depreciation of currencies has emerged as one of the most pressing issues facing the global economy over the past few decades. Since the beginning of the 20th century up until recent times, numerous developing economies have, at one point or another, been confronted with currency crises. As a result, they have pondered whether or not a devaluation of their currency is the best course of action, or perhaps another economic and financial policy reform will be the way out. In recent periods, due to the economic difficulties faced by many countries and their effect on global energy crisis and high inflation in the post covid-19 pandemic, currencies of most countries have depreciated significantly to decade's low rate against the U. S Dollar. In Africa, since the beginning of the year, the currencies of countries such as Ghana (with a depreciation of 60%), South Sudan (with a depreciation of 50.8%), Sudan (with a depreciation of 28.6%), Malawi (with a depreciation of 25.4%), and the CFA Franc (13.3%) have performed the worst in the area (World Bank Group, 2022). Devaluation of national currencies of some eastern and central European countries were less spectacular but also noticeable resulting in inflation acceleration, high costs of fuels etc.

Currency depreciation usually occurs in the regime of floating currency regime where demand and supply determine the price of a countries currency or the exchange rate of the local currency against international currencies (for details see Appendix 1). This is the case in Ghana. But in neighboring African countries various types of exchange regime do exist.

The three types of exchange-rate regimes that are now in use in developing nations are pegged regimes, flexible regimes, and band regimes.

There are different types of pegged regimes, including currency boards, where the currency is (in theory) irrevocably fixed and the base money stock is backed by official foreign reserves, adjustable pegs, where the currency is fixed against a foreign currency but is rarely changed, and crawling pegs, where the currency is initially fixed but policymakers later adjust the exchange rate at regular intervals to account for changes in inflation differentials or a specific (nondiscretionary) feedback rule or a discretionary rule can govern the pace of crawl. In each of these systems, the currency may be pegged to either a single foreign currency or different currency baskets (often tailor-made ones, relying on partner country trade weights). A pure currency board only issues money against the reserve currency at a predetermined exchange rate and the base money stock is entirely supported by foreign reserves. The money that the currency board issues is likewise completely convertible into the reserve currency on

demand (at the predetermined exchange rate) and vice versa. By definition, the exchange rate between the domestic currency and the reserve currency determines the ratio of the base money stock to the stock of foreign currency reserves.

In band regimes, a central exchange rate is announced along with a fluctuation band (which may or may not be symmetric) around it. The central exchange rate is also controlled in some way; it may be fixed or crawling, for example. The central bank has implicitly agreed to aggressively intervene at the band's edges to stop the exchange rate from straying outside of it. Adoption of a set of guidelines to direct any potential foreign currency market intervention is also necessary for the deployment of a band. (Agenor & Montiel, 2008, pp. 269–270).

Fixed exchange rates prevent uncertainty in the exchange rate. The exchange rate is pegged to a desire level and companies and individuals buy or sell foreign currency according to their need. The central bank therefore calibrates the demand and supply of foreign currency in the country. In general, in order to keep the value of the currency from becoming unstable, the central bank needs to correct any imbalances that may exist between the demand for and supply of the currency. The value of the nation's currency will be lowered or reduced (usually under adjustable and crawling peg) by the central bank in comparison to that of other currencies. In a system with a fixed exchange rate, actions taken by a central bank to lower the value of their currency relative to other currencies are referred to as devaluation, while actions taken by the central bank to raise the value of their currency relative to other currencies are referred to as revaluation. Fixed exchange rates regimes require large foreign currency reserves to ensure successful implementation. Fixed exchange rate regime has gone through a number of stages:

- Bretton Woods Agreement −The Bretton Woods conference was held in 1944 in Bretton Woods, New Hampshire, and was attended by representatives from a variety of countries. At this meeting, they devised a mechanism to fix most exchange rates, and it was used from 1944 to 1971. It was also the same time that the IMF and the World Bank were formed. Because of the length of time that this agreement was in place, the time period from 1944 to 1971 is sometimes referred to as the Bretton Woods era. Gold was used to determine the value of each currency; for example, one third-fiftieth of an ounce of gold was equivalent to one United States dollar (dollar was convertible to gold bullion for foreign governments and central banks at US$35 per troy ounce of fine gold or 0.88867gram fine gold per dollar). Because the value of each currency was determined relative to that of gold, the valuations of the currencies in relation to one another were consistent. The foreign exchange markets were subject to

government intervention to ensure that exchange rates did not deviate by more than one percent either higher or lower than the rates that were first fixed. A major hitch with this era was the run on the British Pound in 1967 which lead to the devaluation of the British Pound by14%.

- Smithsonian Agreement – During the time of Bretton Woods, the United States frequently had trade deficits, resulting in a negative balance of trade. These deficits suggested that the dollar may have been overvalued, as the use of dollars for purchases made in other nations surpassed the demand for commodities denominated in other countries' currencies that was placed on the currency by those countries. As early as 1971, it became apparent that the values of some currencies would need to be altered in order to reestablish a flow of payments between countries that was more balanced. In December of 1971, a summit of delegates from a variety of countries resulted in the Smithsonian Agreement. This agreement stipulated that the value of the United States dollar should be reduced relative to other currencies by approximately 8%. In addition, the margins of error for the currency values were widened to include a range that extends up to 2.25% higher or lower than the rates that were initially established by the agreement. Despite this, imbalances in international payments persisted, and as a result, the value of the dollar began to decline once more in February 1973. By March of 1973, the majority of the governments of the world's most powerful nations had given up trying to keep the values of their domestic currencies within the parameters set down by the Smithsonian Agreement. Within this period, the United States under president Richard Nickson suspended the Gold standard for the U. S Dollar. The Gold standard therefore collapsed in 1973 and countries move to other exchange rate regimes including the floating exchange rate regime.
- Due to the collapse of the Bretton Wood system the European countries started to co-operate more closely with regard to their currency exchange mechanisms, since October 1972. The core of the system was a multilateral adjustable exchange rate agreement. The participating countries from European Economic Community (EEC) adjustably pegged their currencies one to one another establishing a single currency fluctuation band of +/-2.25% known as a snake in the tunnel. The currency snake linked their currencies to prevent large fluctuations in relative value. In 1979 the European Monetary System (EMS)

was formally created and eight European countries joined it: Belgium, Denmark, France, Germany, Ireland, Italy, Luxembourg and Netherlands. The EMS continued till 1999, when it was replaced by the Economic and Monetary Union (EMU). The value of currencies of the EU countries that entered so called Euro zone were fixed against the new European currency i.e. Euro. This move was heavily criticized by many economists since Euro-zone did not fulfill conditions envisaged by Robert Mundell in his seminal works for establishing a monetary union (Mckinnon, 2004).

But Bretton Wood legacy is important to understand the exchange rate regimes functioning in practice. According to the regulations of the international monetary system, which are outlined in the Articles of Agreement of the International Monetary Fund, devaluation was encouraged whenever a country's international payments position is in "fundamental disequilibrium." This is the case regardless of whether the disequilibrium was caused by factors from outside the country or by developments within the country itself. Because so many economic adjustments to a discrete change in the exchange rate are crowded into a relatively short period of time, currency devaluation has come to be regarded as a measure of last resort, with countless partial substitutes adopted before devaluation is finally undertaken (Cooper, 1971).

A nation could reap the benefits of having a fixed exchange rate for a number of different reasons. To begin, exporters and importers were able to participate in international trade without having to be concerned about fluctuations in the exchange rate of the currency to which their domestic currency was tied. Any businesses who agree to take the foreign currency as a form of payment will be protected from the possibility that the value of the currency may decrease over the course of time. In addition, any companies that find themselves in the position of needing to acquire that foreign currency in the foreseeable future would be protected from the possibility of the value of that currency increasing over the course of time. A second advantage is that businesses are able to invest directly in overseas markets without having to worry about the effects of fluctuations in the value of the local currency. They would not have to worry about the value of the foreign currency that their earnings were denominated in declining over the course of time since they would be able to transfer those earnings into their own country's currency. Therefore, the management of a multinational corporation would be simplified significantly. Third, investors would be free to put their money into the economies of other nations without the worry that the value of the foreign currency in which their investments are denominated will decline over time. To foster economic expansion, every

nation must have access to sufficient financial resources. Countries that are successful in luring significant amounts of capital inflows typically have interest rates that are lower than average, which can be beneficial to the growth of their economy.

One of the drawbacks of a system with a fixed exchange rate is the fact that there is still the possibility of the government changing the value of its currency. Even though a multinational corporation is not subject to consistent shifts in an exchange rate, there is still the risk that the central bank of the nation in which it is headquartered will either revalue or devalue the currency of that nation. The second potential drawback of a fixed exchange rate system is that, when seen from a macroeconomic perspective, it may make each nation (and its multinational corporations) more susceptible to the state of the economy in other nations (Madura, 2013, pp. 189–190). The third potential drawback is that devaluation will result in an increase in the domestic costs associated with repaying external debt with foreign currency. Even when enterprises are otherwise solid, bankruptcy and a consequent reduction in business activity may result when the obligations are those of businesses who do not gain greatly from the devaluation (Cooper, 1971).

The exchange rate regimes that countries in today's international monetary and financial system have adopted, as well as the system itself, are significantly different from those that were envisioned at the meeting in 1944 at Bretton Woods that established the IMF and the World Bank. The following are the components of the Bretton Woods system: Exchange rates were not variable but might be adjusted as necessary. This system aimed to avoid the undue volatility that was thought to characterize floating exchange rates and to prevent competitive depreciations, while permitting enough flexibility to adjust to fundamental disequilibrium under international supervision; private capital flows were expected to play only a limited role in financing payments imbalances, and widespread use of controls would prevent instability in such flows; temporary official financing of payments imbalances, as well as temporary official financing of competitive depreciations; and finally, this system aimed to avoid the undue volatility that has been.

In flexible regimes, the exchange rate is allowed to fluctuate in response to changes in demand and supply of foreign exchange. If the central bank does not intervene in the market for foreign exchange, the regime is a free float; otherwise, it is a managed float or dirty float. When necessary, central banks will periodically engage in the market for foreign exchange by either expanding or contracting the supply of foreign currency. The float is referred to as a "controlled or managed float" when there is intervention involved (Connolly, 2006, p. 28).

The exchange rate of a currency that is allowed to freely float adjusts on a continuous basis in response to the conditions of demand and supply for that currency. One of the benefits of having a system of freely floating exchange rates is that it helps a country become less susceptible to the external macro-economic shocks experienced in other nations. One further benefit of exchange rates that are allowed to float freely is that they can shield a country from the unemployment issues that occur in other nations. Countries with fixed exchange rate must react to such shocks by changing its macroeconomic policy (usually cutting government spending and social transfers which might lead to severe GDP decline) whereas floating regime provides at least some protection through currency devaluation.

Under a system with variable interest rates, the decrease in the quantity of Ghanaian products purchased by the United States will lead to a decrease in the quantity of Ghana cedis purchased by the United States. A change in demand of this nature could result in a depreciation of the Ghana cedi in relation to the US dollar. This depreciation will make Ghanaian goods cheaper for customers in the United States than they were previously, which will counteract the potential decrease in demand for these goods that could result from a loss in income in the United States. Of course, another question is reaction of the interest rates in Ghana. In the case of their increase demand for cedi for speculative purposes might grow resulting in appreciation of the currency.

The fact that a central bank is not needed to constantly keep exchange rates within predetermined parameters is another advantage of a system in which rates of exchange are allowed to freely float. It is therefore never essential, merely for the sake of managing exchange rates, to undertake an intervention policy that could have an unfavorable effect on the economy. This is because intervention policies have the potential to have a negative influence on the economy. In addition, each nation-state is free to enact policies regardless of the impact those policies would have on the currency exchange rate. In conclusion, if it were not possible for currency exchange rates to fluctuate freely, investors would put their money into the country that offered the highest interest rate. It is very possible that this will result in governments of nations with low interest rates trying to limit the amount of money that can be taken out of the country by investors. Therefore, there would be an increase in the number of limitations placed on the flow of capital, and the efficiency of the financial market would decrease.

The unfavorable effects of a freely floating exchange rate system might be felt by a country in which the unemployment rate is very high. If the unemployment rate in the United States continues to rise, then the demand for imports into the United States will fall, which would result in an increase in the value of the dollar. A stronger dollar will lead to customers

in the United States purchasing goods made in other countries rather than those made in their own country because goods made in other countries are more affordable" (Madura, 2013, pp. 191–192).

In the current system, the exchange rates among the major currencies (primarily the United States dollar, the euro, the British pound, and the Japanese yen) vary in response to market factors, with short-run volatility and occasionally huge medium-run movements. Certain medium-sized industrial countries also use market-determined floating rate regimes, while others, particularly some European countries that are not part of the euro area, have established more stringent pegs for their currencies. There is a wide variety of currency exchange rate arrangements in developing and transition economies. Many nations, although by no means all of them, are moving in the direction of increasing currency exchange rate flexibility.

This diversity of exchange rate regimes is a product of an environment that possesses the following characteristics: industrialized nations have, for the most part, given up on such controls due to efficiency concerns, and emerging market economies have gradually moved away from them because of their limited effectiveness. Both of these factors contribute to the fact that capital controls are not as effective as they once were. The revolution in telecommunications and information technology has dramatically lowered transaction costs in financial markets and further promoted the liberalization and deregulation of international financial transactions. The growth of international capital flows and the globalization of financial markets have also been spurred by this revolution, which has further promoted the liberalization and deregulation of international financial transactions. International private capital flows finance substantial current account imbalances, but changes in these flows appear also sometimes.

There is a significant amount of variation in the exchange rate regimes of emerging and transition countries. These regimes can range from extremely rigid currency pegs to relatively free floats, and there are a variety of other options in between. This should not come as a surprise given the vast disparities that exist between these nations in terms of their economies and financial situations. On the other hand, as a result of these countries' increased involvement in a global economy that is becoming more integrated and the changes that have occurred in their own economic circumstances, there has been a trend toward greater flexibility. This is due to the following reasons: Since the early 1980s, gross capital flows to developing countries have increased significantly. This has increased the potential for large and sudden reversals in net flows, which would make it more difficult to maintain pegged rates. Many developing

economies now trade with a wider range of partner countries, which is consistent with the trend toward globalization. Countries that have their currencies pegged to a single currency are vulnerable to the wide range of swings that occur among the major currencies.

Some observers have concluded that pegged exchange rate regimes are inherently prone to crisis, and that emerging market countries should be encouraged, in the interests of themselves and the international community, to adopt floating rate regimes. The "tequila crisis" of 1994–1995 began in Mexico, and it continued through the Asian, Russian, and Brazilian crises of 1997–1999. Both of these crises began in Mexico. While it is true that recent crises have had a direct and negative impact on a number of emerging market economies that are linked to global financial markets, these crises have only had an indirect impact (through movements in world commodity prices and trade flows) on the majority of developing and transitional countries. This is an important caveat that needs to be emphasized when thinking about this conclusion. And the issues that plagued the countries that were hit the worst were caused by a variety of causes, not the least of which was the relative stability of their exchange rate regimes (*Exchange Rate Regimes in an Increasingly Integrated World Economy -- An IMF Issues Brief*, n.d.).

Since Ghana and most sub-Saharan countries that will be referred to in this research operate in floating exchange rate regimes, the loss of value of the currencies will be referred to as depreciation. A key factor of the flexible or floating foreign exchange regime is currency convertibility. It is the freedom or how easily a local currency can be converted or exchanged into foreign currency at the market rate. Higher convertibility makes a currency more liquid. Currency convertibility could be referred to as current account or capital account convertibility.

Current account convertibility – right to convert freely (full convertibility) a national currency at the prevailing exchange rate into any other currency. Example people or businesses with U.S Dollars can freely exchange them for Ghana cedis at the prevailing market rate or vice versa. Current account convertibility stresses the competiveness of the local economy.

Capital account convertibility – it employs an economy’s ability to attract foreign capital. This includes all sorts of investment assets like shares (stocks), debt, properties and FDI. Local currency could be said to be fully capital convertible when foreign capital can be used for all purposes without restriction. In Ghana, foreign capital investment in some specific industries need to be registered with the GIPC first to enable free convertibility and repatriation of proceeds from those investments.

There are a number of theories to determine exchange rate between currencies. These theories can be classified into long and short run.

The long-run theories are those that take into consideration the fundamental changes may affect the performance of the economy. These long-run theories only concentrate on the effect of the fundamental changes that determine the pattern of exchange rate in the economy.

Short-run theories are those that take into consideration the immediate or present information of the performance of the economy on the exchange rate.

Long-run exchange rate determination theories:

Purchase rate parity – This theory was proposed by a Swedish economist called Gustav Cassell in 1918. According to him, shifts in the value of currencies or the relative purchasing power of different currencies were reflected in fluctuations in exchange rates. He did this by comparing the changes in prices that occurred in a variety of nations to the changes that occurred in the exchange rates during the same time period. When it was found that nations with higher inflation had currency depreciations, he dubbed his theory the "purchasing power parity" (PPP) doctrine of the exchange rates. This was because he believed that countries' currencies should be valued in relation to their "purchasing power."(Connolly, 2006, p. 40). PPP could be absolute or relative.

Absolute PPP states that, without international barriers, consumers shift their demand to wherever prices are lower. Prices of the same basket of products in two different countries should be equal when measured in a common currency.

Relative PPP state that, because there are market imperfections, prices of the same basket of products in different countries will not be the same, but the rate of change in prices should be similar when measured in common currency.

The PPP theory is rationalized by:

Exchange rate adjustment is necessary for the relative purchasing power to be the same whether buying products locally or from another country.

If the purchasing power is not equal, consumers will shift purchases to wherever products are cheaper until the purchasing power is equal.

Relationship between relative inflation rates (I) and the exchange rate (e).

$$e_f = \frac{1+I_h}{1+I_f} - 1$$

e_f - exchange rate

I_h - Inflation in home country

I_f - Inflation in foreign country

Interest Rate Parity (IRP) − the forward exchange rate of one currency against another differs from the spot exchange rate by a sufficient amount to enable the offset of the interest rate differential between the two currencies (Madura, 2013, pp. 235–237).

The Interest Rate Parity is express as follows:

$$p = \frac{1+i_h}{1+i_f} - 1$$

where

$p = \text{forward premium}$

$i_h = \text{home interest rate}$

$i_f = \text{foreign interest rate}$

The interest rate parity could be covered or uncovered:

Covered IRP considers borrowing and lending rates in two markets. It also considers buying of foreign currency on sport and sells forward the concerned currency to arrive at parity condition. Negative interest rate premiums are compensated by an annualized forward premium and positive interest rate differentials are offset by annualized on forward discount.

Uncovered IRP considers forward market transaction as interest rate differentials give rise to changes in future and spot exchange rates.

International Fisher Effect – It estimates changes in current exchange rate between two currencies in direct relations to the differences in the nominal interest rate between the two countries. The differences in the spot exchange rates overtime is influenced by the differences in the nominal interest rates of the two countries. “Fisher effect presumes that the nominal interest rate consists of two components: the expected inflation rate and the real rate of interest. The real rate of interest is defined as the return on the investment to savers after accounting for expected inflation, and it is measured as the nominal interest rate minus the expected inflation rate. If the real rate of interest in a country is constant over time, then the nominal rate of interest there must adjust to changes in the expected rate of inflation” (Madura, 2013, p. 264).

The Monetary Models of Exchange Rate – it combines PPP and quantity theory of money to explain exchange rate in terms of money supply, income and price. Exchange rate is the price of a country’s currency in terms of other currencies. This implies that when there is large amount of one country’s national currency in relation to another country’s national

currency, the price of the former will fall or depreciate. Let assume a stable demand for money be represented by the equation

$$Md = KPY$$

Where:

Md - The quantity of money demanded

P – Price level

Y – Real income

K – A positive constant

With an exogenous money supply M, equilibrium in the money market is:

Money demanded = Money supply

i.e: $P = \frac{M}{KY}$

If PPP holds in this case, then at any point in time:

S = $\frac{P}{P*}$, where, S= Sport rate; P = Home price levels ; P* = Foreign price levels

Then S = $\frac{M}{KP*Y}$

Monetary expansion will lead to increase in money supply. This will make the domestic currency to depreciate.

A rise in foreign prices will lead to a fall in the supply of money and the domestic currency will rise or appreciate.

A rise in income levels will lead to a fall in the supply of domestic currency, hence it will rise or appreciate.

Sebastian Edwards Model of exchange rate – it concerns the determination of real exchange rate (RER) rather than nominal exchange rate. With economic liberalization

process, capital account becomes open, which will lead to an increase in foreign borrowing which will increase foreign currency inflow and that will result in appreciation of RER.

Edwards approach is based on the following:

Autonomous tendency for the actual exchange rate to existing disequilibrium into stable one

Determination of exchange rate is also dependent on macroeconomic policy

Determination of RER largely affected by changes in nominal exchange rates.

Short-run exchange rate determination theories are following:

Demand and supply theory – Exchange rate is determined by the demand and supply of foreign currency in the economy. "Like any other product sold in markets, the price of a currency is determined by the demand for that currency relative to its supply. Thus, for each possible price of a British pound, there is a corresponding demand for pounds and a corresponding supply of pounds for sale (to be exchanged for dollars). At any given moment, a currency should exhibit the price at which the demand for that currency is equal to supply; this is the equilibrium exchange rate. Of course, conditions can change over time. These changes induce adjustments in the supply of or demand for any currency of interest, which in turn creates movement in the currency's price" (Madura, 2013, p. 109). Changes in the demand and supply schedules of a currency will bring about a change in the equilibrium exchange rate in the foreign exchange market. For example: if there should be increase in demand for U.S Dollar on the Ghana interbank market and the amount of U.S dollars supplied (available) remain the same, the banks will not be able to meet the demand for U.S dollars hence the price of dollars against the Ghana cedi will rise resulting in the depreciation of the Ghana cedi against the U.S. dollar. In the same vain if there should be increase in the supply of U.S. dollar with demand for U.S. dollar remaining the same; the price of U.S dollar against the Ghana cedi will fall resulting in appreciation of the Ghana cedi.

Growth theory of exchange rate – According to this theory, the rate of inflation in a country can be deduced from its currency's exchange rate. The value of a country's currency typically decreases in response to an increase in the GDP growth rate of that country. i.e. as a nation develops, its currency has a tendency to lose value in comparison to other international currencies. This is due to the fact that an increase in a nation's GDP may lead to the following: A rise in the purchasing power of the nation, which may lead to an increase in imports; An increase in exports, which might put pressure on the local or domestic currency and lead to a depreciation of that currency if the increase in exports is less than the increase in imports. Balance of payment (BOP) theory describes how fluctuations in international commerce effect

currency depreciation. The magnitude of the effect is determined on the country's level of trade openness: Domestic products become more expensive when the domestic price level rises above the foreign price level. As the domestic price level rises, export profits fall and import bills rise. As export earnings fall, the availability of foreign currency falls. And, as import bills continue to rise, more foreign currency is required to settle them, causing domestic currency to weaken. Foreign currency rates are governed by market forces such as demand and supply. Increased imports or debit goods on the international trade account raise demand for foreign currency. Rise in foreign currency supply is a result of an increase in exports or credit goods on the international trade account. The equilibrium exchange rate is thus determined by the confluence of foreign currency demand and supply. Excess demand for foreign currency due to BOP deficit will cause the local currency to depreciate, while excess supply of foreign currency owing to BOP surplus will cause the local currency to appreciate. This theory contains flaws such as the premise of perfect competition, which does not occur in reality. It also ignores the issue of price levels in different nations and it ignores the fundamental values of different currencies. Currency value is determined by variables other than international trade position. The belief that the BOP is always in balance seems a kind of truism. This may not be the case; there may be a causal link between the foreign exchange rate and the BOP. One should also consider. Asset Market Theory – according to which the premise of perfect mobility and continuous, instantaneous equilibrium in capital markets is crucial to the asset-market perspective. Equilibrium in the economy's portfolio is constant. The net yields are always and instantly equalized if domestic and overseas assets are perfect substitutes. There is still portfolio equilibrium in terms of asset composition at each moment in time even if the assets are imperfect substitutes, that seems a useful assumption for some purposes. The ideal capital mobility is the immediate attainment of portfolio balance. International interest differentials are either permitted by perfect capital mobility with imperfect substitutability or by imperfect mobility. In both situations, even a tiny nation has the power to influence interest rates by shifting the relative supplies of various assets. Contrastingly, under the benchmark scenario of perfect capital mobility and substitutability, nominal interest-rate differentials are only achievable due to expectational mistakes or, in the long run, due to perfectly predicted variations in inflation rates consistent with equality of real rates. The asset-market perspective, on the other hand, emphasizes the benchmark scenario and further implies that nominal asset supply and income are always preset. It is assumed that any current account imbalance may be funded at market rates on the global market. In the short run, given wealth and asset supply, the exchange rate is established in asset markets and establishes the current account. The current

account, in turn, impacts the pace of change of the exchange rate through its effects on wealth, prices, and income. It is feasible to distinguish between a restricted monetary view of exchange rate determination and an asset-market perspective. For instance, changes in asset preferences between domestic and foreign securities would modify exchange rates with no impact at all on the monetary sector if money demand is independent of wealth and projected returns on foreign assets (Dornbusch & Krugman, 1976).

Considering all the above, it becomes clear that the most relevant theories explaining the permanent depreciation of the cedi are those related to demand and supply factors. As noted in the literature (*World Bank Explains Why Cedi Keeps Falling and US Dollar Keeps Winning - MyJoyOnline.Com*, n.d.), Ghana, as a Guggisberg economy, is unable to acquire a sufficient amount of foreign currency to obtain the desired amount of imported commodities that are not produced domestically. This is a primary reason for depreciation, which has more fundamental and structural causes. In the long run, depreciation results in inflation, i.e., diminished purchasing power parity for Ghanaian citizens (*BoG to Sell $420m to BDCs in Final Quarter of 2022 - MyJoyOnline.Com*, n.d.). At this stage, the purchasing power parity theory begins to explain the additional mechanisms of cedi depreciation. However, some experts claim that depreciation is also due to aforesaid failures and inconsistencies of the Monetary Policy and expansionary Fiscal Policy in the country (*MPC Press Release – October 2022 – Bank of Ghana*, n.d.). The details will be discussed and explained in chapter 3.4.

2.3Currency depreciation in Ghana and Sub-Sahara African Countries in retrospect

"Many sub-Saharan African (SSA) countries, undertook fundamental reforms to liberalize their economies, including in particular their international trade and foreign exchange rate regimes, in the 1980s and early 1990s. Before liberalization, the foreign exchange regimes of many of these countries were characterized by administrative controls over foreign exchange allocation and current account transactions, extensive rationing of foreign exchange because of persistently weak external accounts, sizeable black market premiums, sometimes reaching 1,000–4,000%. Today, the countries that successfully reformed look markedly different. Rationing and parallel market spreads are a distant memory, and per capita income has increased sharply, for many by as much as 2.5–5% a year for several decades" (Mæhle et al., 2013, p. 5). Most of the sub-Sahara countries have seen their currencies depreciate in the period from 1983 to 2019 just like Ghana. Will therefore look at the depreciation trends for the currencies of the two biggest African Economies: Nigeria and

South Africa. We will also examine Kenya – a country which economy is similar to that of Ghana in size, and Cote d'Ivoire – a country that operates a pegged currency system unlike the others which operate floating exchange rate system and which economy size is not too far from that of Ghana.

It has been shown, both theoretically and empirically, that a decrease in the value of a currency can have a beneficial impact like improvement in global competitiveness of tradeable goods, reduce expenditure and improvement in trade balance on certain economies, while having the opposite effect like inflation on others(Rawlins, 2011). There are different points of view about whether currency depreciation is expansionary or contractionary, and depreciation can have either an expansionary or a contractionary effect on the economy.

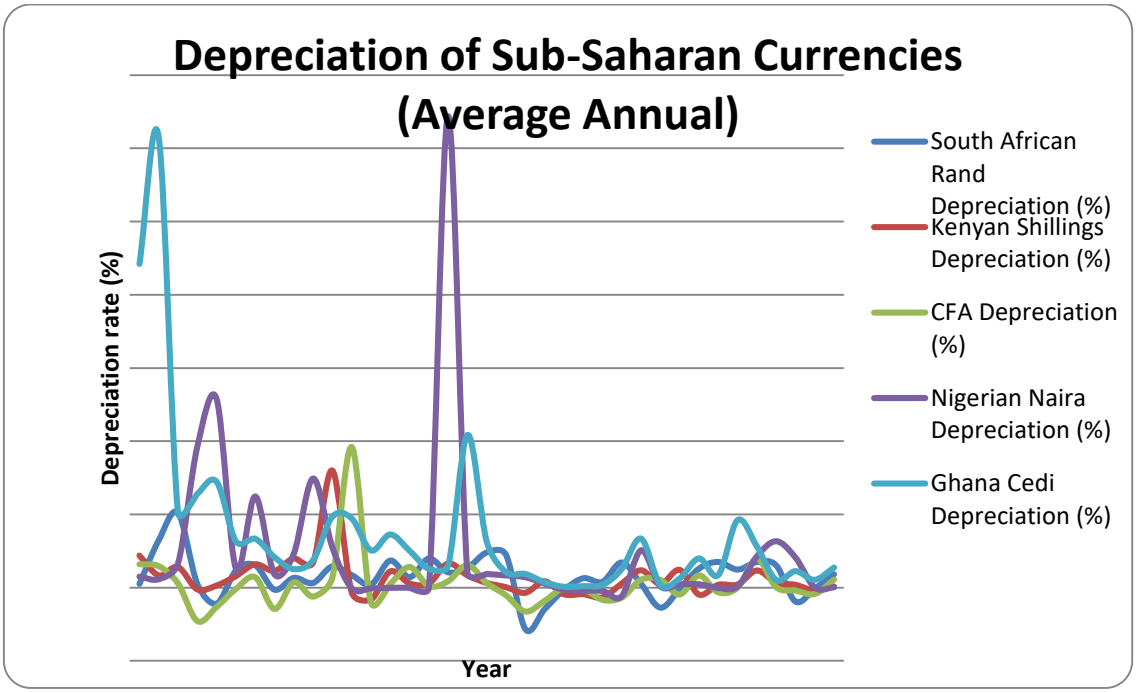

Figure 2.2The rate of depreciation of currencies of some Sub-Sahara African countries against the U. S. Dollar in the years 1983-2019

Source: World Bank and Author's calculations.

Figure 2.2, shows the rate of depreciation of currencies of some Sub-Sahara African countries against the U. S. Dollar. All the currencies as depicted in the above graph show some level of depreciation in the period 1983 to 2019. The rate of depreciation was calculated using the formula stated in section 3.2 earlier. All the currencies at one point in the period 1983 to 2019 registered an appreciation against the U. S. Dollar except the Ghana cedi. During the financial crisis that started in 2008, most of the currencies depreciated. The South African

Rand suffered the largest depreciation at 17.26% followed by the Ghana cedi at 12.83%. The Kenyan Shilling also depreciated marginally at 2.76%. However, the Nigerian Naira and CFA (Communauté Financière Africaine -"African Financial Community" composed of West Africa: Benin, Burkina Faso, Guinea-Bissau, Ivory Coast, Mali, Niger, Senegal and Togo) Franc appreciated by 5.76% and 6.82% respectively. But by the 2009, all the currencies suffered depreciation with the Ghana cedi suffering the most at 33.52%, followed by the Nigerian Naira at 25.76%, Kenyan Shilling at 11.82% and South African Rand at 2.57%. In 2011 as a result of the global crisis in financial markets, the Kenyan shilling and the Ghana cedi suffered the most depreciation at 12.09% and 20.01% respectively. Nigerian Naira also depreciated by 2.37% but the South African Rand and CFA Franc appreciated by 0.82% and 4.76% respectively. Most of the currencies registered average depreciation rate of less than 10% between 2003 and 2019 except the Ghana cedi that depreciated by 12.35% during that period. The CFA Franc. however, appreciated by an average rate of 0.68% in the same period.

Nigerian Naira: Nigeria is the largest economy in Africa, but its currency is one of the unstable ones in Africa too. The Naira has had some huge depreciation in the period between 1983 and 2019. It suffered a depreciation of 321.9% in 1999 which is the highest depreciation suffered by any of the selected Sub-Sahara currencies between the period 1983 and 2019. Nigeria is one of the major oil producers and exporters in Africa. Oil also forms the majority of Nigeria's export with its revenue being the major foreign exchange earner to the country. The strength of the Naira is dependent on revenue from crude oil sales. Crises in oil prices directly affect the strength of the naira in relation to the U.S. Dollar. The naira depreciated by 21.37%, 31.72% and 20.63% in 2015, 2016 and 2017 respectively when oil prices faced crises. The annual average depreciation of the naira for this period was 24.58%.

South African Rand: South Africa is the second largest economy in Africa. It is largely seen as the most developed country in Africa. In 1985, the South African rand suffered the highest depreciation of 51.07%. This is the highest depreciation in the period 1983 to 2019. Although the rand has mainly been depreciating during the period, it made some significant appreciations against the U.S. Dollar during the same period. Example in 2003 the rand appreciated by 28.23% against the dollar, 14.61% in 2004 and 13.6% in 2010. The significant depreciation and fluctuation of the rand has been a major worry for the South Africa Economy. In 2001 when the rand depreciated by 24.05% the country constituted the Myburgh commission to find the reason for the depreciation. "The Myburgh Commission's final report concluded that several macroeconomic factors contributed to the rand depreciation in 2001. It points to a key factor as being the slowdown in global economic activity during this time period that weakened

the rand in at least two ways — by reducing foreign currency availability in the rand market and, by leading to reduced capital inflows to emerging markets, including South Africa. In addition, the Commission found financial market developments to have played an important role. The deepening crisis in Argentina led to a rise in global risk aversion toward emerging markets, and events in Zimbabwe amplified this trend. The Commission also pointed to the South African Reserve Bank's policy of nonintervention in the foreign exchange market (reflecting its objective to reduce its net open foreign position) as having contributed to the depreciation pressures by creating the impression that the rand was a one-way bet. However, since all these factors were present throughout most of 2001, it remains puzzling why the sharp depreciation established itself only in the final months of the year. The Commission points to adverse movements in the balance payments in the last quarter of 2001 as specific factors to explain the year-end depreciation" (Gottschalk & Bhundia, 2003, p. 4). The annual average depreciation of the rand for the research period was 8.15%.

Kenyan Shillings: The Kenyan economy is similar to that of Ghana in terms of size. The shillings generally depreciated for the entire research period of 1983 to 2019. But there were also periods of appreciation within the same period. For example, in 1986, it appreciated by 1.26%, 1994, it appreciated by 3.36%, in 1995, it appreciated by 8.24% which happened to be the highest annual gain by the shillings over the research period. The shilling also appreciated in value against the U.S dollar in 2003 (3.57%), 2005 (4.57%), 2006 (4.57%), 2007 (6.64%), 2012 (4.82%), and 2018 (2.04%). The shillings suffered the biggest depreciation of the research period in 1993 (80.03%). The 2007–2008 global financial crisis, which was caused by the bursting of the US housing bubble, can be seen as the cause of the Kenyan shilling fluctuations within that period. The August 2011 stock market collapse, which was brought on by a decline in stock prices on major stock exchanges in North America (USA mostly), Europe and Asia, can be used to explain the fluctuations in exchange rates that was experienced in 2011 (Kibiy & Nasieku, 2016). The annual average depreciation of the shillings during the period 1983 and 2019 was 6.99%. This make the shillings the currency with the least annual average depreciation compared to the rand, Ghana cedi, and naira.

CFA Franc: The CFA franc uses the pegged exchange rate system and it is use by fourteen (14) Sub-Sahara African countries including Cote D'Ivoire. There are two CFA francs: one used by eight (8) West African countries and another use by six (6) central African countries. Both currencies have the same exchange rate and are pegged against the Euro. Before the introduction of the euro notes and coins in 2002, the CFA franc was guaranteed by the French treasury and pegged against the French franc. The movement in the exchange rate within

the research period (1983 to 2019) either followed the French franc or the euro. As part of the negotiations and preparations to peg the CFA franc against the euro upon its introduction, the CFA franc was devalued 100% against the French franc and as a result depreciated 96.07% against the U.S Dollar in 1994. Although the total effect of the exchange rate relation between the CFA franc and the U. S dollar for the period between 1983 and 2019 has been depreciation, the rate of depreciation has not been as bad as the Ghana cedi, South African rand and the Kenya shillings. The CFA franc has more been fluctuating against the U.S dollar in the research period. Here are some examples of CFA franc gains against the U.S dollar: 1986 (22.92%); 1987 (13.22%); 1990 (14.65%); 1995 (10.10%); 2002 (5.28%); 2003 (16.41%); 2007 (8.38%); 2008 (6.82%); 2015 (19.74%) and 2018 (4.38%). The annual average depreciation of the CFA franc during the period 1983 and 2019 was 2.78%. This seemingly stability of the CFA franc compared to other currencies in Sub-Sahara Africa can be attributed to the pegged system against the Euro which is strong currency. The down side is that the treasuries and monetary policies of those fourteen (14) countries that use CFA franc are under the control of the French treasury.

The Ghana cedi has the highest annual average depreciation (37.87%) for the period 1983 to 2019 among the studied Sub-Sahara currencies.

2.4The mechanism of currency depreciation – case of Ghana

A set of methods used to regulate a country's currency exchange rate compared to other currencies is known as an exchange rate mechanism. This is used by central banks as part of their economic monetary policy. Through these methods, the depreciation or appreciation of a country’s currency will be ascertained.

As economic conditions change, exchange rates can change substantially. For instance, in 2011, both supply and demand for US dollars went up in Ghana. Production of cocoa beans in Ghana exceeded the 1 million metric tons which was 35.7% above the previous year production (United States Department of Agriculture (United States Department of Agriculture (USDA), 2012). Together with the production of oil in commercial quantities in Ghana for the first time in Ghana which led to a record economic growth of 14.05%, exports went up by 54% and imports also went up by 43% but trade deficit was 4.9% resulting in the net effect of 6.34% depreciation of the Ghana cedi against the US dollar (*Ghana | Data*, n.d.). Permanent trade deficit might be among main reasons of the Ghana cedi continuous depreciation.

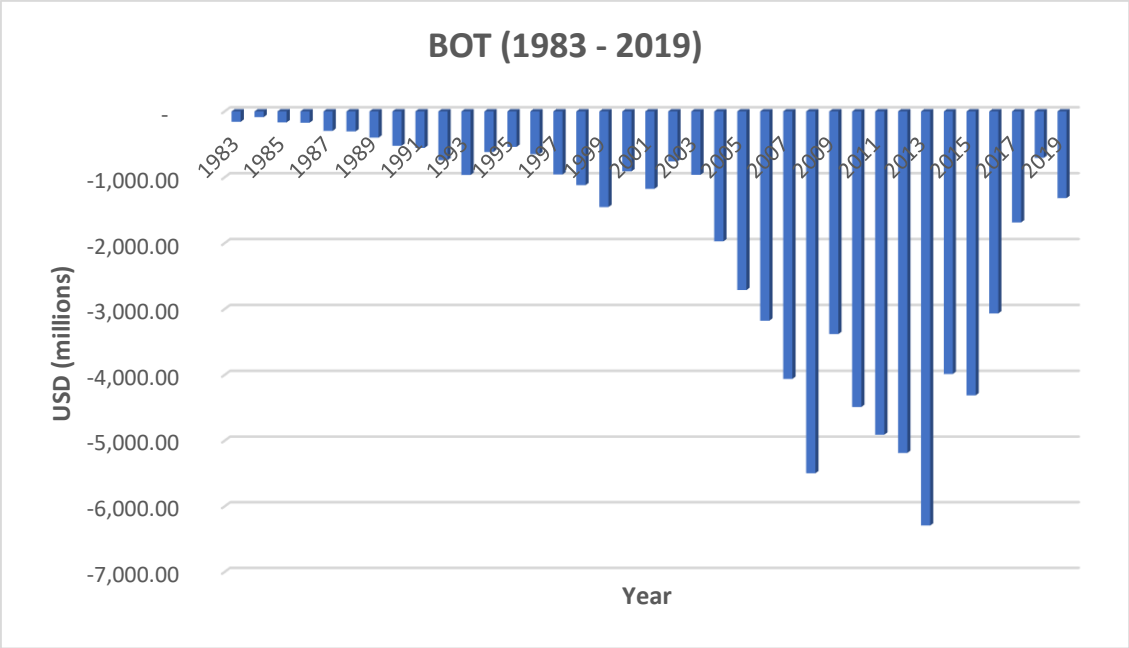

Figure 2.3Balance of trade in Ghana

Source: World Bank and Author's calculations.

From the above Figure 2.3, BOT has remained in negative throughout the research period (1983 – 2019). The lowest deficit recorded was US Dollars 86.30millions and the largest deficit is US Dollars 6,292.08millions in 2013. The average deficit for the period was US Dollars 1,898.43millions.

Exchange rates can also be influenced by actions of the central bank on the financial market. Central banks like the BOG may influence the foreign exchange rate by direct intervention on the financial markets through either directly selling or directing buying of foreign currency on the interbank exchange market. They may sell U. S Dollars on the interbank exchange market to help maintain the Ghana cedi rate against the U. S Dollars when the Ghana cedi is depreciating significantly or sell Ghana cedis by so doing they buy U. S Dollars from the interbank foreign exchange market. These actions help the BOG to maintain stable value of the Ghana cedi against the U. S Dollar and other international currencies (*BoG to Sell $420m to BDCs in Final Quarter of 2022 - MyJoyOnline.Com*, n.d.).

BDCs are Bulk Distribution Companies in Ghana licensed to import mainly finished petroleum products. They are regarded as one of the main consumers of foreign exchange in the country. It is estimated that petroleum products constitute the single most valuable import to Ghana. With the rapid depreciation of the Ghana cedis, in September the BOG agreed to sell four hundred and twenty million U. S dollars to them in forward contracts for the last quarter

of 2022 to ease the pressure on the spot market. According to JP Morgan, which was cited by myjoyonline.com, the probable restructuring of Ghana's debt would further weaken the Ghana cedi. This would be the case even if an increase in the size of Foreign Exchange Forward Auctions or a reversal of the foreign exchange (FX) purchase policy resulted in some short-term relief for the cedi. In its Emerging Market Quick Take on Ghana cedi's performance, it said that one of the reasons behind the falling value of the cedi is the decision of the Bank of Ghana to purchase dollars from mining and oil companies, which inadvertently reduced foreign currency availability within the inter-bank market. This was one of the reasons why the Bank of Ghana's decision contributed to the falling value of the cedi. In addition, it was stated that the decline in trust that has occurred throughout the nation as a whole has led to a large drain from the country's financial account, despite the fact that portfolio outflows have been relatively restrained. As a result of increased unpredictability over the necessity of debt restructuring and the scope of its potential effects, the Ghanaian currency, the cedi, has experienced a decline against the United States dollar of approximately sixty percent in 2018. Due to the depletion of foreign exchange reserves throughout the course of the year, the Bank of Ghana possessed a diminished ability to mitigate fluctuations in the value of the Ghanaian cedi.

The BOG may also use interest rate movements to help maintain the Ghana cedi rate against international currencies. With movement of the interest rate (MPC or prime rate) investors through their analysis of interest rate differentials would decide to invest in the financial instruments on the Ghanaian financial market. This action of investors will affect the financial accounts balance of the BOP either positively by investing more in the Ghanaian economy which will positively affect BOP or withdraw from securities on the Ghanaian financial market or selling the securities they held and take the resources to other economies which will negatively affect the BOP. These movements on the financial account of the BOP will affect the demand and supply of U. S Dollars and other international currencies as well as the exchange rate of the Ghana cedi. Since the US federal Reserve started to tightened its Monetary Policy in 2022 to control inflation that has resulted from high energy prices, most global currencies have depreciated against the U. S Dollar. The Ghana cedi depreciation was 37.2% against the U. S. Dollar year to September 2022. (*MPC Press Release - October 2022 – Bank of Ghana*, n.d.).

Changes in the money supply through the operations of the BOG will affect the exchange rate of the Ghana cedi. Changes in money supply (accompanied by the adequate changes in MPR) through open market operations of the BOG will either increase or decrease the amount of Ghana cedis in circulation in the economy. Increase in money supply which may

help to finance Government budget deficit will lead to decrease in the exchange rate or depreciation of the Ghana cedi and decrease in money supply will help improve the value of the cedi or appreciation of the Ghana cedi against international currencies all things being equal. In Ghana, it was often possible to observe the accommodating policy of the BOG, which increased the money supply to cover the budget deficit without regard for the negative consequences in the form of higher inflation and depreciation of the national currency e.g during the 2020-2021 budget years, at the height of the Covid-19 pandemic, the parliament of Ghana suspended the law that imposed a limit of 5% on the amount that the BOG can lend to the government to cover budget deficit. This allowed the BOG to lend to the government far in excess of the limit.

Central banks may also employ quantitative easing or quantitative tightening which will affect the value of the local currency. Quantitative easing may buy and sell treasuries somehow like the open market operations but it differs from the open market operations in that, the quantitative easing is deployed where the interest rate is at the lowest it could be (e.g. 0%). At this point, open market operation cannot be implemented to reduce interest rate. The central bank may therefore buy longer term (10 years plus) bonds. This action may keep the interest rate still lower along the yield curve but at the same time pump more money into the economy. With increase in the money supply, the local currency will depreciate against international currencies and this will have positive effect on the BOP. Quantitative tightening generates the opposite effect. However, in case of Ghana quantitative easing has not been used and is not very probable. In Ghana, the BOG has sturdily been increasing the monetary policy rate. The MPR has moved from 13.5% in September 2021 to 30% in July 2023.This is in line with the main stipulations of the aforesaid PC-PEG program.

Political factors may also affect the exchange rate of a countries currency. The recent political turmoil that ensued in Sri Lanka, led to reduction in investor confidence and the crushing of the Sri Lankan Rupee. Also, the negative reception of the Mini Budget presented by Mr Kwasi Kwarteng the UK Chancellor led to his resignation and the eventual collapse of Prime Minister Liz Truss Government after just 45 days in office. The rejections of the mini budget by the investor community lead to the rapid depreciation of the British pound to the lowest level of GBP to USD–1.10– the lowest one since 1985. Also, in the night of the "Brexit" vote, the British pound briefly touched the GBP1 to USD1.50 mark because the expectation was that the United Kingdom will vote to stay in the European Union. But as the votes closed and it became clear that "Brexit" was going to happened, the British pound exchange rate to the U. S Dollar dropped to GBP1to USD1.33981 or 1800 points turnaround within 24 hours. In

Ghana, the cedi saw an unusual depreciation in before the elections of the year 2000. In the year 2000, it was not clear if the Late President Rawlings will hand over power to a newly elected president if the opposition party should win the election. This led to the immense depreciation of the cedi.

Daily speculation on future changes in exchange rates is primarily driven by predictions of future movements in interest rates; but, it is possible for it to be influenced by other variables as well. There are instances when fashion tendencies might even take on a life of their own. The potential for quick shifts in the economic conditions that influence exchange rates in the future could lead to rapid rebalancing of speculative currency positions, which in turn would increase exchange rate volatility. It is not very typical for the value of a currency to rise greatly on one day, then fall significantly the following day in the same market. It is typical practice for speculators to take positions based on signals of future actions rather than confirmation of recent acts. Nevertheless, these signals may be deceptive. Interactions between factors and transactions on the foreign exchange market make international trade and/or money flows possible. The impact of news on foreign exchange transactions that include trade is typically far less significant. On the other hand, financial flow transactions are very sensitive to news due to the fact that decisions to hold securities denominated in a certain currency are frequently dependent on anticipated changes in currency prices. The fluctuations in the value of the currency exchange rate can sometimes be attributed to a combination of trade-related and financial variables. In Ghana, to avoid the sharp volatility in the exchange rate of the Ghana cedi, the Bank of Ghana has introduced forward foreign exchange auctions on the interbank foreign exchange market. The multiple price forward foreign exchange auctions will be anticipated to support price discovery, deepen the foreign exchange market and reduce uncertainty on the future availability of foreign exchange to meet the demand of commercial bank clients. This will help the Bulk Oil Distributing Companies (BDCs) who are one of the major consumers of foreign exchange in the country.

CHAPTER 3
INFLATION IN GHANA

This chapter examines the notion of inflation, one of the four macroeconomic concepts forming the research grid of this thesis. Inflation is a dependent variable whose relationship with cedi depreciation will be analyzed latter on in this thesis. Therefore, it is important to discuss its essence, mechanism, and causes in Ghana, as well as to identify the other factors influencing it that will be used as control variables in the research chapter.

3.1Key patterns and mechanisms of inflation

Every item that households buy has a cost. These prices evolve over time. Statistics from the Consumer Price Index (CPI) are used to gauge how significant these changes have been. The CPI uses an index number to provide a complete assessment of the proportional changes in the costs of a set basket of goods and services that households consume. An index number is a way to represent the change that has occurred over a wide range of data in a single number. Any index number possesses at least two basic characteristics: It must have a base period against which all succeeding periods are assessed since it measures change over time. Typically, 100 is chosen as the index value for this base time. The basis for comparing the rates of price changes throughout time is this base period. As a ratio, the index does not measure actual values, just changes in values, therefore values below 100 indicate that the index decreased relative to the reference period, while values over 100 indicate that the index increased.

The CPI of one nation cannot be directly compared to the CPI of another country if their baskets differ. The only things that can be compared are the CPI fluctuations. Faster growth of CPI in a given country does not mean that the price level in this country is relatively high in comparison to the rest of the word, but it shows that its growth of prices is higher.

In Ghana, the CPI is a set basket price index as it is reported by the Ghana Statistical Service (GSS). The typical Ghanaian household uses a wide variety of items (such as food, clothes, power, etc.) and services (such as rent and university tuition), all of which are included in this set basket. The cost of the entire basket fluctuates in tandem with the costs of the individual items. The structure of the basket may also change taken into consideration the consumption pattern of the citizens. Since the basket only comprises items of constant or equal quantity and quality, the index simply reflects changes in prices.

In reality, each consumer has a unique basket of items and doesn't spend their money in the same manner. This implies that each person's CPI and related inflation rate are unique. Based on a basket of commodities that is typical of all Ghanaian households, GSS provides estimates of an average inflation (Ghana Statistical Service, 2020).

The price of this basket of items is tracked each month and, using a mechanism of weighting and aggregation, determines a national price index for that month. The inflation rate is the relative shift in this price index between two time periods, for instance, between January 2018 and January 2019 (or deflation if the change is negative).

Ghana CPI data on prices are collected for 47,877 products every month from all the 16 regions. This price data is collected from 57 markets and 8,337 outlets. 13 Divisions, 44 Groups, 98 Classes, 156 Subclasses, and 307 Items make up the hierarchy in which products are arranged. Each Item may only belong to a single subclass, and each subclass may only belong to a single class.

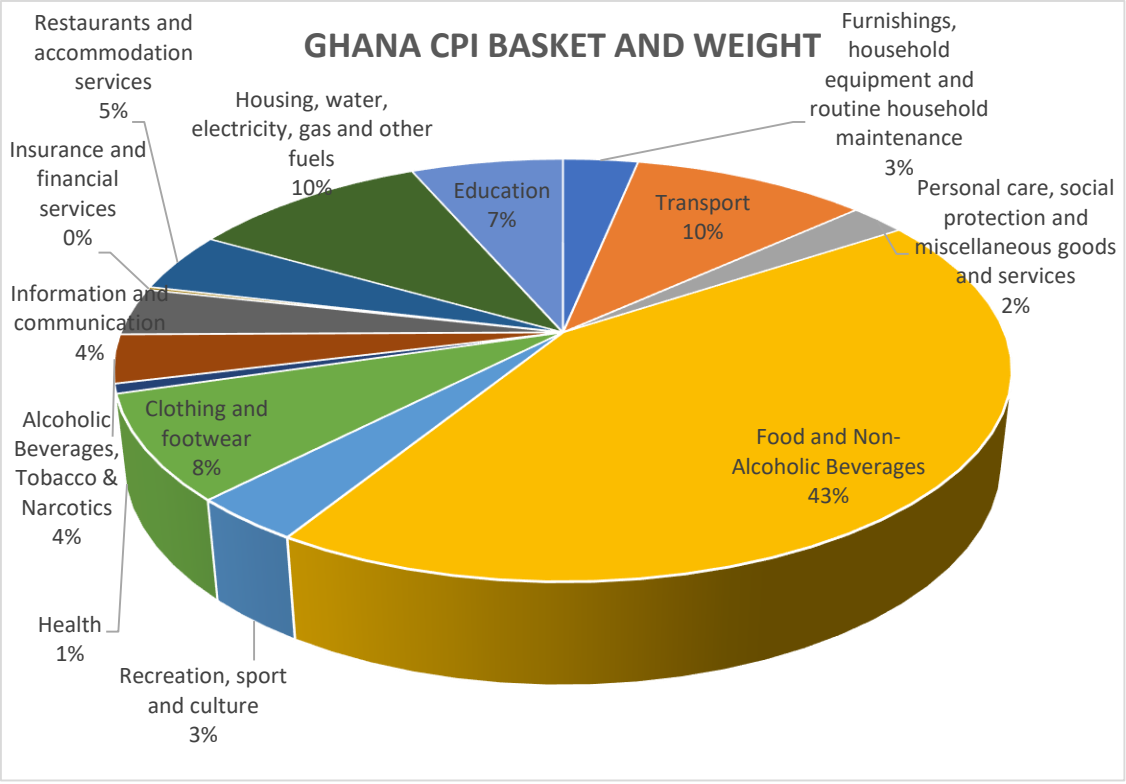

Figure 3.1List of the items that are include in the 13 Divisions used in CPI in Ghana and their weight.

Source: Ghana Statistical Service and Authors calculations

From the above figure 3.1, it is clear that, food and non-alcoholic beverages dominates the CPI and inflation with 43.12%. It is followed by Housing, water, electricity, gas and other fuels (10.2%) and transport (10.1%) contribution to the CPI. clothing and footwear, educations and restaurant and accommodation services followed with 8.1%, 6.5% and 4.6% respectively as their contribution to the CPI. All the other items in the basket contributed not more than 4% each to the CPI figures of the month(Ghana Statistical Service, 2019a, 2019b, 2023).The high share of food spending is an evidence that Ghana belongs to the group of developing countries. Spending on accommodation are relatively low due to prevalence of low quality hosing options. Majority of citizens do not pay for accommodation single cedi.

In Nigeria, CPI data on prices of 740 items (goods and services) are collected from 10,534 informants or sources monthly from all the 36 states. 12 Divisions, 48 Groups, 85 Classes make up the hierarchy in which products are arranged (*Reports | National Bureau of Statistics*, n.d.).

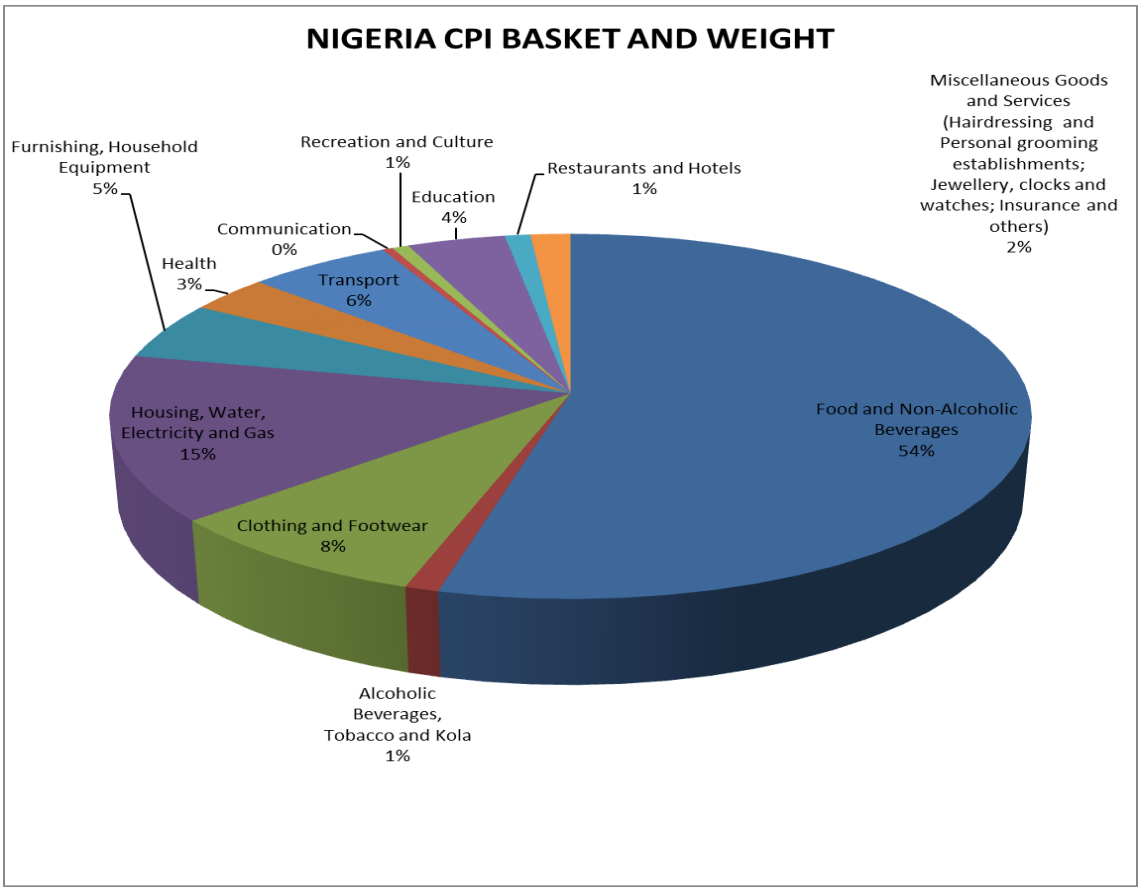

Figure 3.2List of the items that are include in the 12 Divisions used in CPI in Nigeria and their weight.

Source: National Bureau of Statistics (Nigeria) and Author's calculations

The figure 3.2 above shows that Nigeria, just like Ghana, the contribution of food and non-alcoholic beverage to the CPI was dominant at 54% (43.12% in Ghana) and even here it is more than all the other eleven factors combined. Housing, water and electricity and gas contributed 15% to the CPI. Clothing and footwear contributed 8% to the CPI. Alcoholic beverages tobacco and cola contributed only 1% to the CPI in Nigeria but in Ghana, Alcoholic beverages, tobacco and narcotics contributed significant 3.7% to the CPI (almost half of Nigeria's population practice Islam and therefore affect alcohol consumption compare to less than 25% in Ghana). Finishing and household equipment contributed 5%to the Nigerian CPI but 3.2% in Ghana. Transport contributed 6% to CPI in Nigeria and 10.1% in Ghana. Education contributed 4% to CPI in Nigeria and 6.5% in Ghana. Health contributed 3% to CPI in Nigeria but 0.74% in Ghana. Communication did not contribute anything to CPI in Nigeria but contributed 3.61% to the Ghana CPI. In all, Ghana has 13 divisions contributing to its CPI whiles Nigeria has 12 divisions.

The common measure of inflation is the inflation rate - the annualized percentage change in the general price level. A price index can only represent the average movement of prices because they do not all fluctuate at the same rate. Year-over-year inflation indices, therefore the relative change in the CPI between the current period or year (t) and last period or year (t-1) is used to determine the inflation rate for the current period or year (t).

The inflation for current period or year (t) is calculated as:

$$Inf_t = \frac{CPI_t - CPI_{t-1}}{CPI_{t-1}}$$

Where,

Where: Inf is annual rate of inflation i.e. year to year, t is current year, $t-1$ is the last year.

Inflation may refer to the general increase in price level and fall in the purchasing power of money in an economy over a period. When the general price level rises each unit of currency buys fewer goods and services. This includes the change in the general price levels on consumable and non- consumable goods in the economy.

Inflation may as also be divided into headline and core inflation. The headline inflation has been described above. In case of Ghana this is the inflation rate measured by the Ghana Statistical Service's monthly publication of the Consumer Price Index (CPI). Core inflation is CPI-based inflation, which excludes the most volatile items such as food and fuel prices. Many nations have chosen to use a "core" consumer price index that does not include prices impacted by exogenous shocks that the central bank cannot directly control, the first impacts of indirect tax adjustments, and the initial effects of interest rate changes. The main factor in this situation is ideally to include a selection of goods that accurately reflect domestic living expenses and are well regarded by the general public (Mumuni, 2008).

According to the Golinelli & Orsi, (2002) moderate inflation is regarded as a positive macroeconomic phenomenon. The desired level of inflation depends on the economic structure and the degree of development of a given country. In Euro-zone it is 2% yearly, in Poland 2,5% and in Ghana around 8% as already indicated. With such an inflation people anticipate a price increase in the near future, this type of moderate inflation encourages them to buy more. Customers purchase now to avoid future price increases. Producers are urged to produce more as consumer demand rises. Investment grows, which will multiply the amount of revenue produced. Therefore, moderate inflation (creeping or mild inflation or walking inflation) is always better than deflation that might end up with economic collapse of a country. Deflation occurs when prices for products and services fall throughout the whole economy, customers' buying power increases, and deflation expectations reduce aggregate demand. However, inflation above 10% (galloping one) might also be dangerous by eroding stability of the entire economic system, hampering investment and saving decisions and lowering their accuracy level. High inflation has an impact on investment choices because it reduces the actual value of tax revenues and creates uncertainty about the future worth of investment projects (Masiyandima et al., 2018). In addition to making it hard for businesses to buy raw materials and for national and local governments to balance their budgets, rising expenses have also depleted the public coffers and encouraged corruption. All these brings an element of instability which starts to dominate the economic scene with the hyper-inflation. Money depreciates so quickly that profits for companies and workers may not be able to keep up with rising costs and prices. Foreign investors may shun the country which may lead to capital deficit. Ghana was never subject to the permanent hyperinflation such as in Zimbabwe in the 2000s, and Venezuela in the 2010s.

The worst case is stagflation which is the combination of inflation and stagnation in an economy at the same time(stagnation and inflation). Stagnation is usually described as a

situation when GDP growth rate is below 2% annually and inflation is considered to be high when it is above the target of the central bank. Economic growth may usually be associated with increase in prices or inflation and economic decline with disinflation or deflation in some cases. But in unusual situations, inflation might grow while economic growth can stagnate – stagflation. In a situation of stagnation, unemployment may be rising, income will be low which may affect demand and at the same time high inflation that may lead to lower standard of living for workers. In 1983, Ghana experienced its own stagflation where the GDP grew at negative rate (-4.8%) but inflation soar up to 122.87% and as described in previous chapters this situation required commitment of the country to far-reaching restructuring programs.

Milton Friedman, the 1976 Nobel Prize winner in economics wrote - "Inflation is always and everywhere a monetary phenomenon." This phrase is acceptable to both Keynesians and Monetarist group of economists only that they have different approaches. But the Keynesians also believe that fiscal policy and some supply side phenomena may influence inflation rate in the short run. The quantity theory of money leads to the agreement that, the growth in the quantity of money is the primary determinant of the inflation growth. Incremental change in the money supply will create demand and cost pressures which will eventually lead to future increase in the price level. While it is entirely true that inflation cannot occur without increase of money supply in many cases, in particular in developing countries, its origin is somewhere else i.e. in the real sphere, such as low productivity level, defective institutional tissue, insufficient human capital and other obstacles to economic development related to policies and governance routines. There are two key mechanisms of inflation analyzed in depth in the literature: demand pull or cost push inflation. Both of them work in Ghana, due to lose fiscal policy, sometimes excessive financing government deficit by BOG, import dependence, adverse economic shocks (e.g. pandemic COVOD-19) and continuous cedi depreciation (they will be analyzed in depth in next subchapters). These aforesaid two mechanisms are widely known, studied, and described in the literature, therefore, the discussion about them has been moved to the Appendix2. However, it is important to emphasize here the significance of inflation expectations in maintaining this phenomenon at a relatively high level once the original factors causing inflation are no longer active. This situation is currently occurring in Ghana, where society considers relatively high inflation to be an economic norm.

Important lessons learned for Ghana comes from a hyper-inflation disaster in the recent years in the other African countries. Since 2000, Zimbabwe has suffered unprecedented levels of inflation, which erupted in March 2007 as hyperinflation which can be attributed to foreign

currency shortage and effect of economic and trade sanctions from the United Kingdom, European Union and United states of America. In July 2008, annual inflation reached its highest point of 231,000,000% year to year. As a result, there was widespread agreement that Zimbabwe's economic development was distorted by extremely high inflation. The Zimbabwean Government in an effort to boost agricultural productivity, offered farmers fuel at a discount price. However, farmers quickly resell it for 10 times that amount on the illicit market, leaving their fields fallow resulting in low agricultural yields in spite of the acceptable levels of rainfall (Wines, 2007). This is a very important lesson learned regarding institutional factors and improper government structural policies as sources of inflation.

When inflation is high, it has negative effect (cost) on the economy and when it is low, it benefits the economy.

High inflation may affect an economy in the following ways:

- Reduction of purchasing power of the local currency as prices of goods and services rise.
- "Shoe leather Cost" - because interest rates on savings are fixed, savers have to look out for banks with higher interest rates (good interest rate) to invest to reduce the effect of inflation on their returns.
- Reduction in savings as inflation negatively affects the value of savings over time.
- Fiscal drag – income taxes usually increase with increase in income. With high inflation, increase in income is less beneficial as inflation will negatively affect purchasing power. With the increase in taxes as a result of the increase in income, real income is negatively affected.
- Reduction in international competitiveness. Exports will be less competitive whiles the competitiveness of imports is improved. This will negatively affect the country's trade position.
- There will as be an anticipated inflation spiral or wage consumption spiral.

Some Economists argues that low inflation rate will bring the following benefits:

- Increase production: The inflation will incentivize production and income.
- Increase in wages due to the inflation will bring "feel good" atmosphere to the workers which in turn will lead to increase in productivity and economic growth.
- Will lead to reduction in unemployment during periods of economic recession.
- Lead to stable levels of consumption. Thus, incentivize healthy consumer expenditure.

3.2 Inflation in selected African countries

IMF underlines the specific reasons of inflation in Africa. Combination of several factors creates inflationary syndrome in South Saharan Africa (SSA) countries. "…in emerging and developing economies with excess demand pressures and inflation already above target, a food price shock is likely to have larger second round effects and require a more aggressive policy response than in the absence of such preexisting demand pressures"; "…One concern is that the recent rises in food and energy inflation may prove to be persistent, leading to expectations of rising inflation that could spill over into higher wage demands and underlying inflation"(International Monetary Fund, 2011, p. 101).

In SSA inflation rates are mainly driven by:

- Demand pressures – with increment in incomes brings along increase in demand for goods and services. Unfortunately, output has not kept pace with expectation thereby creating an output gap.
- Fiscal and monetary policies – fiscal imbalances in developing countries with scarce resources often lead to monetization of the fiscal deficit. Most SSA Countries are faced with the problem of low revenue collection.
- Supply shocks – changes in the terms of trade, drought, or conflict can lead to supply bottlenecks and persistent changes in the level of prices.
- Inertia/expectations – inflation may have a dynamic component arising from the sluggish adjustment of expectations or the existence of staggered wage contracts (Barnichon & Peiris, 2008).

In their research of the determinants of inflation in Tanzania (Laryea & Sumaila, 2001), identified cost-push, demand pull and structural factors among the key causes of inflation in Tanzania. The study also established a direct relationship between money supply and the rate of inflation. The results therefore confirmed the theory that money supply has significant effect on the general level of prices for goods and services in any economy. The findings also demonstrate that, in the short run, production and money supply are both substantial explanatory factors of Tanzania's inflationary spiral. For instance, according to the government's budget announcement, the headline inflation rate was to be about 10% by the end of June 1998 but the actual was 12.8%. El-Nino affected minimal rainfall prevented this goal from being reached. The agricultural output decline and the increase in the rate of inflation appear to have been the result of the poor rainfall. This outcome is not unexpected given the

fact that 64.2% of the weights in the Consumer Price Index (CPI), which is used to calculate inflation rates, are related to food.

Food prices

In the article "Food inflation in Sub-Sahara Africa: causes and policy implications", the Authors suggested that at least part of the reason for rising food prices in SSA is domestically driven. The domestic food price increase is prominent in low income countries, although the increase in food price may have been cause in part, by movements in exchange rates and increase in global food prices. The average pass-through to domestic food inflation from changes in world food prices, and exchange rate were 32%, and 17% respectively (Alper et al., 2016).

To ascertain the effect of domestic food prices on the consumer price index inflation, the following factors are look at:

- the share of food in the consumption basket and the relationship with inflation expectations. The higher the share of food, the higher it will affect the inflation rate. Increase in food prices may affect wage increase demands. This may lead to higher pass-through to nonfood price inflation because of the higher share of food in the total consumption basket. In fact, in SSA, the share of food in the consumption basket is 40% on average.
- In countries with low inflation controlling records, food and fuel price shocks may lead to increase in expectations of larger inflation in the future and might thereby raise pass-through when these expectations are reflected in prices.

In South Africa, food inflation is influence by both foreign and domestic factors. In the first scenario, growing demand or a reduction in supply on the global market could result in an increase in the price of food internationally. In addition, global food prices could also rise as a result of rising input costs such as oil and fertilizer prices (Rangasamy, 2011). During the food crisis in 2008, there was no agreement on the cause of Ethiopia's sharp increases in food prices. Contrary to the past, when inflation was often linked to shocks to the agricultural supply which was caused by droughts, the recent spike in prices corresponded with very excellent harvests. Due to Ethiopia's tiny food imports, which account for only around 5% of the country's agricultural GDP where changes in global food prices are thought to have little impact (Durevall et al., 2013). The IMF in 2011 pointed out higher food prices among fuel prices and accommodative monetary policy as the major causes of increase in inflation rate in Uganda. The increase in food prices is as a result of supply and demand constraints in addition to the rise in world food prices (Kabundi, 2012).

In their researches, (Ali et al., 2015; Sahnoun & Abdennadher, 2019; Sasongko & Huruta, 2019) contended that money supply, economic growth, currency devaluation, and other factors contribute to inflation. They discovered a favorable association between a number of macroeconomic variables and inflation, but there were some inconsistencies. Such inconsistencies reveal a lack of agreement on the causal linkages between inflation and other economic factors. As a result, each economy needs to be researched separately in order to understand the drivers of inflation.

3.3 Inflation in Ghana 1983-2019

Inflation has been one of Ghana's macroeconomic problems since independence in 1957. The 1970s and early 1980s saw inflation rates moving up to record levels and also bringing about record levels of macroeconomic instability. In 1983, due to the recorded levels of macroeconomic instability and high inflation, Ghana embarked on economic reforms with support from the International Monetary Fund and the World Bank. Although the reforms brought inflation rate down from the over 100% recorded in 1983, inflation rate in Ghana has still remained relatively high. Single digit inflation has been recorded only in three years between the period 1983 to 2019 (Ocran, 2007).

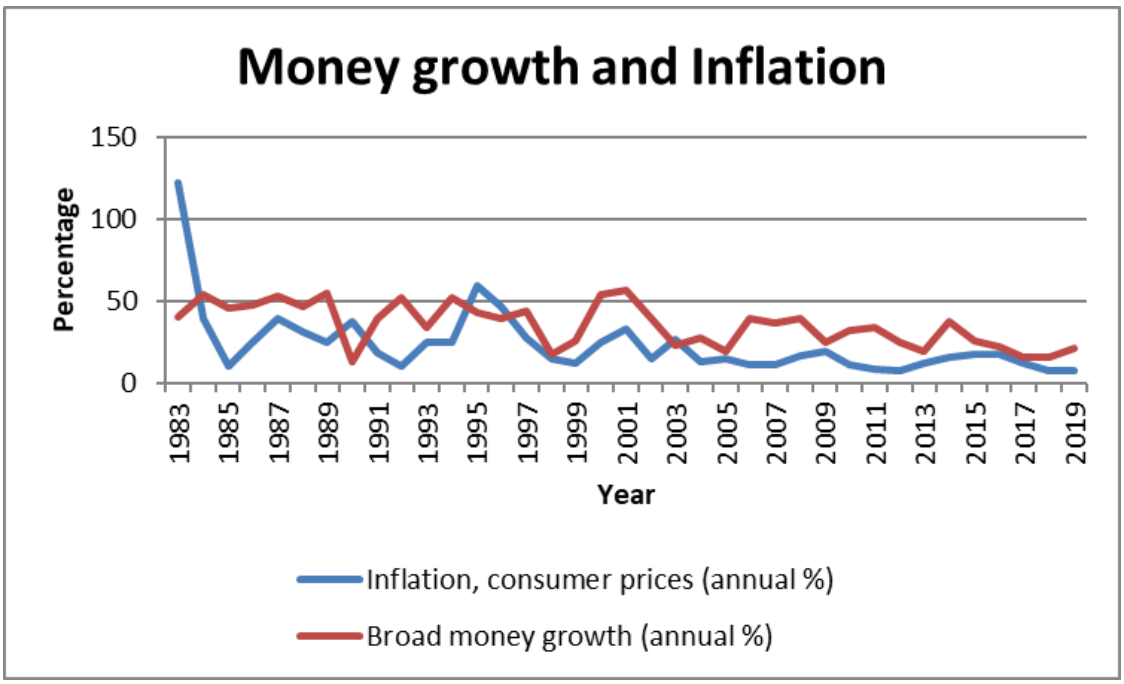

Figure 3.3Money growth and Inflation from 1983 to 2019

Source: World Bank

From the above figure 3.3, Inflation rate in 1983 was 122.9%. This extraordinary high rate could be attributed to aforesaid low agricultural production due to drought, but also weak international trade position, very weak exchange rate and total macroeconomic instability. With the implementation of the Structure Adjustment Program (SAP) in 1983, the improvement in the weather condition (rainfall increase), increase agricultural yields the macroeconomic conditions began to improve. Economic reforms also increased market openness and reduced a number of incentive structure distortions, which aided in production and mended the economy's social and structural flaws. The average annual inflation rate decreased from a high of 122.9% in 1983 to 39.7% in 1984 and by 1985 inflation has reduced to 10.3% which happened to be the lowest rate till 1992 rate of 10.1%.Despite the lower inflation of 10.3% in 1985, inflation rate went up and by 1987, it was 39.8% and it stayed high till 1992. After 1992, the inflation rate began to rise again and attained another very high rate of 59.5% in 1995. The sudden spike can be linked to a number of factors, including rising fuel prices, the depreciation of the Ghana cedi, low agricultural output, and the implementation of a new tax system called the Value Added Tax (VAT), which has a rate higher than the old sales tax (Aidoo, 2010). In 1999 to 2000 and 2002 to 2003, there were a few periods of high inflation that hurt the economy. This was caused by factors such as Ghana cedi depreciation, unsustainable macroeconomic policies, and external shocks. The payment for cocoa purchases, which helped raise the reserve money growth rate to 42.6%, might be the cause of the inflationary tendency that occurred in the last quarter of 2002 (Marbuah, 2010). Since then, the inflation rate has not risen beyond the 26.7% that occurred in 2003 which could be attributed mainly to the rise in the price of petroleum products. Inflation rates decreased to just 10.92% in 2006 and then stabilized until the end of 2007. The central bank used monies from debt relief and debt cancellation from the Heavily Indebted Poor Countries (HIPC) and Multilateral Debt Relief Initiative (MDRI), additional assistance flows, external loans, and inward private transfers to stem the otherwise increased rates of inflation in the economy (Alagidede et al., 2014). After 2007, the experience of moderation was cut short by external shocks brought on by the global financial crisis and high food prices. Due to Ghana's susceptibility to external shocks, the crisis produced a budget deficit of 13.9% of GDP, a rising depreciation of the Ghana cedi, and also 2008 was an election year. It goes without saying that there is a lot of excessive, inflationary government expenditure during election years. The inflation rate for 2008 went up to 16.85%. The inflation rate began to decline till it attained the record low rate of 7.1% in 2012. The low level of inflation could be attributed to improvement in the international trade position of the country after discovery and export of crude oil for the first time in 2011. This also helped the economy (GDP) to grow

at a record level of 14% in 2011 and also grew by 9.3% in 2012. The oil revenues help in relatively reducing the depreciation of the cedis and hence the pass-through effect of imports. Since then, inflation rate has not gone beyond 17.5% (2016) which was mainly due to power crises and its resultant increase in the prices of utilities (water and electricity), increase in fuel prices, transport and increased government spending in an election year. The economy also recorded single digit inflation rate in 2018 and 2019 of 7.8% and 7.2% respectively. This was the result of relative low rate of the Ghana cedi depreciation, increase in the production of oil by bringing on stream new production wells and also improvement in agricultural production. The average inflation rate for the period 1983 to 2019 was 23.5% which is seen as high to enable stable economic development.

The monetary nature of the inflation has already been highlighted several times in the thesis. Inflation in Ghana for the period between 1983 and 2019 has not been different. The money growth rate curve in Figure 3.3 has demonstrated that rather stable relationship between money supply and inflation. The inflation rate curve is almost mimicking the money supply curve but with only a lag and relatively different intensity. The movement in money supply is therefore driving the inflation rate movement. Still open questions remain regarding the reasons of such monetary policy of BOG. It has not been explained in the BOG official statements. One can guess that fear of a recession was probably among the key reasons. So monetary policy passively followed different shocks as already mention draught or increase of fuel prices, etc, although MPC was properly changed in a right direction in the response to the aforesaid problems.

3.4 Factors affecting Inflation in Ghana

As already mentioned inflation is a critical component of any economy. A country's currency loses significant purchasing power if it is not properly controlled. A high rate of inflation, according to the World Development Report of 1987, raises uncertainty, inhibits investment, distorts relative prices, and obstructs long-term prosperity. As a result, political instability may be the primary cause of poor macroeconomic performance such as per capita income and inflation. This was the situation of Ghana's economy prior to the introduction of the Structural Adjustment Programs (SAP) (The World Bank, 1987).

During the recent decade, GDP growth has been extraordinarily strong, averaging 6.8%. As a result of the discovery of oil from the Jubilee fields and high prices of its primary-commodity export in the international market, Ghana saw its highest economic growth of 14.05% in 2011. The Economic Community of West African States (ECOWAS) has made a

single-digit inflation rate as one of the prerequisites for joining the ECOWAS common currency zone. Unfortunately, Ghana's inflation rate has for most of the time exceeded the single-digit level.

Campillo & Miron, (1997), in an article entitled "why does inflation differ across countries" shown that causes of inflation are numerous and may vary from country to country. However, in Ghana there are numerous causes of inflation. These causes may be influenced by other factors which if managed properly can help in lowering the rate of inflation to sustainable levels. These factors may be demand-pull or cost-push in nature.

Inflation in Ghana may be driven by the following factors:

- Money supply
- Domestic food production
- Exchange rate
- Imported inflation and oil prices
- Political elections
- Interest rate and inflation inertia

Money Supply: Monetary theorists believed that inflation is a demand side phenomenon. Increase in money supply will drive up demand which will affect inflation. Broad money as referred to by the World bank (*Ghana | Data*, n.d.) "is the sum of currency outside banks; demand deposits other than those of the central government; the time, savings, and foreign currency deposits of resident sectors other than the central government; bank and traveler's checks; and other securities such as certificates of deposit and commercial paper" (*Ghana | Data*, n.d.). The implementation of monetary policy can be complicated by significant changes in the financial system, which frequently causes instability in the demand for money and the monetary transmission mechanism. The stability of the monetary transmission mechanism and the constancy of money velocity are particularly important factors when a central bank targets a monetary aggregate such as reserve money (Kovanen, 2011). In a world where financial markets are increasingly globalized, domestic money and credit, and consequently asset values as well as local inflation, may be influenced by international developments. This raises the issue of what a central bank can accomplish when acting alone and what it would mean for the exchange rate of that country (Issing, 2011).

The Bank of Ghana since 2007 introduced Inflation Targeting (IT) in the country to help control the rate of inflation. The monetary policy committee of the Bank of Ghana has been adjusting the Monetary Policy Rate (MPR) in their quarterly meetings to reflect the inflation

expectations in the country. These MPR rate announcements take into consideration the current inflation rate and other macroeconomic conditions that will affect the inflation rate in the future. In order to adapt to shocks, the Bank of Ghana, like many other monetary authorities, has prioritized reducing production and interest rate fluctuation over achieving the predetermined yearly inflation targets. A harsh IT policy would not have adequately balanced output and inflation objectives given the structure of the economy (Alichi et al., 2009).

In a study which was titled out on "inflation and monetary policy in Ghana" by Bleaney et al., (2020), concluded that Ghana's monetary policy reaction functions IT for 2007 to 2019 have not been significantly different from those of the countries that have been successful with IT. Interest rates react in the long run more than in proportion to that of inflation shocks, and MPC have been taken particular notice to the more persistent components of inflation in Ghana and of survey the data on inflation expectations in its decisions. The IT has been unsuccessful as compared to other nations that practice same. Despite the targeted inflation never falling below 8% annually, inflation between 2013 and 2017 exceeded the proclaimed objective by four percentage points or more. Despite the fact that it is obvious from economic theory that monetary policy reduces inflationary pressure, the current data shows contradictory results (Adedeji & Nuhu, 2015).

Domestic food production: The composition of food and non-alcoholic beverages in the basket of goods and services used in the computation of inflation by the Ghana Statistical Service in the periods preceding the Covid-19 pandemic averaged of 44% (Figure 3.1). This division also contributes the highest in the year to year computation of inflation rate in Ghana (Ghana Statistical Service, 2020). This is in line with the situation in most SSA countries. Food composed of 15% and 30% in Advanced and Emerging Market economies respectively (Alper et al., 2016). Food inflation in Ghana is influenced by domestic and international factors. The domestic factors are mainly influenced by weather factors that affect agriculture output and inputs (fuel, fertilizer and seeds) prices in the country. Also due to productivity limitations in the agricultural sector, which prevented it from growing at a rate that could keep up with population expansion and urbanization in terms of food consumption, there is a rising demand on agricultural production. This over demand for food subsequently led to broad price hikes. Example, in 1983, the country experienced shortage in foreign currency and the Ghana cedi depreciated averagely by 221.09%. Agriculture production declined by 7 percent and domestic food production also decline couple with shortage of foreign currency which placed limitation on the amount of food that the country could import, led to a situation of almost famine in the country. Food prices escalated, and with the significant size of food in the inflation basket,

inflation therefore went up to astronomical (122.87%). According to research by Alper et al., (2016), with an average pass-through of 32% and 17% respectively, from global food prices and currency rates to domestic food costs, over a third of Sub Saharan African countries have had statistically significant pass-through effect. It was discovered that fresh and non-tradable foods account for a larger portion of greater food inflation and that more countries experience statistically significant pass-through of non-fresh food prices from world food prices and exchange rates than fresh food prices. With the international factors, increase in global commodity prices, inflation in the country of Ghana's trading partners and exchange rate crisis may lead to increase in food inflation which may move the overall inflation level upwards. Also, the level of food imported by Ghana influences the level of food inflation.

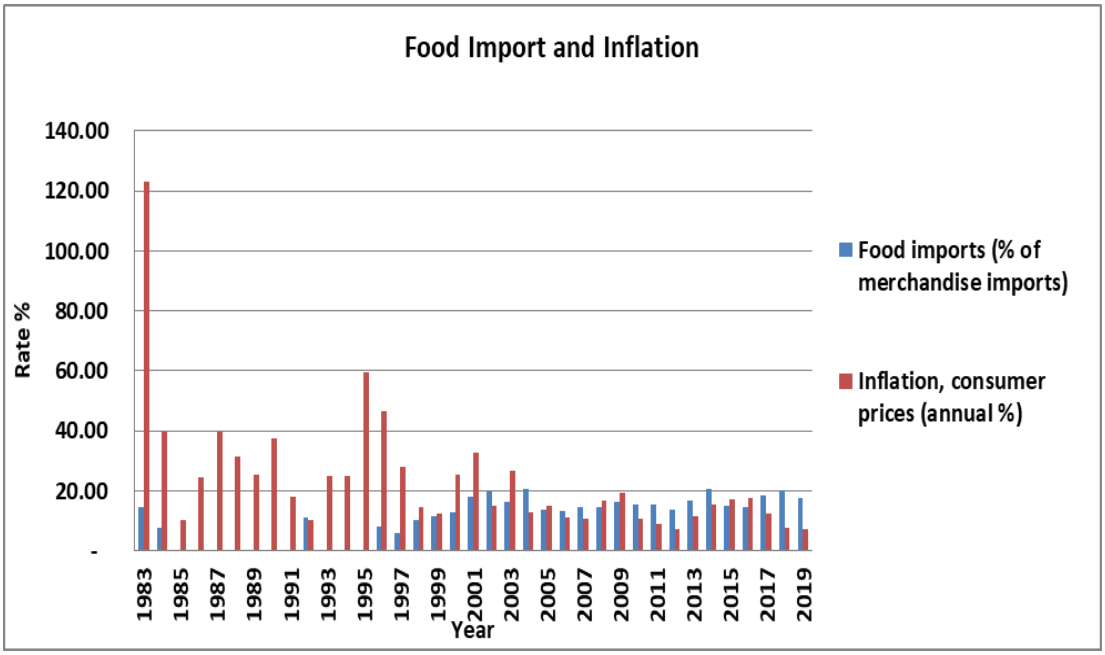

Figure 3.4Food import (percentage of merchandise imports) and inflation

Source: World Bank

Figure 3.4 above shows the relationship between the percentage of food in merchandise imports and inflation. In 2008, the global commodity crisis together with other factors drove the inflation rate up from 10.73% in 2007 to 16.52% in 2008. From 2007, food portion of the merchandised import has been going up and reached a high of 20.07% in 2018.

Disruptions in global commodity markets through production or logistics challenges that may affect a major supplier or lead to increases in the commodity prices influences the level of prices of food in Ghana. The covid-19 health pandemic that affected the world in 2020

affected productivity and seriously disrupted global supply-chain system. Unfortunately, as soon as the impact of the covid-19 was coming to an end, the Russian – Ukrainian war also began in February 2022. This war which involves two of the major producers and exporters of grains and fertilizer has seriously affected the global food supply and commodity prices.

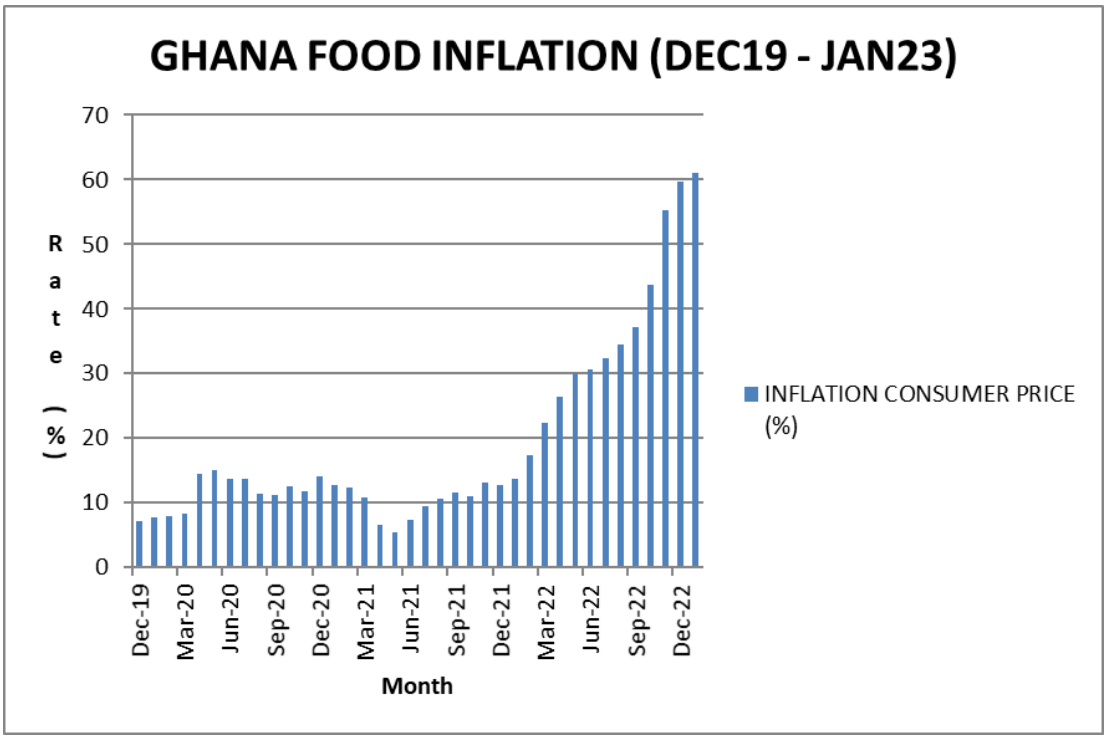

Figure 3.5Ghana food Inflation from December 2019 to December 2022

Source: Ghana Statistical Authority

Figure 3.5 above, shows the food inflation rates in Ghana (CPI) for the period December 2019 to December 2023 which could have been impacted by the effects of the covid-19 pandemic on global productivity and logistics as well as the ongoing war between the Russian Federation and Ukraine. These two countries are major producers and exporters of grains and fertilizer. The war has therefore impacted on the global supply of grains and hence the rising food prices globally which together with rising energy prices are driving up inflation in many countries. Ghana's food inflation in December 2019 before the covid-19 pandemic was 7.2%. It rose to 7.8% in January 2020 when the pandemic began and by May 2020 it has reached a peak of 15.1%. The food inflations stayed at high rate and ended the year 2020 with December 2020 rate of 14.7%. In 2021, most economics began to open up again and the supply-chain challenges also began to ease. Food inflation started to fall and reached a low of 5.4% May 2021 which also coincided with the beginning of the harvesting period in Ghana.

Food inflation in 2021 stayed relatively low and peaked at 12.8% in December 2021. In February 2022, the month the Russian – Ukraine war started, food inflation went up to 17.4% and has been moving up since then. With the shortage of fertilizer and its resultant increase in the price together with high energy cost (especially diesel), local food production has been affected by high input cost. The food inflation went up high to 61% in December 2022. Although the United Nations is trying to ease the effect of the war on global food supply and prices to prevent station with the negotiated food export collider from Ukraine's Odessa port, global food prices have remained high and is fueling global inflation.

Exchange rate: Exchange rate volatility is regarded as one of the major causes of inflationary pressure on the economies of developing countries. Rapid exchange rate depreciation would result in increase in import prices. These price increments in themselves are inflationary and therefore need to be considered in explaining inflation. A research on "an assessment of exchange rate regimes, inflation and growth in developing countries", linked exchange rate to inflation but the extent was dependent on the type of exchange rate regime operational in a particular economy (Bleaney & Fielding, 2002).

The Ghana cedi depreciation has been one of the major problems faced by the Ghanaian economy. Various Governments have tried different economic reforms aimed stabilizing the macroeconomic variables but the currency depreciation has not stopped. Ghana cedi depreciation and inflation in Ghana have been moving in tandem. In most instances depreciation rate follows the trajectory or lagged the trend of inflation. This indicates a strong relationship between the two economic variables (Ocran, 2007). A research was carried out by Nimoh, (2017) to compare the effects of devaluation on inflation in the Ghanaian economy for both short and long run periods. The results revealed that in the long run and short run devaluations of the cedi have influenced the inflation rate. In Ghana, the demand for imports is significantly higher resulting in an inelastic demand for imports. Exchange rate therefore plays a very significant role in the establishment of price stability. Exchange rate volatility will trigger the debate: "…on the issue of the prevalence of producer-currency pricing (PCP) versus local-currency pricing (LCP) of imports, and on whether exchange rate pass-through rates are endogenous to a country's monetary performance" (Campa & Goldberg, 2016). In 2014, the Bank of Ghana attributed the constant increase in inflation during the year to be mostly caused by exchange rate pressures, which increased the cost of transportation, utility rates, and petroleum items. The energy price rises reflected the significant devaluation of the local currency (Bank of Ghana, 2014). In July 2015 MPC meeting, pass-through of currency

depreciation and cost-push factors were mentioned as the major reasons for continuous rise in inflation in Ghana (Bank of Ghana, 2015).

Imported inflation: Imported inflation has been reflected in the prices of imports due to inflation pressure in the countries from where the goods are imported. Local prices move in line with the movement in the price of imported goods and services. The cost of imports increases and companies that import raw materials will have to pay extra which increase their production costs. The extra cost is transferred to consumer in the form of high prices of their products. Ghana's, demand for most of its imports (essential raw materials, semi-finished and finished goods, food, fuel and machinery) are inelastic, therefore increases in their prices can easily be transferred to the consumer with less than proportionate impact on the quantities demanded.

Oil price (local fuel prices): Fuel prices have a very significant effect of domestic price of goods and services. An increase in price of fuel will trigger increase in transport fares as well as the price of energy. Production costs are therefore to some extent driven by cost of fuel and energy. Local prices of fuel are mostly tied to the international price of crude oil and other energy resources. In 2004 for instance, headline inflation began to raise globally as a result of rising crude oil prices. In line with this, the Bank of Ghana predicted that oil prices would likely rise in 2005 which will contribute to the development of inflationary pressures in its outlook for the year. In view of the Bank of Ghana, central banks face a challenge in formulating stable economic policy as a result of rising oil prices. This results from the fact that rising oil costs both increase inflation and slow down economic development (Bank of Ghana, 2014) as Ghana spends almost four times the amount it receives in crude oil exports in importing finished petroleum products because of inadequate local refinery capacity. Ghana since 2011, have been exporting crude oil but most of the domestic fuel and other petroleum products used are imported. Marbuah, (2010), attributed a rise in inflation from 9.08% in January 2011 to 9.16% in February 2011 to 30% increase in utility and fuel prices in Ghana. Domestic fuel price is determined on two main factors: international petroleum prices and exchange rate. A change in any of them will affect the prices on the local market talking into consideration the fact that Ghana operates very liberal petroleum pricing regime (Automatic pricing formula where price of petroleum products is adjusted bi-weekly based on National Petroleum Authority (prescribed petroleum pricing formula) Regulations, 2012 (L.I 2186). The regulations give the following as components of the prescribed petroleum pricing formula:

a. Cost insurance and freight charges
b. Other related charges that include:
c. Offloading charges

d. In-transit losses
e. Inspection fees
f. Letter of credit costs
g. Financing costs
h. Storage and rack loading costs
i. In-plant losses
j. Operating margins
k. Foreign exchange losses
l. Conversion factors
m. Other administrative costs
n. Taxes
o. Levies
p. Distribution margins
q. Price stabilization margin (National Petroleum Authority, 2012)

In the BOG's 2016 report, it was mentioned that the rise in headline inflation for May 2016 was driven by the pass-through effects of the increases in ex-pump prices of petroleum products (Bank of Ghana, 2016). The BOG therefore saw risks to increase inflation to include possible upward adjustment in the prices of petroleum products which will trigger increase in transport fares, utility tariffs and other products. The upward adjustment in petroleum product prices will not only increase the risk of higher inflation but could also affect output growth.

Political elections: In Ghana, political elections take place every four years to elect the president and parliament. The incumbent governments usually try to manipulate fiscal and monetary policy instruments to their advantage in the year of the elections. This presumably will enhance their chances of winning the elections (Oppong et al., 2015). Trade unions and other groups in the nation have typically tried to hold governments to ransom in the years leading up to elections. Additionally, governments acting in their own right have the tendency to sometimes want to prevent voter discontent. Since the Fourth Republic constitution went into effect, ushering the nation into the current multi-party constitutional era, successive governments have kept ex-pump petroleum prices relatively stable or low during election years despite increases in global market prices, only to raise them after the elections. It is believed that these significant increases in the price of petroleum products were a factor in past situations of excessive inflation (Ocran, 2007). The effect is usually either increase in the rate of inflation

in the election year or the year after. Figure 3.5 shows that the election years or the years after mostly result in a peak in the inflation curve (examples are 1993, 2001, 2009 and 2016).

Interest rates (MPR) and Inflation inertia: In countries like Ghana where inflation targeting is practice, central banks will react to the inflation rate rise with increase in monetary policy rates. This will lead to increase in commercial bank rates, Treasury bill and bond rates for governments and in some situations currency depreciation. Due to the increase in the MPR, the cost of borrowing to industry will increase through increase in the Ghana Reference Rate (GRR). This increase in cost to industry will be translated to the final consumer through price increase. Significant price increase will lead demand for higher wages by workers which will in effect lead to increase in cost of production. Increase in interest rate may also be as a result of increase in the government borrowing through the treasury bill and bond markets which will by effect increase the rate of funding for industry. A study by Acquah-Sam, (2017) indicates that inflation reacts positively to changes in interest rates. With high inflation resulting from earlier increase in interest rates, the BOG may try to control inflation by increasing further the policy rate which will result in increase in prices and whichmay lead to cycle of inflation increases. The Ghanaian government is therefore recommended to significantly restrict its participation in the domestic credit market, while the Bank of Ghana and the Ministry of Finance must exercise caution in the determination of the monetary policy and treasury bills rates respectively. It is therefore very necessary for the managers of the economy to take into consideration the dynamics of pricing culture in Ghana and its impact on inflation.

Currency depreciation (CD), Broad money supply (M2G), interest rate(MPR) domestic food prices (FPI), import (IMPORTS) and oil price (OP) have been selected as the main factors affecting inflation in Ghana. They act as the independent variables and the Consumer price inflation is set as the dependent variable. The short and long run collinearity between the variables are performed in chapter eight (research chapter). Impact of policy changes was not taken into consideration in this model because it may dilute how the more dynamic independent variables affect the dependent variable and reduce the effectiveness of the model.

CHAPTER 4
REAL GROSS DOMESTIC PRODUCT GROWTH AND FLUCTUATIONS IN GHANA

This chapter examines the real GDP growth in Ghana. Usually this is a core indicator describing macroeconomic situation of the country. GDP is praised for its straightforward interpretation and comprehensiveness i.e. ability to combine all economic sectors in a single formula. Real GDP growth rate is a dependent variable whose relationship with cedi depreciation will be analyzed latter on in this thesis. Therefore, it is important to discuss its essence, mechanism, and driving factors in Ghana. These factors will be used as control variables in the research chapter, so their proper identification seems important for the success of the thesis.

4.1Overview and theoretical understanding of GDP Growth in Ghana

Over the years, demand and supply side economic views have debated what drives long-term economic development. A number of theories and models have also been developed to explain the phenomenon of economic growth and why per capital Gross Domestic Product (GDP) is higher in some countries than others. In other words, these theories and models explain why some countries are classified as rich and others as poor and to what extent economic mechanisms might change that. The development of growth models was based on the inclination of the proponents to various "Economic schools of thought". Below are some of the models that explain economic growth drivers.

Harrod growth model: this model is inclined to Keynesian economic school of thought. It proposes the rate of savings as a major driver of economic growth. Higher propensity to save will lead to higher investment and applying the multiplier theory, growth will be higher. It also talks about labor force growth as another driver of economic growth.

Domar growth Model, like Harrod growth model is also inclined to Keynesian economic school of thought and emphasized on savings and propensity to save and investment. But it went on to talk about "dual role of investment". On demand side, investment increases income through multiplier principle and raises aggregate demand. It raises productivity on the supply side.

Solow growth model (Exogenous growth): this is inclined to the neo- classical economics school of thought. Solow's growth model was based on rapid convergence of income

between developed and developing countries. It establishes a presumption that poor countries should grow faster than rich countries. The conditional convergence hypothesis states that if countries possess the same technological possibilities and population growth rates but differ in savings propensities and initial capital-labor ratio, then there should still be convergence to the same growth rate, but just not necessarily at the same capital-labor ratio.

The Ramsey-Cass-Koopmans model (Cass, 1965; Koopmans, 1965) also belongs to the class of neoclassical growth models. It differs from the Solow-Swan model in that the choice of the consumption rate is made by consumers based on their current economic situation, thus endogenizing the savings rate. The savings rate is not given externally but is chosen by households in the process of optimization (meaning the savings rate changes with income). As a result, unlike the Solow-Swan model, the savings rate may not be constant during the transition to the long-term steady state. Another implication of the model is that the outcome is Pareto optimal or Pareto efficient. Originally, the model aimed to explain long-term economic growth. However, it has been used to study business cycle fluctuations by adding, for example, government spending shocks, employment fluctuations, and other macroeconomic shocks.

After that through the efforts of Mankiw, Romer, and Weil, the Solow model was extended to include an additional factor of production – human capital. This extension allowed subsequent researchers to also add other types of capital, such as transportation or telecommunications infrastructure, into the model. The Mankiw-Romer-Weil model (Mankiw Gregory et al., 1992) incorporates human capital, which becomes an additional factor of production alongside physical capital (K) and the effective labor force (AL). Similar to the Solow model, the population and technological progress are characterized by constant and exogenous growth rates. In subsequent years (Barro et al., 1995) endogenized the savings rates in this model using the previously described Ramsey approach.

New growth model (Endogenous growth): relates to investment in human capital. Countries have opportunity to increase productivity of labor through increase or improvement in education, investment in research and development and learning by doing. The elimination of the assumption of decreasing returns to “capital” was the main reasoning behind endogenous growth theory (Ochoa & Ochoa, 1996).

Paul Romer’s endogenous growth theory started with his 1986 (Romer, 1986) paper in the Journal of Political Economy which was a seminal work in the modern revitalization of growth theory. Endogenous growth represents a long-run economic growth rate determined by internal forces of an economic system, particularly those forces governing the opportunities and incentives to create technological knowledge(Romer, 1997). Romer theory dwelt on the

assumption of important externalities (at economy level) from accumulation of the knowledge. Romer demonstrated that the neoclassical growth model framework can be used to endogenize the rate of technological progress if this progress is modeled as an externality of the investment process (Cieślik, 2011). The Lucas-Uzawa model assumes that human capital is a significant element of the production function and is produced using human capital itself, while the final product is compiled using both human capital and physical capital. The accumulation of human capital results from workers' decisions on allocating their time between current production and building human capital (Mattana, 2017).The further development of endogenous models advanced towards acknowledging the importance of technological progress and its endogenization. This was made possible by moving away from the assumption of perfect competition and advancing models that recognize the possibility of increasing returns to scale.

However, it seems clear from this short overview that endogenous models do not portray properly situation in Ghana. Growth of GDP in Ghana is still fueled out by availability of capital and labor. Innovations, human capital and B+R seem to play minor role in that. Thus the exogenous models seem to better describe the Ghanaian case.

The exogenous neo-classical growth theory as described above, rooted in Solow-Swan model assumes that developing countries would grow faster than their developed counterparts. This is also named as convergence theory. The developing countries have low capital-labor ratios which should help raise the return on investments all things being equal. Also developing countries get access to global capital market to supplement low domestic savings; hence its lack should not be a hindrance. The access to global market will help quick expansion of output of tradable goods that the developing countries have competitive advantage (Rodrik, 1987).

But a research by Geoffrey Sachs and Andrew Warner, tried to answer the above widely discussed conundrum covering economic convergence in the world economy. They explained that the main reason for expecting economic convergence is that poorer countries can import capital and modern technologies from the richer ones; thereby reap the “advantage of backwardness”. They explained that, the problem resides in the trade regime a particular country practices: “open economies tend to converge but close economies do not” (Sachs & Warner, 1995, p. 3). The problem is that these theoretical expectations have not been confirmed by economic reality at least in African countries. A trade policy known as the Generalized System of Preferences (GSP) gives some imports into the United States from qualified developing nations nonreciprocal duty-free status. There are other regional preference schemes. For African countries, there was the African Growth and Opportunity Act (AGOA) which allowed duty free export of some specific products to the United States.

Development economists argue that growth in African countries has been negatively affected by factors such as weak institutions, poor geography, poor policies and poverty traps (McMillan et al., 2014). Although Sub-Saharan African countries cannot do anything about their geography, there is no doubt that their growth fundamentals and their factors have improved significantly. Agricultural markets have been liberalized, the economies have been open to international trade and companies. There has been rationalization and diversification of state owned enterprises and corporations.

4.2GDP Growth and Sectorial Contributions

The GDP in Ghana started growing immediately after the economic reforms started in 1983.

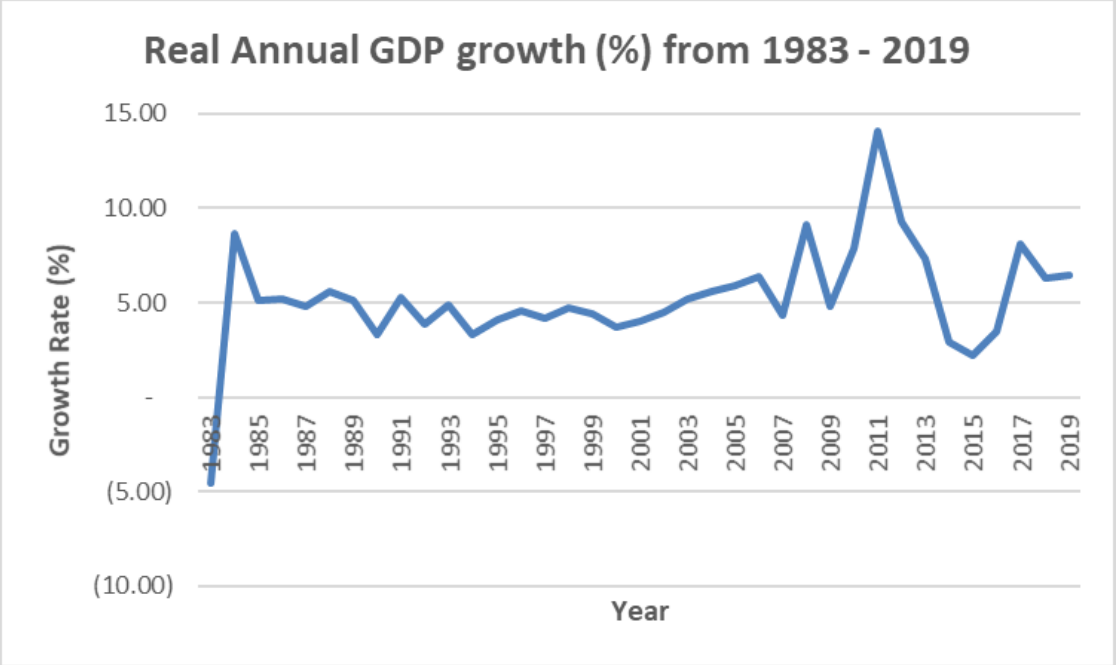

Figure 4.1Ghanaian economic growth in the years 1983-2019

Source: World Bank

As depicted at Figure 4.1. Ghana registered a growth of -4.56% in 1983, in 1984 it registered a positive growth 8.65% as a result of the implementation of the policies associated with the economic reforms. From 1985 to 2007, the economic grew around 5% throughout the period. In 2008, the economy grew by 9.15% but quickly dropped to 4.84% in 2009. In 2010, the GDP grew by 7.90% and went up to a record 14.05% in 2011 as a result of the commercial production of oil. GDP growth stayed relatively high at 9.29% in 2012 and 7.31% in 2013. Due

to the power crisis that the country suffered, the GDP grew relatively smaller by 2.90%, 2.18% and 3.45% in 2014, 2015 and 2016 respectively. With the resolution of the power crisis and bringing on stream of new oil field which increased the daily oil output, the GDP grew by 8.14%, 6.26% and 6.48% in 2017, 2018 and 2019 respectively. The economy registered an average growth of 5.25% in the period from 1983 to 2019.

Ghana has been recently among the fastest growing economies in the world (economic growth record over the past years). Previously growth had been driven largely by the agricultural sector, that has contributed significant proportion of total GDP and about high percent of total employment. However, recent economic growth has largely been attributed to the services sector and to some extent also to industry.

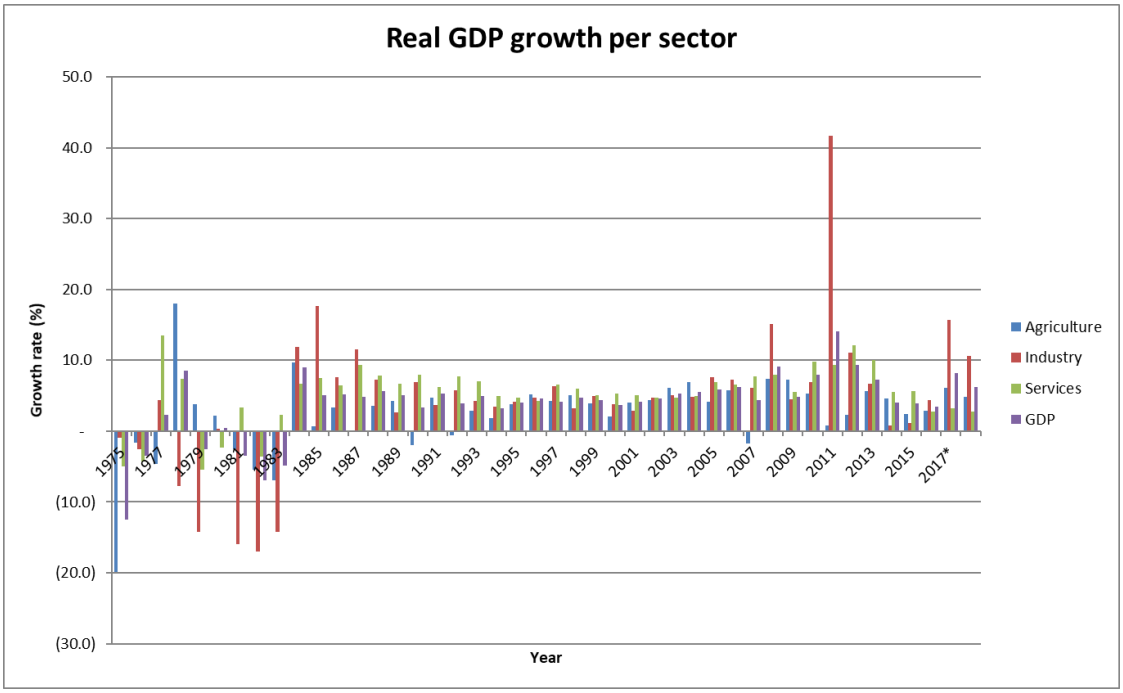

Figure 4.2Contributions of the major sectors to the Ghanaian economic growth in the years 1983-2019

Source: Ghana Statistical Service

Figure 4.2 shows the contributions of the major sectors to the Ghanaian economic growth in the years 1983-2019. As already discussed before the beginning of the economic reforms in 1983 the economy was in depression. In 1984, the economy grew by 9.0% which was mainly driven by growth of 9.7% in agriculture; industry (by 11.9%) and service (by 6.6%).

Between 1985 to 1992 when Ghana started the movement towards democracy in the fourth republic, the economy grew by an average of 4.8% driven mainly by industrial growth (an average of 7.9%) and service sector growth (an average of 7.5%).

In 1993, i.e. at the beginning of the fourth republic the economy grew by 5%. Overall economic growth after 1993 became relative stable (Easterling et al., 2008).

In 2000, the economy grew by 3.7% which was lower than the average of the period from 1993 to 1999. This decline was mainly due to the negative effect of decline in the prices of the main commodity exports of Ghana and the resultant huge depreciation of the local currency and high inflation.

In the period from 2001 to 2008, the economy grew averagely by 5.6%. Growth were mainly driven by the industrial and service sectors.

In 2010, a growth of 9.8% in service sector (e.g trade repairs and household goods - 13%; information and communication – 24.5%; financial and insurance – 16.7%; real estate. Professional administration and support services - 13.9%, health and social work - 11.2%; community, social and personal service activities – 10.8) drove the economy to grow at 7.9%. And in 2011 after Ghana began to produce oil in commercial quantities, industrial growth went up to 41.6% and GDP growth to a record level of 14.05% as a result of the commercial production and export of crude oil. Though the country's economic growth has since been tightly linked to the crude oil market.

Since 2012, the economy has been growing at an average rate of 6% and it is mainly driven by industry 7.2% and service 6%. The Ghanaian economy has been greatly driven by the oil and gas sub-sector making the industrial sector, the second contributor to the overall GDP growth of the country. For a very long time (i.e., pre-independence and significant periods of post-independence Ghana), the economy depended on agriculture for foreign exchange and employment since the country is the world's second largest cocoa producer. However, in recent times, the growth of the economy has been driving at the back of a different commodity, oil. The development and expansion of the oil production coupled with rising international crude oil prices have placed Ghana's economy at a higher pedestal.

The share of three main sectors in producing Ghanaian GDP has varied in the research period.

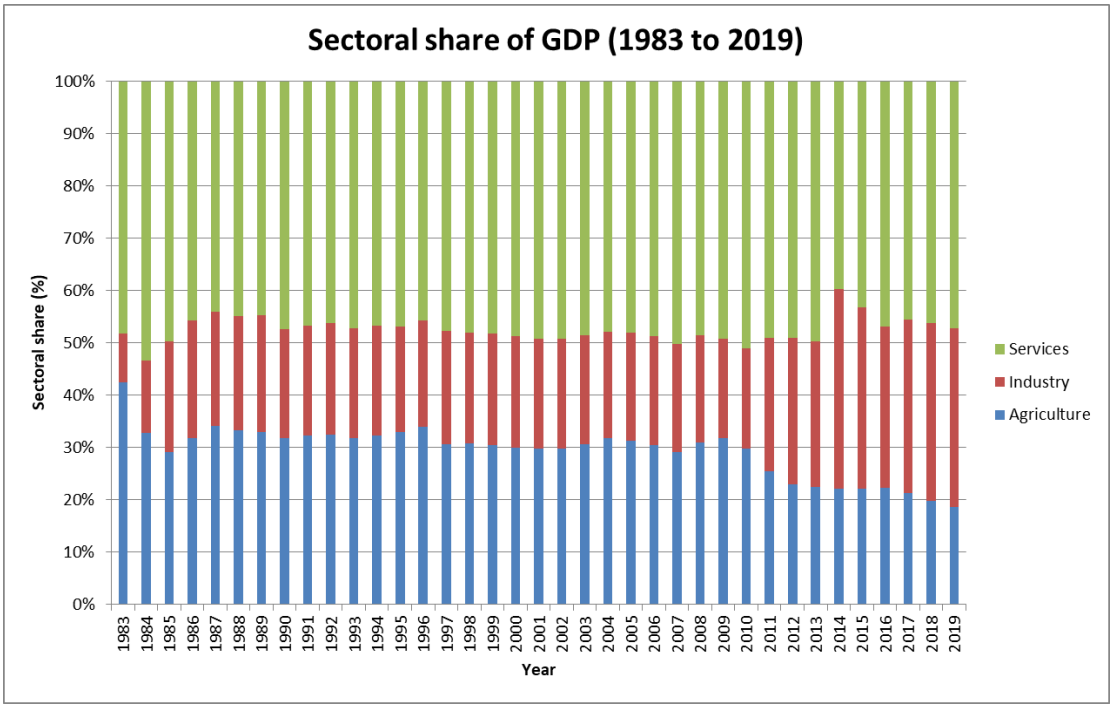

Figure 4.3Contribution of the various sectors to GDP in Ghana in % in the years 1983-2019

Source: Ghana statistical Service

Figure 4.3 shows the contribution of the various sectors to GDP in Ghana in % in the years 1983-2019. From the highest contribution of 43.76% in 1983, agricultural share in the GDP has reduced consistently to the lowest of 18.5% in 2019. Crop farming has been the major contributor to agriculture share of GDP with annual average contribution of about 70% since 2013 (*Ghana Statistical Services.*, n.d.). Livestock contributes about 15% and cocoa which is one of the main contributors to Ghana's export revenue contribute about 8% to the agriculture subsector.

The industry's contribution to GDP grew from a low of 9.32% in 1983 and then stabilized around 20% from 1983 to 2008. It marginally decreased to 19% in 2009 and 19.12% in 2010. However, in 2011, it surged to 25.56% due to the commencement of commercial oil production and has since consistently increased, reaching 34.2% in 2019.But the peak of 38.10% was achieved in 2014 as a result of increase in petroleum production, new energy, mining and construction projects. Mining and quarrying have been the largest contributor to the industrial subsector since 2013 with a contribution of around 35%. Together with oil which contribute an average of 10% makes the extractive industry's contribution very significant as

they control about 45% to the subsector. Manufacturing contributes 35% and construction follows with 24%.

The service sector contribution to GDP has rather been consistently above 40% with an average of 47.52% between 1983 to 2019. But in 2010, driven by the ICT and trade sub-sectors, it contributed 51.13% to the GDP. In 2014, as a result of increase in the contribution by industry, the service sector contribution to GDP growth was 39.8%. Trade has been contributing about 30% to the subsector since 2013, transport around 15%, education about 8%, hostels and restaurants 8% and ICT 5% contribution to the service subsector.

4.3 Factors affecting Ghana's GDP Growth

Until the introduction of the economic recovery program (ERP) in Ghana, the GDP growth rates of developing countries including Ghana have not been encouraging. For instance, the average GDP growth rate of Ghana in the 1970s was about 2% (Nimoh & Addai-Asante, 2018). But with the economic reforms that started in 1983, the economy of Ghana has seen relatively higher growth each year although at a varied rate. Taking into consideration growth theories discussed above different factors may account for this varied growth rates as the economy has shown significant level of potential and moved from underdeveloped level to the middle-income level. Those factors are related to supply side (exogenous models – mainly investments), and demand side (Keynesian approach). However, one should keep in mind that supply factors contributes to growth (GDP trend) whereas demand factors more to GDP changes in a short run. Some of the factors that significantly affect the changes of Ghanaian GDP are:

- Foreign Direct Investment (FDI)
- Government spending (expenditure)
- Exchange rate
- Inflation
- Interest rate
- Credit to private sector
- Balance of payment

FDI: Foreign investors infuse money into the economy of the host country through FDI. This extra money may be invested in a variety of projects, including the growth of current companies, the construction of new infrastructure, and the financing of research and development (R&D) initiatives. Higher investment is frequently the outcome of increased

capital inflow, which further supports GDP growth. The expansion in the production capacity as a result of the FDI inflow will lead to creation of new jobs, infusion of new technologies and access to new markets. In Ghana the manufacturing and extractive industries area mostly dominated by MNCs investment which are mostly as result of FDI inflows. FDI outflow, will have negative effect on job creation, infrastructure development, access to new technologies and expansion in production capacity. These effects of capital flight may negatively affect GDP growth. In a study by Narteh-Yoe et al., (2023), on the impact on Aid, FDI and Domestic investment (DI) on economic development of small states, it was realized that FDI and DI has impact on economic growth of under developed small states. Since Ghana is classified as a developing country although not a small state, FDI has a role to play in its economic development agenda. Prah, (2019), found that FDI inflows into Ghana impacted differently on different sectors of the economy in their contribution to GDP growth. When compared to the secondary and primary sectors, FDI inflow into the tertiary sector comprising export trade, services, tourism, liaison, general trading, and export trading correlates and contributes more to economic growth. The GDP expands by as much as 85% for every unit increase in FDI input into the tertiary sector. The secondary sector, which mostly consists of manufacturing and building and construction, is the second highest contributor to GDP growth in terms of sectorial FDI inflow. The economic growth is multiplied by this industry by roughly 67%. FDI inflows into the primary sector also have a 57% impact on economic growth.

Credit to private sector: Policy makers and economists have always been interested in the effect of credit to the private sector on economic growth in Ghana. Access to credit may boost economic activity, encourage entrepreneurship, enhance productivity, foster financial inclusion, promotes exports, create employment and encourage investment all of which represent important factors that contribute to economic growth. In the short run, credit to private sector will stimulate economic growth (Tahir et al., 2015), in the long run, it may force increase in monetary policy rate to control inflation in the economy and by so doing affect the GDP growth negatively. Gbenga et al., (2019) confirmed this point in their research in Nigeria and demonstrated a substantial relationship between the total amount of credit given to the private sector and money supply in Nigeria, as well as strong relationship between private sector credit and economic growth. Olowofeso et al., (2015) also confirmed the strong relationship between credit to private sector and economic growth in Nigeria.

Interest rate: In Ghana, like in any other nation, the interest rate is a crucial instrument for monetary policy and may have a big influence on GDP growth. Interest rates and GDP growth have a complicated relationship that can change based on a number of variables, such

as the state of the economy right now, its structure, and the precise monetary policy goals that the central bank is pursuing. Ghana practices inflation target system in its monetary policy. Monetary policy rates are therefore geared towards affecting the rate of inflation. This inflation target driven rates may sometimes have negative effect on credit to businesses and hence output. In periods, of higher inflation, monetary policy rates are increase which in effect affects rates that commercial banks charge on loans to business which also affect either output or prices. Output decrease may lead to lower growth in GDP rate. But a successful decrease in inflation rate may lead to increase in output since inflation rate beyond a certain level will negatively affect GDP growth (Ansah, 2022) – U-shape relationship. Ovat et al., (2021) identified the negative relations between interest rate (monetary policy rate) and GDP growth in their research in Nigeria. Changes in interest rate, for instance the MPR, has direct impact on the Ghana reference rate (GRR) which also has impact on the rate applicable to loans given to the private sector. Higher interest rates will mean less businesses and household would be able to afford the cost of borrowing and hence lower impact on the credit that will be offered to the private sector. Also banks through the use of risk management tools will reduce loans to the private sector to reduce the incidence of non-performing loans on their books. In the alternatives, when interest rates are very low, more businesses and households will be able to afford credit. Banks will anticipate lower levels of non-performing loans which may lead to excess liquidity or increase in money supply, spending and inflation in the economy

Government Expenditure: The decades-old relationship between public sector spending and economic development is still very important today and a source of debate among scholars and policymakers. In Ghana, the public sector is seen as the single largest employer and spender. Hence, anything that will affect government spending has implications on income, consumption and output. Estimating the effect of Government spending on economic development or GDP growth in Ghana using ARDL method using data from 1970 to 2016. The empirical results show a short-term positive relationship between government spending and economic growth (Poku et al., 2022). In another study which was aimed at finding the optimal threshold level of government expenditure that may trigger rapid development in Ghana and to give new empirical evidence on the relationship between government expenditure and economic growth in Ghana by Atteh et al., (2022), the result showed that total government expenditure directly impact economic growth positively. But Awuma & Ribar, (2022), concluded that, there is no causal relationship between economic growth and government expenditure in Ghana.

Balance trade: which represents the difference between a country's exports and imports, may significantly affects GDP growth in Ghana, as in other countries. If a country experiences a trade surplus it registers inflow of more foreign exchange, which may be used to finance domestic projects and boost GDP growth. Trade deficit is recorded when imports exceed exports. Foreign reserves may be depleted as a result and external borrowing may become necessary to pay for imports, a persistent balance of trade deficit may negatively affect GDP growth. Unfortunately, since the beginning of the economic reforms in 1983, Ghana has experienced consistent negative balance of payment except 2003.Okyere & Jilu, (2020), conducted a study to examine how exports and imports affected Ghana's economic growth. The results showed that there is no meaningful causal relationship between imports in international trade and the expansion of Ghana's GDP. However, Ghana's GDP growth is significantly correlated with exports in international trade, such as cocoa. This demonstrates that increase in exports may bring about domestic economic growth in Ghana and raise GDP. Boakye & Gyamfi, (2017), found a positive relationship between exports as well as foreign direct investment, gross capital formation, remittance money per capita and external debt per capita and economic growth. But the current account balance and inflation showed a negative effect on economic growth. In both the long and short runs, trade openness and the effectiveness of Ghana's institutions have a major beneficial impact on the country's economic growth (Duodu & Baidoo, 2020).

Exchange rate: Movement in the exchange rate of a country’s currency has an impact on the growth of the economy. A reasonable depreciation of a country’s currency may have a positive impact on the country’s export and hence output all things being equal. Although currency depreciation increases output and improves the balance of payments in the short term, the long-term monetary consequences of the lost in value ensure that these effects are offset by price increases (Momodu & Akani, 2016). Osei et al., (2020)also found a relationship between real exchange rate and GDP growth.

Inflation: Achieving high GDP growth and at the same time keeping inflation low as been a challenge for many countries especially developing countries. Inflation has been one of the most difficult macro-economic problems that Ghana has been facing. Since the economic reforms in 1983 when the highest inflation rate of 122.87% was recorded, inflation rate has not gone to that level again. Recording an average rate of 23.52% for the period 1983 to 2019 with the lowest rate being 7.13% recorded in 2012.The question of whether inflation slows down or accelerates economic growth has been up for discussion. While some academics, especially those learning to the Keynesian and structural schools of thought, tend to feel that inflation is

not damaging to economic growth, other academics, especially those in the monetarist school, contend that inflation is destructive to economic progress. Kunkuaboor et al.,(2021), after analyzing data for Ghana for the period 1995 to 2019 concluded that, inflation has negative effect on economic growth. Agalega & Acheampong, (2013) established a positive relationship between inflation and GDP growth in the short run. Kankpeyeng et al., (2021), using VAR model to analyze data from 1986 to 2018, concluded that general and low inflation has positive impact on GDP growth. Yeboah, (2022), analyzing data from 1991 to 2021 using regression (ordinary least squares), found that inflation has a negative impact on GDP growth in Ghana.

Currency depreciation (CD), balance of trade (BOT), credit to private sector (CPS), foreign direct investment (FDI), government expenditure (GX), inflation (INF) and monetary policy rate (MPR)have been selected as the main factors affecting real GDP growth in Ghana. They act as the independent variables and the real GDP growth rate is set as the dependent variable. The short and long run collinearity between the variables are performed in chapter seven (research chapter).

CHAPTER 5
FINANCIAL RELATIONS WITH THE REST OF THE WORLD

This chapter addresses the balance of payments. It is a crucial macroeconomic variable that illustrates, in financial terms, a country's relationships with the rest of the world. The formation of the BOP varies across countries, and there are no universal theories that describe this phenomenon in isolation from the specific context of its functioning. In reality, the state of the BOP depends on its components, which result from factors such as foreign trade, the inflow and outflow of foreign direct investment, or portfolio investments, among others. Economic theories related to these phenomena were partly presented in the previous chapter. This chapter primarily focuses on identifying the factors influencing the BOP in Ghana. This is achieved using empirical data (information on the components of the BOP) and economic analyses of the formation of this category as it pertains to Ghana. This approach allows for the identification of independent variables used in economic modeling in the research chapter.

5.1. BOP in Ghana

Open economies keep record of all the transactions with trade partners. This record is known as the country’s balance of payment. BOP is therefore the summary of the transactions between citizens of one country and citizens of another within a given time period. It is an accounting of a nation's foreign exchange transactions for a given time frame, typically a quarter or a year. It records transactions made by organizations, people, and the government. Various elements contribute to the balance-of-payments statement. The current account, the capital account, and the financial account are the ones that get the most consideration (Madura, 2013, p. 33).

The major characteristics of BOP are that:

- BOP is always in balance(KRUGMAN et al., 2012, p. 307).
- It uses double entry accounting principle.
- Its transactions have a credit and an equal debit side.

BOP provides important information for both private sector, public authorities and even general public.

- Balance of Payments gives a number of details about its global economic standing. It displays the nation's financial situation on a global scale. If the national economy

needs support from imports, the government can create the necessary rules to redirect the money and technology to the vital economic sectors that could fuel future growth.

- BOP helps government in making decisions on its monetary and fiscal policies, as well as its foreign trade and payments-related challenges. Any economy's commercial transactions are broken down into exports and imports of products and services for a precise financial year. However, it will help the government to identify the sectors and regions with the potential for export-oriented growth so the government can create policies that promote and encourage such industries.
- In the case of a developing nation, the balance of payments demonstrates the degree to which the nation's economic progress depends on aid from industrialized nations. The government can base its monetary and fiscal policies, as well as its policies for controlling inflation, on the indicators from the BOP to determine the state of the economy.
- It acts as a sign of how a country's economic standing abroad is evolving. BOP can be used as an economic barometer to assess short-term international economic prospects of a given economy, gauge its level of international solvency, and assess whether the exchange rate of its currency is acceptable.
- Using data from the BOP, the government can take defensive actions like advanced tariffs and penalties on imports to deter the importation of non-essential goods and promote domestic industry self-sufficiency.
- BOP offers essential information in order to comprehend a country's economic interactions with other nations. It brings together all transactions with other nations by listing the inflows and outflows of money.
- BOP can be instrumental in creating a national income accounting tool that can be used to determine the influence of foreign trade and transitions on the level of the country's national income.
- If the government wants to boost its economy, it can take steps like devaluing the currency to lower the cost of its goods and services on the global market and increase exports (trade policy) and all these actions will bring measurable consequences that can be identified thanks to BOP analysis.

BOP is composed of following elements:

- the financial account– the net acquisition and disposal of financial assets and liabilities including short term financial assets like the money market instruments.
- the capital account which includes the net flow of FDI (direct investment into business assets and acquisition of lands and properties in a foreign country.

- the current account − a summary of all financial transactions that take place between one country and all others, whether they are related to the sales and purchase of goods and services, or the cash flows produced by financial assets that create revenue.
- Errors and omissions.

Errors and Omissions show the difficulties of accurate information. A country should have a positive capital and financial account balance if its current account is negative. This suggests that even while it sends more money to other countries than it receives for trade and factor income, it obtains more money for capital and financial account components like investments from other countries. A positive balance on the capital and financial account should be used to counterbalance the negative balance on the current account. However, measurement errors can arise when attempting to determine the value of transferred funds into or out of a country, thus the offsetting impact is rarely complete. As a result, there is a category for errors and omissions in the BOP account (Madura, 2013, p. 36).

5.2. Disequilibrium of BOP in Ghana and its reasons

A nation may experience BOP problems due to a variety of factors, including expansive monetary policies, a decline in terms of trade, price distortions, high debt servicing, or a combination of these factors. Many nations seek BOP assistance from outside sources, such as the International Monetary Fund (IMF), and debt relief from creditors as part of a planned adjustment process to address these issues (Dhliwayo, 1996).

Disequilibrium is a state in which internal and/or external pressures hinder the market from achieving equilibrium or lead it to get out of balance. Due to the interconnectedness of all countries, there are times when some countries accrue current account surpluses at the expense of other countries, which run deficits. This condition is known as a global imbalance (*Balance of Payments Disequilibrium - Economics Help*, n.d.). Disequilibrium can result from any of the following:

- Deficit or surplus in the current account
- Basic balance
- Official settlement balance

Basic Balance is defined as the sum of balances on the current and capital accounts (net current account plus net capital account balances). Analysis of basic balance gives insights into the country's economic relationship with the rest of the world. It was considered to be the country’s best position vis-à-vis other countries during fixed exchange rates regimes during the 1950s and 1960s. Basic balance position has been providing policymakers, economists and

other stakeholders understanding of the country's external financial position. A sustainable basic balance is crucial for economic stability. A consistent deficit of basic balance may raise concerns about the country's ability to meet its external obligations. In Ghana, the basic balance is calculated from the trade balance, the export and import of goods and services, remittance from Ghanaian workers abroad and those of expatriate workers in Ghana, investment income received from Ghanaians against that of foreign investors in Ghana (dividends and interest). Also, Net capital transfers from FDI, aid and grants. A surplus in the basic balance implies that Ghana is receiving more funds from other countries than it is paying to them and vis-versa.

Official settlement balance is an essential part of a country's balance of payments (BOP) accounting. It monitors the activities of a country's central bank concerning international reserves, including gold, bank deposits, foreign exchange reserves, and special drawing rights (SDRs).

This balance shows movements in reserve assets and associated activities that governments make to affect the exchange rate or only to finance the balance of payments(Statistics Department of IMF, 2000).

Stabilizing the BOP enhances macroeconomic policies, which is the goal of many developing countries. A prolonged current account deficit is common among emerging nations, which is a major cause for concern because it hinders commerce, which in turn slows down economic progress. Maintaining a healthy and stable BOP is important for every nation. Therefore, it is crucial for developing nations to focus on managing and maintaining the BOP equilibrium (Boateng & Ayentimi, 2013). Since the middle of the 1970s, Ghana has had a negative basic balance in particular in the years in which e imports of goods, services and capital exceed export. This is mostly due to the deterioration in the trade account, which has led to numerous inquiries on the causes of this imbalance. Gold, cocoa, bauxite, wood, cashews, oil, tuna, diamonds, horticultural products, and manganese ore are just a few of Ghana's abundant natural resources. But despite the availability and export of all those resources, the BOP remained in red. The economic reforms that started in 1983 has done much to improve and modernize the economy, but Ghana has not been able to resolve the issue with BOP deficit. BOP in Ghana is affected by all factors which may include those that will affect international trade flow, those that will affect FDI and those that will affect portfolio investments.

BOP disequilibrium in Ghana may also be as a result of the imbalance in the countries international receipts and payments. Below are some of the economic factors that account for the disequilibrium of BOP in Ghana:

- Trade imbalance – Many developing countries like Ghana and other SSA countries, experiences trade imbalance where the values of their exports exceed that of their imports. This situation may result in deficit balance of the current account. Ghana imports many goods and services including manufactured goods, machinery, food and finished petroleum products whose demand is mostly inelastic and export raw materials and commodities which has very unstable prices and whose supply is also inelastic. Also, these prices are not determined by the suppliers but by the global market.
- External Debt - High levels of external debt can put pressure on a country's BOP. Ghana's debt as at the 3rd quarter 2022 stood at 75.9% of GDP of which foreign (external) debt was 44.1% of GDP(Ministry of Finance, 2022). With this high level of external debt, there will always be the need to find foreign currency to service the debt. This can contribute to a BOP deficit, because of the significant level of dependence on external financing.
- Exchange Rate Volatility – exchange rates volatility may affect the BOP. Depreciation of the Ghana cedi affects the cost of imports but at the same time has very little impact on the export price since most of Ghana's exports are denominated in U.S Dollars and not Ghana cedis. The depreciation of the Ghana cedi therefore contributes to BOP imbalance.
- Global Economic Conditions – External economic conditions have direct impact on Ghana's BOP. Ghana imports a lot of goods including food and finished petroleum products. Any changes in global economic conditions will affect the Ghanaian economy in one way or the other. For instance, the covid-19 pandemic affected the Ghanaian economy due to its impact on the global output and logistics. Similarly, the Russian-Ukrainian war with its impact on global food and energy prices also affected the BOP in Ghana. Changes in the prices of commodities like cocoa and gold which are some of the main exports of Ghana also affects the BOP.

5.3. Policies of the Ghana government and Central bank in combating BOP disequilibrium

BOP disequilibrium position is based on the situation of the component (sub) accounts that form the BOP. Correcting BOP disequilibrium can therefore be achieved through the correction of each of the component.

- BOT deficit could be resolve through following policies (Madura, 2013, pp. 42-45):

- Expenditure switching policies: these might include policies to lower inflation, tariffs, and allowing the local currency to depreciate. Instead of lowering consumption as a whole, the goal is to reduce the demand for and supply of imports.
- Expenditure reducing policies: these regulations are designed to lower consumers' actual expenditure on imports. These regulations cover both fiscal and monetary policy actions. To encourage saving, the government might raise taxes and cut spending, while the central bank might raise interest rates.
- Supply-side policies: governments may implement policies to improve the country's productivity which may lead to improvement in exports competitiveness in the international markets. The government may implement policies that will lead to reduction in the cost of production in the country. These policies could include reduction in taxes, lower energy cost, subsidies, grants and implementation of deregulation.

• The capital account in Ghana can be affected:

- Implementation of reform policies from Donor Agencies. During the time of the SAP, the World Bank and IMF supported Ghana in the area of Educational and Road infrastructure.
- Inflow from debt forgiveness as a result of subscribing to economic reform plans from the IMF and World bank. During the period of HIPC initiative, Ghana received reasonable funds from debt forgiveness from the multilateral organizations and creditor nations like the "Paris club" to finance education, health and sanitation projects in the country
- Also, factors that affect capital flight like exchange rate instability, interest rate differentials, increasing external debt levels and high inflation can affect the capital account (Forson et al., 2017)

• The financial account can be affected by policies which affects both FDI and international portfolio investment:

- Portfolio investment (Madura, 2013, p. 52):

 low tax rate on interest and /or dividend – low tax rate means the net amount of money going to investors will be higher than returns in countries with higher tax rates and this will attract investors into the country's financial markets,

 higher interest rate – higher interest rate will attract more portfolio investments since the return or yield will be higher than countries with lower interest rates,

 increase in the value of currency – this will lead to the increase in the value of the assets purchased. In Ghana payment of interest and dividends to nonresidents attract withholding tax. The current withholding tax rate applicable is 8%. Because of the double

taxation agreement Ghana has with some countries including United Kingdom, Switzerland, Germany, The Netherlands, Belgium, Singapore and few other countries, investors from these countries can use the withholding tax credit in their respective countries. In times where investors anticipate relative stability in the exchange rate, they will take advantage of the higher interest rates that prevail in the country,

- o FDI (Chakraborty & Nunnenkamp, 2008):

- changes in restrictions as result of the reforms in various economics in the 1980s and the 1990s. Most countries therefore removed restrictions on FDI and rather sort to promote FDI,

- privatization will bring in FDI. Foreign companies will buy local or former state owned organizations,

- potential for economic growth – investors will be interested in countries with potential or high GDP growth rate. It is believed that investing in such economies will yield higher return on investment and/or return on assets,

- low tax rate – countries with lower tax rate are likely to attract more FDI all things being equal,

- strengthening of exchange rates – the potential for the exchange rate of local the currency to move upwards will make assets cheap and the asset value will appreciate in terms of international currencies in the near future.

5.4. Factors affecting BOP in Ghana

5.4.1 Factors affecting the current account in Ghana

The current account can be described as a trade and at the same time an income account. The main parts of the current account are:

- Receipts and payments for goods and services such as cocoa, gold, tourism, legal and consulting services.
- Net factor income. It represents the interest and dividends on investment in financial assets received by local investors in a foreign economies and payment to foreign investors who invest in the domestic economy.
- Net transfers. It refers to the aid, grants, and gifts from one country to another.

Exports revenues and incomes received generate cash inflow to the domestic economy and are recorded a credit to the current account and imports and income payments generates cash outflow to the domestic economy which are recorded as debit to the current account.

A current account deficit indicates that the domestic country is paying more money to other economies to import goods and services or pay incomes or transfers than it is receiving from its exports of goods and services and incomes and transfers from abroad. Current accounts surplus happens when the domestic country is paying less money to other economies to import goods and services or pay incomes than it is receiving from its exports of goods and services and incomes.

Deficit or surplus in the current account can occur as a result of:

- The trade accounts. The trade accounts include the export and import of goods, services and primary income. Ghana's trade account has mostly been in deficit and this has adversely affected the BOP. If Ghana could, turn its trade account deficit into surplus by exporting more than importing, most of the problems associated with BOP will be resolved.
- Donor flows which Ghana receives from donor agencies like the world bank in the form of aid and grants. But aid from specific countries may be geared towards increasing the exports of those countries to the recipient countries (Nowak-Lehmann et al., 2009). For instance, rice aid to Ghana by Japan and the United States of America in the year 1983 when Ghana was facing unprecedented drought led to increase in rice imports in the years after 1983.
- Remittances from Ghanaians living abroad which has become one of the important factors in the current account
- The GIPC regulations allows free flow of capital and profit by foreign investors. The annual transfer of profit by MNCs and other foreign businesses operating in Ghana also affects the current account. Also, remittance of profits by Ghanaian companies operating in other countries apply.

According to a Madura, (Madura, 2013, pp. 42–48)and analysis provided in the previous subchapter, the following factors might affect current account:

- Inflation;
- Changes in real GDP;
- Commodity prices on the international market;
- Trade policies.
- Exchange rate movement
- Exports
- Imports
- Interest rate (MPR)

Inflation: Increase in the CPI rate negatively affect exports. In a situation where the local inflation rate increases and stands above that of the country's trading partners

(relative inflation), there will be increase in the price of the locally produced goods which will affect their competitiveness hence reduction in export. With increases in the prices of locally produced goods and services going up, imports will relatively become cheaper all things being equal and that will lead to increase in imports. But in Ghana, export prices for commodities like cocoa are determined by the international commodity market. In this case inflation has very little impact on the amount of the commodities that can be exported. The country is therefore a price taker and the commodity prices are set by demand and supply on the international market. Supply of the export commodity like cocoa is inelastic and would not be influence by relatively short time changes in price or cost of production. Export revenues are therefore based on volume of exports which is also dependent on factors like climatic condition and also commodity prices on the international market. Imports may reduce or remain constant because domestic inflation reduces the disposable income of the citizenry which will affect their level of consumption of imported products. But in the situation where inflation is driven by increase of demand, the increase of inflation will lead to increase in imports in the short run.

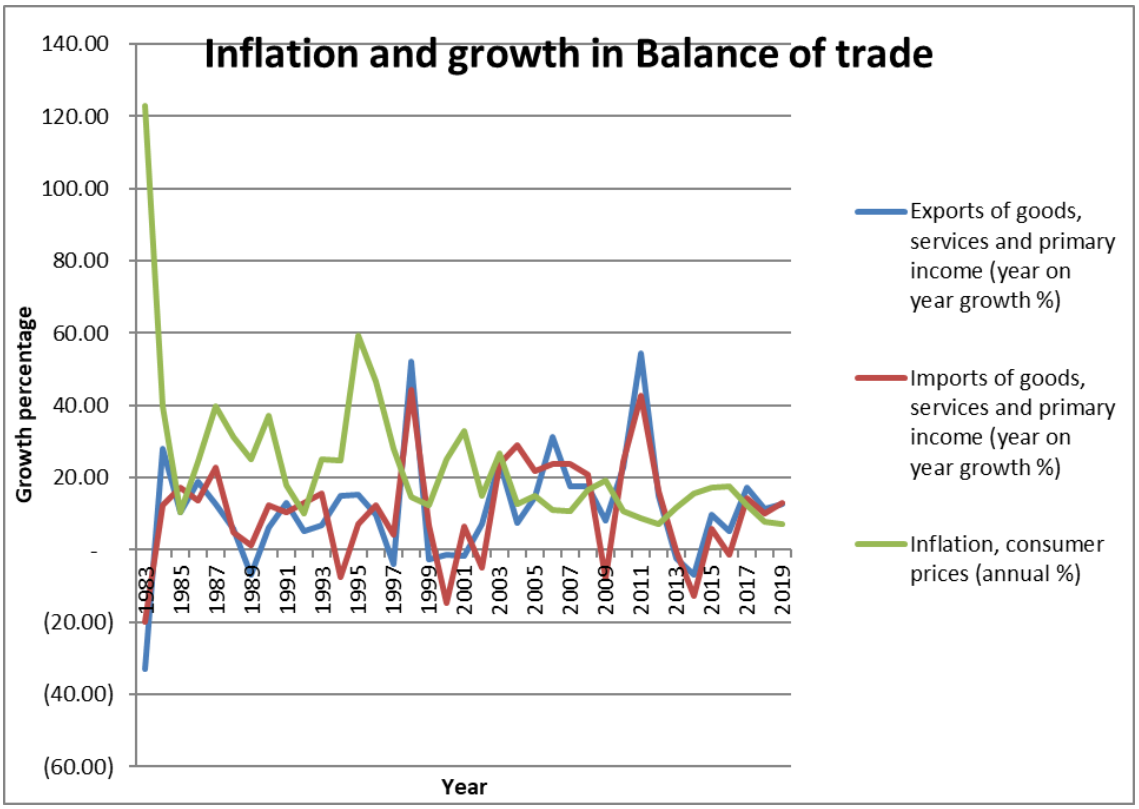

Figure 5.1Ghana's imports and exports and inflation

Source: World Bank and Author's calculation

Figure 5.1 shows that, in most cases as inflation rates move upwards, exports move downwards in some of the cases. A case in point is in 1983, when inflation rate went up to 122.87%, exports declined by 33.1%. But in other years, this is not the case because Ghana as exporter of raw materials and commodity does not price its export in local currency but U.S dollars as it was mentioned several times. In 1995, inflation went up to 59.46% but exports grew by 15.43% over that of the previous year. Imports are supposed to have a positive relationship with inflation. As domestic inflation increases, imports are supposed to be cheaper and therefore increase demand for them. But in Ghana, the import growth curve as depicted in figure 5.2 almost follows that of export growth. For example, in 1983 as inflation increased to 122.87% imports reduced by 20.0%. Similarly, in 1995 as inflation went up by 59.46% imports went up by 7.29% even lower that the growth in exports of 15.43%. In Ghana growth in inflation rate is sometimes attributable to imports when the currency depreciates. Ghana's demand for imports (manufactured goods, semi-processed, raw materials, food and fuels) are inelastic. Changes in prices as a result of inflation do not trigger immediately significant changes in demand.

Commodity prices on the international market: Changes of commodity prices in international market definitely have an impact of BOT in Ghana. But its direction is uncertain. For instance, in recent years despite Ghana being exporter of crude oil, increase in petroleum prices has been worsening BOT and fueling high inflation. Ghana imports finished petroleum products and gas to about five times more than the value of the crude oil it exports (*Ghana Oil and Gas Sector*, n.d.). Also, most of the MNCs in Ghana imports semi-finished goods or raw materials from their related companies in other countries. This make the price of their locally manufactured goods dependent on the price of imports. The export price of finished goods by these MNCs to other West African countries are sometimes controlled by their parent companies through transfer pricing mechanisms as it will be described in the FDI underpinning theories.

Increase in economic growth: Ghana's GDP has been growing consistently from 1984 at varied rates.

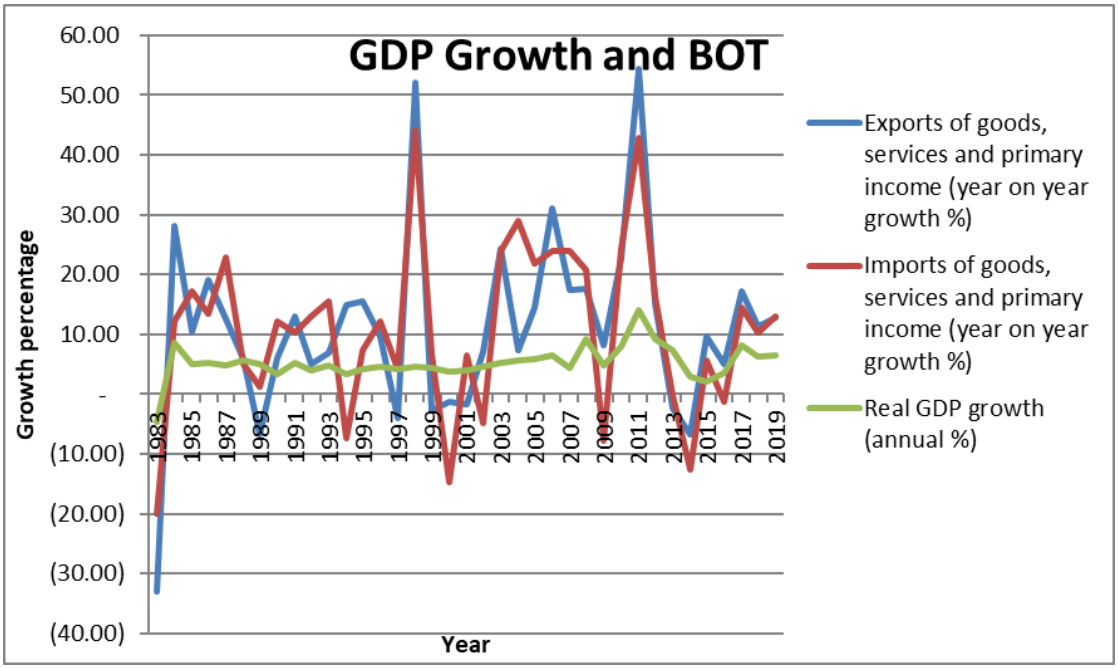

Figure 5.2 GDP growth and balance of trade as they move along the period 1983 to 2019

Source: World Bank and Author's calculation

What is seen at the Figure5.2 as the GDP grows, international trade both imports and exports also grew. In 1984, the GDP grew by 8.65% (from -4.56% in 1983), the imports grew by 12.6% in 1984 (from -20% in 1983) and exports grew by 28.08% in 1984 (from --33.1% in 1983). In 2011 GDP growth was 14.05% (from 7.9% in 2010), imports grew by 42.79% (from 24.38% in 2010) and exports grew by 54.38% (from 22.7% in 2010). In 2017 GDP growth was 8.14% (from 3.45% in 2016), imports grew by 14.44% (from -1.27% in 2016) and exports grew by 17.16% (from 5.04% in 2016). However, one should opt for explanation that the growth in exports influences the level of GDP growth not vice versa.

Government policies: Trade positions of a country is affected by policies of the Government. These economic policies directly affecting foreign exchange can take the form of:

- Subsidy for exporters which make exports cheaper. Examples are subsidies on loans, free zones and free ports with all the related tax incentives. In Ghana, the government does not tax most exports. Tax rebates are given in the form of duty drawbacks for raw materials and goods used to produce goods for export. Also, the Ghana free zones regulations grant 10 years corporate tax holidays for companies operating under the free zone. They are required to export not less than 70% of their output(Free Zone Act, 1995).These measures have help in increasing the non-traditional exports of the country. Between 2018 and 2022, the

non-traditional exports have been growing on average 6.86% annually (Ghana Export Promotion Authority, 2022)

- Restrictions on imports through the use of tariffs and quotas. Tariffs make imports expensive thereby reducing their demand or make imports expensive for consumers and thereby shifting to buying of locally manufactured alternatives. This method can act as a means to save local industries. Quotas restrict the volume of imports into the economy. But these policies could also attract retaliation from other countries and also lead to trade wars among them. In 2014, the Ghana Ministry of Food and Agriculture implemented the "Poultry and Livestock import policy" which restricted the importation of livestock and poultry products by an importer to 100 tons every 3 months. As a result of Government policies, the livestock production index for Ghana which was 94.18% in 2013, went up to 96.39% and 101.65% in 2014 and 2015 respectively and it has been going up since then (*Ghana | Data*, n.d.).

But there are some other policies that influence trade indirectly such as monetary policy, budget policy but also policies supporting R&D, attracting FDI or supporting development of national production. In the African context worth mentioning is piracy restriction.

Combating piracy: Restriction on piracy makes it illegal to deal in unlicensed products. This will increase imports and therefore its lack will allow people to counterfeit licensed products or violet copyrights. This will ultimately affect the volume of licensed goods and services that can be imported. Also, it helps reduce the level of imports and may increase export if some of the products are directed to the international market. In Ghana, the Ghana Copyright Office is responsible for the protection of intellectual property rights. The office was established in 1985 and is a department under the Ministry of Justice which is responsible for the administration of copyright in Ghana. The Copyright Act, 2005 (690) gives legal backing to the work of the office. The section 5 of the Act give rights to Authors of any protected copyright work to "the exclusive economic right in respect of the work to do or authorize the doing of any of the following: the reproduction of the work in any manner or form; the translation, adaptation, arrangement or any other transformation of the work; the public performance, broadcasting and communication of the work to the public; the distribution to the public of originals or copies of the work by way of first sales or other first transfer of ownership; and the commercial rental to the public of originals or copies of the work" (Copyright Act, 2005 (Act 690), 2005).

Exchange rate movement: Movements in the value of a countries currency (appreciation and depreciation) affects its international trade position. Currency depreciation makes the price of domestically produced goods cheaper compared to imports all things being equal which may

drive up demand for locally manufacture goods and reduce imports. Depreciation of the local currency may also affect increase demand for the country's exports. Appreciation may have opposite effect. But Ghana cedi depreciation a very little effect on Ghana's trade balance because of the inelastic nature of export supply and import demand.

Exports: Ghana's exports are mainly made of raw materials and commodities' These products mostly have inelastic supply. The prices are also quoted in US dollars as dictated by the world market. Depreciation of the local currency therefore have no effect on the prices that are quoted to buyers hence the trade balance but rather affects to profitability of the exporting companies.

Imports: Ghana's imports are mainly finished products, machinery and fuel. All these are necessity for economic development. As a result, the demand elasticity of Ghana's imports is inelastic and therefore changes in prices do not necessarily affect the trade balance much.

Interest rates (MPR): Interest rate affects the cost of borrowing which may ultimately affect production cost. Higher interest rates may affect the ability of companies to expand which will negatively affect exports. Lower interest rates may increase the ability of local companies to either increase export production at competitive prices or compete with imports on the local market to reduce imports. Increase in exports or reduction in imports will positively affects the country's trade balance.

The review of the factors influencing BOT seems inconclusive. With exception of the trade policy they might work in different directions. Both real GDP growth and inflation can have positive or negative relationship with the BOT (or lack of clear relationship) depending on circumstances. Although trade policy is very important factor that affects the BOP of a country, it is not included as one of the independent factors in the BOP model (in chapter 8), because since the economic reforms that started in 1983, Ghana's trade policy has been aligned with directives of the IMF which has acted as the main advisory body for the trade policy implemented by Ghana. This has therefore not created significant change in the country's trade policy which may significantly affect the BOP.

5.4.2 Factors affecting the capital and financial accounts

Capital Account: It "registers the acquisitions or disposal of non-financial and non-produced assets. This includes the exploitation of natural resources, such as mineral, forest, or airspace." (Terra, 2015, p. 12). A key condition in such a case is change in the ownership of the right to exploit. The capital account also includes the value of financial assets sent across

from the domestic country by people who move to a different country. This includes the value of patents and trademarks that are sent to other countries. If a copy right is sold to a company in other country, it is treated as a credit to the domestic balance of payments account, and if a local company buys a patent right from a foreign company, it is treated as a debit to the domestic balance of payments account. Moreover, the account registers forgiveness of foreign debt between countries, as well as capital transfers including those from international financial organizations like the World Bank.

Financial Account: It alludes to particular investment items, such as portfolio investment and Direct Foreign Investments. Transactions reflecting inflows of funds provide positive figures (credits) for the balance of the country for all three accounts, while those reflecting outflows of funds produce negative numbers (debits) for the balance. The account is influenced by following components:

- Foreign Direct Investment (FDI)– they have been discussed in the previous chapter,
- Foreign Portfolio Investment (FPI) – transactions involving long-term financial assets (such stocks and bonds) between nations that have no bearing on the transfer of control. This involves lending capital to get return but no control over the use of the capital and indirect investment.
- Foreign Institutional Investment (FII) – It involves the purchase of financial assets by an investment fund in a country outside where it is registered. It may also refer to foreign companies investing in the financial market of another country. These institutional investors include insurance companies, pension funds and hedge funds. All these companies need to do is to be registered in the stock exchange to enable them to make their investments. They may also be involved transactions in the area of short-term financial assets such as money market securities in different countries.
- Financial Derivative – buying or selling financial derivatives, which are financial contracts between two parties where the value is derived from another financial asset, such as bond, share, or market index. Instead of money changing hands, risk is exchanged between participants in these transactions.
- Reserve Assets – the acquisition or disposition of reserves held by the Central Bank. These reserves are assets that the Central Bank manages to achieve policy goals including intervening in the foreign currency market.
- Other Investment – monetary exchanges that do not fall under one of the other categories. An example is "trade credit," when an importer buys items from abroad but does not

pay for them until they arrive. Also "currency and deposits," which refers to the transnational deposit or withdrawal of funds from banks as well as the transnational movement of coins and banknotes (Bank of Australia, n.d.).

FDI therefore measures the expansion of companies' foreign operations whiles FPI, FII and Financial Derivative measure the net flow of funds as a result of financial asset transactions between individual or institutional investors in different countries.

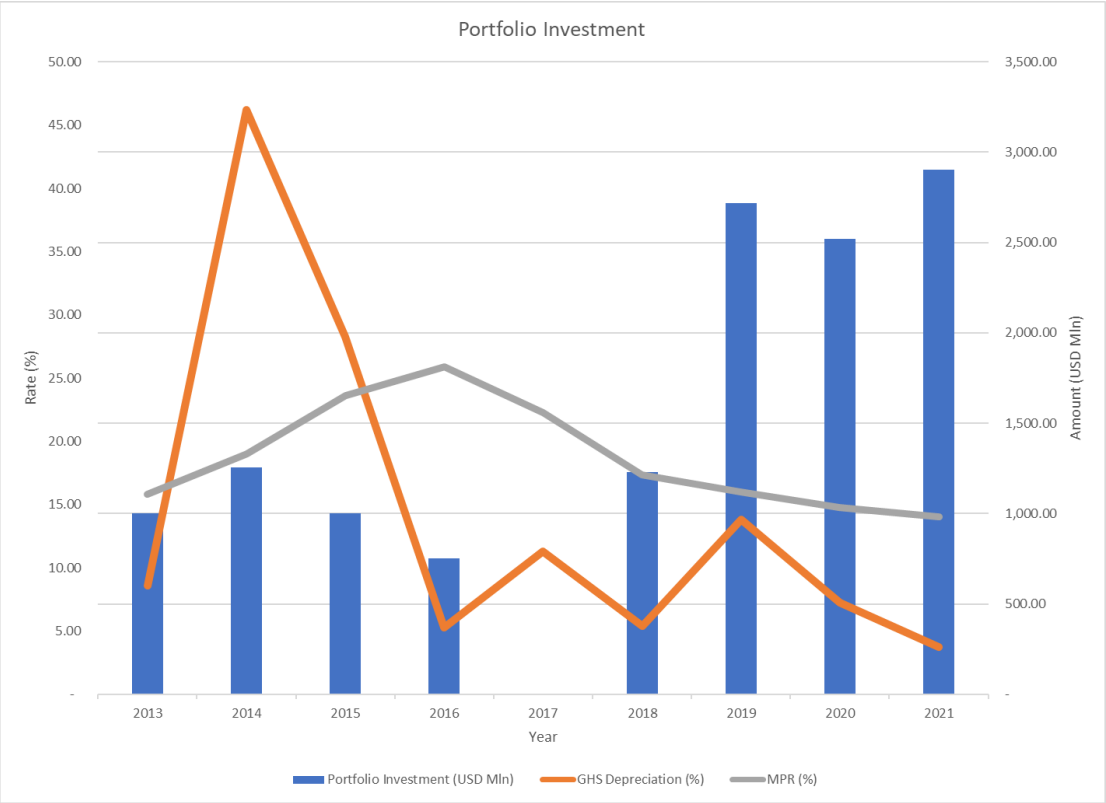

Figure 5.3 Currency depreciation and portfolio investments in Ghana

Source: World Bank and Author's calculation

From the figure 5.3 it is clear that investors decision regarding portfolio investment in Ghana is influenced by their anticipation of the Ghana cedi performance against international currencies especially against the U.S Dollar. Where the investors anticipate a significant depreciation of the local currency, they will reduce their portfolio holdings. The investors may also take advantage of arbitrage that may result from the depreciation of the Ghana cedi and higher interest rate or returns to investors on the financial markets. Using the MPR as a proxy for interest rate, where investors anticipate a significant positive difference between the interest rate and the currency depreciation, they increase their holding of Ghanaian portfolio investment. For instance, in 2018 and 2021, foreign portfolio holdings went up to USD1.25 billion from

practically zero holdings in 2017 and USD2.9 billion in 2021 from USD 2.5 billion for previous year 2020, whiles the MPR rate was significantly higher at 17.75% in 2020 and 14% in 2021 against currency depreciation of 5.4% in 2018 and 3.75 in 2021.

Taking into consideration the presented above analysis one can identify the following factors that may affect the capital and financial accounts:

- Global economic conditions
- FDI policies,
- Access to Financial Markets;
- Exchange rate movement;
- Market size and prospects of growth;
- FDI.

Global Economic Conditions: Capital flows may be affected by general global economic conditions like economic crises or recessions. Investors may return money to safer markets in difficult times. In recent times, more investment is moving from developing economies like Ghana to the developed Countries due to the credit crises affecting most countries especially developing ones. Higher inflation and resultant increase in monetary policy rates by the various central banks makes investment in Government bonds and treasuries more attractive in the countries like the United States of America.

Foreign Direct Investment (FDI) Policies: The amount of FDI inflows can be affected by a nation's FDI policies and regulations which may include ownership regulations, profit repatriation, tax incentives and sector-specific limitations among others. In Ghana, FDI policies and regulations are develop in conjunction with the GIPC.

Access to Financial Markets: The capital account may be impacted by the availability of efficient financial markets, such as stock exchanges and bond markets, which may stimulate participation from both domestic and international investors. The Ghana stock exchange until recently has been one of the high performing markets in the West African sub-region and Africa as a whole. Ghana has also been participating in the Eurobond market since 2007.

Exchange rate (currency depreciation) and inflation (interest rate): In situations where interest rates increase and currency depreciation stays lower, foreign portfolio investors may take advantage of an arbitrage that may ensued. As depicted in Figure5.3 above, in 2018, FPI in Ghana went up from practically zero to USD1.23bln. The MPR rate in 2018 was 17.33% and currency depreciation was 5.4% which gives room for foreign investors to take advantage of an arbitrage.

Market Size and Growth Prospects: Larger markets with promising development potential frequently draw international capital. Investors look for opportunity in nations with growing consumer markets and promising economic outlooks. Ghana has been trying to act as the gateway to West Africa and with the inception of AfCFTA, investing in Ghana give access to the whole African market.

FDI: FDI has a direct impact on financial account as it was described above.

The FDI, GDP growth rate (as proxy for growth prospects), inflation and depreciation have been selected out of the above listed factors as independent variables that might explain the performance of financial and capital accounts in Ghana. Some other factors such as access to financial markets, global economic conditions and governmental policies as well as market size were not taken into consideration in this model. The main reason was difficulty in their proper quantification in the monthly intervals. Market size could be quantified but it changes very slowly in Ghana and mainly due to GDP growth. Commodity prices on the international market were disregarded to the aforesaid MNC pricing policies that distort the impact of these prices on BOP in Ghana.

Summing up, currency depreciation (CD), INF (inflation), GDPG (gross domestic product growth), FDI (foreign direct investment), and BOT (balance of trade) are selected as the main factors affecting BOP in Ghana. They act as the independent variables and the BOP is set as the dependent variable. The short and long run collinearity between the variables are performed in chapter seven (research chapter). Since the two biggest items in Ghana's BOP are FDI and BOT the decision was to check their relationship with Ghana cedi depreciation separately. This is important since according to the economic theory this relationship might be crucial for understanding the economic patterns in Ghana.

CHAPTER 6
TRADE AND FDI IN GHANA

Ghana is a country of which prosperity depends a lot on trade (both export and import) and FDI. This chapter examines both notions to decide whether they should be used as dependent variable in the research analysing relationship between cedi depreciation and macroeconomic performance of a country. In this chapter their mechanisms and patterns are examined. key factors influencing them are identified (they are necessary as control variables in aforesaid quantitative research in chapter 7) and the underpinning theories guiding further research are selected.

6.1 Understanding Trade in Ghanaian context

Many countries trade with almost every country provided it will yield economic benefits to its citizens. Countries may open their economies to:

- increase trade by the country,
- promote diplomatic relations with other nations,
- help improve the standard of living of its citizens through getting access to goods and services that are produced in other countries,
- allocate resources and production capabilities to areas where the country has competitive advantage over other nations,
- help greater variety of goods and services to enter that country from everywhere around the world. the availability of these goods and services leads to maximization of utility of the citizens.

Close economies are countries which restricts the free trading activities with other countries. This restriction may be based on ideological reasons. Countries may close their economies to other nations to protect domestic producers. These countries may open their economies later when they feel their domestic producers are strong enough to compete and take advantage of opportunities in other countries. Closing a country’s economy may lead to:

- less consumer choices for its citizens,
- consumer utilities may reduce as a result of reduction in the variety and supply of goods and services,
- reduction in the standard of living of the citizens.

Most countries would normally like to take advantage of the benefits of an open economy to improve the wellbeing of their citizens. Open economy allows free flow of goods, services, resources and international investments in and out of an economy (see also Appendix 3). However, for countries such as Ghana foreign trade might also augment its development trap. Weaker trade partners in many cases are not allowed to climb up in the supply chain to be engaged in its value added richer segments although the example of "Asiatic tigers" shows that such upgrade is possible. It would usually require conscious complex development policies, conducted by national governments, often with a support of international financial organizations. However, in the aforesaid Asiatic case first development stimuli came from a foreign trade.

Trade as is being conducted among nations is underpinned by different theories which help to explain the observed trade or the characteristics of trading countries in order to deduce what they actually trade in and why. They also help to ascertain different models and patterns of international trade, to understand the benefits and effects of trade on domestic economies, and to evaluate the role of government intervention through various types of policies that affect imports and exports, such as subsidies, tariffs, and quotas. These theories have been described in depth in the Appendix 3. In this chapter their relevance for Ghana is discussed (Table 6.1).

Table 6.1. Selected trade theories and their relevance for Ghana

Theory	Relevance	Justification
Mercantilist theory	Not relevant	Ghana has never aimed at permanent positive BOT and such situation would be dangerous for its long-term development
Absolute advantage by Smith	Partially relevant	Ghana is specialised in its foreign trade in the commodities that cannot be produced in its trading partners (cocoa, gold, oil)

Comparative advantage by Ricardo	Partially relevant	In exchange of its export Ghana can obtain goods production of which would be impossible or very costly (in relative terms) in the country
Opportunity cost theory by Haberler	Partially relevant	Ghanaian opportunity costs predestine it for production of raw materials, however the increase of the export production in Ghana hardly leads to the changes in opportunity cost so its trade structure remains stable and import substitution does not occur (constant marginal opportunity costs, constant slope of a production possibility curve).
Heckscher-Ohlin factor endowment theory		Ghana is specialised in the production of goods for which it possesses specific factor endowments, however this hardly leads to increase of the prices of this factor (wages). The issue lies in the substantial surplus of redundant labour in agriculture, which impedes the growth of real wages even in other sectors.
Reciprocal demand theory by Mill	Relevant	Ghana faces low price elasticity both in export and in import and this is the main factor resulting in foreign trade inertia as far as trade structure is concerned.
Economies of scale by Krugman	Not relevant	Ghana is not engaged in inter industry trade, and the economies of scale are not prevalent in the Ghanaian industries.
Technological Gap theory: by Posner	Not relevant	The the spread or transmission of new technology to Ghana is very slow. Ghana has structural problems to accommodate new technologies (lack of human capital, institutional problems, geography and accessibility)

Product life cycle theory by Vernon	Not relevant	MNCs in Ghana are concentrated in the raw materials sector and they are not willing to bring to the country more advanced parts of the supply chain (offering larger added value). This might be changed but mainly through external policies and incentives.

Source: own compilation by the Author

Ghana as an open economy has trade relationship with almost all other countries in the world. Ghana exports natural resources and goods that it has comparative advantage and imports goods and other resources from other countries. In the econometric study of Zimbabwe experience of BOP as a money phenomenon, (Dhliwayo, 1996) cited the unfavourable changes in the global economy that the Zimbabwean government had little or no control over as one of the main factors contributing to the external imbalance of the country's trade position. These changes included abrupt shifts in trade agreements, abrupt rises in oil prices, repayment of external debt, an increase in protectionism, and a recession in western industrial nations.

Ghana trade during the colonial days was designed on the classical theory of absolute advantage. Ghana's natural environment which is tropical climate and its location gave the country an advantage of production of forest products. Ghana was therefore made to export timber and later on cocoa it had and still have absolute advantage in its production. The country also had a lot of minerals with gold being in the first place. That is why the colonial authorities named the country the Gold coast and gold was also exported in huge volumes. Since manufacturing was not encouraged until independence, the theory of comparative advantage was considered only after independence. Ghana started processing raw materials into finished and semi-finished products before export.

After the overthrow of Dr Kwame Nkrumah and the first republic in 1966, the international trading relationship was more modelled along the neo-classical theory with the opportunity cost theory of Gottfried Harberler, Ghana under the financing of condition of the IMF and the World Bank gave up on a number of its manufacturing projects started by the Nkrumah government and resorted to the importation of those previously manufactured goods despite the fact that the theory concentrates on only trade between two countries with two

commodities and two factors of production (labour and capital). Modern economy and trade depend on multiple products, among multiple countries and more than two factors of production. The theory also assumes full employment, price of each commodity is equal to the marginal cost of production, perfect completion and commodity and factor markets as well as no restrictions on international trade. J.S Mill's theory of reciprocal demand, the actual ratio at which commodities are transacted between two countries depends on the strength and elasticity of each countries demand, quantities of export that a country will offer at different terms of trade in return for various quantities of imports. This resembles the situation of Ghana and most SSA countries whose export of raw materials have elastic demand and imports of finished and semi-finished goods have inelastic demand in these countries. The neoclassical theory therefore holds that, the differences in technology between Ghana and SSA countries and that of the developed nations (mostly European countries, United States of America and currently China) trading partners, endowment of factors (labour at different skills levels and capital) and the cultural preferences determines the direction of trade.

Ghana since 1983 have been reforming its economy and this reform also affected the trade policy of the country. The country's merchandise trade now stands over 40% of GDP (*World Development Indicators | DataBank*, n.d.). Comparing groups of nations with highly restrictive trade policies that later liberalized them with groups that had equally stringent trade policies but no liberalization. After trade liberalization, the average growth rate has been much higher than it was in the earlier period which has been the case in Ghana too. However, when this change in growth rate is contrasted with that for nations that did not liberalize trade, we discover that the growth rate after trade liberalization is not materially different from that before to trade liberalization. Trade liberalization does not result in higher growth rates since the boost in growth that occurred in liberalizing countries also occurred in non-liberalizing countries (Kneller, 2005).

Out of the theories discussed in Tab. 6.1, it seems that nowadays the most relevant is the one dealing with export and import elasticity. As mentioned several times in this thesis both of them are low in case of Ghana. The sum of both elasticities is below 1 (see Marshall Learner condition described below) This rise a fundamental question about the impact of cedi devaluation of Ghanaian foreign trade.

The effect of devaluation on current account depends on: how it affects income and how it affects absorption. If the devaluation can raise domestic income than domestic absorption, then current account will improve but if the opposite is true then it will worsen the situation of the current account. Devaluation of a nation's currency affects National Income in increasing production of export and import competitive goods. If there are unemployed resources in the economy then devaluation will lead to increase in national income but at full employment, devaluation will lead to increase in price levels. Also, at full employment, devaluation may lead to deterioration in the terms of trade. Imports become expensive and exports become cheaper. The exception to this will be in the case of developing countries whose exports are not priced in their own currencies. Example, Ghana like many developing countries that export raw materials and commodities like cocoa and oil are price-takers, they therefore depend largely on global trade which is mainly conducted in U.S. Dollars.

Devaluation of their local currencies has very little or no impact on their terms of trade (*World Bank Explains Why Cedi Keeps Falling and US Dollar Keeps Winning - MyJoyOnline.Com*, n.d.) because all exports and imports are mostly priced in the U.S. Dollars. But to enhance their revenue from the products where they have significant competitive advantage, these countries may introduce export taxes on those specific exports products. Example Cote D'Ivoire has export tax on its cocoa exports which is considered to be an important source of fiscal revenue to the nation (Kireyev, 2010). Ghana also charges export duties on cocoa beans export. In order for devaluation to improve BOT, the Marshall-Learner condition, which measures the sum of the elasticities of demand for imports and exports in absolute terms, must be met (Senyefia, 2019). According to the condition, currency depreciation (devaluation) will only result in a better balance of payments if the combined demand elasticity for imports and exports is higher than one. A J-curve diagram can be used to explain this phenomenon (Figure6.1).

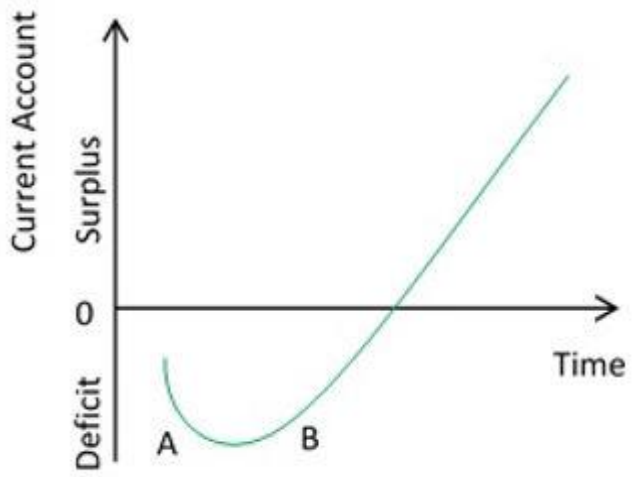

Figure 6.1J-Curve

Source: own compilation by the Author

From Figure 6.1 one can see that if the Marshall-Learner condition is met, current account deficit will initially get worse after devaluation, at point A, because pre-existing trade agreements indicate that the demand for imports and exports will continue to be very inelastic. As a result, it's possible that the volume of imports and exports would not change much (Adebayo, 2021). As consumer tastes and preferences change and business contracts shift over time, the demand for imports and exports becomes more elastic starting from point B. The expected effect of greater exports following depreciation will therefore gradually materialize. However, figure6.1 gives no or little hope in Ghana's situation. Thus cedi depreciation may not increase volume of export and decease volume of import even in a long run.

Of course one should also notice that some of the trade theories considered as non-relevant for Ghana might change entirely the economic situation of the country if their conditions are met. The will serve us for formulating recommendations in the concluding chapter. However, cedi depreciation or appreciation should not be seen as a primary condition of putting them into motion in Ghana. Instead deep structural reforms are necessary in terms of human capital accumulation, social capital building, institutional improvements (in the sense of this notion as defined by North, (1991) and diminishing the accessibility barriers (e.g. broad-band internet, transport infrastructure). However, this discussion is slightly beyond the focus of this thesis.

6.2 Trade in Ghana

Although foreign trade flows will not be subject to the further research (as dependent variable) some key stylized facts on Ghanaian trade night be presented here. This is important since import and export have been already identified as control variables.

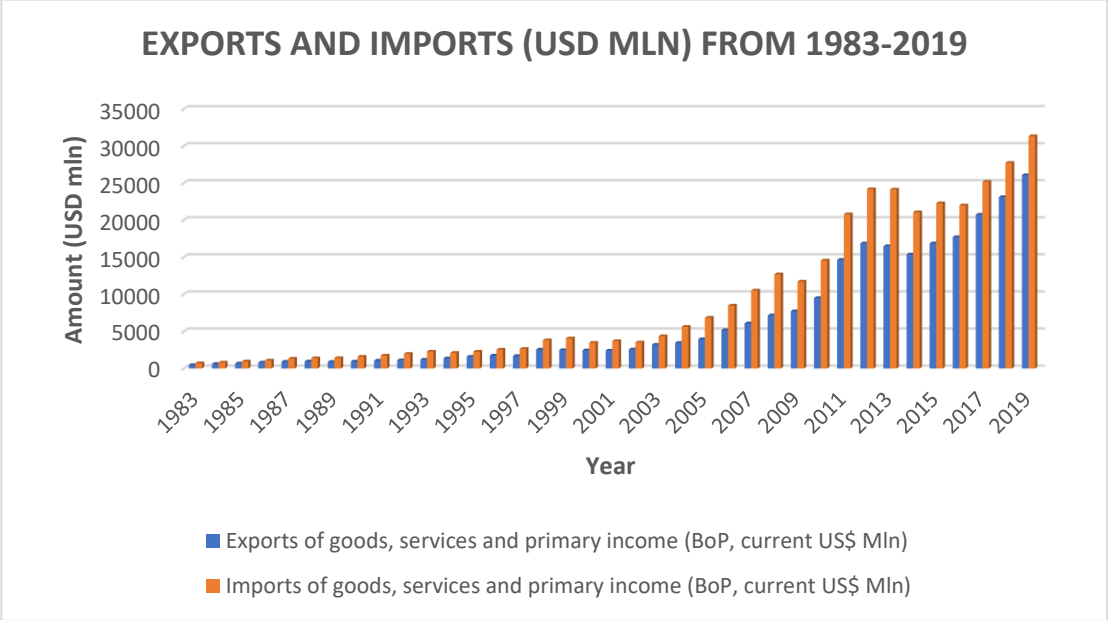

Figure 6.2Exports and imports of Ghana from 1983 to 2019

Source: World bank

The major components of Ghana's international trade and their movement over period can be identified. Imports of goods, services and primary income are very prominent. Ghana's import has been growing steadily but began to move rapidly in 2006 when it went up by 24% over 2005. As a result of the debt forgiveness which the country received during the HIPC program, its capacity to borrow was increased and that also gave the opportunity for high imports. It reached a record high of USD 24.18 billion in 2012 before easing a little in the following year. It is worth noting that Ghana's import consists of Machinery, food, fuel and energy, manufactured goods, raw material and semi processed goods to feed industry. International price of commodities and energy resource directly affects the value of imports. Changes in the price of crude oil for example, directly affect the level of imports and also the cost of electricity which in turn affects the price levels or inflation. The service component of imports e.g. consultancy services, technical assistance and payment to expatriate is significant. Most multinational companies operating in the country charge royalties for their

brand names, technical assistance for the production technology and expertise knowledge in addition to payment for the expatriate staff that is employed to work in the country. In 2011, imports went up 43% as against 2010. This can be attributable to increase in the import of oil and gas industry since that was the beginning of the mining of oil in commercial quantities for export. The high level of imports continued to 2013 as more expatriate workers and technology was imported for the new oil industry. In 2015, Ghana suffered an acute shortage in electricity production. The country therefore took a decision to import a number of light crude oil and gas-powered electricity generators to support the shortage. Power was also imported from Cote D'Ivoire to support local electricity production. As a result, imports went up by 6% above the 2014 level and reached a recent period high of 43.63% of GDP. By 2019, the imports have gone beyond the USD 31 billion. Imports in next years have being declining due to the covid-19 pandemic and the resultant logistical issues as well as import substitution that have emerged to take care of the shortage in imports. Recent events like the war in Ukraine and the sanctions against Russia with its resultant increase in the price of petroleum products, gas and food may push up the import bill for Ghana.

Exports have been growing but were not steep. Growth in exports was mainly determined by prices of commodities on the world market. Exports began to grow rapidly from 2006 with over 31% above that of 2005. This could be attributable to increase in cocoa production during that period. Increase in cocoa production began to drive export revenues high until 2011 when Ghana began to export oil in commercial quantities. Export increase by 54.38% over that of 2010 and was 36.94% of GDP of that year. By 2012, the additions of oil revenue have moved the export revenue to a high of over USD16.8 billion. The growth in exports was 15.13% over that of 2011 and 40.36% of GDP. But following the slump in oil prices, the oil revenue began to reduce which affected the export revenue negatively. It went down by 2.3%. By 2017, improvement in commodity prices drove up the export revenue by 17.16% and kept export revenues above 35% of GDP from 2017. Increase in cocoa and gold production and new investment in the oil industry pushed export revenues upward and by 2019, it has passed the USD 26 billion mark.

With the help of organizations like the World Trade Organization (WTO) and General Agreement on Tariffs and Trade (GATT), which were created to encourage free trade among nations throughout the world, international commerce has significantly contributed to the growth of both industrialized and developing nations. Their primary focus has been on

promoting free trade and removing or reducing trade obstacles. This is due to the advantages that free trade offers to many nations around the world. Three basic advantages that Ghana has recently reaped as a result of globalization and international commerce include quicker economic growth, poverty reduction, governance promotion, and enhanced product qualities at cheaper prices as a result of foreign competition. According to the World Bank, economic expansion has raised life expectancy in developing nations, including Ghana, by an average of almost twenty years and by over a decade in rich nations. The connection between international trade, globalization, and the reduction in poverty is mostly due to the numerous job possibilities that are produced by foreign investments. It might be argued that this has lowered Ghana's unemployment rate.

6.3 Understanding FDI

As indicated in the previous subchapter countries trade with the others because of uneven distribution of natural resources. Natural resources, such as minerals, oil, and forest resources, are not evenly distributed among nations. International price differentials due to differences in productivity, technology, factor endowment, and economy of scale, which provides a cost advantage as well as product differentiation and market structure are important factors shaping foreign trade. As a new source of investment capital (foreign savings), FDI has the potential to significantly contribute to the growth of productivity and trade in emerging economies by that changing their trade position and initiate Big Push (Rosenstein-Rodan, 1943) in particular a take-off (Rostow, 1960). Additionally, FDI flows incorporate complementing growth elements such as technology, knowledge, managerial experience, and capital (Robert, 2007). However, some studies show that the FDI may tend to locate in higher productive and fast growing countries, thus FDI inflows may be attracted to economies of high growth rates and markets (Hansen & Rand, 2006; Hsiao & Hsiao, 2006) and not the emerging ones like Ghana.

FDI means investments made in fixed assets that can be used to run businesses abroad are referred to as overseas investments. Examples of foreign direct investment include a company buying another company, building a new manufacturing facility, or expanding an existing facility abroad. In this case, the investment need not to be 100%, must be a real investment and faces the market risk. FDI brings additional capital for production, support development of the labour force of the receiving economy and make available new technologies in production. In the short run, FDI has (Rosenstein-Rodan, 1943) been realized

to have a positive effect on economic growth in developing countries (Herzer et al., 2008). In Ghana, FDI have played a strong role in development of high technological industries as well as the extractive industry. Companies like Newmont and Goldfields in the mining industry and Tallow oil in the oil and gas sectors are examples. According to economic theory, there are numerous advantages of FDI. Some of which are that FDI inflows promote capital accumulation by increasing domestic savings and improving resource allocation, fostering competition, enhancing human capital, expanding domestic financial markets, lowering local capital costs in the recipient country and also foreign high-level technology becomes available to the country. Over the past few years, economic reforms in the areas of trade openness and governance have emerged as the cornerstones of growth strategies in most countries including Ghana (Hausmann & Rodrik, 2002; Kandiero & Chitiga, 2006). It is believed that FDI may help in improving economic situation of countries if the right policies are adopted and also if those countries reach a certain level of development (Wang et al., 2022).

However, there are some disadvantages such as worsening of BOP because of the repatriation of earnings by foreign investors. It is also believed that the higher the contribution of FDI from a single country to the GDP of a particular country, the likelihood that there will be interference in the political economy of that country. For instance, countries with higher levels of United States of America based FDI in the GDP of their economy are likely to suffer more from United States of America sanctions on that country (Biglaiser & Lektzian, 2011; Lektzian & Biglaiser, 2014). FDI can also deepen the issue of dual economy, where the MNCs will train few workers to work in their organizations. These workers earn relatively more money than those of the workers who work in the traditional sector which is mainly agriculture and non-formal jobs. To help breach the gap between the informal or traditional sectors and the formal sectors, Ghana Government in 2007, started the current technical and vocational education and training (TVET) reforms. These reforms are aimed at increasing the skills and employability of the Ghanaian worker especially the youth to enhance their productivity as well as that of the economy (Kondo et al., 2021). In Ghana, the GIPC regulations allows free repatriation of proceeds from investment without hindrance and also allows MNCs in the extractive industry to retain higher portions of export proceed in foreign banks.

Contemporary theories explaining FDI behaviour seems to work in Ghana (Table6.2). They are presented in depth in the Appendix 3.

Table 6.2 Main FDI theories and their relevance for Ghana

Theory	Relevance	Justification
The Theory of Exchange Rates on Imperfect Capital Markets	Relevant	MNCs by location in Ghana can reduce transaction costs and gain a competitive advantage.
The Internationalisation theory by Buckley and Casson,	Relevant	Ghana is a country with weak intellectual property rights, licensing makes little sense in such a situation. FDI offer better solutions in such a case. All these attracts FDIs possessing necessary skills and patents. Consequently, Ghanaian enterprises have low incentives to invest in research and development (R&D). Moreover, MNCs operating in Ghana enjoy additional benefits, such as taking control over the entire supply chain, exerting excessive market power, and using internal transfer pricing to reduce their tax liabilities due to administrative insufficiencies in Ghana. Also growth of Ghanaian market might attract FDI. Important role in attracting FDI is played by costs of overcoming distance. Development of transport infrastructure in Ghana thus plays a catalytic role.
Eclectic Paradigm theory by Dunning	Relevant	Ownership guarantee, trade openness, location (access to raw materials), and internalization benefits (see internationalization theory) should drive foreign direct investment to Ghana. Also Some factors can discourage FDI like inflation, lack of political stability, high market uncertainty and some others

Source: own compilation by the Author

In Ghana, FDI has been part of the economy since colonial days when the colonial masters invested in mining and timber companies to exploit these natural resources which were exported to their countries. Also, the periods before and immediately after independence also saw foreign investments in the trading and fast-moving consumer goods industry. Companies like JB Olivet and UAC were dominant in the trading sphere together with a number of Syrian, Indian and Lebanese trading companies. After independence, the Nkrumah Government in order to achieve its import substitution program, tried to help create local firms to compete with the foreign ones. FDI was still prominent in either Joint Venture Companies with the Ghana Government or fully owned foreign companies. VALCO, a subsidiary of the American aluminium consortium Kaiser-Reynolds was established in Ghana to take advantage of the available power generated by the Akosombo Hydroelectric Dam project to establish an Aluminium smelter in Tema. Companies like Lever Brothers (Unilever) and Nestle have established manufacturing plants in Ghana.

Kandiero & Chitiga, (2006), conducted an analysis that covered different periods (1980–1985, 1985–1990, 1990–1995, and 1995–2001) between 1980 and 2001 in selected African countries. The study considered different aspects of trade openness, including trade openness in the total economy, openness in manufacturing industry, primary commodities, and services. The results indicated that trade openness have positive effect on FDI inflows, particularly in the services sector. They concluded that, African countries with greater trade openness have higher FDI to GDP ratios. This implies that increased trade openness results in greater attractiveness for foreign investors.

Other factors which also play a role in determining FDI and multinational companies' activities are defined in the OLI (Ownership, location, and internalization) variable triangle. The OLI triangle of variables play a critical role in influencing the activity of MNCs and attract foreign direct investment. This structure was compared to a "three-legged stool, where one leg supports the others and the stool only works when all three legs are in balance" (Dunning, 2009, p. 45).

Buckley & Ghauri, (2014) conducted a study to review literature on how ownership and placement strategies relate to economic geography and ideas of globalization with the aim of identifying new research opportunities. They also investigated the conflicts between markets and economic management in the context of globalization and contended that the different rates of globalization across markets provide a variety of difficulties for

decision-makers in local, national, and regional governments as well as in international organizations. In Examining the shifting location and ownership strategies of MNCs, they revealed how managers' increasingly sophisticated decision-making is slicing up business activities more profoundly and deepening the global division of labour by locating in different places which is best for each narrowly defined activity. The complexity of ownership methods is also arising, creating a control matrix that includes joint ventures as alternatives for future decisions making and going from completely owned units through FDI to market linkages like subcontracting. Thus, it is becoming increasingly crucial to apply economic geography knowledge when analysing trends in global trade.

Galan et al., (2007) conducted a study that examined the most significant factors for and against the location decisions in foreign direct investment made by multinational Companies on the basis of theoretical assumptions approached through the investment development path (IDP) in host countries in Latin America and the European Union which are at very different levels of economic development. Several types of analysis were conducted on a sample of 103 businesses taken from some medium-sized economy that has recently attained the status of developed nation. The findings reviewed that home country company managers' perceptions of the significance of various geographical determinants are somewhat influenced by the level that each group of the host countries has reached in the IDP. It was discovered that business managers primarily consider the factors related to the acquisition of strategic assets when it comes to determining where to investment in the European Union countries. However, social and cultural factors are more influential when these business managers select the location in regions of less developed countries like Latin America. This highlights the significance of historical and cultural linkages between the home and host countries. This situation also applies to Sub-Saharan African countries like Ghana, where during the period pro to independence, most of the FDI came from the country of the colonial masters or related to them through their multinational companies.

Filatotchev et al., (2008) conducted a study to examine the relationships between foreign ownership, managerial decision-making autonomy, and foreign owned companies' export operations in five European Union candidate countries. The researchers used data collected from 434 companies with foreign investments in Poland, Hungary, Slovenia, Slovakia, and Estonia. The results showed a positive relationship between foreign investor ownership and strategic decision-making influence and export intensity, which was measured

as the ratio of exports to total sales. The results showed that foreign equity and foreign control over company operations work together synergistically to affect export intensity. It can therefore infer that FDI affects exports and trade.

6.4 FDI in Ghana

Despite a significant surge in FDI inflows into the African continent, proportion of FDI to Africa has fallen short of that of other global regions like Asia. This could be attributed to among other things perceived corruption, ineffective government, and inadequate infrastructure. However, Resource-rich nations which includes Ghana draw higher level of FDI. Ghana allows other countries to invest in the productive sectors of the economy through foreign direct investments in material, agriculture, mining and accommodation and food service activities among others. FDI inflows to Ghana after the 1983 economic reforms have seen a significant upward trend. The economic reforms gave opportunity to foreign companies to acquire divested state-owned companies. Since then Ghana has seen the growth of FDI annually. With the establishment of the Ghana investment promotion Centre (GIPC) and later passage of the GIPC Act in 2013 (Act 865), the country has made significant strides in attracting FDI for development. Investments by multinational companies in Ghana lead to the creation of new job opportunities as well as enhanced placement options for locally available skilled people. This is made possible by the local subsidiaries of multinational firms' activities recruiting and training unemployed people while simultaneously poaching talented personnel away from local corporations offering better salaries and work conditions (Yennu, 2018).

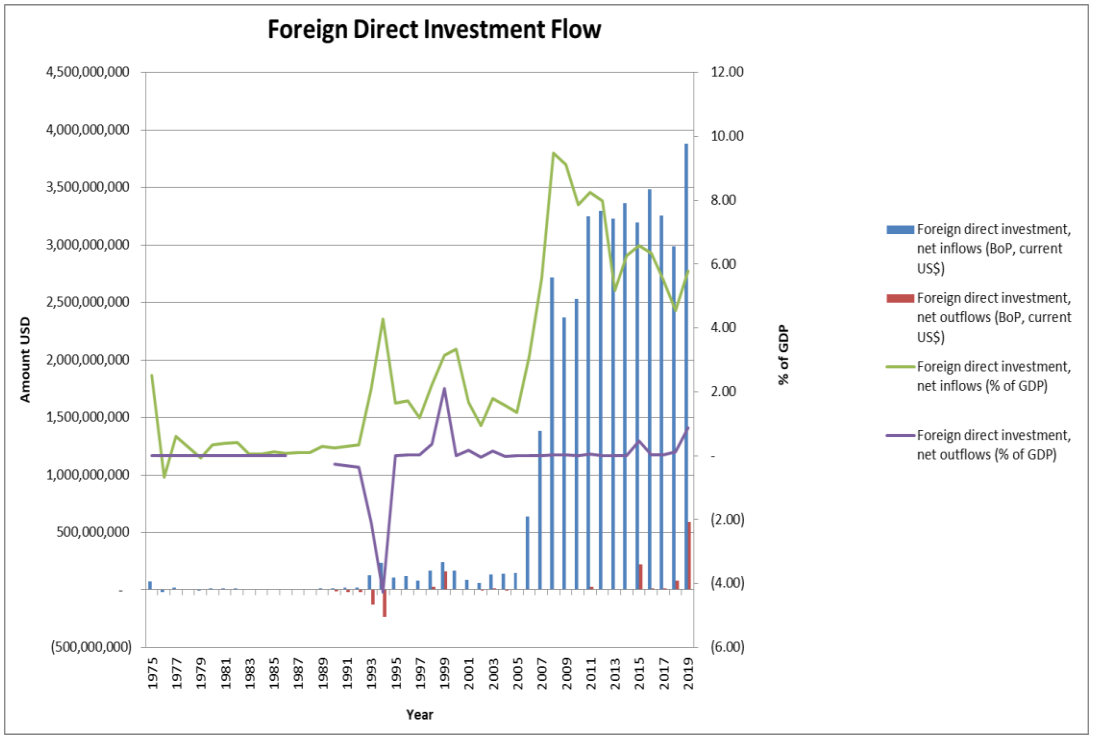

Figure 6.3 Foreign Direct Investment in Ghana in USD and as percentage of GDP in the years 1975-2019

Source: World bank

Figure 6.3 shows the Foreign Direct Investment (FDI) in Ghana in USD and as percentage of GDP in the years 1975-2019. FDI has been increasing by significant amounts especially since 1993. The date marks the inception of the fourth Republic in Ghana (return of the country to democratic rule). According to the world bank data, FDI net inflow move from the low of USD2.4million in 1983 to USD3.89 billion in 2019 (*Ghana | Data*, n.d.), FDI jumped from USD22.5million in 1992 to USD125million in 1993. But in 1997, 2001 and 2005, it recorded net FDI inflow below that of 1993.Since 2006, the net inflow of FDI has been higher each year with very few exceptions.

Just like inflows, there has also been some outflows of FDI during the same period with the highest being USD588million in 2019. Most of the FDI since 2019 has gone to the oil and gas industry.

The FDI net inflow as a percentage of GDP was 2.1% and 4.28% in 1993 and 1994 respectively. It declined to 1.65% in 1995 and to the lowest of 0.91% in 2002. It started growing substantially in 2008 when it recorded the highest rate of 9.47%. Since 2009, it has

stayed at an average of 6.67% of GDP (from 2009 to 2019), with the lowest being 4.56% recorded in 2018 and highest of 7.98% in 2012.

The GIPC Act, 2013 (Act 865) shaped the Ghana Investment Promotion Centre (GIPC) to promote the country globally as a place to invest and attract FDI into country. This has made the investment mechanism in Ghana very easy for foreign investors. The country ranked among the top receiving nations of the FDI in Africa (Yeboah, 2018).

However, environmental groups like Friends of the Earth Ghana, have argued that, the increase in investments in the mining sector brings only short term benefits to the economy and these are achieved at a significant environmental, health and social cost to the citizens (Awudi, 2002). Recently, in Ghana, they have been an outcry of the population against what is known as “Galamsey” (derived from the phrase "gather them and sell", is a local Ghanaian term which means illegal small-scale gold mining in Ghana) for the destruction of farm lands and water bodies.

Sectoral Composition of FDI

Different sectors of the Ghanaian economy have received FDI inflows. Mining has historically been a prominent beneficiary of FDI in Ghana (UNTAD, 2021). Investments have gone into gold, diamond and bauxite mining projects. Following the discovery of oil reserves in 2007and 2008, the oil and gas industry also became well-known attraction to a significant amount of FDI. Foreign investors have also shown interest in industries including manufacturing, agriculture, services, and infrastructure (GIPC, 2018). In the 1990s, apart from the mining sector, investments also went to the manufacturing sector with projects like the Coca Cola bottling plant in Tema. Also significant investments went into the service sector with new hotels being built and new telecommunications projects key among them were Spacefon now MTN and Millicom now Tigo. In recent years FDI has gone mainly into mining, oil and gas, manufacturing, construction, financial services and agriculture (GIPC, 2020).

Source of FDI

Before independence in 1957, most of the investments in the country came from the colonial masters. After independence, Ghana’s economy was open to other countries but most of the investments came from Western Europe and North America. China by far has led the

amount of FDI coming into Ghana in recent years. Ghana has benefited greatly from foreign direct investment flows in the building and construction sector throughout the years. The University of Ghana Drama Studio, Dangbe East District Hospital, and an office complex for the Ministry of Defence are a few finished Chinese-funded projects (Boakye-Gyasi & Li, 2016). They also lead in the number of projects by any single country into the Ghanaian economy as reported by the Ghana Investment Promotion centre in various quarterly reports(GIPC, 2013, 2014, 2018, 2021). The Netherlands, India United States of America, United Kingdom, South Africa, Turkey and Nigeria are some of the countries that invest in the Ghanaian economy. According to Boakye–Gyasi & Li, (2017), the economies of China, India, the United States, and South Africa are most significant sources of foreign investment for Ghana since these countries' investments has helped the country's economy to change. Their share of overall FDI in Ghana was more than a quarter of total FDI value at 27% and 36% of all registered projects from 2000 to 2014, and their total FDI flow to Ghana within the period was around US$ 7.9 billion

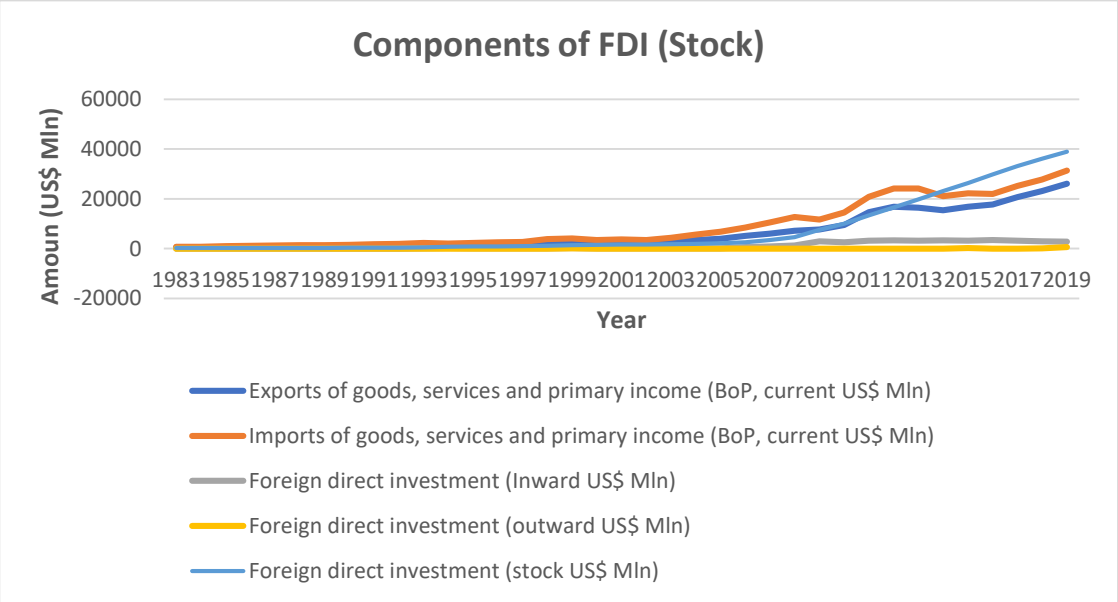

Figure 6.4 Components of Ghana's FDI Stock

Source: World bank and UNTAD

The FDI inflow trend mostly had been upwards since 1983 as shown at the Figure6.4. Between 1983 and 1992, although the economic reform was still ongoing, FDI was not growing very fast FDI moved from USD2.4million in 1983 to USD 22.5million in 1992 (UNTAD, 2021). This could be attributed to the fact that the country was still under military

rule. After the inception of the fourth republic and movement of the country to the multi-party democracy system of governance, FDI moved from USD22.5 million in 1992 to USD125 million in 1993 and USD223 million in 1994. Between 1995 and 1997, FDI came down to a low of USD81.8 million which could be attributed to the difficult elections campaign and the elections itself that took place in December 1996. Investors may have adopted "wait and see" attitude since that was the first time elections were being held after the transition to democracy by Ghana. Similarly, in the year 2000 and 2001, FDI also reduced. This could be in addition to the first time an opposition party has won election from the incumbent and also the declaration of the new government's intention to participate in the Highly Indebted Poor Country Initiative (HIPC) by the World Bank and IMF. In addition to the huge investment made by companies like Newmont in the Gold mining industry, the Government of Ghana made significant efforts to attract investment into the oil exploration sector. FDI went up from USD144.97 million in 2005 to USD636 million in 2006 and reached USD2.7 billion in 2008.

By the year 2011 when Ghana started producing oil in commercial quantities, the FDI has gone up to USD3.25 billion. After this the FDI continued its upward trajectory until 2018 when there was a drop in the net inflows to USD2.99 billion from USD3.255 billion in 2017 and then back to upwards movement in 2019. The outflow was as a result of decline in the prices of Ghana's main export commodities on the international market which affected profitability of MNCs operating in the export sector of the Ghanaian economy.

6.5 Drivers of FDI in Ghana

Taking into consideration theories analysed in this chapter with relevance to FDI one can identify several factors that might contributed to Ghana being one of the attractive destinations for FDI over the years or discouraging their inflow:

- Political stability;
- Natural resources and commodities presence;
- Geographical location;
- Market size;
- Labour availability and quality;

- Business ownership;
- Exchange rate movement;
- Inflation;
- Exports and economic openness;
- GDP growth;
- Credit to private sector;
- Interest rate.

Political Stability: Ghana is politically stable and practices democratic form of governance. According to Ghana's Constitution, elections for both the legislature and the president are conducted every four years (PWC, 2020). The country has put in place democratic institutions and procedures to guarantee good governance and the rule of law in the nation, it is seen as one of the most stable political environments in Africa and arguably, the most stable within the West African sub region.

Natural resources and commodities: Ghana is endowed with a wealth of natural resources, including gold, cocoa, oil, and timber, all of which have served as important trade catalysts. The country is Africa's top gold-producing nation, has the third biggest bauxite deposit in Africa, it is the second largest producer of cocoa in the world. The country also produces oil and has huge natural gas deposits. The country also has deposits of iron ore and manganese. Ghana also has about 563km of unspoiled coastline, 5 million hectares of arable land, 4 million hectares of cultivable land, and 228,792 hectares of irrigable land. These goods support the nation's export revenue and draw FDI to industries like mining and energy (*World Development Indicators | DataBank*, n.d.). In the 1980s and the 1990s, the mining sector was mostly associated with FDI. In various instances, it was used as the yardstick for evaluating the Economic Recovery Program/Structural Adjustment Program. This was mainly due to the sector's ability to return from an economic downturn and become the nation's top foreign exchange earner (Tsikata et al., 2000). The chunk of FDI in the resource extractive industry in recent years in Ghana have gone to the Oil and Gas sector.

Location: Ghana is the closest nation to the center of the earth. The Greenwich Meridian (Longitude zero degrees) passes through Tema in Ghana and the Equator (Latitude zero degrees) is just 5 degrees south of Accra. World-class airport (Kotoka International Airport) which was named the best airport in West Africa and the best in Africa for airport service quality, with the capacity to serve 2–5 million passengers annually. It takes 8 hours on average to fly to Europe and the Americas. Tema Port, one of West Africa's biggest ports, is located in the country's capital and has been modernized to handle 3.5 million twenty-foot equivalent units (TEUs) (*Why Ghana? – Ghana Investment Promotion Centre – GIPC*, n.d.). Good trunk road infrastructure and efficient banking services are important prerequisites for FDI inflow.

Market size: Domestic market appears as a determinant of FDI in many econometric studies. The market hypothesis maintains that once the market attains a size that allow local production to get to reasonable levels of economies of scale then, all things being equal, the level of foreign direct investment in that market is likely to be closely related to its size. Much has been done to guarantee that investing in Ghana's economy would go in line with the government's objectives to turn the nation into the gateway to West Africa. The country therefore gives immediate access to the Economic Community of West African States (ECOWAS) market, which has a population of more than 370 million and access to the $3.4 trillion in combined Gross Domestic Product (GDP) of the 1.3 billion people that make up the African Continental Free Trade Area (AfCFTA) market.

Labour Availability: Ghana has one of the highest percentages of literacy in all of West Africa. With over 79% of adults (15 years or older) being literate (*Ghana | Data*, n.d.), the country has well trained and qualified workers who are also one of the most affordable in West Africa. Ghana's growing skilful workforce has help to attract FDI in various sectors, which include manufacturing, services and technology. Although there are quotas for a certain percentage of local workforce to be employed in certain fields, government policies for foreign direct investment allow an investor to employ both domestic and foreign skilled and unskilled workers. However, with regards to investments or business activities that require higher expertise, the laws permit a 100% recruitment of expatriates if local equivalent is not available.

Business Ownership: The investment laws and regulations of Ghana, allows 100% foreign ownership, therefore allowing investors to oversee and manage their business

activities without fear of intimidation from the government. Investment risks are becoming a key element that potential investors take into account when choosing the ideal location for their companies. Ghana is a member of a number of organizations that protects and provide investment guarantees. One such example is Ghana's participation in the Multilateral Investment Guarantee Agency (MIGA) which is a member of the World Bank Group that offers investment guarantee against the risk of investing in emerging economies (Yeboah, 2018).

Exchange rate movements: Due to changes in a company's real costs and revenues, exchange rate changes can affect how attractive FDI is to investors. Additionally, the anticipation of a currency depreciation's reversal can encourage investors to make investments in order to benefit from capital gains that will accrue when the domestic currency appreciates.

Foreign investors might profit or loss from a depreciated currency. They could benefit from the host nations' greater purchasing power. Furthermore, they have more affordable production, which makes exporting simpler. Therefore, this can draw FDI that is looking for efficiency and resources. Foreign businesses should avoid entering a nation if they feel that depreciation would continue after they arrive since this would mean that expenses would be too high to make their investments worthwhile. We anticipate that a depreciated currency will promote FDI inflow into the host nations since it will lower the cost of investment for international business (Lawson et al., 2019).

Inflation: Economic and investment theories contend that inflation stimulates FDI through shocks at the local, national, and international levels as well as through its impact on other macroeconomic variables. According to the results obtain by Asiamah et al., (2019), in their analysis of the determinants of FDI in Ghana indicate that, while the country's inflationary experience has benefited the economy overall, it has also had an adverse impact on FDI.

Export orientation or economic openness: has generally been found to influence significantly FDI. Since it creates opportunities for future exporting of surplus output, an export-oriented economy is seen to positively affect FDI into that economy. Stepanova, (2020), attributed increase in Agricultural product export revenue in the Russian Federation to the expansion of agricultural cooperation between the BRICS nations and the Eurasian Economic Community. In Ghana most of the FDI in the Agricultural sector are

mainly geared towards the provision of raw materials for the food industry (Djokoto, 2020) and the export industry. FDI in the Banana estates in the Volta region of Ghana are all directed at the export market. Almost all the output of the FDI companies in the mining and Oil and Gas industries are geared towards exports.

GDP growth: When analysing how the market affects FDI flows, real GDP growth and GDP or per capita GDP are used as proxies for market size. According to studies, (Tsikata et al., 2000)the market element has a favourable impact on a foreign investor's or a multinational corporation's choice to invest overseas. Even though Ghana's market cannot be regarded as enormous when compared to other nations, the country does have a population of over 31 million people and is a member of the ECOWAS region, which is home to over 370 million people. The market size has been shown in a variety of ways, including by the GDP growth rate (as market potential), real GDP per person, and the consumption to GDP ratio (Tsikata et al., 2000). As long as receiving nations of FDI have attained a certain degree of infrastructure, technology, and/or educational development, it appears that FDI inflows and economic growth are positively correlated(Antwi et al., 2013). Some studies however point to the fact that some positive effects of FDI may be insignificant or negative (Gidiglo et al., 2023) in this regard.

Credit. to the private sector: Availability of credit to the private sector enables businesses to expand, invest in new and emerging technologies and also buy new plant and machinery. This increased capital expenditure can lead to higher productivity and contribute to economic growth. Foreign firms in the country can increase production, provided they can have access to funding at reasonable interest rates. Unfortunately, interest rates in Ghana are high and therefore foreign owned business, mostly have to resort to their home country for credit to fund their business expansion. This has led to delay in the way most companies carrying out their expansion plans. Also, with “thin capital rule” where interest payments on foreign contracted loans above two times of equity of a company are disallowed for tax purposes, foreign contracted loans above twice the equity of the company becomes tax inefficient for the company.

Interest Rate (MPR): Interest rates helps in the determination of the direction of flow of FDI. Lower interest rates will lead to lower cost of capital and higher interest rates means higher cost of capital. Most MNCs will like to invest in economies with lower interest rates since that will help in reduction of financial cost and maximization of profit. Higher interest

rates may affect the inflow of FDI, potential expansion in existing MNCs and in some cases can lead to outflow of FDI (Asiamah et al., 2019; Fornah & Yuehua, 2017; Okafor, 2012). In situations where central banks practice expansionary monetary policy by reducing their policy rates (MPR in Ghana), it reduces the cost of capital through lowering of the interest rate, and thus promote inflow of foreign direct investment (Karahan & Bayır, 2022).

Currency depreciation (CD), INF (inflation), EXPORT(Exports), GDPG (gross domestic product growth), CPS (credit to private sector) and MPR (monetary policy rate) have been selected as the main factors affecting FDI stock in Ghana. They act as the independent variables and the Consumer price inflation is set as the dependent variable. The short and long run collinearity between the variables are performed in chapter seven (research chapter). Institutional factors, market size, labour availability and quality as well as geographical location were not taken into consideration in this model. Some of them are factors of “longue durée” nature, and their inclusion to the model would be hardly useful. They change too slow to affect the dependent variables within expected period.

Including others like natural resources and commodities presence could lead to overfitting, where the model becomes too complex and less generalized. Additionally, they may dilute the impact of the more dynamic and relevant variables, which ultimately will reduce the effectiveness and interpretability of the model.

CHAPTER 7
RESEARCHING COINTEGRATIONOF CURRENCY DEPRECIATION IN GHANA WITH KEY MACROECONOMIC VARIABLES

This study focuses on currency depreciation in Ghana and its relations with the selected macroeconomic variables (inflation, gross domestic product growth, foreign direct investment and balance of payments). The preceding chapters conducted a critical review and analysis of literature and synthesized the research. This chapter looks at the methodologies and approaches which are relevant to this research. This chapter is developed using three questions: “what”, “why” and “how” as its foundational framework. The research philosophy, research approach, the study design, model specifications, and the estimation techniques as well as the results obtained are presented in details in this chapter.

7.1 Key characteristics and justification for the chosen research approach

7.1.1 Research Philosophy

It is important to understand the philosophical underpinnings of every research since it determines the type of studies that may be undertaken and which research methods are most appropriate for that particular research (Gorman & Macintosh, 2016). Research philosophy is a set of presumptions and views regarding the advancement of knowledge. Undertaking a research in a particular field of study or topic will lead to the expansion of the researcher’s knowledge in that particular field (Saunders et al., 2019). In the social sciences field, research philosophy is concerned with the nature and evolution of knowledge in society as a whole. Important beliefs about how one observes or perceives the social world are part of research philosophy (Bahari, 2010).

The main goals of philosophy are to strictly define, govern, and enhance the processes of knowledge formation in all intellectual pursuits, including area of research (Chia, 2002).

Researchers usually make a variety of assumptions throughout the research process, whether intentional or unintentional. These assumptions comprise among other things, presumptions regarding the facts they come across throughout the study (ontological assumptions), presumptions regarding human knowledge (epistemological assumptions), and presumptions regarding the degree to which their individual values impact the research process

(axiological assumptions). The choice of research question is influenced by a credible research philosophy, which comprised of a well-defined and consistent set of assumptions which will serve as the foundation for the research approach, selection of methodology, data collection and analysis techniques, and the way findings and discussion will be presented (Saunders et al., 2023). There are five main philosophies that may act as basis for social science research. These are positivism, critical realism, interpretivism, postmodernism and pragmatism.

Positivism is associated with philosophical perspective which are used by natural scientists, to produce law-like generalizations that requires dealing with an observable social reality. It guarantees clear and precise knowledge (Saunders et al., 2023). Scientific methods are used to derive knowledge, which is based on sensory experience discovered through investigations or comparative study. The objective is to provide a distinct and refined portrayal of any selected facet of reality, irrespective of prevailing opinions (Walliman, 2011). Positivisms assumes the independence of research and its qualities which should be measured the used of unbiased methods like the use of experimental methods which involves testing theories or hypotheses to progressively create and improve universal "laws of nature". Positivist researchers look for patterns and causal connections among the element of social world's in an effort to explain and forecast what occurs there (Bahari, 2010).

This study adopts the positivist approach to examine the impact of currency depreciation on macroeconomic variables. According to Gorman & Macintosh, (2016), positivist paradigm reduces phenomena to its most basic components, concentrates on facts, and searches for causality and underlying rules. The focus therefore is on development of hypotheses and conducting experiments to put into action ideas to enable their measurement.

There are two main impacts that can be observed from the prevalence of positivist assumptions in research. First of all, it creates a perception that social science research, when done well, should follow the same methodology as the natural sciences which will help to identify the root causes of social or psychological phenomena. Its supporters think that it has the ability to forecast societal trends and possibly even manipulate events. Based on the premise that social phenomena and their causes are directly correlated, positivist-empiricist techniques were formerly thought to be able to create a science of society. Persistent assumptions regarding research conduct remain, despite the fact that most individuals approach causal assumptions with skepticism, taking into consideration the complexity of social processes and the difficulty of identifying causes empirically. Secondly, insisting that social science research follow rigid scientific model may cause research to be underestimated as it may lack the essential instrument for understanding the complex web of social life. It is reasonable to criticize positivism's

scientific method for its inability to adequately explain how people live, see the world, overcome obstacles, bring about change, and other aspects of daily life (Ryan, 2006).

7.1.2. Research Approach

A research approach refers to the methodology and philosophy that underpins and guide how a research is conducted and interpreted. There are fundamentally three types of research approaches in literature. These are: quantitative, qualitative and mixed methods. Each research approach has its strengths and limitations, depending on the types of questions asked, methods employed, and interpretations that are made. Researchers often select an approach based on the nature of their research questions, the theoretical framework, and desired outcomes, which contribute meaningfully to their field of study while they recognize the philosophical implications of their chosen approach. The positivist research approach is characterized by its emphasis on empirical observation, objectivity, and the use of quantitative methods to establish causal relationships between variables. As stated earlier, this study applies the positivism philosophy to look into the impact of currency depreciation on macroeconomic variables hence the quantitative approach.

Quantitative approach to research typically begins with a particular theory, either previously formed or put out, which gives rise to certain hypotheses that are subsequently rigorously and quantitatively examined, analyzed, and assessed in accordance with accepted research procedures. There are two main reasons for data collection by researchers: to draw conclusions about larger groups not included in the study and to gain a deeper understanding of occurrences within the group under study (Swanson & Holton, 2005, p. 30).

This approach assumes that reality is objective and can be studied independently of the researcher, aiming to uncover generalized laws that controls natural and social phenomena (Bryman, 2016). Positivist approach has feature of prioritization of empirical evidence derived from systematic observation and measurement. It relies on data that can be quantified and statistically analyzed to test hypotheses and validate theories (Damamisau et al., 2020); It strives to be objective in research with the aim to minimize subjective interpretations and biases; It depends on the formulations and theoretical frameworks or previous researches to derive hypothesis that are tested with empirical data to ascertain the relationships; It also seek to establish causal relationships between variables. Thus, it aims to identify independent variables (in the case of this research currency depreciation) that predict or cause changes in dependent variables (Inflation, GDP growth, BOP, FDI, and BOT), using statistical methods to control for extraneous factors (Bryman, 2016; Walliman, 2011).

7.1.3. Study Design

Research design is informed by the provision of a useful framework or outline for the thorough and appropriate resolution of research problems. A research design that accurately and impartially evaluates each stage of the investigation promotes the validity and dependability of the findings (Fink, 2000).

The steps that researchers take to test hypotheses or provide answers to research questions are outlined in the study design. It is the framework that links research questions or hypotheses to the approach taken to test or address the hypotheses. Research designs might be cross-sectional, exploratory, survey, explanatory, descriptive, or experimental. The study design is chosen by the researcher. Making a decision, therefore, must depend on the research, research philosophy, research approach, and the focal point of the research objectives.

The design choice of this research is explanatory. The occurrence relation in explanatory research considers other pertinent features and causally links one determinant to the occurrence (Bentouhami et al., 2021).

7.1.4. Sources and Description of Data

The research is aimed at looking at how currency depreciation relates to a number of macroeconomic variables in Ghana, mainly: inflation, gross domestic product growth (GDPG), balance of payment (BOP), foreign direct investment (FDI) and balance of trade (BOT). To achieve this, the short and long run relationships between the currency depreciation and each of the macroeconomic variables have been looked at. To test the validity of the models used, data from the period 1984 to 2019 was collected mainly from the World Bank, Ghana Statistical Service (GSS) and the Bank of Ghana. The year 2019 was chosen as the end of the research period to avoid the impact of one-time but significant macroeconomic shocks on the studied relationships, mainly the COVID-19 pandemic, which disrupted international trade, on which Ghana's economy is dependent. Also data from 1983 was not included in the research analysis because of the fact that, although the economic reforms started in 1983, in that year Ghana suffered the worst drought in the country’s history leading to famine couple with repatriation of more than one million Ghanaians from Nigeria which resulted in worse macroeconomic situation. This one-time economic shock if not excluded will affect the objectivity of the research outcome. Some variables had to be proxied using their closest data available because the needed variables are not readily available in few cases. For instance, MPR is used as a proxy for interest rate; food production index (FPI) for domestic food production.

7.1.5 Frequency of data

The analysis of the data was performed using econometric techniques in EViews software. The quantitative information was obtained for the period 1984 to 2019. Data available exclusively in the yearly format was converted to monthly form of frequency(high-frequency). Estimation of higher frequency data example monthly from low frequent ones for such indicators like GDP growth and other macroeconomic variables is a useful tool for policy makers to monitor economic performance. This may be a valuable input in the analysis and development of models in the areas of economics and finance (Ilham, 2020). The low-frequency data often cloud signals arising from a more scattering pattern and lesser straighter line of sight. Consistent with the existing literature, the interpolation technique is used to transform low-frequency data into high-frequency data, specifically for temporal disaggregation in cases where there is a lack of additional high-frequency data to aid in the conversion process (Di Fonzo, 2003). In the context of temporal disaggregation, this means using mathematical algorithms to fill in the gaps between low-frequency data points in order to create a higher-frequency dataset (Hautsch, 2011, pp. 81–83). This process is particularly useful when there is a need to analyse data at a more granular level, but only low-frequency data is available (Ilham, 2020). The Denton disaggregation function in EViews software was adopted and used in this case (Ilham, 2020; Jobarteh & Selemani, 2020). The Denton benchmarking method is the one which is mostly use for distribution (Marco & Di Fonzo, 2012).

The study specifically follows the Denton technique for data conversion. The Denton technique is a statistical technique used to transform low-frequency information into high-frequency data. This approach is commonly employed in economic and financial analysis, particularly in the field of time series analysis. Denton preserves the overall growth rates and patterns of the original data (i.e. the low-frequency data) while generating additional data points at a higher frequency. It is one of the few interporal techniques which is particularly useful when dealing with economic data that is available at a lower frequency, such as annual or quarterly data, but requires higher frequency data for analysis or forecasting purposes, such as monthly or daily data. This technique identifies an interpolated sequence by establishing a connection between a high-frequency indicator sequence and a low-frequency benchmark sequence. This is achieved through the minimization of the proportional first difference function introduced by Denton, (1971). For the empirical implementation, the study follows the EViews setup to run the Denton procedures. EViews employs Cholette's (1984)’s version of the Denton technique

to eliminate a temporary fluctuation at the start of the estimated series(Chen, 2007). This technique generates an interpolated series 'x' by relating a higher-frequency indicator series 'y' to a lower-frequency benchmark series 'z'. The proportional first difference function is expressed as:

$$P = \sum_{t-1}^{T} \left(\frac{x(t)}{z(t)} - \frac{x(t-1)}{z(t-1)} \right)^2 \quad (7.1)$$

The Eq(1) can be estimated as a constrained optimization subject to the constraints specified in Eq (2):

$$\sum_{t=b_q}^{e_q} x(t) = y_q \quad (7.2)$$

Where: 'y' is the benchmark at period 'q', b_q and e_q are the beginning and end of each period.

Although the Denton disaggregation procedure has a benefit of transforming a low-frequency data into a high-frequency data, it also has the limitation of dependency on indicator series which is usually high-frequency to disaggregate the low-frequency data. If the indicator does not correlate better with the low-frequency data, the high-frequency series (data) from the disaggregation will be in inaccurate. Denton method may still be able to disaggregate low-frequency data into high-frequency data without indicator series. In this case, it is likely that the accuracy of the resultant high-frequency data will be low (Sax & Steiner, 2013).

For the variables that have monthly data available like inflation, currency depreciation and monetary policy rate, the actual monthly data has been used. The study therefore sought to use high-frequency data to observe the pattern, pinpoint the exact moment of the effect, shocks including overreactions, and to deepen the observation of the signals (Tsay, 2000). The monthly data series covered the period from the first month (January) of 1984 to the last month (December) of 2019. The year 1983 was rejected due too important outliers being caused by macroeconomic policy changes (i.e. extremely high level of inflation).

7.1.6. Research methods

Research methods are the tools of trade to gather, arrange, and evaluate data so that conclusions could be drawn. The validity of findings and the foundational nature of newly proposed or generated knowledge depends on the deployment of the appropriate research methods in the specific field of the study (Walliman, 2011, pp. 7–8).

ARDL bounds test (the long and short run relationships estimation) methods were used to ascertain the relationships between currency depreciation (CD), inflation (INF), gross domestic product growth (GDPG), balance of payment (BOP), foreign direct investment (FDI) and balance of trade (BOT) in Ghana for the period 1984 to 2019. Although there are various econometric tools that could be employed in data analysis to consider short and long run relationships by different researchers, in this thesis, the ARDL bounds test model is used as indicated in Pesaran et al., (2001), critical approximation p-values to ascertain the short and long run relationship between CD and selected macroeconomic variables: INF, GDPG, FDI and BOP, in Ghana for the researched period. The aforesaid macroeconomic variables have been used as the dependent variables whereas the CD has been used as independent variable to find its impact on each of the macroeconomic variables of INF, GDPG, BOP, FDI and BOT. For each independent variable a separate model has been compiled. In these models some additional variables (their selection have been described in the previous chapters) such as: MPR (monetary policy rate), M2G (money supply growth), EXPORTS (value of export),IMPORTS (value of import),GX (government expenditure),CPS (credit to private sector),FPI(food production index),OP (Oil Price),have been employed.

To be able to use the ARDL model, the primary prerequisite for ARDL is that, regardless of whether the underlying regressors are individually or mutually integrated at level I(0), or first difference I(1) but not I(2) (Nkoro & Uko, 2016).After estimating the appropriate regression models, it will also be important to verify the lack of serial autocorrelation of the error terms, as well as the stability of the model.

The use of ARDL bounds test come with some benefits according to Afzal et al., (2013) and Nyasha & Odhiambo, (2015), which are important for this research:

Firstly, the ARDL limits testing strategy does not impose the limiting premise that all the variables under consideration have to be integrated of the same order, as other conventional cointegration techniques do. However, it is important that none of the explanatory variables must be of second difference I(2) or higher order.

Secondly, the ARDL technique utilizes a single reduced form equation, whereas traditional cointegration methods estimate the long-run relationship within the framework of a system of equations.

Thirdly, even in cases when part of the regressors are endogenous, the ARDL technique typically yields correct t-statistics and unbiased estimates of the long-run model.

Fourthly, even with small sample sizes, the ARDL test is still appropriate compared to other cointegration procedures that are sensitive to sample size.

Fifth, by allowing for sufficient number of lags to fully capture the data-generating process, the ARDL Model uses a general-to-specific modelling framework.

With appropriate time lags, each variable will be tested for stationarity using Augmented Dickey Fuller tests (ADF) of the form:

$$\Delta Y_t = \mu + \gamma_t + \beta Y_{t-1} + \delta_0 \Delta Y_{t-1} + \cdots + \delta_{p-1} \Delta Y_{t-p+1} + \varepsilon_t, \quad (7.3)$$

and the Phillips-Perron test (PP)of the form:

$$\Delta X_{t-1} = \alpha_0 + \beta X_{t-1} + \varepsilon_t. \quad (7.4)$$

The results show that out of the fourteen (14) variables used for the study, nine (9) are stationary at first difference and five (5) are stationary at levels. These results are depicted in the table 7.1 below:

Table 7.1 Unit root analysis

Variables	ADF	PP	ORDER
	AT LEVELS		
CD	-20.5185***	-20.6225***	I(0)
GDPG	-3.5028***	-2.7587*	I(0)
INF	-3.2061**	-7.2895***	I(0)
M2G	-3.4000**	-2.9534**	I(0)
BOP	-3.6845***	-1.8175	I(0)
MPR	-1.7891	-1.6813	I(1) or Higher
OP	-1.6393	-1.1982	I(1) or Higher
EXPORTS	-1.0127	1.6564	I(1) or Higher
FPI	1.3863	1.9728	I(1) or Higher
BOT	-1.5970	-1.2003	I(1) or Higher
CPS	-1.5405	-1.6337	I(1) or Higher
FDI	-1.7099	-0.7891	I(1) or Higher
GX	-0.2017	0.6603	I(1) or Higher
IMPORTS	-0.6676	1.2217	I(1) or Higher

AT FIRST DIFFERENCE			
MPR	-8.6654***	-20.1762***	I(1)
OP	-3.7663***	-4.9387***	I(1)
EXPORTS	-2.8715**	-3.1053**	I(1)
FPI	-3.8921***	-5.3685***	I(1)
BOT	-2.4022	-3.5033***	I(1)
CPS	-4.0259***	-5.0894***	I(1)
FDI	-1.8645	-4.1306***	I(1)
GX	-3.2875**	-4.5835***	I(1)
IMPORTS	-3.3164**	-3.5523***	I(I)

Note: *,** and *** denote significance at 10%, 5% and 1% respectively.

Source: generated from EViews 12.0 Package by the Author.

For the models in this research work, "f" is a function that defines the relationship between the various macroeconomic variables and the currency depreciation at time t. Currency depreciation is depicted as the main independent factor which together with some other factors affect the various macroeconomic variables which are further analysed below and expressed mathematically as described in the following paragraphs.

On the basis of the factors that affect inflation as stated in chapter four, the following variables were selected and express as:

$$INF = f(CD, M2G, MPR, OP, FPI, Imports) \quad (7.5)$$

where INF (inflation), CD (currency depreciation which also depict the exchange rate), $M2G$ (money supply growth), MPR (monetary policy rate), OP (oil price), FPI (food production index which also represents domestic food production)and Importsare all related to the inflation. Equation 7.5 can further be expressed as follows:

$$INF_t = \beta_0 + \beta_1 CD_t + \beta_2 M2G_t + \beta_3 MPR_t + \beta_4 OP_t + \beta_5 FPI_t + \beta_6 Imports_t + \varepsilon_t \quad (7.5.1)$$

(The β_k represent the degree to which each $k$variable influences $INF$and $\varepsilon_t$the error term.)

Based on factors affecting Ghana's GDP growth in chapter five, the following variables were selected for the analysis and mathematically expressed as:

$$GDPG = f(CD, GX, FDI, BOT, CPS, INF, MPR) \quad (7.6)$$

where $GDPG$ (gross domestic product growth), CD (currency depreciation which also represent exchange rate), GX (government expenditure), FDI (foreign direct investment), BOT (balance of trade or trade terms), CPS (credit to private sector), INF (inflation) and MPR (monetary policy rate)which are all related to GDPG. Equation 7.6 can further be expressed as follows:

$$GDPG_t = \beta_0 + \beta_1 CD_t + \beta_2 GX_t + \beta_3 FDI_t + \beta_4 BOT_t + \beta_5 CPS_t + \beta_6 INF_t + \beta_7 MPR_t + \varepsilon_t \quad (7.6.1)$$

(The β_k represent the degree to which each $k$variable influences $GDPG$and $\varepsilon_t$the error term.)

Based on the drivers of trade and FDI in Ghana in chapter six, the following variables were selected for the analysis and mathematically expressed as:

$$FDI = f(CD, INF, Exports, GDPG, CPS, MPR) \quad (7.7)$$

Where FDI (foreign direct investment), CD (exchange rate movement or currency depreciation), INF (inflation), $Exports$, $GDPG$ (gross domestic product growth), CPS (credit to private sector) and MPR (monetary policy rate) are all related to FDI. Equation 7.7 can further be expressed as follows:

$$FDI_t = \beta_0 + \beta_1 CD_t + \beta_2 INF_t + \beta_3 Exports_t + \beta_4 GDPG_t + \beta_5 CPS_t + \beta_6 MPR_t + \varepsilon_t \quad (7.7.1)$$

(The β_k represent the degree to which each $k$variable influences *FDI* and $\varepsilon_t$the error term.)

Relating to the factors affecting BOP in Ghana in chapter seven, the following variables were selected for the analysis and mathematically expressed as:

$$BOT = f(CD, INF, GDPG, EXPORTS, MPR) \quad (7.8)$$

where BOT (balance of trade), CD (Exchange rate movement or currency depreciation), INF (inflation), $GDPG$ (gross domestic product growth),$exports$(foreign direct investment), and mpr (monetary policy rate) are all related to BOT. Equation 7.8 can further be expressed as follows:

$$BOT_t = \beta_0 + \beta_1 CD_t + \beta_2 INF_t + \beta_3 GDPG_t + \beta_4 EXPORTS_t + \beta_5 MPR_t + \varepsilon_t \quad (7.8.1)$$

(The β_k represent the degree to which each $k$variable influences *BOT* and $\varepsilon_t$the error term)

Relating to the factors affecting BOP in Ghana in chapter seven, the following variables were selected for the analysis and mathematically expressed as:

$$BOP = f(CD, INF, GDPG, FDI, BOT) \quad (7.9)$$

where BOP (balance of payment), CD (Exchange rate movement or currency depreciation), INF (inflation), $GDPG$ (gross domestic product growth),FDI (foreign direct investment), and BOT (balance of trade) are all related to BOP. Equation 7.9 can further be expressed as follows:

$$BOP_t = \beta_0 + \beta_1 CD_t + \beta_2 INF_t + \beta_3 GDPG_t + \beta_4 FDI_t + \beta_5 BOT_t + \varepsilon_t \quad (7.9.1)$$

(The β_k represent the degree to which each $k$variable influences *BOP* and $\varepsilon_t$the error term)

7.2 Results and discussions

The study examines currency depreciation and its effect on the macroeconomic variables in Ghana. The previous section (7.1) presented the methodologies suitable for the study and the associated objectives. This chapter applies the methodologies and estimation approaches discussed in the methodology chapter to achieve the study objectives and address the research gaps identified in the study. It specifically presents the data analyses, interpretations, and discussions of the results. The results are reported in tables and figures according to the specific objectives of the study. Therefore, the thematic issues in this chapter follow the objectives.

7.2.1. Descriptive Statistics (for variables employed in the models)

The descriptive statistics are presented in Table 7.2. and described below in brief.

The Currency depreciation (CD) is relatively volatile as exhibited by the standard deviation of 5.236 in relation to the mean. This is also confirmed by the coefficient of variation (COV) of 2.809 which is greater than 1. This suggests that the individual observations are not closely packed around the mean. CD is also positively skewed with excess peakness evident in skewness and Kurtosis statistics of 8.206 and 100.759 respectively. The skewness and the kurtosis coupled with the significant Jarque-Bera statistics show that CD has no normal distribution.

Regarding inflation, the data is less volatile as shown by the standard deviation of 21.640 and the accompanying coefficient of variation of 0.689. This means that the observations are not far apart. The variable is positively skewed; however, it is not far away from normality since the statistics is within ± 2(Ali et al., 2015; Gravetta & Wallnau, 2014; Queku., 2017). However, the kurtosis exhibits excess peakness, and the Jarque-Bera statistics are significant suggesting that the data has no normal distribution.

The growth in money supply (M2G) has a standard deviation of 11.523 suggesting relatively low dispersion in the data pattern. The coefficient of variation also supports the conclusion reached on the data dispersion as the statistics stand at 0.329 which is close to zero. In terms of normality, the skewness assessment shows that data for the money supply has a normal distribution with the skewness statistics close to zero (i.e. 0.092). Additionally, the kurtosis shows that there is no excess peakness. However, the Jarque-Bera statistic is relatively significant.

The monetary policy rate (MPR) shows low volatility in the data. This is evident in both the standard deviation and the coefficient of variation of 9.128 and 0.38 respectively. Following the skewness threshold of ± 2 (Ali et al., 2015; Gravetta & Wallnau, 2014; Queku., 2017), MPR has a normal distribution. The kurtosis is closer to 3 making it exhibit normal distribution. The Jarque-Bera still maintains a significant statistic.

The oil price (OP) has a standard deviation of 27.193 and a coefficient of variation of 0.623. This makes the data pattern less volatile. This implies that the observations are not closely packed around the mean. The oil price has a normal distribution from the skewness assessment of 0.704 (Ali et al., 2015; Gravetta & Wallnau, 2014; Queku., 2017). The Jarque-Bera statistic is significant.

The food production index (FPI) has a standard deviation of 28.717 and a coefficient of variation of 0.458. This makes the data pattern less volatile. This implies that the observations are not closely packed around the mean. The oil price has a normal distribution from the skewness assessment of 0.376. The Jarque-Bera statistic is significant.

Imports also have a standard deviation of 9568.687 and a coefficient of variation of 0.9870. which is less than but very close to 1. This suggests that the individual observations are closely packed around the mean. Imports are also positively skewed with skewness and kurtosis

statistics of 0.858 and 2.183 respectively. The skewness and the kurtosis coupled with Jarque-Bera statistics of 64.991 show that Imports have no normal distribution.

The government expenditure (GX) has a standard deviation of 4548.639 with a coefficient of variation of 0.897 indicating that the individual variables are relatively gathered around the mean. This is an indication that the data pattern is relatively less volatile. The skewness and kurtosis analysis of the GX resulted in 0.806 and 2.048 respectively. This is also an indication that the data has a normal distribution property. The Jarque-Bera statistic outcome being significant, portrays data non-normality.

The credit to the private sector (CPS) appears less sensitive to currency depreciation. This is demonstrated by the standard deviation of 4.410 and also supported by the coefficient of variation of 0.441. These statistics indicate that the individual variables are closely gathered around the mean. This is an indication that the data pattern is less volatile. The skewness and kurtosis analysis of the CPS resulted in -0.399 and 1.528 respectively. These demonstrate a normal distribution characteristic of the data. However, the Jarque-Bera statistic outcome is significant indicating data non-normality.

Foreign direct investment (FDI) has a standard deviation of 1,371.412 which shows a highly dispersed feature of the individual variables away from the mean. This position is corroborated by the coefficient of variation (COV) of 1.244. This is an confirmation of the volatile nature of the variable. Again, the FDI has a skewness of 0.744 demonstrating data normality distribution. The kurtosis assessment also indicates the non-existence of excess peakness with a figure of 1.696. This as well confirms the normality in data distribution. However, the Jarque-Bera statistic is significant, portraying a non-normality data pattern.

Exports have standard deviation of 7570.059 with a coefficient of variation of 1.080 highly dispersed nature of the individual variables around the mean. This shows that the data is very volatile. The skewness and kurtosis analysis of exports resulted in 1.079 and 2.726 respectively. This is an indication that the data has a normal distribution property even though the Jarque-Bera statistic outcome is relatively significant.

Gross domestic product growth (GDPG) has a standard deviation of 2.028 with a coefficient of variation of 0.374 indicating a relatively close proximity of the individual variables around the mean. This shows that the data is less volatile. The skewness and kurtosis analysis of the

GDPG resulted in 1.618 and 6.599 respectively. This is also an indication that the data has a normal distribution property even though the Jarque-Bera statistic outcome is significant portraying data non-normality.

The balance of payment (BOP) has a standard deviation of 647.826 indicating a highly dispersed feature of the individual variables away from the mean. This position is corroborated by the coefficient of variation (COV) of -1.342. This is an confirmation of the volatile nature of the variable. Again, the balance of payment has a skewness of 0.180 demonstrating data normality distribution. The kurtosis assessment also indicates the non-existence of excess peakness with a figure of 5.331. This as well confirms the normality in data distribution. However, the Jarque-Bera statistic is significant, portraying a non-normality data pattern.

The balance of trade (BOT) is highly dispersed from the mean with the standard deviation of 1759.035. But the coefficient of variation of -0.874 indicates a relatively close proximity of the individual variables around the mean. The skewness statistics stood at -0.779 and the analysis of the kurtosis statistics also stood at 2.140. This is also an indication that the data has a normal distribution property even though the Jarque-Bera statistic outcome is relatively significant.

Table 7.2 Descriptive statistics of the variables used

	BOP	BOT	CD	CPS	EXPORTS	FDI	FPI	GDPG	GX	IMPORTS	INF	M2G	MPR	OP
Mean	-482.632	-2012.776	1.864	9.996	7012.162	1102.403	62.727	5.416	5068.845	9693.547	21.640	34.991	24.000	43.651
Median	-352.917	-1105.981	0.750	11.917	2577.719	158.521	59.808	4.992	2150.585	3968.871	17.319	34.364	22.750	28.975
Maximum	1533.000	-86.300	73.333	15.827	26075.280	3485.300	118.260	14.047	14119.380	31343.330	125.994	56.534	45.000	99.670
Minimum	-2429.000	-6292.081	-20.169	2.209	611.700	2.000	24.600	1.007	834.102	812.800	1.140	13.301	12.500	14.420
Std. Dev.	647.826	1759.035	5.236	4.410	7570.059	1371.412	28.717	2.028	4548.639	9568.687	14.914	11.523	9.128	27.193
COV	-1.342	-0.874	2.809	0.441	1.080	1.244	0.458	0.374	0.897	0.987	0.689	0.329	0.380	0.623
Skewness	0.180	-0.779	8.206	-0.399	1.079	0.744	0.376	1.618	0.806	0.858	2.678	0.092	0.927	0.704
Kurtosis	5.331	2.140	100.759	1.528	2.726	1.696	1.908	6.599	2.048	2.183	14.428	1.797	3.078	2.069
Jarque-Bera	100.166	56.976	176869.600	50.454	85.121	70.509	31.638	421.646	63.044	64.991	2867.286	26.653	61.949	51.296
Probability	0	0	0	0	0	0	0	0	0	0	0	0.000002	0	0
Sum	-208497.000	-869519.300	805.417	4318.278	3029254.000	476238.100	27098.050	2339.654	2189741.000	4187612.000	9348.488	15116.230	10368.020	18857.240
Sum Sq. Dev.	1.81E+08	1.33E+09	11817.7	8381.91	2.47E+10	8.11E+08	355423.5	1772.83	8.92E+09	3.95E+10	95867.07	57226.39	35909.48	318700
Observations	432	432	432	432	432	432	432	432	432	432	432	432	432	432

Source: generated from EViews 12.0 Package by the Author.

7.2.2. Currency depreciation and inflation

This section is related to the first objective of the study which seeks to examine the effect of currency depreciation on inflation in Ghana. The model specifications and estimations are based on the variables in this objective and the associated control variables. Prior to the estimation of the model, the study presents data diagnostics including descriptive statistics, multicollinearity, and unit root test.

Descriptive Statistics (Inflation Model)

The study reports the descriptive statistics of all the study variables relevant to this first objective. Descriptive analysis identifies the statistical properties of the data used to measure the study variables. The results are captured in Table 7.2 above. It can be observed that all the variables have positive means. This is not surprising as these variables are positive parameters. Specifically, the mean values for inflation (INF), currency depreciation (CD), broad money supply growth (M2G), monetary policy rate (MPR), oil price (OP), food production index (FPI) and imports are 62.727, 1.864, 34.991, 24.000, 43.651, 62.727 and 9693.547 respectively.

Collinearity analysis (Inflation Model)

Multicollinearity problem is a common challenge for multiple regression. A multicollinearity exists when two variables (i.e. independent and control variables) in a given model are highly correlated. When a multicollinearity problem exists in model estimation it may lead to spurious regression making the findings suspicious. It is therefore an important pre-diagnostic test to check for multicollinearity problems. The study follows a correlation matrix to test for the presence of a multicollinearity problem. Although there is no strict benchmark for multicollinearity condition, it is believed that a correlation greater than 0.9 suggests a possible multicollinearity problem.

Table 7.3: Correlation matrix (Inflation Model)

	CD	M2G	MPR	OP	IMPORTS	FPI
CD	1.000	0.201	0.041	-0.128	-0.117	-0.143
M2G	0.201	1.000	0.144	-0.461	-0.652	-0.689
MPR	0.041	0.144	1.000	-0.703	-0.495	-0.434
OP	-0.128	-0.461	-0.703	1.000	0.758	0.757
IMPORTS	-0.117	-0.652	-0.495	0.758	1.000	***0.957***
FPI	-0.143	-0.689	-0.434	0.757	***0.957***	1.000

Source: generated from EViews 12.0 Package by the Author

The above Table 7.3, shows a multicollinear relation between food production index (FPI) and imports. the correlation coefficient among the variables is 0.957 which is above 0.9. The multicollinearity relation is cured through dropping one of the two variables in this case the FPI. It can be observed that the correlation coefficients of all the other variables are within the threshold. The next highest correlation coefficient is 0.758 which is far below the threshold. This implies that there is sufficient-appropriate evidence to assume that there is no multicollinearity problem. Thus, the model can be specified and estimated without the need for remodelling.

Unit root analyses (Inflation Model)

Determining the unit root status of variables in a model is a prerequisite in choosing an appropriate estimation approach. It is generally acknowledged that time series data have unit root problems, there, it is useful to take care of that in the estimation process. Moreover, since the study seeks to employ Autoregressive Distributed Lag (ARDL), it is critical to conduct a unit root test to ensure that none of the variables have an integration order of two (2).

The study follows Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) to conduct the test. The results are presented in Table 7.1. The results show that the order of integration for the variables are mixed. Some of the variables have integration order zero: I(0) while others also exhibit integration order one: I(1). However, none of these variables is I(2).

ARDL analysis (Inflation Model)

The results from the diagnostic tests show that it is appropriate to estimate the specified inflation model without modification using the ARDL estimator. It is important to recall that

the main variables of interest are the INF and the CD. The remaining variables are controls. The analyses are conducted to present estimates of both long-run and short-run dynamics.

The study presents the F-Bounds Test. The results are captured in Table 7.4. It can be seen in Table 8.4 the display of F-statistics and critical values and their associated lower bounds (i.e. I(0)) and upper bounds (i.e. I(1)). The critical values are reported for 1%, 5%, and 10% significance levels respectively. The bounds tests are important because the p-values for the individual variables from the regression output are not compatible with the test distribution since the distribution is non-standard even though the statistics are valid. Therefore, the critical values from the bounds test are the basis for the assessment of the significance and upon which inferences are drawn.

The critical values are calculated under an asymptotic regime where the sample size is equal to 1000. Table 7.4 further provides critical value under a finite sample regime where the sample size ranges from 30 to 80 in incremental of 5. The testing criteria or rules for the bound testing are as follows:

When the critical values are less than the lower bounds (i.e. I(0)), then, there is no cointegration.

When the critical values are greater than the lower bounds (i.e. I(0)) but lower than the upper bounds (i.e. I(1)), then, cointegration test is inconclusive.

When the critical values are greater than the upper bounds (i.e. I(1)), then, there is evidence of cointegration.

It can be observed that the F-statistic value is greater than the I(0) and the I(1) values. This shows that there is strong evidence of cointegration consistent with the criterion (iii). This supports the interpretations provided under the long-run dynamics in Table 7.5.

Table 7.4: Bounds Test (Inflation Model): ARDL

Test-Statistic	Value	Level	Critical values	
			Restricted Constant and no Trend	
			I(0)	I(1)
		1%	3.351	4.587
F-statistic	7.628	5%	2.550	3.606
		10%	2.303	3.154
K= 5	INF($_{INF}$/CD, M2G, MPR, OP, IMPORTS)			

Source: generated from EViews 12.0 Package by the Author. Notes:K is the number of explanatory variables, ** denote 5% level of significance. Critical values are obtained from Narayan(2005).

Table 7.5 presents the results of the long-run estimates. The results show that currency depreciation has a coefficient of 1.137. The p-value is 0.053 which is significant. The significant level is crystallised by the F-bound test where the F-statistic value of 7.628 is greater than the critical value of all the upper bounds of the 1%, 5%, and 10% (see Table 7.4). This indicates that the null hypothesis that there is no level relationship between currency depreciation and inflation is rejected. This means cointegration exists between currency depreciation and inflation. This estimate shows that currency depreciation has a significant effect on inflation in Ghana which suggests that all other things being equal, an increase in the depreciation of the Ghana cedi would lead to increase in inflation in the long-run.

Although the individual p-values show that none of the control variables have a significant long-run relationship with inflation except the monetary policy rate (MPR) with a positive coefficient of 0.707 and p-value of 0.002, the F-bound test demonstrates that all the variables in the long-run specification are significant. Specifically, the growth of money supply (M2G), monetary policy rate (MPR) and oil prices (OP) exhibited a positive relationship with inflation which can be expected. Thus, these variables (mainly MPR) are drivers of inflation in the long-run. Imports however, exhibited a negative long-run relationship with inflation which is against theoretical stipulations that inflation stimulates imports. Explanation can be found in low import price elasticity in Ghana. Please also note that import is negatively correlated with currency depreciation although this correlation is very weak. This evidence demonstrates the dynamics in the long-run relationship between these control variables and inflation.

Table 7.5: Long-Run Estimation (Inflation Model): ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CD	1.137	0.586	1.940	0.053
M2G	0.003	0.179	0.018	0.986
MPR	0.707	0.230	3.076	0.002
OP	0.043	0.099	0.431	0.667
IMPORTS	-0.0003	0.0003	-1.196	0.233
C	2.349	12.269	0.191	0.848
EC= INF - (1.137*CD + 0.003*M2G +0.707*MPR +0.043*OP-0.0003*IMPORTS + 2.349)				

Source: generated from EViews 12.0 Package by the Author.

Besides the long-run analyses, the study also conducted a short-run estimation of the relationship between currency depreciation and inflation. The model nevertheless included the control variables found in the long-run. However, the discussions and implications are based on the variable of interest which is the currency depreciation (CD).

The short-run results are captured in Table 7.6. The short-run estimates are based on the error correction Model (ECM) regression. For brevity, the detailed lag results are not reported and discussed in this section (except the lag of one) but have been captured under the Appendix 4.

It can be observed from Table 7.6 that the short-run coefficient of currency depreciation (CD) is 0.015. Like the long-run result, this is also positive. The corresponding p-value for the coefficient is 0.848. This suggests that the coefficient is not significant which means that the study has not rejected the null hypothesis that currency depreciation has no significant short-run relationship with inflation. But in the lag of one or a period after the current, CD has a negative coefficient of 0.051 with a correspondence p-value of 0.011. This make the result significant and rejects the null hypothesis in the short-run. The negative coefficient indicates that after a short-term shock caused by depreciation, Ghana's economy relatively quickly returns to the long-term positive relationship between inflation and depreciation. This demonstrates the flexibility of the analysed country's economy.

Besides the variable of interest, none of the control variables used in the analysis exhibited a short-run relationship with inflation. Further implications would be drawn for the variable of interest in the discussion section.

Table 7.6: Short-Run Estimation (Inflation Model): ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.165	0.861	0.192	0.848
Δ(CD)	0.015	0.017	0.884	0.377
Δ(CD (-1))	-0.051	0.020	-2.548	0.011

Source: generated from EViews 12.0 Package by the Author.

Discussions of the Results and Implications

Overall, the results partially confirm the study apriori, the short and the long runs have a positive results (coefficient) which are consistent with the study's expectations. The study expected that due to the exchange rate-pass through, a fall in local currency is expected to drive prices of goods and services up since Ghana is import-driven economy and ultimately upscale the level of inflation. The study, therefore, expected Ghana cedi depreciation to exhibit a significant positive effect on the level of inflation. This expectation was not fully confirmed through the short-run estimation (the insignificant positive coefficient) but with a period lag, the results become very significant. This shows that it will take at least a month for the effect of currency depreciation to affect prices of goods and services and hence inflation.

Empirically, the insignificant positive relationship between currency depreciation and inflation observed in the short-run confirms the conclusions reached in some earlier studies in the Ghanaian literature (Abradu-Otoo et al., 2003; Adu et al., 2015; Frimpong & Adam, 2010; Oppong et al., 2015; Sanusi, 2010). These researchers found a positive and statistically significant relationship between currency depreciation and inflation in the short-run which indicates an evidence of time needed for exchange rate pass-through to inflation in Ghana and this is also same in the results of this study only with a lag period of one.

Besides the study apriori and empirical relevance of the findings, the study has significant implications for theory, policy, and practice. Despite the surprises in some of the estimates in this study, the findings seem to extend the theoretical implication of the Taylor rule theory in the currency depreciation-inflation nexus. Although the traditional view of

Taylor's theory is that changes in inflation, output, and other macroeconomic information should determine central banks' adjustment of the policy rate, emerging evidence has demonstrated that since the exchange rate remains foundational in an integrated economy, there is the need to augment the Taylor rule with the exchange rate in order that monetary authorities could adjust the policy tool based on the changes in exchange rate to reduce inflation (Bleaney et al., 2020; Corsetti & Dedola, 2010; Monacelli, 2013). Thus, the augmented Taylor rule theory suggests that currency depreciation could drive inflation and the nature of the relationship is dependent on the effectiveness of monetary policy intervention. The time-varying effect (i.e. the level of significance) on the relationship between currency depreciation and inflation found in this study, therefore, extends the understanding of the augmented Taylor rule theory to the effect that the timing of monetary policy adjustment is crucial in defining the effectiveness of monetary tools in containing inflation amidst currency depreciation.

The findings further project the practical and empirical reality of the purchasing power parity (PPP) theory. The PPP provides a theoretical mechanism explaining the transmission channel between an exchange rate and inflation or domestic prices. For the PPP theory assumption to hold, a depreciating local currency will require more units of that currency (i.e. the local currency) to purchase goods or services worth the same unit of the foreign currency (Adu et al., 2015; Aryeetey & Kanbur, 2010; Connolly, 2006, p. 40; Sanusi, 2010). Thus theoretically, PPP theory provides that currency depreciation could lead to high prices of imported goods in a domestic economy or country. Both the short and the long run estimates in this study confirm and contribute to this theoretical position. Nevertheless, the proponents of PPP theory failed to recognise the time-varying effect (i.e. differences in the level of significance) on the proposed transmission channel between exchanges and prices of goods and services. The extended view from the differences in the significance of the short-run and long run coefficient of the findings in this study is that the PPP theory holds when other intervening considerations including timing intervention and the magnitude of the pass-through have been accounted for.

7.2.3. Currency depreciation and Real Gross Domestic Product Growth (GDPG)

Second objective of the study is to examine the effect of currency depreciation on gross domestic product growth in Ghana. The appropriateness of the data characteristics was

assessed by conducting Pre-diagnostic test of descriptive statistics, multicollinearity and unit root test.

Descriptive Statistics (GDPG Model)

The variables of interest under this model are data on currency depreciation (CD) and real gross domestic product growth (GDPG), with the control variables as data on balance of trade (BOT), credit to private sector (CPS), foreign direct investment (FDI), government expenditure (GX), inflation (INF) and monetary policy rate (MPR).

The statistical dynamics of the data used for the study was assessed by measuring the descriptive statistics. The outcome of the descriptive statistic is represented in Table 7.2. The results show that all the variables except BOT have positive means. The positive mean of GDPG, CD, GX, FDI, CPS, INF and MPR indicate positive patterns in the data dynamics. BOT however, exhibited negative mean, demonstrating trade deficit. The mean values for gross domestic product growth, currency depreciation, government expenditure, foreign direct investment, balance of trade, credit to private sector, inflation and monetary policy rate are 5.416, 1.864, 5068.845, 1102.403, -2012.776, 9.996, 21.640 and 24.000 respectively.

Collinearity Analysis (GDPG Model)

The study follows a correlation matrix to test for the presence of a multicollinearity problem.

Table 7.7. Correlation Matrix (GDPG Model)

Variables	CD	GX	FDI	BOT	CPS	INF	MPR
CD	1.000	-0.122	-0.092	0.130	-0.143	0.069	0.041
GX	-0.122	1.000	***0.947***	-0.718	0.632	-0.474	-0.507
FDI	-0.092	***0.947***	1.000	-0.734	0.634	-0.435	-0.482
BOT	0.130	-0.718	-0.734	1.000	-0.770	0.467	0.572
CPS	-0.143	0.632	0.634	-0.770	1.000	-0.474	-0.393
INF	0.069	-0.474	-0.435	0.467	-0.474	1.000	0.472
MPR	0.041	-0.507	-0.482	0.572	-0.393	0.472	1.000

Source: generated from EViews 12.0 Package by the Author.

The above Table 7.7 reveals a multicollinear relation between government expenditure (GX) and foreign direct investment (FDI). The correlation coefficient among the variables is 0.947 which is above 0.9. The multicollinearity relation is cured through dropping one of the two variables in this case the FDI. It can be observed that the correlation coefficients of all the other variables are within the threshold. The next highest correlation coefficient is 0.770 which is below the threshold. This implies that there is sufficient-appropriate evidence to assume that there is no multicollinearity problem. Thus, the model can be specified and estimated without the need for remodelling.

There is collinear relationship between GX and FDI as a result of that, FDI will be dropped from the next matrix

Unit Root Analyses (GDPG Model)

The results show that the order of integration for the variables are mixed. Some of the variables have integration order zero: I(0) while others also exhibit integration order one: I(1). However, none of these variables is I(2) variable Table 7.1.

ARDL Analysis (GDPG Model)

The results from the diagnostic tests show that it is appropriate to estimate the specified GDP growth model without modification using the ARDL estimator. The results are captured in Table 7.8. It can be seen in Table 7.8 the display of F-statistics and critical values and their associated lower bounds (i.e. I(0)) and upper bounds (i.e. I(1)). The critical values are reported for 1%, 5%, and 10% significance levels respectively. The bounds tests are critical because the p-values for the individual variables from the regression output are not compatible with the test distribution since the distribution is non-standard even though the statistics are valid. Therefore, the critical values from the bounds test are the basis for the assessment of the significance and upon which inferences are drawn.

It can be observed that the value of the F-statistics is greater than the critical values of I(0) and the I(1) at the 5% level of significance. This shows that there is strong evidence of cointegration. This supports the interpretations provided under the long-run dynamics in Table 7.9.

Table 7.8: Bounds Test (GDPG Model): ARDL

Test-Statistic	Value	Level	Critical values	
			Restricted Constant and no Trend	
			I(0)	I(1)
		1%	3.173	4.485
		5%	2.431	3.518
F-statistic	4.384	10%	2.088	3.103
K= 6	GDPG($_{GDPG}$/CD, GX, BOT, CPS, INF, MPR)			

Source: generated from EViews 12.0 Package by the Author. Notes: K is the number of explanatory variables. ** denote 5% level of significance. Critical values are obtained from Narayan(2005)

Table 7.9 presents the results of the long-run estimates. The results show that currency depreciation has a coefficient of -0.056. The p-value is 0.320 making it statistically insignificant. This is against the F-statistic from the bonds test which shows that the value of 4.384 is greater than the critical value of all the upper bounds of the 5%, (see Table 7.8). This indicates that the null hypothesis that there is no level relationship between currency depreciation and gross domestic product growth is rejected. This means cointegration exists between currency depreciation and real GDP growth in the long run. This estimate shows that currency depreciation has a negative effect in Ghana's gross domestic product growth on the long-run. This suggests that all other things being equal, an increase in the depreciation of the Ghana cedi by one percent will lead to -0.056 percent point decrease in the gross domestic product growth rate in the long-run.

The individual p-values showed that only balance of trade have significant long-run negative relationship with gross domestic product growth. Government expenditure, credit to private sector, inflation and monetary policy rate showed insignificance when it comes to gross domestic product growth in Ghana. However, the F-bound test demonstrates that all the variables in the long-run specification are significant. Specifically, currency depreciation exhibited negative relationship with gross domestic product growth. Also, all the other control variables exhibited negative relationship with gross domestic product growth except inflation which exhibited a positive relationship. This evidence demonstrates the dynamics in the long-run relationship between these control variables and gross domestic product growth.

Table 7.9: Long-Run Estimation (GDPG Model): ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CD	-0.056	0.057	-0.995	0.320
GX	-0.0002	0.0001	-1.820	0.070
BOT	-0.0007	0.0003	-2.208	0.028
CPS	-0.040	0.112	-0.356	0.722
INF	0.021	0.028	0.727	0.467
MPR	-0.054	0.045	-1.203	0.230
C	5.896	1.515	3.893	0.000
EC = GDPG - (-0.056*CD -0.0002*GX -0.0007*BOT -0.040*CPS +0.021*INF - 0.054*MPR + 5.896)				

Source: generated from EViews 12.0 Package by the Author.

The short-run estimates are based on the error correction model (ECM) regression. For brevity, the detailed lag results are not reported and discussed in this section but have been captured under the Appendix 4. It seems that in the short-run, currency depreciation (CD) does not affect the gross domestic product growth (GDPG). Resultantly, the study is unable to reject the null hypothesis that currency depreciation has no significant short-run relationship with gross domestic product growth.

Discussions of the Results and Implications

The results reflect the study in a way that is based on theoretical deduction and are consistent with the study's expectations. The study expected that due to the important role exchange rate play in an economy like Ghana that so much depends on its relations with international partners for its economic growth which include import of essential goods and service, the nature of Ghana’s exports and price elasticity of demand for exports and imports, a fall in local currency rate is expected to have a very little or no effect on working hypothesis on negative long term relationship between currency depreciation and gross domestic product growth in Ghana (see results of F test) is that depreciation might restrict domestic consumption but unfortunately this cannot be tested due to lack of appropriate data. This would require further research.

Findings on short-run relationship are in line with lack of long-term relationship between cedi depreciation and real GDP growth. If this relationship is weak the short run

responses to the shocks in terms of cedi depreciation have no impact on the speed of economic adjustment (i.e. returning to the long-term relationship).

Empirically, the practically no significant relationship between currency depreciation and gross domestic product growth contradicts some earlier studies in literature (Hafeez et al., 2018; Nawaz & Ghani, 2017; Nimoh & Addai-Asante, 2018; Okaro, 2017; Osei et al., 2020). All the researches demonstrated positive relationship between currency depreciation and gross domestic product growth in both short and long runs. However in the long-run some researchers e.g. Adjei, (2019; Krugman & Taylor, (1976; Mohammed et al., (2015), demonstrated also the negative effect of currency depreciation (devaluation) on economic growth in their various works. The model (table 7.9) shows that Ghana is import depended in its GDP growth. Macroeconomic policies have little impact on that. Perhaps also institution might matter as in many other developing countries but testing this hypothesis is beyond the scope of this study.

In addition to the study apriori and numerous empirical relevance of the findings, the study has significant implications for theory, policy, and practice. The study outcome contradicts the expansionary effect of currency depreciation in economic growth in Ghana. The result of the study contradicts the convergence theory as explain by Sachs & Warner, (1995), which look at the opportunity of trade by open economic countries to grow their economy. Policy makers in Ghana can look at the risk rapid currency depreciation present to growth of the economy and the possibility of taking advantage of policies like African Growth and Opportunity Act (AGOA) and Africa Continental free Trade Agreement (AfCFTA).

Practically, the findings mainly reflect the economic reality of Ghana. Because Ghana is an import dependent economy and a price taker on the global market for its exports, currency depreciation therefore has very little or no effect on the output. Industrial capacity to take advantage of the higher import prices to produce local substitutes are lacking, supply of export commodities are inelastic and imports enjoy inelastic demand. The long run effect of cedi depreciation on real income growth is therefore limited and increase in profit if any (Krugman & Taylor, 1976) mostly go to MNCs operating in Ghana.

7.2.4. Currency Depreciation and Foreign Direct Investment (FDI)

The third objective of the study is to examine the relation between cedi depreciation and foreign direct investments in Ghana. The main variables of interest for the model specifications and estimations are data on currency depreciation and foreign direct investment. In addition, data on inflation, exports, GDP growth, credit to private sector and the monetary policy rate were also used as control variables. Pre-diagnostic test was conducted to evaluate the appropriateness or otherwise of the data dynamics to pave way for the choice of the appropriate estimation approach. The pre-diagnostics test undertaken are in respect of the descriptive statistics, multi-collinearity and unit root test.

Descriptive Statistics (FDI Model)

The statistical dynamics of the data used for the study was assessed by measuring the descriptive statistics. The outcome of the descriptive statistic is represented in Table 7.2. The results show that all the variables have positive means. The positive mean values of the variables are an indication indicate positive patterns in the data dynamics. The mean values for Foreign Direct Investment (FDI), currency depreciation (CD), Inflation (INF), Exports, Gross domestic product growth (GDPG), Credit to Private Sector (CPS) and monetary policy rate are 1102.403, 1.1864, 21.640, 7012.162, 5.416, 9.996 and 24.000 respectively.

Collinearity Analysis (FDI Model)

Table 7.10 reports the results of the multi-collinearity analyses. It can be observed that the correlation coefficients of all the variables are within the threshold. The highest correlation coefficient is 0.580 which is far below the threshold. This implies that there is sufficient-appropriate evidence to assume that there is no multi-collinearity problem. Thus, the model can be specified and estimated without the need for remodelling.

Table 7.10: Correlation Matrix (FDI Model)

Variables	CD	INF	EXPORTS	GDPG	CPS	MPR
CD	1.000	0.069	-0.108	-0.104	-0.143	0.041
INF	0.069	1.000	-0.444	-0.174	-0.474	0.472
EXPORTS	-0.108	-0.444	1.000	0.283	0.580	-0.447
GDPG	-0.104	-0.174	0.283	1.000	0.277	-0.462
CPS	-0.143	-0.474	0.580	0.277	1.000	-0.393
MPR	0.041	0.472	-0.447	-0.462	-0.393	1.000

Source: generated from EViews 12.0 Package by the Author.

Unit Root Analyses (FDI Model)

The results show that the order of integration for the variables used in this section are mixed. Some of the variables have integration order zero: I(0) while others also exhibit integration order one: I(1). However, none of these variables is I(2) variable(Table 7.1).

ARDL Analysis (FDI Model)

The results from the diagnostic tests show that it is appropriate to estimate the specified FDI model without modification using the ARDL estimating method. The results are captured in Table 7.11. It can be seen from Table 7.11 that both F-statistic and T-statistics are displayed with their associated lower bounds (i.e. I(0)) and upper bounds (i.e. I(1)) and the critical values. The critical values are reported for 1%, 5%, and 10% significance levels respectively. The bounds tests are critical because the p-values for the individual variables from the regression output are not compatible with the test distribution since the distribution is non-standard even though the statistics are valid. Therefore, the critical values from the bounds test are the basis for the assessment of the significance and upon which inferences are drawn.

It can be observed that F-statistic value is less than the critical value of the lower bounds I(0) of 5% level of significance. This indicates that the null hypothesis that there is no level relationship between currency depreciation and foreign direct investment is accepted. This estimate shows that, currency depreciation may not have a significant effect on foreign direct investment in Ghana in the long-run.

Table 7.11: Bounds Test (FDI Model): ARDL

Test-Statistic	Value	Level	Critical values	
			Restricted Constant and no Trend	
			I(0)	I(1)
		1%	3.173	4.485
		5%	2.431	3.518
F-statistic	1.340	10%	2.088	3.103
K= 6	FDI($_{FDI}$/CD, INF, EXPORTS, GDPG, CPS, MPR)			

Source: generated from EViews 12.0 Package by the Author. Notes: K is the number of explanatory variables. ** denote 5% level of significance. Critical values are obtained from Narayan(2005)

Table 7.12 presents the results of the long-run estimates. The results show that currency depreciation has a coefficient of -76.088 The p-value is 0.540 thus insignificant. The F-statistic from the bounds test shows a value of 1.340 which is less than the critical value of the lower bounds of the 5%, (see Table 7.11). This indicates that there is no cointegration among the variables. This suggests that all other things being equal, an increase in the depreciation of the Ghana cedi will lead to no significant changes in the FDI situation in the long-run.

Table 8.12: Long-Run Estimation (FDI Model): ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CD	-76.088	123.922	-0.614	0.540
INF	-2.791	46.607	-0.060	0.952
EXPORTS	-0.136	0.324	-0.420	0.675
GDPG	97.793	345.442	0.283	0.777
CPS	228.063	262.952	0.867	0.386
MPR	-98.933	123.972	0.283	0.777
C	1621.637	3874.749	0.419	0.676
EC = FDI - (-76.088*CD -2.791*INF -0.136*EXPORTS + 97.793*GDPG + 228.063*CPS-98.933*MPR+1621.637)				

Source: generated from EViews 12.0 Package by the Author.

The short-run estimates are based on the error correction model (CEM) regression. For brevity, the detailed lag results are captured in the Appendix 4. It seems that in the short-run

currency depreciation (CD) did not show any effect on foreign direct investment (FDI). This means that the study is unable to reject the null hypothesis that currency depreciation has no significant short-run relationship with FDI. Thus, as Ghana cedi depreciates, all other things being equal, FDI records no changes in the short-run.

Discussions of the Results and Implications

The results did not reflect the study expectations. The study expected that due to the exchange rate effect on prices of local assets in an open economy like Ghana, currency depreciation is expected to drive interest in local businesses and assets which will ultimately drive up the level of FDI inflows into the economy. In other words, if Ghana cedi depreciates rapidly, the international price or value of Ghanaian businesses will fall which will make it easier for foreigners to buy stake or fully acquire the businesses driving in FDI. The study, therefore, expected currency depreciation (cedi depreciation) to exhibit a significant positive effect on the level of FDI inflow. The study observed that in the long-run, the coefficient is negative indicating an inverse relationship between currency depreciation and FDI. In addition, the relationship is not statistically significant and the F-statistics bounds test results indicated no cointegration between currency depreciation and FDI.

Empirically, the statistically no relationship between currency depreciation and FDI observed in the short-run contradicts some earlier studies in literature (Cushman, 1988; Denisia, 1998; Takagi & Shi, 2011; Udomkerdmongkol et al., 2009) which found positive relationship between currency depreciation and FDI in the short run but in support of Cambazoğlu &Güneş, (2016), who did not find any relationship in the short-run. Cambazoğlu & Güneş, (2016) however, found a positive long run relationship between currency depreciation and FDI in Turkey but that contradicts the result of this study which is negative and statistically insignificant relationship between currency depreciation and FDI.

Apart from the study apriori and empirical relevance of the findings, the study makes contribution to policy, theory and practice. Although some of the factors producing results that are not in line with the existing theory that states that currency depreciation has positive effect on FDI inflows, the study also shows that depending on the future expectation of the performance of the exchange rate, investors will make a decision in putting their funds in a particular economy or not (Udomkerdmongkol et al., 2009). This study results especially in

the short-run adds to the theory of exchange rate on imperfect capital market. The theory looks at uncertainty as a factor affecting FDI (Cushman, 1988; Itagaki, 1981). Cushman paid more emphasis on exchange rate and risk on FDI inflows. Itagaki, (1981), paid more attention to the level of exposure of MNCs to currency risk as being it positive or negative determines how uncertainty affects trade volumes, production volumes, and trade balance.

Also depending on the activities engage in, the results of the study supports the idea of Dunning's Eclectic Paradigm (Denisia, 2010; Dunning, 1998, 2009). The OLI theory of Dunning draws attention to ownership of MNCs or access to natural resources at low cost which could be facilitated by depreciation in the local currency. The location of Ghana which is practically in the centre of the earth couple with its political stability also facilitates export business and the result of the study which shows a positive relationship between exports and FDI confirms that locations like Ghana can support exports oriented FDI. Ghana is an open economy and therefore internationalisation of business activity is promoted which meets some of the goals of MNCs hence their investment through FDI. If the above conditions are met, investors will still invest despite the currency situation, example are investors whose engaged in the extractive industry (International Monetary Fund, 2003).

The evidence of the seemingly mixed results in the short-run and long-run relationship further echoes the Internationalisation theory of FDI. This theory together with the transaction cost theory, rest on the fact that: firms choose the least cost location for each activity they perform and firms grow by internalizing markets until the point where the benefits of further internalization are outweighed by the costs (Buckley, 1988, 2016; Buckley & Casson, 2009; Denisia, 2010; Hennart, 2010). With the depreciation of the Ghana cedi, local costs are reduced and exports revenue will go up which will increase the profitability of the MNCs operating in Ghana. However in a long run the depreciation of the Ghana cedi might trigger inflation problems which will need monetary policy intervention to sustain macroeconomic stability.

In general, the findings reflect the economic situation. It also confirms the Ghana cedi depreciation impact on direction of FDI in the country. The Ghana cedi depreciation has been happening year on year since the economic reforms in 1983. With the economic reforms, most of state owned enterprises were divested to foreign owned companies. This could be attributed to lower value of the Ghana cedi that made the companies cheaper to international buyers (MNCs). Also, Ghana's mineral resources are exploited by MNCs who are mainly into

extraction of raw materials for export. The local cost of labour almost remains the same or less in terms of the US dollar equivalent as the depreciation of the Ghana cedi sometimes exceeds the rate of salary increment. This boost the profit of the MNCs. Ghana's mining and oil and gas industries are dominated by multinational companies.

7.2.5. Currency Depreciation and Balance of Trade (BOT)

The fourth objective examines the effect of currency depreciation on balance of Trade in Ghana. The model specifications and estimations used data on currency depreciation and balance of trade as the main variables of interest. In addition, data on inflation, gross domestic product growth, exports and monetary policy rate were also used. Pre-diagnostic test was conducted to evaluate the appropriateness or otherwise of the data dynamics to pave way for the choice of the appropriate estimation approach. The pre-diagnostics test undertaken are in respect of the descriptive statistics, multi-collinearity and unit root test.

Descriptive Statistics (BOT Model)

The statistical dynamics of the data used for the study was assessed my measuring the descriptive statistics. The outcome of the descriptive statistic is represented in Table 7.2. The results show that all the variables except and BOT have positive mean. The positive mean of CD, INF GDPG and FDI indicate positive patterns in the data dynamics. BOT however, exhibited negative mean, demonstrating trade deficit. The mean values for balance of trade (BOT), currency depreciation (CD), Inflation (INF) and Gross domestic growth (GDPG), Exports, Imports and Monetary policy rate (MPR) rate are-2012.776, 1.864, 21.640, 5.416, 7012.162, 9693.547 and 24.000 respectively.

Collinearity Analysis (BOT Model)

Multi-collinearity problem is a common challenge for multiple regression. A multi-collinearity exists when two variables (i.e. independent and control variables) in a given model are highly correlated. When a multi-collinearity problem exists in model estimation it may lead to spurious regression making the findings suspicious. It is therefore an important pre-diagnostic test to check for multi-collinearity problems. The study follows a correlation matrix to test for the presence of a multi-collinearity problem. Although there is no strict

benchmark for multi-collinearity condition, it is believed that a correlation greater than 0.9 suggests a possible multi-collinearity problem.

Table 7.13 reports the results of the multicollinearity analyses. It can be observed that the correlation coefficients of all the variables are within the threshold except Exports and imports which are 0.992 which is greater than 0.9. The multicollinearity relation is cured through dropping one of the two variables in this case the Imports. The highest correlation coefficient therefore becomes 0.472 which is far below the threshold. This implies that there is no longer any appropriate evidence to assume that there is multicollinearity problem. Thus, the model can be specified and estimated without the need for remodelling.

Table 7.13: Correlation Matrix (BOT MODEL)

Variables	CD	EXPORTS	IMPORTS	INF	GDPG	MPR
CD	1.000	-0.108	-0.117	0.069	-0.104	0.041
EXPORTS	-0.108	1.000	0.992	-0.444	0.283	-0.447
IMPORTS	-0.117	0.992	1.000	-0.474	0.334	-0.495
INF	0.069	-0.444	-0.474	1.000	-0.174	0.472
GDPG	-0.104	0.283	0.334	-0.174	1.000	-0.462
MPR	0.041	-0.447	-0.495	0.472	-0.462	1.000

Source: Generated from EViews 12.0 Package

Unit Root Analyses (BOT Model)

Determining the unit root status of variables in a model is a prerequisite in choosing an appropriate estimation approach. It is generally acknowledged that time series data have unit root problems, therefore, it is useful to affirm or disaffirm in the estimation process. Moreover, since the study seeks to employ Autoregressive distributed lag (ARDL), it is critical to conduct a unit root test to ensure that none of the variables have an integration order of two (2).

The study follows Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) to conduct the test. The results are presented in Table 7.1. The results show that the order of integration for the variables are mixed. Some of the variables have integration order zero: I(0) while others also exhibit integration order one: I(1). However, none of these variables is I(2) variable making the use of ARDL suitable and appropriate.

ARDL Analysis (BOT Model)

The results from the diagnostic tests show that it is appropriate to estimate the specified balance of trade model without modification using the ARDL estimator. It is important to recall that the main variables of interest are the BOT and the CD. The remaining variables are controls. The analyses are conducted to present estimates of both long-run and short-run dynamics. The study further presents the F-Bounds Test and the T-Bounds Test. The results are captured in Table 7.14. It can be seen in Table 7.14 the display of F-statistics and T-statistics and their associated lower bounds (i.e. I(0)) and upper bounds (i.e. I(1)) and the critical values. The critical values are reported for 1%, 5%, and 10% significance levels respectively. The bounds tests are critical because the p-values for the individual variables from the regression output are not compatible with the test distribution since the distribution is non-standard even though the statistics are valid. Therefore, the critical values from the bounds test are the basis for the assessment of the significance and upon which inferences are drawn.

It can be observed that the value of the F-statistics value of 1.666 is less than the critical value of I(0) at the 5% level of significance. This shows that there is no evidence of cointegration.

Table 7.14: Bounds Test (BOT Model): ARDL

Test-Statistic	Value	Level	Critical values	
			Restricted Constant and no Trend	
			I(0)	I(1)
F-statistic	1.666	1%	3.351	4.587
		5%	2.550	3.606
		10%	2.303	3.154
K= 5	BOT($_{BOT}$/CD, INF, GDPG, EXPORTS, MPR)			

Source: Generated from EViews 12.0 Package. Notes. K is the number of explanatory variables. ** denote 5% level of significance. Critical values are obtained from Narayan(2005)

Table 7.15 presents the results of the long-run estimates. The results show that currency depreciation has a negative coefficient of -39.345. The p-value is 0.619 thus insignificant. The F-statistic from the bonds test shows that the value of 1.666 is less than all

the lower bound of the 1%, 5%, and 10% level of significance. This indicates that the null hypothesis that there is no level relationship between currency depreciation and balance of trade is accepted. This means that there is no cointegration between currency depreciation and balance of trade in the long run.

The individual p-values show exports have statistically significant long-run relationship with balance of trade with coefficient of -0.187 in the long run. INF and MPR show positive but statistically insignificance influence when it comes to the issues of balance of trade discourse in Ghana. Whiles GDPG shows negative but statistically insignificant relationship with balance of trade.

Table 8.15: Long-Run Estimation (BOT Model): ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CD	-39.345	78.965	-0.498	0.619
INF	12.989	38.318	0.339	0.735
GDPG	-332.596	295.390	-1.126	0.261
EXPORTS	-0.187	0.074	-2.515	0.012
MPR	19.785	61.001	0.324	0.746
C	-242.451	2500.159	-0.097	0.923
EC = BOT - (-39.345*CD +12.989*INF -332.596*GDPG -0.187*EXPORTS +19.785*MPR -242.451)				

Source: Generated from EViews 12.0 Package

Besides the long-run analyses, the study also conducted a short-run estimation of the relationship between currency depreciation and balance of trade. The model nevertheless included the control variables found in the long-run. However, the discussions and implications are based on the variable of interest which is the currency depreciation (CD).

The short-run estimates are based on the error correction model (ECM) regression. For brevity, the detailed lag results are not reported and discussed in this section but have been captured under the appendix 4. It seems that the study is unable to reject the null hypothesis that currency depreciation has no significant short-run relationship with balance of payment. Thus, as Ghana cedi depreciates, other things being equal, balance of trade is insignificantly affected in the short-run.

Discussions of the Results and Implications

Overall, the results did not reflect the study apriori and are not consistent with the study's expectations. The study expected that due to the exchange rate effect on international trade, a fall in the Ghana cedi exchange rate will drive up prices of goods and services especially since Ghana is import-driven economy and ultimately reduce the level of imports and increase exports as locally produce goods will become cheaper to international customers. The study, therefore, expected Ghana cedi depreciation to exhibit a significant positive effect on the BOT. In the short-run estimation, the Ghana cedi depreciation did not show any statistically significance on balance of trade which far away from expectation. The long-run showed significant negative coefficient (-39.345) but statistically insignificant.

Empirically, the no relationship between currency depreciation and balance of trade as was observed in the short-run is contrary to some earlier studies in literature (Naandam, 2019; Ng et al., 2009) whose research resulted in negative relationship between exchange rate movement and trade balance. Their studies looked at how changes in exchange rate drove trade results. The long-run effect of currency depreciation on BOT in this study is negative and showed no cointegration between the Ghana cedi depreciation and BOT. This is contrary to studies by Bahmani-Oskooee & Brooks, (1999); Bahmani-Oskooee & Cheema, (2009); Ng et al., (2009) who recorded positive relationship between exchange rate movement and trade balance in the long-run. But this study although statistically insignificant (no cointegration), partially in line with studies by Raza et al., (2013; Tuyet Trinh, (2014), which confirmed that in the long-run currency depreciation leads to negative effect on balance of trade.

Besides the study apriori and empirical relevance of the findings, the study has significant implications for theory, policy, and practice. The finding of the study has impact on the effect of exchange rate on balance of trade. This explanation may be shown as a theoretical extension of the J-curve. In a research summary by Bhattarai & Armah, (2005), on the effect of exchange rate on trade balance in Ghana, it showed that, price elasticity of demand on Ghana's export is low, and the price elasticity of import in relation to the real exchange rate is also small. The total of the two elasticities' absolute values is less than unity (0.353). This implies that the short-run requirement for a successful impact of depreciation (devaluation) to have effect on trade balance is not satisfied. Consequently, in the short to

medium term, the trade balance would not be improved by any nominal reduction of the exchange rate. This is partly because Ghana's exports are not priced in Ghana cedis and also the prices are dictated by the world market or buyers. This is also corroborated by (Raza et al., 2013) who confirmed that J-curve effect is in the long-run. This is because the short-run effect is dependent on price elasticity of imports and exports. Tuyet Trinh, (2014), also confirmed that in the long-run currency depreciation does not affect balance of trade positively but rather negative. This has been the situation of most developing countries.

Practically, the findings also reflect the economic reality and import dependent nature of the Ghanaian economy. Despite the consistent depreciation of the Ghana cedi in the past few decades, the BOT mostly has been negative. There is the issue of contract rigidities which affects trade volumes and value. Also pass-through effect of currency depreciation on domestic prices which may not take place until sometime has passed after the depreciation. Ghanaians still import most of their basic needs including food fuel and raw materials for most of the locally manufactured goods. The country exports raw materials and semi-finished goods whose prices they do not control but the global market. Also all the export commodities are priced in US dollars. Most of the MNCs operating in Ghana (in the extractive industry) have the possibility of retaining their export revenues in foreign banks and countries and also can repatriate their profits in the form of dividends without restrictions.

7.2.6. Currency Depreciation and Balance of Payment (BOP)

The fourth objective of the study is to examine the effect of currency depreciation on balance of payment in Ghana. The appropriateness of the data characteristics was assessed by conducting Pre-diagnostic test of descriptive statistics, multicollinearity and unit root test.

Descriptive Statistics (BOP Model)

The variables of interest under this model are data on currency depreciation (CD) and balance of payment (BOP), with the control variables as data on balance of trade (BOT), Inflation (INF) and real GDP growth rate (GDPG), and Foreign direct investment (FDI).

The statistical dynamics of the data used for the study was assessed by measuring the descriptive statistics. The outcome of the descriptive statistic is represented in Table 7.2. The results show that all the variables except BOP and BOT have positive means. The positive mean of CD, INF GDPG and FDI indicate positive patterns in the data dynamics. BOP and BOT

however, exhibited negative mean, demonstrating trade deficit or BOP on red. The mean values for balance of payment (BOP), currency depreciation (CD), Inflation (INF) Gross domestic growth (GDPG), Foreign direct investment (FDI) and balance of trade (BOT) rate are -482.632, 1.864, 21.640, 5.416, 1102.403 and -2012.776 respectively.

Collinearity Analysis (BOP Model)

Table 7.16 reports the results of the multicollinearity analyses. It can be observed that the correlation coefficients of all the variables are within the threshold. The highest correlation coefficient is 0.467 which is far below the threshold. This implies that there is sufficientappropriate evidence to assume that there is no multicollinearity problem. Thus, the model can be specified and estimated without the need for remodelling.

Table 7.16: Correlation Matrix (BOP MODEL)

Variables	CD	INF	GDPG	FDI	BOT
CD	1.000	0.069	-0.104	-0.092	0.130
INF	0.069	1.000	-0.174	-0.435	0.467
GDPG	-0.104	-0.174	1.000	0.383	-0.441
FDI	-0.092	-0.435	0.383	1.000	-0.734
BOT	0.130	0.467	-0.441	-0.734	1.000

Source: Generated from EViews 12.0 Package

Unit Root Analyses (BOP Model)

Determining the unit root status of variables in a model is a prerequisite in choosing an appropriate estimation approach. It is generally acknowledged that time series data have unit root problems, therefore, it is useful to take care of that in the estimation process. Moreover, since the study seeks to employ Autoregressive distributed lag (ARDL), it is critical to conduct a unit root test to ensure that none of the variables have an integration order of two (2).

The results show that the order of integration for the variables are mixed. Some of the variables have integration order zero: I(0) while others also exhibit integration order one: I(1). However, none of these variables is I(2) variable making the use of ARDL suitable and appropriate.

ARDL Analysis (BOP Model)

The results are captured in Table 7.17. It can be seen in Table 7.17 the display of F-statistics and T-statistics and their associated lower bounds (i.e. I(0)) and upper bounds

(i.e. I(1)) and the critical values. The critical values are reported for 1%, 5%, and 10% significance levels respectively. The bounds tests are critical because the p-values for the individual variables from the regression output are not compatible with the test distribution since the distribution is non-standard even though the statistics are valid. Therefore, the critical values from the bounds test are the basis for the assessment of the significance and upon which inferences are drawn.

It can be observed that the value of the F-statistics is greater than the critical values of I(0) and the I(1) at the 5% level of significance. This shows that there is evidence of cointegration. This supports the interpretations provided under the long-run dynamics in Table 7.18.

Table 7.17: Bounds Test (BOP Model): ARDL

Test-Statistic	Value	Level	Critical values	
			Restricted Constant and no Trend	
			I(0)	I(1)
F-statistic	3.840	1%	3.351	4.587
		5%	2.550	3.606
		10%	2.303	3.154
K= 5	BOT($_{BOT}$/CD, INF, GDPG, FDI, BOT)			

Source: generated from EViews 12.0 Package by the Author. Notes: K is the number of explanatory variables, ** denote 5% level of significance. Critical values are obtained from Narayan(2005

Table 7.18 presents the results of the long-run estimates. The results show that currency depreciation has a negative coefficient of -7.477. The p-value is 0.534 thus it means insignificant relationship. However, the F-statistic from the bonds test shows that a value 3.840 which is greater than all the lower bounds of the 1%, 5%, and 10% and greater than upper bound of the 5% (Table 7.17). This indicates that the null hypothesis that there is no level relationship between currency depreciation and balance of payment is rejected. This means that there is cointegration between currency depreciation and balance of payment in the long run.

The individual p-values show FDI and BOT have statistically significant long-run relationship with balance of payment. INF and GDPG show negative but statistically insignificance influence when it comes to the issues of balance of payment discourse in Ghana. But because of the fact that the F-statistic value is greater than both critical values of the lower

level I(0) and upper level I(1) at 5% level of significance, the variables inflation and gross domestic product growth have cointegration with BOP in the long-run.

Table 7.18: Long-Run Estimation (BOP Model): ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CD	-7.477	12.019	-0.622	0.534
INF	-6.343	5.504	-1.152	0.250
GDPG	-60.683	40.947	-1.482	0.139
FDI	0.304	0.094	3.225	0.001
BOT	0.405	0.074	5.485	0.000
C	469.051	264.454	1.774	0.077
EC = BOP - (-7.477*CD -6.343*INF-60.683*GDPG + 0.304*FDI +0.405*BOT + 469.051)				

Source: denerated from EViews 12.0 Package by the Author.

The short-run estimates are based on the error correction model (ECM) regression. For brevity, the detailed lag results are not reported and discussed in this section but have been captured under the Appendix 4.

Estimations prove that in the short-run currency depreciation (CD) has no significant effect on the balance of payment. This means that the study is unable to reject the null hypothesis that currency depreciation has no significant short-run relationship with balance of payment.

Discussions of the Results and Implications

Overall, the results did not reflect the study apriori and are mostly inconsistent with the study's expectations. The study expected that due to the exchange rate effect on international trade, a fall in the Ghana cedi exchange rate will drive up prices of goods and services especially since Ghana is import-driven economy and ultimately reduce the level of imports and increase exports as locally produce goods will become cheaper to international customers. The study, therefore, expected Ghana cedi depreciation to exhibit a significant positive effect on the BOP. But the results show that, the Ghana cedi depreciation had no significant effect on the balance of payment. The long-run model showed a coefficient -7.477 but statistically insignificant. However, the cointegration does exists. This cointegration must be related to other parts of the

Ghana's BOP than FDI and BOT (previous chapters showed no cointegration with the Ghana cedi depreciation of these two BOP items). This issue would require further analysis.

Findings on short-run relationship are in line with lack of long-run positive relationship between cedi depreciation and BOP. If this relationship is weak in a long run the short run responses to the shocks in terms of cedi depreciation have no impact on the speed of BOP adjustment (i.e. returning to the long-run relationship).

Empirically, the finding on no relationship between currency depreciation and balance of payment is contrary to some earlier studies in literature (Naandam, 2019; Ng et al., 2009). These studies looked at how changes in exchange rate drove trade results. The long-run effect of currency depreciation on BOP in this study was negative and showed cointegration between the Ghana cedi depreciation and BOP in the long-run. This contradicts studies by (Bahmani-Oskooee & Brooks, 1999; Bahmani-Oskooee & Cheema, 2009; Ng et al., 2009; Raza et al., 2013) who recorded positive relationship between exchange rate movement and trade balance in the long-run.

Besides the study apriori and empirical relevance of the findings, the study has significant implications for theory, policy, and practice. The finding of the study has impact on the effect of exchange rate on balance of payment which can also be explain through the effect of currency depreciation on trade balance (in section 7.2.5 above).

Practically, the findings also reflect the economic reality and import dependent nature of the Ghanaian economy. The MNCs operating in the manufacturing sector either semi-processed local raw materials for export or import semi-processed goods to complete and sell on the local market. Franchise holders also repatriates huge sums in foreign exchange for franchise fees, technical support fees and royalties. All the above have negative impact on the exchange rate of the Ghana cedi and at the same time affects the BOP situation negatively. Cedi depreciation seems to be result of negative BOP, so we can see cointegration in a long run with negative sign (worsening of BOP augments depreciation).

CONCLUSION AND RECOMMENDATION

The research is aimed at finding the impact of currency depreciation on selected macroeconomic variables. The summery of the outcomes are presented in Table 8.1.

Table 8.1. Relationship between depreciation of cedi and selected macroeconomic variables characterizing performance of economy of Ghana

	Long run		Short run	
	Relationship	Performance in line (or against) key macroeconomic theories	Relationship	Performance in line (or against) key macroeconomic theories
Inflation rate	Positive and significant relationship, evident cointegration	In line with the mainstream theories	Negative and significant relationship (one month lag)	in line with the mainstream theories (Ghana's economy quickly adapts to the short term shocks)
GDP growth rate	Negative and insignificant relationship, but cointegration does exist (requires further analysis)	Can be explained by the mainstream theories, however seems country specific	None	In line with econometric expectations
FDI	Lack of cointegration	against the mainstream theories	None	In line with the econometric expectations

Balance of trade	Lack of cointegration	against the mainstream theories	None	In line with econometric expectations
Balance of payments	Negative and insignificant relationship but cointegration does exist (requires further analysis)	Can be explained by the mainstream theories, however seems country specific	None	In line with econometric expectations

Source: own elaboration by the Author

Table 8.1. allows for positive validation of the main hypothesis of the research that due to the syndrome of small economy exporting mainly raw materials the impact of currency depreciation in Ghana on key macroeconomic variables is different than in more diversified economies. This divergence with the predictions of the mainstream theories can be observed with regard to , GDPG BOP but in particular to FDI (and BOT So it seems that depreciation of cedi witnesses negative relationship with GDPG in Ghana (but impact on GDPG is insignificant), and the same is true for BOP There is no relationship with FDI and BOT Partially these can be explained by the peculiarities of economic situation of Ghana i.e. small open economy dependent on export of raw materials with underdeveloped manufacturing sector supplying domestic market and therefore with low export and import price elasticity. However, it shows that cedi depreciation in fact has the statistically significant relationship only with inflation. This remains in line with the mainstream theory claiming impact of depreciation of the currency on the country price level in a long run. For other four variables the relationship is insignificant and for FDI and BOT there is even no sign of cointegration. In general this speaks against active monetary policy of the BOG aiming at boosting economy or improving BOT and or attracting FDI through currency depreciation. In opposite Ghana's authorities should concentrate on long term measures curbing excessive Ghana cedi depreciation. However this would require a holistic package of policies including structural ones (extending export base, supporting import substitution, improving total factor productivity in Ghana etc.)

Inflation

Ghana cedi depreciation has a positive and significant relationship with inflation in a long run. Ghana cedi depreciation may be positively related to inflation because its pass-through effect on domestic pricing mechanism and therefore on inflation. The study results suggest that because imported products affected by currency depreciation may not be immediately sold on the market because it takes some time for current stocks to be sold out for the new and higher priced imports (resulting from currency depreciation) to be placed on the shelves. It may also suggest that most importer in anticipation of Ghana cedi depreciation may apply forward rates in their pricing mechanism which therefore prevent them from frequent changes in prices that will trigger inflation. These results are in line with some earlier studies by Frimpong & Adam, (2010); Oppong et al., (2015); Sanusi, (2010) whose results confirmed the existence of significant pass-through effect of currency depreciation on prices and inflation in Ghana in the short-run.

The study result confirmed that there is positive relationship between Ghana cedi depreciation and inflation in the long-run which supports the result of earlier studies by Sanusi, (2010).

Gross domestic product growth

Currency depreciation has no significant relationship with gross domestic product growth in Ghana. As the Ghana cedi depreciates, the GDP growth seems be little affected. This result is contrary to research work done by Hafeez et al., (2018);
Nawaz & Ghani, (2017); Nimoh & Addai-Asante, (2018); Okaro, (2017); Osei et al., (2020). The long run results differ in the fact that the coefficient is negative (-0.056) although insignificant (but cointegration does exist). The difference could be as a result of Ghana's major exports whose supply are inelastic are priced not in Ghana cedi but US dollars so depreciation of the Ghana Cedi against major international currencies does not make the exports cheaper to the buyers and generate extra demand that will lead to increase exports which may translate into significant economic growth. Depreciation can also depress the purchasing power of Ghana's households. The long run negative relationship is affirmed by the research results of Adjei, (2019); Krugman & Taylor, (1976); Mohammed et al., (2015).

Foreign direct investment

In the short run, Ghana cedi depreciation has no impact on the FDI. This is not in line with expectation since depreciation of the local currency makes local businesses and assets lower in price for international buyers which may drive more FDI inflows. This also does not support earlier studies by Cushman, (1988); Denisia, (1998); Takagi & Shi, (2011); Udomkerdmongkol et al., (2009). However, in the long-run, Ghana cedi depreciation had a negative impact on FDI but the result was statistically insignificant. This is completely opposite of the studies by Cambazoğlu &Güneş, (2016) where there was a significant relationship between currency depreciation and FDI in Turkey in the long-run. The insignificant long-run relationship between currency depreciation and FDI could be due to investors expectation of the performance of Ghana cedi against the US dollar and other international currencies in the future. Expectation of future depreciations will have negative effect on FDI. Moreover, decisions of multinational companies to invest in Ghana van be driven by global factors (e.g. projections for demand for oil or coca, availability of oil and gas) and not by the Ghana cedi depreciation itself.

Balance of trade

Balance of trade (BOT) was not affected by the Ghana cedi depreciation although the theoretical expectation was that depreciation of Ghana cedi will improve the BOT because currency depreciation will make exports cheaper and imports expensive. But in an import driven economy like Ghana, currency depreciation is expected to reduce the level of imports due to the increase in prices that will accompany. However, in the short-run, there was no effect of Ghana cedi depreciation on the BOT which can be traced to the fact the Ghana's imports are essential items and therefore have inelastic demand. Exports also have inelastic supply hence currency depreciation has little or no impact on exports. The long-run was also statistically insignificant with coefficient of (-39.345). The long-run negative coefficient is in contradiction with the result of studies by Bahmani-Oskooee & Brooks, (1999); Bahmani-Oskooee & Cheema, (2009); Ng et al., (2009); Raza et al., (2013) who recorded positive relationship between exchange rate movement and trade balance in the long-run. The statistically insignificant results of both the short and the long runs could be attributed to the fact that price of Ghanaian exports which are mainly raw materials are dictated by the global market and quoted in US dollars with the Ghanaian exporters being price takers.

Balance of payment

Changes in Balance of Payments (BOP) as a dependent variable is not significantly affected by the Ghana cedi depreciation, although the theoretical expectation was that depreciation of Ghana cedi will improve the BOP because currency depreciation will make exports cheaper and imports expensive (see subsection of BOT). Especially in an import driven economy like Ghana, currency depreciation is expected to reduce the level of imports due to the increase in prices that will accompany. However, in the short-run, there was no effect of Ghana cedi depreciation on the BOP. The long-run coefficient was negative and statistically insignificant. The bounds test though signified cointegration. The coefficient in the short-run contradicts the result of study by Naandam, (2019); Ng et al., (2009).The long-run also contradicted the studies by Bahmani-Oskooee & Brooks, (1999); Bahmani-Oskooee & Cheema, (2009); Ng et al., (2009); Raza et al., (2013) who recorded positive relationship in the long-run.

Based on the result of the research, the following recommendations has been made to help resolve the persistent currency depreciation in Sub-Saharan African countries especially Ghana and the effects it has been having on the macroeconomic variables. The key issue is diminishing dependence of Ghana's prosperity from export of raw materials that is among key reasons of identified in this thesis macroeconomic peculiarities. It is suggested to:

1. Refine petroleum products: Refined petroleum products form 24% of total imports by ECOWAS countries. Ghana should refine its crude oil into petroleum products and sell to the countries in the West Africa sub region since most of them imports finished petroleum products from Europe and countries beyond Africa. Buying from Ghana will come out cheaper because of lower transportation cost. This will enhance generation of foreign exchange for the country and support the stability of the Ghana cedi.

2. Renegotiate Retention Agreement: the current retention agreements allow companies in the extractive industries to keep majority of their export revenues in their home countries or other offshore locations. These retentions affect the flow of foreign currency into the country and affect the price of the Ghana cedi on the foreign exchange market.

3. Build Gold refineries: Like oil, most of Ghana's gold is exported in the raw form. By building gold refineries and insistence on export of only refined gold, Ghana will

increase inflows of foreign currency from gold exports which will help to stabilize the value of the Ghana cedi.

4. Receipt of Royalties: Ghana can receive its royalties from mining companies especially, gold mining companies in the form of gold. The gold can be used to soar up the reserves of the country's gold reserves at BOG. This method can also bring transparency in the area of royalty collection and payments.

5. BOG should move from inflation targeting regime to foreign exchange targeting regime. Exchange rate targeting is the means by which a central bank will affect the foreign exchange market mechanism to maintain the exchange rate of the country's currency at a particular level that seems desirable to that country. For example, Trinidad and Tobago maintain their national currency at an average rate of USD1.00 to TTD 6.50. But to practice exchange rate targeting, the BOG must maintain significant levels of foreign reserves to intervene in the market.

6. Ghana should partner with other ECOWAS countries to adopt payment system that will use electronic netting as is done in the Single Euro Payments Area (SEPA) in which customers can make cashless euro payments through credit transfer and direct debit to any country in the European Union in a fast, safe and efficient way.

7. Forward notice: the BOG should release information about its intended actions on the foreign exchange market to help decision making by the participants. In 2015, during a period of sharp depreciation of the Ghana cedi, the BOG made an announcement of its intent to sell USD20 million daily on the foreign exchange market. Although the amountwas insignificant compared to the daily demand, it calmed the market down and brought about a sort of stability to the Ghana cedi.

8. Resource Equity: Ghana is endowed with many natural resources. Companies receive license from Ghana's appropriate agencies for the exploitation of these resources after payment of license fees. Ghana therefore receives royalties on the extracted resource. Natural resources could be used as equity in the companies that undertakes the resource exploitation instead of the license fees. With this, the country will participate in profit sharing in addition to royalties and taxes. Alternatively, the country can give resources (spectrum, mineral

concession, oilfields) in exchange for a certain percentage of sales revenue which is a form of resource distribution.

There are also some interesting observations worthy of further research. In particular one might examine the nature of cointegration between Ghana cedi depreciation and BOP and real GDP growth in a long run. One can also try to identify actual mechanisms behind negative relationship between Ghana cedi depreciation and real GDP growth.

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APPENDIX

Appendix 1. The mechanism of currency depreciation – case of Ghana

A set of methods used to regulate a country's currency exchange rate compared to other currencies is known as an exchange rate mechanism. This is used by central banks as part of their economic monetary policy. Through these methods, the depreciation or appreciation of a country's currency will be ascertained.

As economic conditions change, exchange rates can change substantially. In comparing the spot rate of a foreign currency at two different times, the spot rate at the more recent date is denoted by S and the spot rate at the earlier date is denoted as

St−1. The percentage change in the value of the foreign currency is then computed as

Follows: $\text{Percent}\,\Delta \text{ in foreign currency value} = \frac{S - S_{t-1}}{S_{t-1}}$

Where:

S – the current spot rate

St−1 – the spot rate at the previous period or date

Δ - change

A positive percentage change indicates that the foreign currency has appreciated, and a negative percentage change indicates that it has depreciated.

Although it is easy to measure the percentage change in the value of a currency, it is not that easy to explain why the value changed or to anticipate how it may change in the future. To attain either of these goals, there is the need to first understand the concept of an equilibrium exchange rate, as well as the factors that influence it.

At any given point in time, a currency should exhibit the price (exchange rate) at which the demand for that currency is equal to its supply. The price at this point is the equilibrium exchange rate.

Figure A1.1 Mechanism of Foreign exchange equilibrium focus on USD

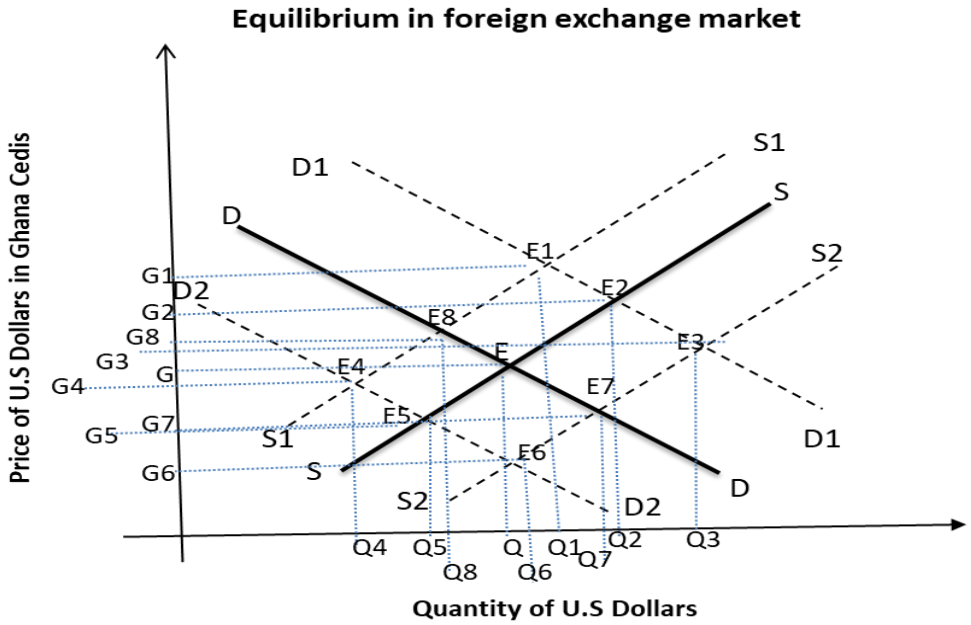
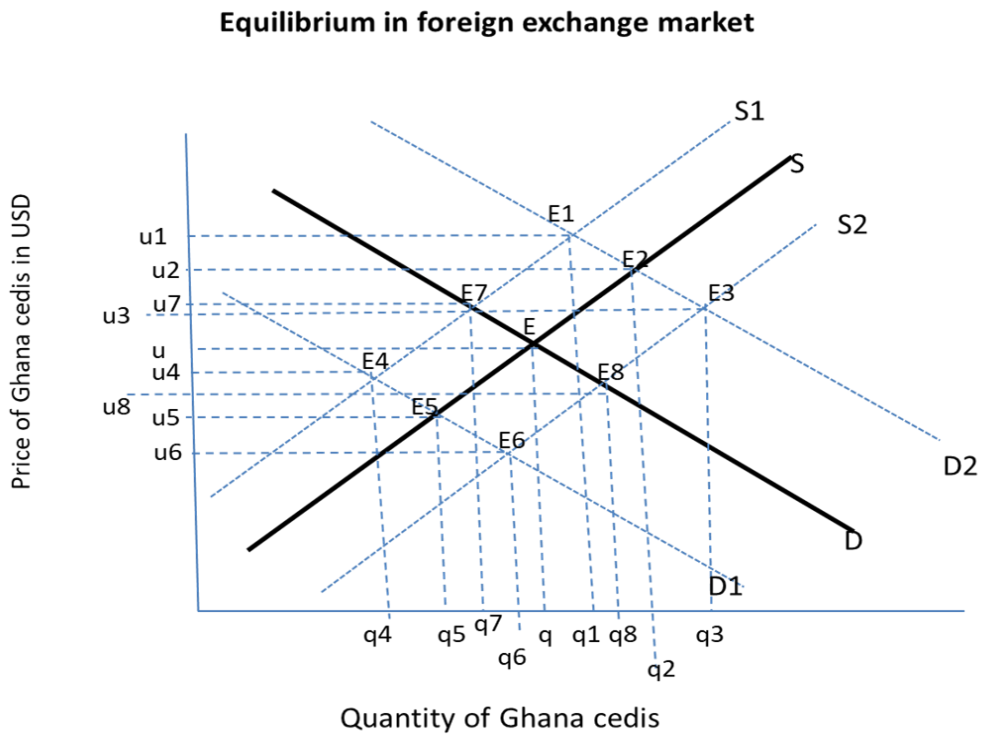


Figure A1.2 Mechanism of Foreign exchange equilibrium, focus on cedi



From the Fig. A1.1, demand for U.S Dollars in Ghana is represented by the line D and supply of USD in the same market is represented by the line S. At that level, equilibrium is achieved at point E where the price of US dollars in Ghana cedis (exchange rate) is G with quantity of dollars supplied and demanded (traded) at Q.

When conditions change over time, adjustments in the supply or demand for currencies occur, resulting in currency price volatility.

Change in the Equilibrium Exchange Rate may be as a result of changes in the demand and supply schedules of the USD which may force a change in the equilibrium exchange rate in the foreign exchange market.

The exchange rate varies because banks that act as intermediaries in the foreign exchange market adjust the price at which they are would like to buy or sell a particular currency in the face of a sudden shortage or excess of that currency (Madura, 2013, pp. 111–112). There are four main possible changes in market conditions that can affect the exchange rate of a cedi.

(I) Increase in Demand for U.S. Dollars: The demand for U. S Dollars in Ghana can change at any time. Assume that the demand for U. S. Dollars in Ghana, as shown

on Fig A1.1 through an outward movement of the demand curve from D to D1. The increase in demand for excess U.S. Dollars may be as a result of increase in the petroleum product prices on the global market where Ghana has been buying finished petroleum products. Ghana's bill for the importation of finished petroleum products is five times the revenue it gets from the export of crude oil though Ghana has emerged as one of the significant oil producers in Africa (*Ghana Oil and Gas Sector*, n.d.) or increase in the price of some commodities that Ghana imports (wheat and sugar). This also means that supply of Ghana cedi at foreign market must increase from S to S2 as depicted in Fig. A1.1. If the supply curve of U. S. Dollars for sale has remains the same at S, then the amount of U. S. Dollars demanded in the foreign exchange market will exceed the amount for sale in the foreign exchange market at the current exchange rate G (from Q to Q2 in Fig.A1.1) which will result in a shortfall U. S. Dollars on the foreign exchange market. The intermediary banks in the foreign exchange market will not have enough U. S. Dollars to meet the demand of customers for U. S. Dollars at the current exchange rate of G. These banks will respond to the change in demand by increasing the exchange rate of the U. S. Dollars to G2 which also implies depreciation of the Ghana cedi against U. S. Dollars. The increase in the exchange rate of the U. S. Dollars against the Ghana cedi will result in decrease in the amount of U. S. Dollars that is demanded in the foreign exchange market. Alternatively, the banks will raise the exchange rate to the level at which the amount of U. S. Dollars demanded will be equal to the amount of U. S. Dollars supplied in the foreign exchange market creating a new equilibrium at E2.

(II) Decrease in Demand for U.S. Dollars: In a situation where the demand for U. S. Dollars decreases (less cedi enters foreign exchange market) – depicted in Fig.A1.1as an inward shift in the demand curve from D to D2 as a result of reduction in the price of petroleum products on the global market or decrease in the volume of food imports because of increase in the domestic agricultural production and or increase in the domestic refinery capacity for oil products. Also, reduction in the global commodity prices reduces the total cost of food import. With the supply of U. S. Dollars for sale remaining at the same level on the curve S. In this instance, the amount of U. S. Dollars demanded in the foreign exchange market will decrease from Q to Q5 lower than the amount for sale in the foreign exchange market at the

prevailing exchange rate. The banks that serve as intermediaries in this market will have an excess of U. S. Dollars at the prevailing exchange rate, and they will respond by lowering the price of the U. S. Dollars from G to G5. This represents an appreciation in the value of the Ghana cedi. As exchange rate of the U.S Dollar is reduced, there will be an increase in the amount of U. S. Dollars demanded in the foreign exchange market and a decrease in the amount of U. S. Dollars supplied in that market. The banks will reduce the exchange rate to the level at which the amount of U. S. Dollars demanded is equal to the amount supplied in the foreign exchange market creating a new equilibrium at the point E5.

(III) Increase in Supply of U.S Dollars: Ghana is heavily dependent on commodity exports, particularly Cocoa, Gold and Crude oil which account for a significant proportion of the country's export earnings. In a situation where there is increase in the price of the main export commodities of Ghana (Cocoa, Gold and Crude Oil) or increase in the business activities of foreign companies in the Ghanaian economy through increase in foreign direct investment (FDI) or participation in the Ghanaian financial market, supply of U.S Dollars will increase and demand for Ghana cedis will increase from D to D2 as depicted in Fig.A1.2.. in fact, the increase in the demand for Ghana cedis will result in an increase in the amount of U. S. Dollars to be supplied in the foreign exchange market. This is depicted on Fig. A1.1 as an outward shift in the supply curve from S to S2 but the U. S Dollars demand remain at D. This will make the amount of the U. S Dollars supplied in the foreign exchange market to exceed the amount of U. S. Dollars demanded in that market at the prevailing exchange rate resulting in a surplus of U. S. Dollars (from Q to Q7). The banks that serve as intermediaries in the foreign exchange market will respond by reducing the price of the U. S. Dollars thus appreciation of the Ghana cedi from G to G7. As they reduce the exchange rate, there will be an increase in the amount of U. S. Dollars demanded in the foreign exchange market. The banks will reduce the exchange rate to the level at which the amount of U. S. Dollars demanded is equal to the amount of U. S. Dollars supplied in the foreign exchange market creating a new equilibrium at E7.

(IV) Decrease in Supply of U.S Dollars: In a situation where there is a decrease in the price of the main export commodities of Ghana in USD (Cocoa, Gold and Crude Oil) or decrease in the business activities of foreign companies in the Ghanaian

economy or participation in the financial market through capital flight, demand for Ghana cedis will decrease from D to D1 as depicted in the Fig A1.2. By the same token this means smaller amount of USD entering the Ghana's foreign exchange market (reduction of supply). Thus, the decrease in the demand for Ghana cedis will result in a decrease in the amount of U. S. Dollars to be supplied in the foreign exchange market. This is depicted on Fig. A1.1 as an inward shift in the supply curve from S to S1 with the U. S Dollars demand remaining at D. This will make the amount of the U. S Dollars supplied in the foreign exchange market to less than the amount of U. S. Dollars demanded in that market at the prevailing exchange rate resulting in a shortage of U. S. Dollars (from Q to Q8). The banks that serve as intermediaries in the foreign exchange market will respond by increasing the price of the U. S. Dollars which will lead to the depreciation of the Ghana cedi from G to G8. As the price of the U. S Dollars increase (depreciation of the Ghana cedis), there will be a decrease in the amount of U. S. Dollars demanded in the foreign exchange market. The banks will increase the exchange rate to the level at which the amount of U. S. Dollars demanded is equal to the amount of U. S. Dollars supplied in the foreign exchange market creating a new equilibrium at E8.

(V) Increase in supply and demand for U. S. Dollars: In situations where there is increase in the supply of U. S Dollars as a result of increase in the commodity prices of Ghana's main exports (Gold, Cocoa, oil), the supply curve will move from S to S2 as depicted in Fig A1.1. This will make more U. S. Dollar available for sales on the foreign exchange market. At the same time if demand for the USD increase on the market as a result of increase in the price of Ghana's imports (finished petroleum products, food, raw, semi-finished and finished products), the demand curve for U. S Dollars will move from D to D1 as depicted in Fig A1.1 or the supply curve for Ghana cedis will move from s to S2 as depicted in Fig.A1.2. The extent to which the exchange rate will be affected will depend on the rate of increase in supply and demand of the U. S Dollars on the foreign exchange market. In Fig.A1.1, the increase in both demand and supply of U. S Dollars will result in a new equilibrium E3 being created. The price of the U. S. Dollar which is the exchange rate will move from G to G3.

(VI) Decrease in supply and demand for U. S. Dollars: in the situation where there is decrease in supply of U. S Dollars due reduction in the volume of exports or

reduction in the price of the main exports of Ghana's exports (Gold, Cocoa, oil) the supply curve S will move to S1 as depicted in Fig.A1.1. This will result in less U. S Dollars for sale on the foreign exchange market. In the same time demand for U. S Dollars may also reduce as a result of reduction in the volume of imports because of increase in domestic production and or reduction in the price of Ghana's major imports (finished petroleum products, food, raw, semi-finished and finished products), moving the demand curve from D to D2 as depicted in Fig. A1.1. The rate of movement in the exchange rate on the market will be affected by the individual changes in the demand and supply of U. S Dollars. As a result of the movement in the supply and demand for the U. S Dollars, a new equilibrium will be created at E4 with exchange rate at G4. The decrease in the supply and demand for U. S Dollars will also affect demand and supply on the foreign exchange market as depicted on Fig. A1.2. The equilibrium will occur at point E4 too but the exchange rate will be u4.

For instance, in 2011, both supply and demand for US dollars went up in Ghana. Production of cocoa beans in Ghana exceeded the 1 million metric tons which was 35.7% above the previous year production (United States Department of Agriculture (USDA), 2012). Together with the production of oil in commercial quantities in Ghana for the first time in Ghana which led to a record economic growth of 14.05%, exports went up by 54% and imports also went up by 43% but trade deficit was 4.9% resulting in the net effect of 6.34% depreciation of the Ghana cedi against the US dollar(*Ghana | Data*, n.d.).

Exchange rates can also be influenced by actions of the central bank on the financial market. Central banks like the BOG may influence the foreign exchange rate by direct intervention on the financial markets through either directly selling or directing buying of foreign currency on the interbank exchange market. They may sell U. S Dollars on the interbank exchange market to help maintain the Ghana cedi rate against the U. S Dollars when the Ghana cedi is depreciating significantly or sell Ghana cedis by so doing they buy U. S Dollars from the interbank foreign exchange market. These actions help the BOG to maintain stable value of the Ghana cedi against the U. S Dollar and other international currencies (*BoG to Sell $420m to BDCs in Final Quarter of 2022 - MyJoyOnline.Com*, n.d.)

Appendix 2. Inflation theories

According to the Quantity Theory of Money, price level and money supply have a direct and significant positive relationship. The following quantity equation of money can be used to demonstrate this relationship.

MV = PT

where

M is money supply.

V is money velocity.

P is the average price level.

T is the total amount of products and services produced.

The price level and money supply in a country's economy have a proportionately positive connection. This means that if the money supply grows by a given percentage, the price level will grow by the same. The theory further states that inflation caused by a rise in money supply of a particular country, will not be followed by increase in the output of that country.

“These pressures come from three main sources:

1. Excess demand for output and labour. An increase in the money supply has an expansionary effect on the economy, raising the total demand for goods and services. To meet this demand, producers of goods and services must employ workers overtime and make new hires. Even if wages are given in the short run, the additional demand for labour allows workers to ask for higher wages in the next round of wage negotiations. Producers are willing to pay these higher wages, for they know that in a booming economy, it will not be hard to pass higher wage costs on to consumers through higher product prices.

2. Inflationary expectations. If everyone expects the price level to rise in the future, their expectation will increase the pace of inflation today. Workers bargaining over wage contracts will insist on higher money wages to counteract the effect on their real wages of the anticipated

general increase in prices. Producers, once again, will give in to these wage demands if they expect product prices to rise and cover the additional wage costs.

3. Raw materials prices. Many raw materials used in the production of final goods, for example, petroleum products and metals, are sold in markets where prices adjust sharply even in the short run. By causing the prices of such materials to jump upward, a money supply increase raises production costs in materials-using industries. Eventually, producers in those industries will raise product prices to cover their higher costs." (Krugman, Obstfeld, & Melitz, 2012 pp. 373-374)

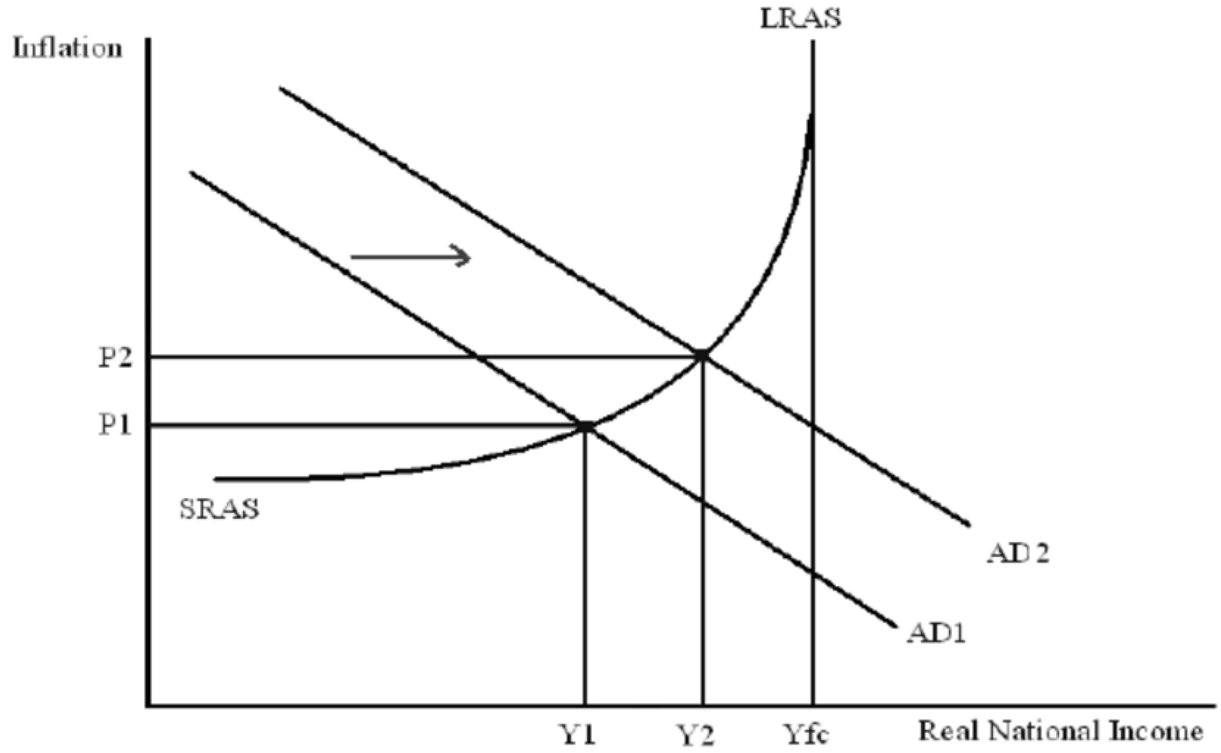
According to Keynesian theory, inflation is a level of prices that develops after the attainment of full employment. While the quantity method focuses on the amount of money that is thought to be the cause of the increase in the price level. Keynes distinguishes between two sorts of price increases: (1) those that are accompanied by an increase in production and (2) those that are not. The growth of money or other variables that raise demand will cause a rise in price levels as well as an increase in the volume of products and services produced in an economy that is operating at a low level, has a high rate of unemployment, and underutilized resources. This will continue until full employment, or the point at which all unemployed have found work and capital and other resources are being used more effectively. Beyond this point, however, any boost in demand or money supply will result in higher prices, which will also increase output or employment. The first increase in prices up to the point of full employment is therefore advantageous for the country since it increases output and employment. Such an increase in price is referred to as reflation or partial inflation. Since there hasn't been a matching growth in output or employment, the country suffers from the price increase following the point of full employment. In developing countries, inflationary conditions and human and material resource unemployment may coexist. This is because there are obstacles, such as insufficient money, equipment, transportation, and technological know-how. Due to these constraints and shortages, even if full employment may not have been attained in the country, an increase in price level may not result in an increase in output past a certain point. The main stream economics accepts both views, assuming that in the short run expansionary monetary policy might result in production increase and moderate rise of prices whereas in a long run the only effect is price increase. However some orthodox schools like rational expectation one still believe that monetary policy makes no sense unless being implemented by surprise.

The Yugoslavia hyperinflation (1992 – 1994), confirmed the monetarist theory of inflation that sees lack of fiscal control as the main factor in excessive increase in money supply which will lead to monetization of fiscal deficit. The Yugoslavia hyperinflation was a result of economic restriction that was placed on the country during the war that led to the disintegration of that country and as a result, there was significant reduction in the GDP and huge fiscal deficit of up to 28% of GDP of the Federal Republic of Yugoslavia (Serbia and Montenegro) which emerged after the war (Petrović et al., 1999).

Inflation may be classified as demand pull or cost push.

Demand pull Inflation refers to inflation situation where increase in the level of price is driven by strong consumer demand which raises aggregate demand above aggregate supply. This drive prices to go up may be described as the phenomenon where too much money is chasing too few goods.

Fig A2.1 The mechanism of demand-pull inflation



Source: (Dedu & Dumitrescu, 2009)

From the above Fig A2.1, The curve SRAS represents the short-term aggregate supply that rises upward. when a full-employment level of aggregate supply Yfc (potential product) is reached, the supply curve of SRAS takes a vertical shape. At full employment (potential GDP), output supply cannot be increased. Changes is SRAS can occur as a result of drought which may affected food supply negatively and may lead to increase in inflation (e.g in 1983 Ghana suffered the worse form of drought and there was significant reduction in food supply. Inflation went up to 122.87%). In 1990, during the "Gulf war" an armed campaign waged by a 35-country military coalition led by the United States in response to the Iraqi invasion of Kuwait brought about temporal reduction in crude oil supply which led to increase in oil prices. This raised the inflation rate in Ghana to 37.26% from 25.22% in 1989.

With the aggregate demand curve AD1, equilibrium is reached at a point Y_1 which is lower than the full employment level at the price level P1. If the aggregate demand increases to AD2, the price level will also increase to P_2 due to excessive demand at price P_1.

It is worth noting that the rise in the price level from P_1 to P_2 has led to an increase in the output supplied from Y_1 to Y_2. However, since the aggregate short run aggregate supply curve is still sloping upward, any increase in aggregate demand from D2 will move output from Y_2 to Y_{fc}. After this point, any increase in aggregate demand will only increase the price level in the short run since the full employment level $Y_{fc}$is reached (Dedu & Dumitrescu, 2009).

Inflation which is persistent and not one-time price rise phenomenon requires sequence of shifts of the AD curve. The demand-pull inflation may be caused by the following factors:

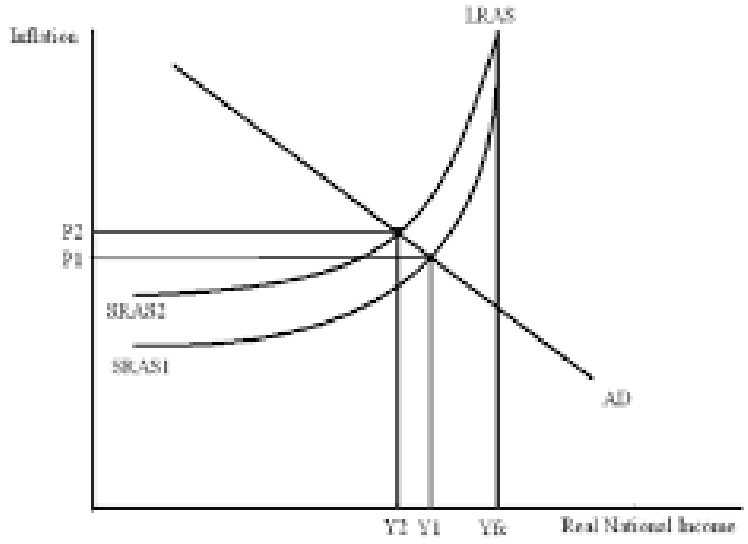
- Consumption: An increase in consumption level pushes up the price of the certain product/commodity. Increase in consumption may be due to increase in remuneration for of workers as a result on economic growth
- Exchange Rate: Depreciation in the value of local currency may make exports cheaper. This may increase exports and will drive increase in aggregate demand.
- Government Spending: Increase in government spending will lead to increase in money supply which in turn will boost the aggregate demand in an economy.
- Income Tax: Reduction in the rate of income related taxes will make available more available to consumers to spend. And if too much money is chasing too few goods, inflation will rise.

- Expectations: The very anticipation of inflation will lead to a rise in inflation. Expectations regarding the future movement of inflation may initiate a new cycle of inflation because income earners may choose to consume more in the present as they anticipated increase the price levels. Thus, expectations might be among the reasons for the shifts of the aggregate demand curve from AD1to AD2 (Fig A2.1).

Those factors might occur during the boom or as a result of the consciousness expansionary policies including money printing. Right-ward shift of AD1 caused by normal functioning of economy has its natural limits thus demand inflation must stop at some point of time. Moreover, its occurrence is related to achieving potential production (low level of unemployment) so such inflation can be perceived as useful and acceptable by decision makers and general public.

Cost-push inflation refers to inflation caused by significant increases in the cost of production. usually due to resource limitation. As the result the increment in the prices of factors of production may lead to a decrease in supply. Cost-push inflation may also occur in the situation where producers, confronted with higher production costs may decide to raise the price of their products in order to maintain their profit margin.

Fig A2.2 The mechanism of cost-push inflation



Source: (Dedu & Dumitrescu, 2009)

From the above Fig A2.2, The curve SRAS1 and SRAS2 represent the short-run aggregate supply and LRAS is the Long-run aggregate supply. A rise in cost-push inflation will cause the short run aggregate supply (SRAS1) to shift leftward to Cost-push inflation all things being equal will lead to reduction in the output of the nation (aggregate supply). This short run reduction will create a situation where the general price levels will increase from P_1 above $P_2$with production remaining Y_1 on the curve SRAS2 but after a while the output will drop to Y_2. while price stabilize at P_2. This situation is perceived usually as a very negative one due to combination of increase of prices and increase of unemployment level.

Cost-push inflation may be caused by the following factors:

- Increase in the prices of some factors of production (raw material and labour): Rising labour costs occur when the increase in wages outruns the improvements in productivity- this in specially the case for labour-intensive industries.
- Increase in Business taxes: If the government decides to impose higher indirect taxes like VAT (Value Added Tax) on products it will lead to increase in the cost of production. The level at which producers will transfer the effect of the taxes to prices is largely influenced by the elasticity of demand for their products.
- Currency depreciation: The depreciation in the value of a country's currency will lead to increase in the cost of imports. In the case where raw materials are imported, the cost of production will increase. Currency depreciation could ignite a fear that an inflation-depreciation spiral may occur. This fear may be as a result of previous history of high inflation that started by exchange rate depreciation (Goldfajn & Werlang, 2005)
- Expectations: Wages expect inflation and therefore claim higher wages in advance or put some inflationary clauses to their job contracts which results in permanent increase of the labour costs in the country. With the anticipated increase in inflation, workers are likely to ask for increase in wages in order to protect their purchasing power.

Thus, such type of inflation is not caused by negative external macro-economic shocks only but also by some structural problems within the country such as wage-price spiral. It can also be augmented by the inflation expectation caused by the initial inflationary impulse. However, in developing countries cost-push inflation may occur also as a result of very fast development facing several bottlenecks that might cause gradual but, in some cases, irreversible increase of

the costs of factor of production (rigidity of wages phenomenon) faster than increase of the productivity level.

Even though some producer may temporary avoid price increases due to increase in labour cost by reducing costs in other areas of the businesses' operations, wage inflation has a strong influence on price inflation in the long-run.

In some instances, demand pull variables and cost push elements can contribute to form mixed-demand inflation. Macroeconomics proponents believe that in most cases, it is difficult to discern between supply-side and demand-side inflation. An increase in aggregate demand, for example, may boost demand for labour by companies and induce workers to demand higher salaries, causing companies to increase prices of their products. In this scenario, inflation may be demand-side in that the ultimate reason was a rise in aggregate demand, but it is supply-side in that the proximate source of the price increase was an increase in wages. The increase in demand by labour for increase in wages may also lead to increase in cost of production which will also have to be passed on to consumer through price increases. The price increase in consumer goods may further trigger agitation by labour for higher wages thereby creating already mentioned a spiral of price increases and inflation. To the aforesaid example we can also add expectations that cause price inertia. Once the rate of inflation begins to rise, sellers of goods anticipate increase in the cost from the source of their products. This anticipation will inform their pricing decision. Expectations on future inflation therefore affect the determination of current inflation. This has justified the need to place emphasis on expectations management and communications as important tools of monetary policy (Yoshikawa et al., 2015). Higher inflation expectations will also lead to the agitation for higher wages by workers. Increase in wages will lead to the increase in the cost of production of goods and services. This increase in cost will eventually be passed on to the prices of goods and services which will therefore aggravate the inflation situation. In countries where employments by Governments are significantly high, increase in wages by workers could lead to fiscal instability. To improve the fiscal situation, Governments could result to increase taxes or introduction of new ones. If the government decides to concentrate on indirect taxes like VAT, this will immediately lead to increase in prices which will again affect the inflation rate leading to a spiral.

Appendix 3. Overview of trade theories

The following trade and FDI theories explain the essence and reasons for development of international trade (they are presented in chronological order) and FDI inflow and outflow:

- The Mercantilist theory was popular in the period between 1500 and 1800. In mercantilism, a nation's wealth is measured by its holding of treasure (usually in Gold) which is used as the main means of exchange. Countries are therefore required to encourage and export more through given of subsidies and discourage import through the introduction of tariffs and quotas to achieve positive balance of trade and amass treasure or wealth. However, the restrictions impose on imports impairs the growth of nations. Because monetary issues are a key component of mercantilism but monetary policy is not carried out at the regional level, it is challenging to completely apply the mercantilism concept to regional study. Mercantilism proposed a positive trade balance. This would be made possible through a proactive foreign trade strategy. This policy in a regional block like the European Union (EU) cannot be implemented at the local (country) level because it falls under the exclusive purview of the EU. Export promotion is seen as a method to boost employment. When foreign rivals pose a threat to a region which has large number of major enterprises in a certain economic sector, such firms may propose the implementation of antidumping or anti-subsidy measures to protect their market share (Uminski & Nazarczuk, 2020, p. 8).
- Adam Smith in his 1776 book entitled "The wealth of Nations", proposed the Theory of Absolute Advantage in which he argued that, the notion of mercantilism is misguided. The notion that a country creates wealth by exporting more than importing is an illusion and not something that in reality will define a nation's wealth. He therefore argued that nation's wealth is based on the total goods and services available to its citizens rather than gold reserves. The theory of absolute advantage duels on the capability of one country to produce more of a product with the same amount of inputs than another country. Countries may have natural advantages like climate, natural resources and location or acquired advantage like design skills and processed technology. As a result, a country should produce only things where it is most efficient and trade for goods where it is inefficient. He therefore showed supports for specialization through free trade since consumers would benefit more if they can acquire cheaper items from other countries. Adam Smith therefore advocated for trades without restriction in order to enable

countries specialize in the production of goods they have an advantage for specialization leads to greater efficiency and higher productivity. The theory only explain how free trade can be advantageous and the causes of trade when both countries enjoy absolute advantage in the production of at least one product; it assumes that transportation cost are either non-existing or insignificant which may not be true; it also assumes that prices are comparable across countries implying stability of exchange rate. But in today's condition, exchange rates are determined by demand and supply of a particular currency on the foreign exchange market; the theory also assumes perfect mobility of labour between sectors of the economy. Labour may be mobile but to an extent because of issues of location and skills requirement for different industries.

- The theory of comparative cost advantage – based of the limitations of the theory of absolute advantage, David Ricardo in 1817 developed what is called the theory of comparative cost advantage which shows that gainful trade can still occur even if one country has no absolute advantage over its trading partner. According to the theory, a country should produce only those goods in which it is most efficient and import those goods in which it is less efficient; there is a difference in opportunity cost and a country has a comparative advantage in producing that good in terms of other goods in the country compared to other countries; even if a country is efficient in producing all goods, trade between two countries can prove beneficial. They can nevertheless benefit from trade by distributing resources according to comparative advantage and trading with one another; the theory also highlights the issue of technological disparities between nations as the main determinants; the theory also strives to demonstrate the advantages of trade for all the countries involved.The theory is mainly based on the nineteenth century model of international trade where the developing countries mainly export raw materials to the developed countries and in return import finished products (Myint, 1958); it assumes only two countries and goods to test the theory. However, international trade involves many countries and commodities; the assumption of full employment helps the theory in explaining trade on the basis of comparative advantage in cost of production, in terms of labour, which may change as countries with varying levels of employment move toward full employment; transportation costs are also not considered just like the theory of absolute advantage by Adam Smith in determining comparative cost differences.
- The Heckscher-Ohlin hypothesis: This is also known as factor endowment or factor proportions theory. Its core idea is that trade is driven by abundance of factors of

production in different countries. It therefore states that the relative endowment of labour and capital in a country determines the relative cost of factors, whereas factor cost determines which items the country can manufacture most effectively. It analyses the proportions in which different are of production accessible in different nations, as well as the proportions in which they are utilised in the manufacture of various items. The model predicts that capital surplus nations, such as Germany, will specialize in the manufacture and export of capital-intensive commodities, whereas labour surplus countries, such as Ghana and Nigeria, will specialize in the production and export of labour-intensive goods. This theory is limited in the way its assumptions are oversimplified and seems unrealistic; it gives undue importance to supply and less importance to demand. This theory has given rise to what is known as the Leontief paradox- many empirical tests have been conducted on the Heckscher-Ohlin hypothesis, with the majority raising concerns about its validity. Wassily Leontief used the US economy as an example for similar criticisms in 1953. Because the United States has comparatively ample capital in comparison to other countries, it would be an exporter of capital-intensive commodities and an importer of labour-intensive ones. However, Leontief discovered that US exports were less capital demanding than imports, which became known as the Leontief paradox. The United States has a distinct edge in developing new and creative goods that require less capital and rely significantly on skilled labour and imaginative entrepreneurship. Consider computer software. As a result, disparities in technology may result in inequalities in productivity, which influences international trade patterns (KRUGMAN et al., 2012, pp. 80–99).

- The neoclassical theory: It is based mainly on two theories – Opportunity cost theory by Gottfried Haberler and theory of reciprocal demand by J.S Mill. The theory deals with the issue of international rate of exchange and distribution of gain from trade among the trading countries. The theory according to J. S. Mill, the actual ratio at which commodities are transacted between two countries depends on the strength and elasticity of each country's demand for the product of the other country or reciprocal demand. By reciprocal demand, Mills meant the quantities of export that a country would offer at different terms of trade in return for various quantities of import. The neoclassical theory holds that the determinants can be concurrently found in the variations in technologies, factor endowments, and cultural preferences among various nations. Even if technologies and factor endowments were totally comparable between nations, the last component accounts for the potential for international trade (Gandolfo, 1998, p. 5).

- The new trade theory: it originated in the 1970s in response to the limitations of the classical theories, and it was examined by Paul Krugman and other economists. Countries do not always specialize and trade only to benefit from differences in resource endowment or technology, but rather to obtain economies of scale (low cost advantage). The theory introduces a view of industrial organization that includes: real-life imperfect competition; economies of scale - a reduction in average cost as a result of increased output; and increasing returns - a unit increase in input results in a more than proportionate increase in output, leading to specialization in many industries. Trade allows nations to specialize in items where they have economies of scale, as the size of the market restricts a country's diversity and scale of production. Each nation may be able to specialize in manufacturing a small range of items through trade, so increasing the variety of commodities available for consumption at a cheaper cost. When nations do not vary in terms of resource endowment or technology, commerce provides reciprocal benefit.
- Technological Gap theory: technology is an important factor that can influence both the pattern and direction of trade. Michael V. Posner proposed this theory in his 1961 work International Trade and Technological Change. In the analysis, he loosens the Heckscher-Ohlin model's exemptions. He then stated that there is a lag in the spread or transmission of technology across countries, which has a significant impact on the structure of international trade. He also stated that a large portion of international trade between industrialized countries is based on the introduction of new technology, new products, and new manufacturing processes, which give the innovators a temporary monopoly in international trade. That indicates that countries that create new items will have a temporary monopoly that will be eroded by copying by other countries. This situation is also known as the imitation lag hypothesis. Posner used the example of two countries to explain the hypothesis: if country A develops a new product, that product will not be available in country B immediately. This he attributed to two lags: imitation lag, which is the time required by country B to replicate the new product's manufacturing process, and demand lag, which is the time required by consumers in country B to acquire the taste of the new product from country A. As a result, he calculated net lag by comparing imitation lag to demand lag. This is the period during which country A will have monopolistic control over the new product and will export it to country B. Posner thus felt that international trade primarily concentrates on the introduction of new or innovative products that provide the originating country with a

temporary monopoly over that product or innovation. The theory's fundamental shortcoming is that it does not explain the reasons for technological distinctions or superiority enjoyed by some countries, nor how those technological differences are erased over time.

- Product life cycle theory: it is regarded as a development of the technological gap theory. Raymond Vernon introduced it in his book “International Investment and International Trade” in 1966. It was also founded on the idea that there is a lag in the distribution of technology across countries. As a result, not all countries have access to the same technologies. This leads to a pattern of new goods production which initially concentrates in developed countries, but gradually shifts to other (developing) countries. His work also emphasized that companies may tend to become multinational at a certain stage of their growth. Exports are frequently used to expand into international markets in the early phases of a product's life cycle. This is made possible by the fact that various countries are at different stages of economic development, which leads to a "technology gap" where rich countries function as a demonstration effect, showing innovative items to prospective buyers overseas. The company now need strong relationships with both its product market and suppliers. The company may decide to look for lower-cost locations and search for new markets abroad as the product develops and standardizes whiles at the same time competitive products start to emerge. The reason in this case may not just be the less expensive raw materials or inputs available elsewhere, but also the potential economies of scale that could be enjoyed through longer production runs by allocating different component manufacturing and assembly to different factories. Vernon's theory of trade provide understanding into how MNCs develop new products, expand their markets, and change over time as they adjust to changing economic conditions and look for competitive advantages across borders. In Ghana, some of the MNCs that operate manufacturing plants may fall in this category as mostly start business by importing products from their home countries and as the market for the product matures, they resort to local production and use of local raw materials to reduce cost and make them competitive.
- The Theory of Exchange Rates on Imperfect Capital Markets

  Foreign Exchange risk has been at the forefront of international trade analysis. The market imperfections theory, suggests that firms engage in FDI to capitalize on imperfections in the product, factor, and financial markets. By conductingintercompanycross-border transactions, MNCs can reduce transaction costs

and gain a competitive advantage. Cushman, (1988), paid more emphasis on the role exchange rate movements play in attracting FDI to a particular economy. Whiles in analysing uncertainty as a factor affecting FDI Itagaki, (1981), also laid more emphasize on the role of the exchange rate risk that MNCs will face as they invest in other economies.

- The Internationalisation theory

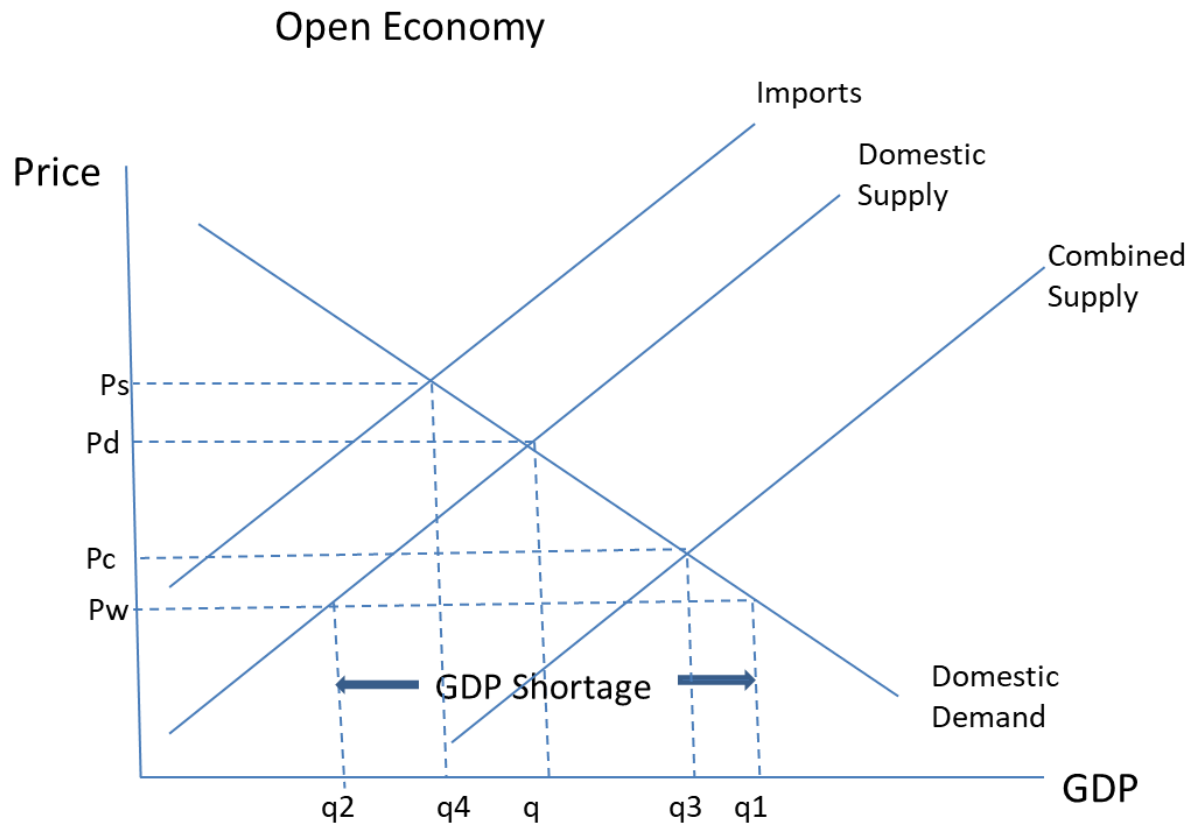
  This theory aims at explaining the reasons for the expansion of MNCs and their pursuit of FDI. The theory's which was first proposed by Buckley and Casson, show how MNCs structure their internal operations to enhance distinct advantage that can subsequently be used to their benefit. Dunning also agrees the fact that internalization theory is very important and included it into his eclectic theory, however he also made the assertion that this only partially explains FDI flows(Buckley, 1988, 2016; Buckley & Casson, 2009; Buckley & Ghauri, 2014; Dunning, 2009).

- Eclectic Paradigm

  Dunning's eclectic paradigm, or OLI framework, integrates a number of factors that may influence FDI. According to this theory, ownership (O), location (L), and internalization (I) benefits drive foreign direct investment (FDI). When companies have distinctive assets, when the host nation has appealing attributes, and when internalising transactions makes more sense than licensing or exporting, they are more likely to invest overseas (Denisia, 2010; Dunning, 1998, 2009). This theory could easily explain the fact that more FDI in Ghana are directed at the extractive industry.

Advantages of unrestricted foreign trade are explained at Fig. A3.1.

Fig.A3.1 Open economy

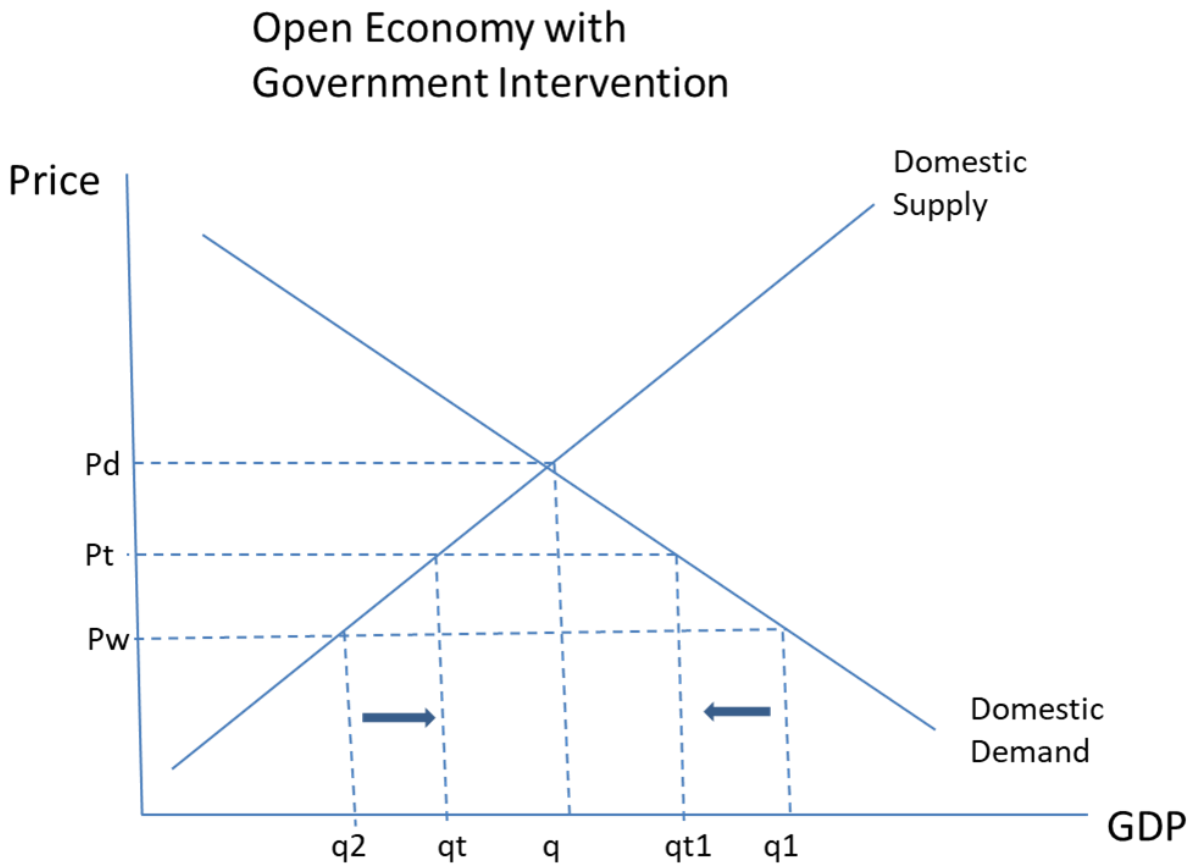


Source: own compilation by the Author

From the above, at domestic production q, prices for goods and services will be at the point Pd. But as the country opens its economy to international trade, the quantity of goods and service for domestic consumption will increase to q1 at the price Pw. Originally, at this price domestic producers would have supplied only q2 which would have resulted in a higher price for domestic consumers. The extra quantities q1 – q2 made available to the local market through international trade will help to keep prices lower at Pw. In situation where the local production is inadequate to satisfy the domestic demand at a reasonable price, imports are needed to ensure that domestic customers are satisfy at a reasonable price. From the above figure, domestic supply q at the price Pd will not satisfy the domestic customer at a reasonable price Pd. Imports only of q4 will not also satisfy the domestic customer at the price Ps. But when imports are allowed into the country to compliment domestic production as a result of open economy, quantity q3 will be available for domestic consumption and in this case, the combined quantity q3 will be available to the domestic customer at a price Pc which is lower than Ps and Pd. These

low prices will help to raise utility and standard of living in the country.Fig.A3.2 shows the effect of tariffs on international trade.

Fig.A3.2 The effect of tariffs on international trade



Source: own compilation by the Author

From the Fig A3.2 above, the introduction of tariffs will increase prices from Pw to Pt. This price is above the price of Pw which is the price of imports without tariffs. At this price, quantity of imports will reduce from q1 to qt1. Domestic supplies will go up from q2 to qt. The increase in domestic production will:

- increase profit of domestic producers as a result of economy of scale
- improve the country's net export balance by decreasing imports

But at the same time, domestic consumers will suffer increase in prices of imports and reduction in satisfaction or utility compared to the period before the introduction of the tariffs.

Appendix 4. Error correction Model(ECM) regression

Inflation

ECM Regression

Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INF(-1))	0.595205	0.032722	18.18984	0.0000
D(CD)	0.014728	0.016667	0.883682	0.3774
D(CD(-1))	-0.050706	0.019900	-2.547960	0.0112
D(CD(-2))	-0.048618	0.016618	-2.925696	0.0036
CointEq(-1)*	-0.070187	0.009537	-7.359299	0.0000

GDPG

ECM Regression

Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDPG(-1))	0.918711	0.019088	48.12928	0.0000
D(GX)	-0.000245	0.000115	-2.125081	0.0342
D(GX(-1))	0.000405	0.000116	3.486869	0.0005
D(BOT)	-0.000901	0.000126	-7.128567	0.0000
D(BOT(-1))	0.000964	0.000129	7.485351	0.0000
D(CPS)	-0.356038	0.068134	-5.225523	0.0000
D(CPS(-1))	0.337180	0.068368	4.931845	0.0000
CointEq(-1)*	-0.013498	0.002260	-5.971955	0.0000

FDI

ECM Regression

Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FDI(-1))	0.902626	0.019645	45.94792	0.0000
D(EXPORTS)	0.154652	0.017031	9.080854	0.0000
D(EXPORTS(-1))	-0.144472	0.017154	-8.421795	0.0000
D(GDPG)	-62.80689	7.109560	-8.834145	0.0000
D(GDPG(-1))	60.27529	7.089696	8.501816	0.0000
D(CPS)	-36.69971	9.066716	-4.047739	0.0001
D(CPS(-1))	36.40624	9.104739	3.998604	0.0001
D(MPR)	-0.634423	0.498201	-1.273427	0.2036
D(MPR(-1))	0.964557	0.499872	1.929607	0.0543
CointEq(-1)*	-0.001110	0.000336	-3.301379	0.0010

BOT

ECM Regression

Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(BOT(-1))	0.941968	0.016355	57.59349	0.0000
D(EXPORTS)	0.379159	0.044124	8.592935	0.0000
D(EXPORTS(-1))	-0.362163	0.044845	-8.075965	0.0000
D(GDPG)	-197.1956	18.12029	-10.88258	0.0000
D(GDPG(-1))	189.8102	17.93639	10.58241	0.0000
CointEq(-1)*	-0.003374	0.000981	-3.439097	0.0006

BOP

ECM Regression

Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(BOP(-1))	0.912656	0.019998	45.63740	0.0000
D(GDPG)	-39.91508	8.030073	-4.970699	0.0000
D(GDPG(-1))	36.79178	8.097837	4.543409	0.0000
D(FDI)	-0.179525	0.077626	-2.312691	0.0212
D(FDI(-1))	0.170937	0.077341	2.210188	0.0276
D(BOT)	0.102660	0.030424	3.374336	0.0008
D(BOT(-1))	-0.090518	0.031092	-2.911310	0.0038
CointEq(-1)*	-0.011000	0.002106	-5.222137	0.0000

Table of Data

	BOP	BOT	CD	CPS	EXPORTS	FDI	FPI	GDPG	GX	IMPORTS	INF	M2G	MPR	OP
Jan-84	(474.00)	(86.30)	0.00	2.21	611.70	2.00	24.68	8.65	834.10	812.80	125.99	53.62	14.50	29.40
Feb-84	(469.67)	(92.94)	0.00	2.28	617.06	2.30	24.67	8.35	841.28	824.43	117.50	53.00	14.50	29.12
Mar-84	(465.33)	(99.58)	0.00	2.36	622.42	2.60	24.67	8.05	848.45	836.05	98.41	52.38	14.50	28.84
Apr-84	(461.00)	(106.23)	16.67	2.43	627.78	2.90	24.66	7.76	855.63	847.68	74.17	51.76	14.50	28.55
May-84	(456.67)	(112.87)	0.00	2.51	633.13	3.20	24.65	7.46	862.80	859.30	43.25	51.14	14.50	28.27
Jun-84	(452.33)	(119.51)	0.00	2.58	638.49	3.50	24.65	7.17	869.98	870.93	23.88	50.52	14.50	27.99
Jul-84	(448.00)	(126.15)	0.00	2.66	643.85	3.80	24.64	6.87	877.15	882.55	28.96	49.90	14.50	27.70
Aug-84	(443.67)	(132.79)	10.00	2.73	649.21	4.10	24.63	6.57	884.33	894.18	24.27	49.27	14.50	27.42
Sep-84	(439.33)	(139.43)	0.00	2.81	654.57	4.40	24.63	6.28	891.50	905.80	20.88	48.65	14.50	27.14
Oct-84	(435.00)	(146.08)	0.00	2.88	659.93	4.70	24.62	5.98	898.68	917.43	13.80	48.03	14.50	26.86
Nov-84	(430.67)	(152.72)	0.00	2.96	665.28	5.00	24.61	5.68	905.85	929.05	7.90	47.41	14.50	26.58
Dec-84	(426.33)	(159.36)	29.87	3.03	670.64	5.30	24.61	5.39	913.03	940.68	5.99	46.79	14.50	26.29
Jan-85	(422.00)	(166.00)	0.00	3.11	676.00	5.60	24.60	5.09	920.20	952.30	8.66	46.17	18.29	26.01
Feb-85	(406.92)	(166.48)	0.00	3.15	686.73	5.49	24.75	5.10	936.99	963.04	4.11	46.31	18.29	25.10
Mar-85	(391.83)	(166.95)	0.00	3.20	697.46	5.38	24.91	5.11	953.77	973.78	3.35	46.46	18.29	24.18
Apr-85	(376.75)	(167.43)	6.00	3.24	708.18	5.28	25.06	5.12	970.56	984.51	1.72	46.61	18.29	23.27
May-85	(361.67)	(167.91)	0.00	3.28	718.91	5.17	25.21	5.13	987.35	995.25	1.14	46.76	18.29	22.36
Jun-85	(346.58)	(168.38)	0.00	3.32	729.64	5.06	25.36	5.14	1,004.13	1,005.99	6.78	46.90	18.29	21.44
Jul-85	(331.50)	(168.86)	0.00	3.37	740.37	4.95	25.52	5.15	1,020.92	1,016.73	10.18	47.05	18.29	20.53
Aug-85	(316.42)	(169.34)	7.55	3.41	751.09	4.84	25.67	5.15	1,037.70	1,027.46	17.02	47.20	18.29	19.62
Sep-85	(301.33)	(169.81)	0.00	3.45	761.82	4.73	25.82	5.16	1,054.49	1,038.20	17.44	47.35	18.29	18.70
Oct-85	(286.25)	(170.29)	5.26	3.50	772.55	4.63	25.97	5.17	1,071.27	1,048.94	18.26	47.49	18.29	17.79

Nov-85	(271.17)	(170.77)	0.00	3.54	783.28	4.52	26.13	5.18	1,088.06	1,059.68	20.47	47.64	18.29	16.88
Dec-85	(256.08)	(171.24)	0.00	3.58	794.00	4.41	26.28	5.19	1,104.84	1,070.41	19.50	47.79	18.29	15.96
Jan-86	(241.00)	(171.72)	50.00	3.63	804.73	4.30	26.43	5.20	1,121.63	1,081.15	18.75	47.94	21.17	15.05
Feb-86	(243.92)	(182.02)	0.00	3.59	813.18	4.33	26.47	5.17	1,104.09	1,101.70	19.56	48.38	21.17	15.40
Mar-86	(246.83)	(192.32)	0.00	3.55	821.63	4.37	26.50	5.13	1,086.55	1,122.26	20.29	48.83	21.17	15.74
Apr-86	(249.75)	(202.62)	0.00	3.51	830.07	4.40	26.54	5.10	1,069.01	1,142.81	21.60	49.28	21.17	16.09
May-86	(252.67)	(212.91)	0.00	3.47	838.52	4.43	26.57	5.06	1,051.47	1,163.37	23.34	49.73	21.17	16.43
Jun-86	(255.58)	(223.21)	0.00	3.43	846.97	4.47	26.61	5.03	1,033.93	1,183.92	23.15	50.18	21.17	16.78
Jul-86	(258.50)	(233.51)	0.00	3.39	855.42	4.50	26.64	5.00	1,016.39	1,204.48	23.88	50.63	21.17	17.13
Aug-86	(261.42)	(243.81)	0.00	3.35	863.86	4.53	26.68	4.96	998.85	1,225.03	23.93	51.08	21.17	17.47
Sep-86	(264.33)	(254.11)	0.00	3.31	872.31	4.57	26.71	4.93	981.31	1,245.58	23.84	51.53	21.17	17.82
Oct-86	(267.25)	(264.41)	0.00	3.27	880.76	4.60	26.75	4.90	963.78	1,266.14	28.94	51.98	21.17	18.16
Nov-86	(270.17)	(274.70)	0.00	3.23	889.21	4.63	26.78	4.86	946.24	1,286.69	32.72	52.43	21.17	18.51
Dec-86	(273.08)	(285.00)	0.00	3.19	897.65	4.67	26.82	4.83	928.70	1,307.25	33.34	52.88	21.17	18.85
Jan-87	(276.00)	(295.30)	0.00	3.15	906.10	4.70	26.85	4.79	911.16	1,327.80	33.44	53.33	23.50	19.20
Feb-87	(284.00)	(296.00)	0.00	3.15	910.48	4.73	26.94	4.86	917.64	1,333.26	34.39	52.74	23.50	18.93
Mar-87	(292.00)	(296.70)	73.33	3.15	914.87	4.75	27.03	4.93	924.12	1,338.72	37.49	52.15	23.50	18.66
Apr-87	(300.00)	(297.40)	1.28	3.15	919.25	4.78	27.12	5.00	930.60	1,344.18	41.00	51.57	23.50	18.39
May-87	(308.00)	(298.10)	1.27	3.15	923.63	4.80	27.21	5.07	937.08	1,349.63	42.34	50.98	23.50	18.12
Jun-87	(316.00)	(298.80)	0.62	3.15	928.02	4.83	27.30	5.14	943.57	1,355.09	43.87	50.39	23.50	17.85
Jul-87	(324.00)	(299.50)	0.62	3.15	932.40	4.85	27.39	5.21	950.05	1,360.55	45.00	49.80	23.50	17.59
Aug-87	(332.00)	(300.20)	1.85	3.15	936.78	4.88	27.48	5.28	956.53	1,366.01	45.54	49.22	23.50	17.32
Sep-87	(340.00)	(300.90)	6.67	3.14	941.17	4.90	27.57	5.35	963.01	1,371.47	45.91	48.63	23.50	17.05
Oct-87	(348.00)	(301.60)	(1.14)	3.14	945.55	4.93	27.66	5.42	969.49	1,376.93	39.31	48.04	23.50	16.78
Nov-87	(356.00)	(302.30)	0.00	3.14	949.93	4.95	27.75	5.49	975.98	1,382.38	35.30	47.45	23.50	16.51
Dec-87	(364.00)	(303.00)	1.15	3.14	954.32	4.98	27.84	5.56	982.46	1,387.84	34.18	46.86	23.50	16.24
Jan-88	(372.00)	(303.70)	0.00	3.14	958.70	5.00	27.93	5.63	988.94	1,393.30	33.92	46.28	26.00	15.97
Feb-88	(362.58)	(311.59)	3.98	3.36	953.31	5.83	28.13	5.58	989.91	1,394.71	34.14	46.98	26.00	16.28
Mar-88	(353.17)	(319.48)	1.09	3.59	947.92	6.67	28.32	5.54	990.87	1,396.12	33.15	47.68	26.00	16.58
Apr-88	(343.75)	(327.38)	0.54	3.82	942.53	7.50	28.52	5.49	991.84	1,397.53	32.48	48.37	26.00	16.89
May-88	(334.33)	(335.27)	(1.08)	4.04	937.13	8.33	28.72	5.45	992.81	1,398.93	33.56	49.07	26.00	17.19
Jun-88	(324.92)	(343.16)	3.26	4.27	931.74	9.17	28.91	5.40	993.77	1,400.34	33.35	49.77	26.00	17.50
Jul-88	(315.50)	(351.05)	5.79	4.49	926.35	10.00	29.11	5.36	994.74	1,401.75	31.47	50.47	26.00	17.81
Aug-88	(306.08)	(358.94)	12.44	4.72	920.96	10.83	29.31	5.31	995.70	1,403.16	30.48	51.17	26.00	18.11
Sep-88	(296.67)	(366.83)	0.44	4.94	915.57	11.67	29.50	5.27	996.67	1,404.57	30.03	51.87	26.00	18.42
Oct-88	(287.25)	(374.73)	0.88	5.17	910.18	12.50	29.70	5.22	997.64	1,405.98	29.92	52.57	26.00	18.72
Nov-88	(277.83)	(382.62)	0.87	5.39	904.78	13.33	29.90	5.18	998.60	1,407.38	28.74	53.27	26.00	19.03
Dec-88	(268.42)	(390.51)	(0.43)	5.62	899.39	14.17	30.09	5.13	999.57	1,408.79	26.56	53.97	26.00	19.33
Jan-89	(259.00)	(398.40)	0.87	5.84	894.00	15.00	30.29	5.09	1,000.54	1,410.20	26.28	54.67	26.00	19.64
Feb-89	(269.67)	(408.73)	12.07	5.77	898.57	14.98	29.84	4.94	1,004.03	1,424.56	25.53	51.22	26.00	20.05
Mar-89	(280.33)	(419.05)	0.77	5.69	903.13	14.97	29.40	4.79	1,007.52	1,438.92	24.81	47.77	26.00	20.45
Apr-89	(291.00)	(429.38)	1.15	5.62	907.70	14.95	28.95	4.65	1,011.02	1,453.28	24.38	44.33	26.00	20.86

May-89	(301.67)	(439.70)	0.75	5.54	912.27	14.93	28.50	4.50	1,014.51	1,467.63	23.27	40.88	26.00	21.27
Jun-89	(312.33)	(450.03)	0.37	5.46	916.83	14.92	28.05	4.35	1,018.00	1,481.99	22.76	37.43	26.00	21.68
Jul-89	(323.00)	(460.35)	1.87	5.39	921.40	14.90	27.61	4.21	1,021.49	1,496.35	23.54	33.98	26.00	22.09
Aug-89	(333.67)	(470.68)	1.47	5.31	925.97	14.88	27.16	4.06	1,024.98	1,510.71	23.79	30.54	26.00	22.49
Sep-89	(344.33)	(481.00)	1.81	5.23	930.53	14.87	26.71	3.91	1,028.48	1,525.07	24.40	27.09	26.00	22.90
Oct-89	(355.00)	(491.33)	1.77	5.16	935.10	14.85	26.26	3.77	1,031.97	1,539.43	25.61	23.64	26.00	23.31
Nov-89	(365.67)	(501.65)	3.83	5.08	939.67	14.83	25.82	3.62	1,035.46	1,553.78	28.05	20.20	26.00	23.72
Dec-89	(376.33)	(511.98)	1.68	5.01	944.23	14.82	25.37	3.48	1,038.95	1,568.14	30.46	16.75	26.00	24.12
Jan-90	(387.00)	(522.30)	0.99	4.93	948.80	14.80	24.92	3.33	1,042.45	1,582.50	33.04	13.30	26.00	24.53
Feb-90	(384.50)	(524.99)	0.65	4.82	959.02	15.23	25.83	3.49	1,059.85	1,596.07	35.95	15.45	26.00	24.28
Mar-90	(382.00)	(527.68)	1.30	4.72	969.23	15.67	26.73	3.65	1,077.25	1,609.64	36.07	17.60	26.00	24.03
Apr-90	(379.50)	(530.36)	1.60	4.61	979.45	16.10	27.64	3.82	1,094.65	1,623.21	36.01	19.75	26.00	23.78
May-90	(377.00)	(533.05)	2.84	4.50	989.67	16.53	28.55	3.98	1,112.05	1,636.78	35.61	21.89	26.00	23.53
Jun-90	(374.50)	(535.74)	0.92	4.40	999.88	16.97	29.45	4.14	1,129.45	1,650.36	36.42	24.04	26.00	23.28
Jul-90	(372.00)	(538.43)	0.91	4.29	1,010.10	17.40	30.36	4.31	1,146.85	1,663.93	39.01	26.19	26.00	23.04
Aug-90	(369.50)	(541.11)	1.20	4.19	1,020.32	17.83	31.27	4.47	1,164.25	1,677.50	40.21	28.34	26.00	22.79
Sep-90	(367.00)	(543.80)	0.60	4.08	1,030.53	18.27	32.17	4.63	1,181.65	1,691.07	41.36	30.49	26.00	22.54
Oct-90	(364.50)	(546.49)	1.18	3.98	1,040.75	18.70	33.08	4.79	1,199.05	1,704.64	39.32	32.63	26.00	22.29
Nov-90	(362.00)	(549.18)	0.58	3.87	1,050.97	19.13	33.99	4.96	1,216.45	1,718.21	37.24	34.78	30.00	22.04
Dec-90	(359.50)	(551.86)	0.29	3.76	1,061.18	19.57	34.89	5.12	1,233.85	1,731.78	35.90	36.93	30.00	21.79
Jan-91	(357.00)	(554.55)	0.29	3.66	1,071.40	20.00	35.80	5.28	1,251.25	1,745.35	30.38	39.08	35.00	21.54
Feb-91	(345.25)	(570.10)	2.31	3.76	1,075.89	20.21	35.76	5.16	1,282.42	1,764.29	26.61	40.18	35.00	21.46
Mar-91	(333.50)	(585.64)	1.98	3.87	1,080.38	20.42	35.72	5.05	1,313.58	1,783.23	24.88	41.28	35.00	21.38
Apr-91	(321.75)	(601.19)	0.83	3.98	1,084.88	20.63	35.68	4.93	1,344.75	1,802.16	22.29	42.38	35.00	21.30
May-91	(310.00)	(616.73)	0.55	4.09	1,089.37	20.83	35.64	4.81	1,375.92	1,821.10	19.77	43.48	35.00	21.22
Jun-91	(298.25)	(632.28)	0.27	4.19	1,093.86	21.04	35.60	4.70	1,407.09	1,840.04	17.30	44.58	35.00	21.14
Jul-91	(286.50)	(647.83)	0.82	4.30	1,098.35	21.25	35.56	4.58	1,438.26	1,858.98	15.28	45.68	35.00	21.06
Aug-91	(274.75)	(663.37)	0.81	4.41	1,102.84	21.46	35.51	4.46	1,469.43	1,877.91	14.61	46.78	32.00	20.98
Sep-91	(263.00)	(678.92)	0.80	4.51	1,107.33	21.67	35.47	4.35	1,500.59	1,896.85	13.22	47.88	32.00	20.90
Oct-91	(251.25)	(694.46)	0.80	4.62	1,111.83	21.88	35.43	4.23	1,531.76	1,915.79	13.95	48.98	28.00	20.82
Nov-91	(239.50)	(710.01)	1.85	4.73	1,116.32	22.08	35.39	4.11	1,562.93	1,934.73	12.89	50.08	25.00	20.74
Dec-91	(227.75)	(725.55)	1.04	4.83	1,120.81	22.29	35.35	4.00	1,594.10	1,953.66	10.26	51.18	20.00	20.66
Jan-92	(216.00)	(741.10)	0.00	4.94	1,125.30	22.50	35.31	3.88	1,625.27	1,972.60	8.69	52.28	20.00	20.58
Feb-92	(209.92)	(759.76)	0.77	4.93	1,131.70	31.04	35.54	3.96	1,636.27	1,998.08	7.72	50.72	20.00	20.40
Mar-92	(203.83)	(778.42)	3.56	4.92	1,138.10	39.58	35.76	4.04	1,647.28	2,023.57	7.33	49.15	20.00	20.22
Apr-92	(197.75)	(797.08)	0.25	4.92	1,144.50	48.13	35.99	4.12	1,658.28	2,049.05	8.21	47.59	20.00	20.04
May-92	(191.67)	(815.73)	0.49	4.91	1,150.90	56.67	36.21	4.20	1,669.29	2,074.53	8.87	46.02	20.00	19.86
Jun-92	(185.58)	(834.39)	1.22	4.90	1,157.30	65.21	36.44	4.28	1,680.29	2,100.02	8.37	44.46	20.00	19.68
Jul-92	(179.50)	(853.05)	5.06	4.89	1,163.70	73.75	36.67	4.36	1,691.30	2,125.50	10.23	42.89	20.00	19.51
Aug-92	(173.42)	(871.71)	3.21	4.88	1,170.10	82.29	36.89	4.45	1,702.30	2,150.98	11.69	41.33	23.00	19.33
Sep-92	(167.33)	(890.37)	6.67	4.87	1,176.50	90.83	37.12	4.53	1,713.31	2,176.47	11.48	39.76	26.00	19.15
Oct-92	(161.25)	(909.03)	2.08	4.86	1,182.90	99.38	37.34	4.61	1,724.31	2,201.95	11.72	38.20	26.00	18.97

Nov-92	(155.17)	(927.68)	4.49	4.86	1,189.30	107.92	37.57	4.69	1,735.32	2,227.43	12.74	36.63	26.00	18.79
Dec-92	(149.08)	(946.34)	1.56	4.85	1,195.70	116.46	37.79	4.77	1,746.32	2,252.92	13.33	35.07	30.00	18.61
Jan-93	(143.00)	(965.00)	6.73	4.84	1,202.10	125.00	38.02	4.85	1,757.33	2,278.40	21.46	33.50	30.00	18.43
Feb-93	(144.00)	(935.88)	7.39	4.87	1,217.11	134.00	37.94	4.72	1,753.02	2,264.25	22.97	35.09	30.00	18.33
Mar-93	(145.00)	(906.75)	0.84	4.91	1,232.12	143.00	37.86	4.59	1,748.71	2,250.10	23.27	36.68	35.00	18.23
Apr-93	(146.00)	(877.63)	0.00	4.94	1,247.13	152.00	37.77	4.46	1,744.39	2,235.95	23.05	38.27	35.00	18.12
May-93	(147.00)	(848.50)	0.00	4.98	1,262.13	161.00	37.69	4.33	1,740.08	2,221.80	23.93	39.86	35.00	18.02
Jun-93	(148.00)	(819.38)	0.00	5.01	1,277.14	170.00	37.61	4.20	1,735.77	2,207.65	26.04	41.45	35.00	17.92
Jul-93	(149.00)	(790.25)	10.65	5.04	1,292.15	179.00	37.53	4.08	1,731.46	2,193.50	25.18	43.04	35.00	17.81
Aug-93	(150.00)	(761.13)	3.16	5.08	1,307.16	188.00	37.44	3.95	1,727.15	2,179.35	25.22	44.62	35.00	17.71
Sep-93	(151.00)	(732.00)	1.90	5.11	1,322.17	197.00	37.36	3.82	1,722.84	2,165.20	26.89	46.21	35.00	17.61
Oct-93	(152.00)	(702.88)	3.72	5.15	1,337.18	206.00	37.28	3.69	1,718.52	2,151.05	26.49	47.80	35.00	17.51
Nov-93	(153.00)	(673.75)	5.93	5.18	1,352.18	215.00	37.20	3.56	1,714.21	2,136.90	26.61	49.39	35.00	17.41
Dec-93	(154.00)	(644.63)	7.03	5.22	1,367.19	224.00	37.11	3.43	1,709.90	2,122.75	27.66	50.98	35.00	17.30
Jan-94	(155.00)	(615.50)	11.68	5.25	1,382.20	233.00	37.03	3.30	1,705.59	2,108.60	22.81	52.57	30.00	17.20
Feb-94	(171.25)	(609.02)	2.12	5.24	1,399.98	222.46	37.47	3.37	1,733.02	2,121.42	21.96	51.79	30.00	17.30
Mar-94	(187.50)	(602.53)	0.00	5.22	1,417.75	211.92	37.91	3.44	1,760.46	2,134.23	21.53	51.00	35.00	17.41
Apr-94	(203.75)	(596.05)	(0.59)	5.21	1,435.53	201.38	38.35	3.50	1,787.89	2,147.05	21.05	50.22	35.00	17.51
May-94	(220.00)	(589.57)	0.00	5.19	1,453.30	190.83	38.79	3.57	1,815.32	2,159.87	21.00	49.44	35.00	17.61
Jun-94	(236.25)	(583.08)	1.13	5.18	1,471.08	180.29	39.23	3.64	1,842.76	2,172.68	20.89	48.65	35.00	17.71
Jul-94	(252.50)	(576.60)	3.13	5.16	1,488.85	169.75	39.68	3.71	1,870.19	2,185.50	22.32	47.87	35.00	17.81
Aug-94	(268.75)	(570.12)	(0.36)	5.15	1,506.63	159.21	40.12	3.77	1,897.63	2,198.32	23.68	47.09	35.00	17.92
Sep-94	(285.00)	(563.63)	1.70	5.13	1,524.40	148.67	40.56	3.84	1,925.06	2,211.13	26.10	46.30	35.00	18.02
Oct-94	(301.25)	(557.15)	2.89	5.12	1,542.18	138.13	41.00	3.91	1,952.49	2,223.95	29.44	45.52	35.00	18.12
Nov-94	(317.50)	(550.67)	2.61	5.10	1,559.95	127.58	41.44	3.98	1,979.93	2,236.77	31.70	44.74	35.00	18.23
Dec-94	(333.75)	(544.18)	1.06	5.09	1,577.73	117.04	41.88	4.04	2,007.36	2,249.58	34.18	43.96	35.00	18.33
Jan-95	(350.00)	(537.70)	1.14	5.07	1,595.50	106.50	42.32	4.11	2,034.79	2,262.40	35.58	43.17	39.00	18.43
Feb-95	(349.08)	(546.95)	0.56	5.15	1,608.40	107.63	42.63	4.15	2,037.45	2,285.44	38.39	42.84	39.00	18.74
Mar-95	(348.17)	(556.19)	3.93	5.23	1,621.30	108.75	42.95	4.19	2,040.11	2,308.48	43.59	42.51	39.00	19.05
Apr-95	(347.25)	(565.44)	1.71	5.31	1,634.20	109.88	43.26	4.23	2,042.77	2,331.51	49.93	42.18	39.00	19.35
May-95	(346.33)	(574.68)	1.86	5.38	1,647.10	111.00	43.57	4.28	2,045.42	2,354.55	56.12	41.85	39.00	19.66
Jun-95	(345.42)	(583.93)	2.00	5.46	1,660.00	112.13	43.88	4.32	2,048.08	2,377.59	61.85	41.52	39.00	19.97
Jul-95	(344.50)	(593.18)	1.62	5.54	1,672.90	113.25	44.20	4.36	2,050.74	2,400.63	67.20	41.19	39.00	20.28
Aug-95	(343.58)	(602.42)	1.93	5.62	1,685.80	114.38	44.51	4.40	2,053.40	2,423.66	69.94	40.85	39.00	20.58
Sep-95	(342.67)	(611.67)	7.15	5.69	1,698.70	115.50	44.82	4.44	2,056.05	2,446.70	69.80	40.52	45.00	20.89
Oct-95	(341.75)	(620.91)	3.68	5.77	1,711.60	116.63	45.13	4.48	2,058.71	2,469.74	69.14	40.19	45.00	21.20
Nov-95	(340.83)	(630.16)	4.66	5.85	1,724.50	117.75	45.45	4.52	2,061.37	2,492.78	70.24	39.86	45.00	21.51
Dec-95	(339.92)	(639.40)	2.26	5.93	1,737.40	118.88	45.76	4.56	2,064.03	2,515.81	70.82	39.53	45.00	21.81
Jan-96	(339.00)	(648.65)	3.56	6.01	1,750.30	120.00	46.07	4.60	2,066.68	2,538.85	69.20	39.20	45.00	22.12
Feb-96	(340.17)	(674.40)	3.00	6.19	1,744.56	116.82	45.97	4.57	2,064.14	2,547.70	68.03	39.61	45.00	21.99
Mar-96	(341.33)	(700.15)	2.56	6.37	1,738.83	113.63	45.86	4.53	2,061.60	2,556.55	64.78	40.01	45.00	21.87
Apr-96	(342.50)	(725.90)	1.59	6.55	1,733.09	110.45	45.76	4.50	2,059.05	2,565.39	60.26	40.42	45.00	21.74

May-96	(343.67)	(751.65)	1.46	6.74	1,727.35	107.27	45.65	4.47	2,056.51	2,574.24	54.24	40.83	45.00	21.62
Jun-96	(344.83)	(777.41)	1.44	6.92	1,721.62	104.08	45.55	4.43	2,053.97	2,583.09	48.42	41.24	45.00	21.49
Jul-96	(346.00)	(803.16)	1.92	7.10	1,715.88	100.90	45.45	4.40	2,051.43	2,591.94	42.64	41.64	45.00	21.37
Aug-96	(347.17)	(828.91)	0.42	7.28	1,710.14	97.72	45.34	4.37	2,048.88	2,600.79	39.21	42.05	45.00	21.24
Sep-96	(348.33)	(854.66)	1.09	7.47	1,704.41	94.53	45.24	4.33	2,046.34	2,609.63	36.51	42.46	45.00	21.11
Oct-96	(349.50)	(880.41)	0.71	7.65	1,698.67	91.35	45.13	4.30	2,043.80	2,618.48	34.29	42.86	45.00	20.99
Nov-96	(350.67)	(906.16)	0.51	7.83	1,692.93	88.17	45.03	4.26	2,041.26	2,627.33	33.17	43.27	45.00	20.86
Dec-96	(351.83)	(931.91)	0.47	8.01	1,687.20	84.98	44.92	4.23	2,038.71	2,636.18	32.66	43.68	45.00	20.74
Jan-97	(353.00)	(957.66)	0.77	8.20	1,681.46	81.80	44.82	4.20	2,036.17	2,645.02	31.51	44.09	45.00	20.61
Feb-97	(362.92)	(971.14)	3.29	8.28	1,754.54	88.93	45.13	4.24	2,048.54	2,742.44	30.56	41.87	45.00	20.09
Mar-97	(372.83)	(984.61)	4.46	8.36	1,827.62	96.07	45.44	4.28	2,060.91	2,839.86	29.22	39.65	45.00	19.58
Apr-97	(382.75)	(998.08)	3.36	8.45	1,900.70	103.20	45.75	4.32	2,073.27	2,937.28	29.09	37.44	45.00	19.06
May-97	(392.67)	(1,011.55)	3.43	8.53	1,973.77	110.33	46.06	4.36	2,085.64	3,034.69	29.57	35.22	45.00	18.55
Jun-97	(402.58)	(1,025.03)	4.58	8.62	2,046.85	117.47	46.37	4.41	2,098.01	3,132.11	29.05	33.00	45.00	18.03
Jul-97	(412.50)	(1,038.50)	2.53	8.70	2,119.93	124.60	46.69	4.45	2,110.37	3,229.53	29.17	30.79	45.00	17.52
Aug-97	(422.42)	(1,051.97)	0.81	8.78	2,193.01	131.73	47.00	4.49	2,122.74	3,326.94	28.22	28.57	45.00	17.00
Sep-97	(432.33)	(1,065.44)	1.35	8.87	2,266.09	138.87	47.31	4.53	2,135.11	3,424.36	27.73	26.36	45.00	16.48
Oct-97	(442.25)	(1,078.91)	0.68	8.95	2,339.17	146.00	47.62	4.57	2,147.48	3,521.78	27.42	24.14	45.00	15.97
Nov-97	(452.17)	(1,092.39)	0.33	9.04	2,412.24	153.13	47.93	4.62	2,159.84	3,619.20	24.19	21.92	45.00	15.45
Dec-97	(462.08)	(1,105.86)	0.52	9.12	2,485.32	160.27	48.24	4.66	2,172.21	3,716.61	20.83	19.71	45.00	14.94
Jan-98	(472.00)	(1,119.33)	1.73	9.20	2,558.40	167.40	48.55	4.70	2,184.58	3,814.03	19.80	17.49	45.00	14.42
Feb-98	(454.92)	(1,147.10)	0.38	9.47	2,552.56	173.76	48.80	4.68	2,180.05	3,835.59	19.60	18.15	45.00	14.83
Mar-98	(437.83)	(1,174.88)	0.36	9.74	2,546.72	180.12	49.05	4.65	2,175.51	3,857.14	20.30	18.81	45.00	15.24
Apr-98	(420.75)	(1,202.65)	0.05	10.00	2,540.88	186.48	49.30	4.63	2,170.98	3,878.70	23.10	19.47	45.00	15.65
May-98	(403.67)	(1,230.42)	0.04	10.27	2,535.03	192.83	49.55	4.60	2,166.45	3,900.25	22.90	20.13	45.00	16.06
Jun-98	(386.58)	(1,258.19)	0.63	10.54	2,529.19	199.19	49.80	4.58	2,161.92	3,921.81	21.80	20.79	45.00	16.47
Jul-98	(369.50)	(1,285.97)	0.10	10.80	2,523.35	205.55	50.05	4.55	2,157.38	3,943.37	18.70	21.45	45.00	16.88
Aug-98	(352.42)	(1,313.74)	(0.01)	11.07	2,517.51	211.91	50.29	4.53	2,152.85	3,964.92	18.60	22.11	45.00	17.29
Sep-98	(335.33)	(1,341.51)	(0.03)	11.34	2,511.67	218.27	50.54	4.50	2,148.32	3,986.48	17.38	22.77	42.00	17.70
Oct-98	(318.25)	(1,369.28)	0.11	11.60	2,505.83	224.63	50.79	4.48	2,143.79	4,008.03	17.14	23.44	42.00	18.11
Nov-98	(301.17)	(1,397.06)	0.52	11.87	2,499.98	230.98	51.04	4.45	2,139.25	4,029.59	16.16	24.10	37.00	18.52
Dec-98	(284.08)	(1,424.83)	0.30	12.14	2,494.14	237.34	51.29	4.43	2,134.72	4,051.14	15.75	24.76	37.00	18.93
Jan-99	(267.00)	(1,452.60)	0.51	12.41	2,488.30	243.70	51.54	4.40	2,130.19	4,072.70	15.33	25.42	32.00	19.34
Feb-99	(276.42)	(1,407.35)	0.50	12.52	2,485.62	232.97	51.58	4.34	2,075.93	4,022.76	15.04	27.82	32.00	20.26
Mar-99	(285.83)	(1,362.10)	1.96	12.64	2,482.94	222.23	51.63	4.28	2,021.68	3,972.82	13.74	30.22	32.00	21.18
Apr-99	(295.25)	(1,316.86)	1.00	12.76	2,480.26	211.50	51.67	4.22	1,967.42	3,922.88	10.23	32.62	27.00	22.10
May-99	(304.67)	(1,271.61)	1.68	12.88	2,477.58	200.77	51.71	4.17	1,913.17	3,872.94	9.40	35.03	27.00	23.02
Jun-99	(314.08)	(1,226.36)	1.95	12.99	2,474.90	190.03	51.76	4.11	1,858.91	3,823.00	10.26	37.43	27.00	23.94
Jul-99	(323.50)	(1,181.11)	1.62	13.11	2,472.23	179.30	51.80	4.05	1,804.65	3,773.06	12.69	39.83	27.00	24.86
Aug-99	(332.92)	(1,135.86)	1.10	13.23	2,469.55	168.57	51.84	3.99	1,750.40	3,723.12	12.00	42.23	27.00	25.78
Sep-99	(342.33)	(1,090.62)	2.74	13.35	2,466.87	157.83	51.89	3.93	1,696.14	3,673.18	11.79	44.64	27.00	26.70
Oct-99	(351.75)	(1,045.37)	10.55	13.46	2,464.19	147.10	51.93	3.87	1,641.89	3,623.24	12.62	47.04	27.00	27.62

Nov-99	(361.17)	(1,000.12)	15.79	13.58	2,461.51	136.37	51.97	3.82	1,587.63	3,573.30	13.24	49.44	27.00	28.54
Dec-99	(370.58)	(954.87)	2.42	13.70	2,458.83	125.63	52.02	3.76	1,533.37	3,523.36	13.80	51.84	27.00	29.46
Jan-00	(380.00)	(909.62)	2.49	13.82	2,456.15	114.90	52.06	3.70	1,479.12	3,473.42	14.28	54.24	27.00	30.38
Feb-00	(373.83)	(931.80)	5.17	13.64	2,452.73	112.77	52.24	3.73	1,506.52	3,492.18	14.93	54.43	27.00	30.01
Mar-00	(367.67)	(953.98)	8.52	13.47	2,449.30	110.63	52.42	3.75	1,533.91	3,510.95	15.57	54.63	27.00	29.65
Apr-00	(361.50)	(976.16)	8.02	13.30	2,445.88	108.50	52.60	3.78	1,561.31	3,529.71	17.51	54.82	27.00	29.28
May-00	(355.33)	(998.34)	7.23	13.13	2,442.46	106.37	52.78	3.80	1,588.71	3,548.48	18.72	55.01	27.00	28.91
Jun-00	(349.17)	(1,020.51)	15.67	12.95	2,439.03	104.23	52.96	3.83	1,616.11	3,567.24	19.84	55.20	27.00	28.55
Jul-00	(343.00)	(1,042.69)	10.65	12.78	2,435.61	102.10	53.15	3.85	1,643.50	3,586.00	22.07	55.39	27.00	28.18
Aug-00	(336.83)	(1,064.87)	5.27	12.61	2,432.19	99.97	53.33	3.88	1,670.90	3,604.77	26.61	55.58	27.00	27.81
Sep-00	(330.67)	(1,087.05)	2.26	12.44	2,428.77	97.83	53.51	3.90	1,698.30	3,623.53	32.30	55.77	27.00	27.45
Oct-00	(324.50)	(1,109.22)	2.16	12.26	2,425.34	95.70	53.69	3.93	1,725.70	3,642.30	37.38	55.96	27.00	27.08
Nov-00	(318.33)	(1,131.40)	2.30	12.09	2,421.92	93.57	53.87	3.95	1,753.09	3,661.06	39.54	56.15	27.00	26.71
Dec-00	(312.17)	(1,153.58)	0.93	11.92	2,418.50	91.43	54.05	3.98	1,780.49	3,679.83	40.54	56.34	27.00	26.35
Jan-01	(306.00)	(1,175.76)	0.10	11.75	2,415.07	89.30	54.23	4.00	1,807.89	3,698.59	40.93	56.53	27.00	25.98
Feb-01	(304.17)	(1,140.93)	1.69	11.77	2,429.22	86.77	54.72	4.04	1,792.47	3,683.45	40.14	55.09	27.00	26.00
Mar-01	(302.33)	(1,106.11)	1.29	11.79	2,443.36	84.23	55.20	4.08	1,777.05	3,668.31	41.95	53.65	27.00	26.01
Apr-01	(300.50)	(1,071.28)	0.48	11.81	2,457.50	81.70	55.69	4.13	1,761.64	3,653.18	39.50	52.20	27.00	26.03
May-01	(298.67)	(1,036.45)	0.15	11.83	2,471.65	79.17	56.17	4.17	1,746.22	3,638.04	37.92	50.76	27.00	26.05
Jun-01	(296.83)	(1,001.63)	1.08	11.85	2,485.79	76.63	56.66	4.21	1,730.80	3,622.90	36.84	49.32	27.00	26.06
Jul-01	(295.00)	(966.80)	(1.60)	11.87	2,499.93	74.10	57.14	4.25	1,715.39	3,607.76	34.89	47.87	27.00	26.08
Aug-01	(293.17)	(931.97)	(0.10)	11.89	2,514.08	71.57	57.63	4.29	1,699.97	3,592.62	32.02	46.43	27.00	26.10
Sep-01	(291.33)	(897.15)	(0.06)	11.92	2,528.22	69.03	58.11	4.33	1,684.55	3,577.48	28.31	44.99	27.00	26.11
Oct-01	(289.50)	(862.32)	0.33	11.94	2,542.36	66.50	58.60	4.38	1,669.13	3,562.34	25.60	43.54	27.00	26.13
Nov-01	(287.67)	(827.49)	0.84	11.96	2,556.50	63.97	59.08	4.42	1,653.72	3,547.21	23.68	42.10	27.00	26.15
Dec-01	(285.83)	(792.67)	0.99	11.98	2,570.65	61.43	59.57	4.46	1,638.30	3,532.07	21.29	40.66	27.00	26.16
Jan-02	(284.00)	(757.84)	0.62	12.00	2,584.79	58.90	60.05	4.50	1,622.88	3,516.93	19.87	39.21	27.00	26.18
Feb-02	(285.58)	(774.87)	2.40	12.03	2,637.22	63.16	60.25	4.56	1,677.53	3,586.95	18.33	37.88	27.00	26.59
Mar-02	(287.17)	(791.91)	1.74	12.07	2,689.65	67.42	60.45	4.62	1,732.17	3,656.97	16.02	36.55	24.50	27.00
Apr-02	(288.75)	(808.94)	1.78	12.10	2,742.08	71.68	60.65	4.68	1,786.81	3,726.99	14.88	35.22	24.50	27.40
May-02	(290.33)	(825.98)	1.20	12.13	2,794.52	75.94	60.85	4.73	1,841.45	3,797.01	14.34	33.89	24.50	27.81
Jun-02	(291.92)	(843.01)	1.13	12.16	2,846.95	80.20	61.05	4.79	1,896.09	3,867.03	13.68	32.56	24.50	28.22
Jul-02	(293.50)	(860.04)	1.94	12.19	2,899.38	84.46	61.26	4.85	1,950.74	3,937.05	13.49	31.23	24.50	28.63
Aug-02	(295.08)	(877.08)	0.53	12.23	2,951.81	88.72	61.46	4.91	2,005.38	4,007.07	13.13	29.90	24.50	29.04
Sep-02	(296.67)	(894.11)	0.29	12.26	3,004.24	92.98	61.66	4.97	2,060.02	4,077.09	12.88	28.57	24.50	29.45
Oct-02	(298.25)	(911.14)	0.90	12.29	3,056.67	97.24	61.86	5.03	2,114.66	4,147.11	13.19	27.23	24.50	29.85
Nov-02	(299.83)	(928.18)	0.53	12.32	3,109.10	101.50	62.06	5.08	2,169.31	4,217.13	13.99	25.90	24.50	30.26
Dec-02	(301.42)	(945.21)	1.13	12.35	3,161.54	105.76	62.26	5.14	2,223.95	4,287.15	15.17	24.57	24.50	30.67
Jan-03	(303.00)	(962.24)	1.38	12.39	3,213.97	110.02	62.46	5.20	2,278.59	4,357.17	13.48	23.24	25.50	31.08
Feb-03	(326.33)	(1,046.41)	0.79	12.44	3,233.74	112.46	62.63	5.23	2,337.92	4,462.52	25.48	23.58	25.50	31.95
Mar-03	(349.67)	(1,130.58)	0.60	12.50	3,253.52	114.90	62.80	5.27	2,397.25	4,567.88	29.84	23.91	27.50	32.82
Apr-03	(373.00)	(1,214.75)	0.54	12.55	3,273.29	117.33	62.98	5.30	2,456.58	4,673.23	29.34	24.25	27.50	33.69

May-03	(396.33)	(1,298.92)	0.25	12.61	3,293.07	119.77	63.15	5.33	2,515.92	4,778.58	31.61	24.59	27.50	34.56
Jun-03	(419.67)	(1,383.10)	0.26	12.67	3,312.85	122.21	63.32	5.37	2,575.25	4,883.93	32.94	24.92	27.50	35.43
Jul-03	(443.00)	(1,467.27)	0.17	12.72	3,332.62	124.65	63.49	5.40	2,634.58	4,989.29	33.03	25.26	26.00	36.30
Aug-03	(466.33)	(1,551.44)	0.15	12.78	3,352.40	127.08	63.66	5.43	2,693.91	5,094.64	33.58	25.59	26.00	37.16
Sep-03	(489.67)	(1,635.61)	0.07	12.83	3,372.17	129.52	63.83	5.47	2,753.24	5,199.99	29.79	25.93	26.00	38.03
Oct-03	(513.00)	(1,719.78)	0.13	12.89	3,391.95	131.96	64.01	5.50	2,812.57	5,305.35	33.17	26.27	24.00	38.90
Nov-03	(536.33)	(1,803.95)	0.68	12.95	3,411.73	134.40	64.18	5.53	2,871.90	5,410.70	33.63	26.60	24.00	39.77
Dec-03	(559.67)	(1,888.12)	0.29	13.00	3,431.50	136.83	64.35	5.57	2,931.24	5,516.05	31.27	26.94	21.50	40.64
Jan-04	(583.00)	(1,972.29)	0.33	13.06	3,451.28	139.27	64.52	5.60	2,990.57	5,621.41	28.95	27.28	21.50	41.51
Feb-04	(600.00)	(2,033.91)	0.64	13.26	3,493.00	139.75	64.67	5.63	3,024.99	5,723.85	18.60	26.62	20.00	42.77
Mar-04	(617.00)	(2,095.53)	0.77	13.45	3,534.72	140.22	64.82	5.65	3,059.41	5,826.30	15.62	25.97	20.00	44.03
Apr-04	(634.00)	(2,157.15)	0.22	13.65	3,576.45	140.70	64.98	5.68	3,093.83	5,928.75	17.26	25.32	20.00	45.29
May-04	(651.00)	(2,218.76)	0.09	13.85	3,618.17	141.17	65.13	5.70	3,128.26	6,031.20	17.62	24.67	18.50	46.55
Jun-04	(668.00)	(2,280.38)	0.13	14.05	3,659.89	141.65	65.28	5.73	3,162.68	6,133.65	18.00	24.02	18.50	47.81
Jul-04	(685.00)	(2,342.00)	0.14	14.24	3,701.62	142.12	65.43	5.75	3,197.10	6,236.10	15.03	23.37	18.50	49.08
Aug-04	(702.00)	(2,403.62)	(0.01)	14.44	3,743.34	142.60	65.58	5.78	3,231.52	6,338.54	17.53	22.72	18.50	50.34
Sep-04	(719.00)	(2,465.24)	0.01	14.64	3,785.06	143.07	65.73	5.80	3,265.94	6,440.99	19.64	22.07	18.50	51.60
Oct-04	(736.00)	(2,526.86)	0.11	14.84	3,826.79	143.55	65.89	5.83	3,300.37	6,543.44	16.90	21.42	18.50	52.86
Nov-04	(753.00)	(2,588.48)	0.13	15.03	3,868.51	144.02	66.04	5.85	3,334.79	6,645.89	16.51	20.77	18.50	54.12
Dec-04	(770.00)	(2,650.10)	(0.05)	15.23	3,910.23	144.50	66.19	5.88	3,369.21	6,748.34	16.44	20.12	18.50	55.38
Jan-05	(787.00)	(2,711.72)	0.01	15.43	3,951.96	144.97	66.34	5.90	3,403.63	6,850.78	16.83	19.47	18.50	56.64
Feb-05	(785.42)	(2,750.49)	0.06	15.06	4,054.53	185.89	66.49	5.94	3,490.81	6,987.15	16.96	21.12	18.50	57.42
Mar-05	(783.83)	(2,789.26)	0.17	14.69	4,157.09	226.81	66.64	5.98	3,577.99	7,123.51	17.79	22.78	18.50	58.21
Apr-05	(782.25)	(2,828.03)	0.02	14.33	4,259.66	267.73	66.79	6.02	3,665.16	7,259.87	17.14	24.44	18.50	58.99
May-05	(780.67)	(2,866.80)	0.00	13.96	4,362.23	308.65	66.93	6.07	3,752.34	7,396.23	14.51	26.09	16.50	59.78
Jun-05	(779.08)	(2,905.57)	0.02	13.59	4,464.80	349.57	67.08	6.11	3,839.52	7,532.59	14.05	27.75	16.50	60.56
Jul-05	(777.50)	(2,944.34)	0.02	13.22	4,567.37	390.49	67.23	6.15	3,926.69	7,668.95	17.34	29.40	16.50	61.35
Aug-05	(775.92)	(2,983.12)	0.01	12.86	4,669.94	431.41	67.38	6.19	4,013.87	7,805.32	13.33	31.06	16.50	62.13
Sep-05	(774.33)	(3,021.89)	(0.03)	12.49	4,772.51	472.33	67.53	6.23	4,101.05	7,941.68	14.34	32.72	15.50	62.91
Oct-05	(772.75)	(3,060.66)	0.04	12.12	4,875.08	513.25	67.68	6.27	4,188.22	8,078.04	14.92	34.37	15.50	63.70
Nov-05	(771.17)	(3,099.43)	0.02	11.75	4,977.65	554.17	67.82	6.32	4,275.40	8,214.40	14.65	36.03	15.50	64.48
Dec-05	(769.58)	(3,138.20)	0.30	11.39	5,080.22	595.09	67.97	6.36	4,362.58	8,350.76	13.91	37.68	15.50	65.27
Jan-06	(768.00)	(3,176.97)	(0.06)	11.02	5,182.79	636.01	68.12	6.40	4,449.75	8,487.12	12.76	39.34	14.50	66.05
Feb-06	(818.67)	(3,250.62)	0.11	11.30	5,258.22	654.29	68.00	6.23	4,590.67	8,655.69	12.27	39.13	14.50	66.57
Mar-06	(869.33)	(3,324.26)	0.14	11.59	5,333.66	672.58	67.88	6.06	4,731.59	8,824.26	11.28	38.92	14.50	67.10
Apr-06	(920.00)	(3,397.91)	0.04	11.87	5,409.09	690.86	67.76	5.89	4,872.51	8,992.83	11.21	38.71	14.50	67.62
May-06	(970.67)	(3,471.55)	0.22	12.15	5,484.52	709.14	67.63	5.72	5,013.43	9,161.40	11.75	38.51	14.50	68.15
Jun-06	(1,021.33)	(3,545.19)	0.35	12.44	5,559.96	727.42	67.51	5.54	5,154.34	9,329.97	11.39	38.30	14.50	68.67
Jul-06	(1,072.00)	(3,618.84)	0.05	12.72	5,635.39	745.71	67.39	5.37	5,295.26	9,498.54	12.91	38.09	14.50	69.19
Aug-06	(1,122.67)	(3,692.48)	0.36	13.00	5,710.82	763.99	67.27	5.20	5,436.18	9,667.11	12.56	37.88	14.50	69.72
Sep-06	(1,173.33)	(3,766.13)	0.05	13.28	5,786.26	782.27	67.15	5.03	5,577.10	9,835.68	11.67	37.67	14.50	70.24
Oct-06	(1,224.00)	(3,839.77)	0.09	13.57	5,861.69	800.55	67.03	4.86	5,718.02	10,004.25	10.87	37.46	14.50	70.77

Nov-06	(1,274.67)	(3,913.41)	(0.01)	13.85	5,937.13	818.84	66.90	4.69	5,858.93	10,172.82	10.70	37.25	14.50	71.29
Dec-06	(1,325.33)	(3,987.06)	(0.01)	14.13	6,012.56	837.12	66.78	4.52	5,999.85	10,341.39	10.92	37.04	12.50	71.82
Jan-07	(1,376.00)	(4,060.70)	0.11	14.42	6,087.99	855.40	66.66	4.35	6,140.77	10,509.95	10.89	36.83	12.50	72.34
Feb-07	(1,360.92)	(4,180.30)	0.13	14.54	6,177.01	885.82	67.35	4.75	6,201.53	10,692.05	10.42	37.03	12.50	74.62
Mar-07	(1,345.83)	(4,299.91)	0.24	14.65	6,266.03	916.24	68.04	5.15	6,262.29	10,874.15	10.19	37.23	12.50	76.90
Apr-07	(1,330.75)	(4,419.51)	0.03	14.77	6,355.04	946.66	68.73	5.55	6,323.05	11,056.25	10.50	37.42	12.50	79.17
May-07	(1,315.67)	(4,539.11)	0.07	14.89	6,444.06	977.07	69.41	5.95	6,383.81	11,238.34	11.02	37.62	12.50	81.45
Jun-07	(1,300.58)	(4,658.72)	0.01	15.01	6,533.08	1,007.49	70.10	6.35	6,444.57	11,420.44	10.69	37.81	12.50	83.73
Jul-07	(1,285.50)	(4,778.32)	0.25	15.12	6,622.09	1,037.91	70.79	6.75	6,505.32	11,602.54	10.14	38.01	12.50	86.01
Aug-07	(1,270.42)	(4,897.92)	0.20	15.24	6,711.11	1,068.33	71.48	7.15	6,566.08	11,784.63	10.41	38.20	12.50	88.28
Sep-07	(1,255.33)	(5,017.52)	0.83	15.36	6,800.13	1,098.75	72.17	7.55	6,626.84	11,966.73	10.19	38.40	12.50	90.56
Oct-07	(1,240.25)	(5,137.13)	0.90	15.48	6,889.14	1,129.17	72.86	7.95	6,687.60	12,148.83	10.14	38.59	12.50	92.84
Nov-07	(1,225.17)	(5,256.73)	1.10	15.59	6,978.16	1,159.58	73.54	8.35	6,748.36	12,330.93	11.40	38.79	13.50	95.12
Dec-07	(1,210.08)	(5,376.33)	0.28	15.71	7,067.18	1,190.00	74.23	8.75	6,809.12	12,513.02	12.75	38.98	13.50	97.39
Jan-08	(1,195.00)	(5,495.93)	0.97	15.83	7,156.19	1,220.42	74.92	9.15	6,869.88	12,695.12	12.81	39.18	13.50	99.67
Feb-08	(1,162.17)	(5,319.60)	0.36	15.80	7,204.40	1,360.14	75.51	8.79	6,810.51	12,613.01	13.21	37.97	13.50	96.53
Mar-08	(1,129.33)	(5,143.27)	0.21	15.78	7,252.60	1,499.87	76.10	8.43	6,751.14	12,530.90	13.79	36.77	14.25	93.38
Apr-08	(1,096.50)	(4,966.94)	1.01	15.76	7,300.80	1,639.59	76.69	8.07	6,691.77	12,448.78	15.29	35.57	14.25	90.24
May-08	(1,063.67)	(4,790.61)	1.31	15.73	7,349.00	1,779.31	77.28	7.71	6,632.40	12,366.67	16.88	34.37	16.00	87.10
Jun-08	(1,030.83)	(4,614.28)	2.39	15.71	7,397.21	1,919.04	77.87	7.36	6,573.03	12,284.56	18.41	33.16	16.00	83.95
Jul-08	(998.00)	(4,437.95)	4.28	15.69	7,445.41	2,058.76	78.47	7.00	6,513.66	12,202.45	18.31	31.96	17.00	80.81
Aug-08	(965.17)	(4,261.62)	3.01	15.66	7,493.61	2,198.48	79.06	6.64	6,454.29	12,120.34	18.10	30.76	17.00	77.67
Sep-08	(932.33)	(4,085.29)	2.01	15.64	7,541.81	2,338.21	79.65	6.28	6,394.92	12,038.23	17.89	29.55	17.00	74.52
Oct-08	(899.50)	(3,908.96)	2.74	15.61	7,590.02	2,477.93	80.24	5.92	6,335.55	11,956.11	17.30	28.35	17.00	71.38
Nov-08	(866.67)	(3,732.63)	2.69	15.59	7,638.22	2,617.65	80.83	5.56	6,276.18	11,874.00	17.44	27.15	17.00	68.24
Dec-08	(833.83)	(3,556.30)	2.78	15.57	7,686.42	2,757.38	81.42	5.20	6,216.81	11,791.89	18.13	25.94	17.00	65.09
Jan-09	(801.00)	(3,379.97)	4.52	15.54	7,734.62	2,897.10	82.01	4.84	6,157.44	11,709.78	19.86	24.74	17.00	61.95
Feb-09	(819.42)	(3,472.30)	4.91	15.46	7,880.93	2,866.29	82.17	5.10	6,362.63	11,947.30	20.34	25.34	18.50	63.41
Mar-09	(837.83)	(3,564.63)	2.96	15.38	8,027.24	2,835.48	82.34	5.35	6,567.82	12,184.83	20.53	25.94	18.50	64.87
Apr-09	(856.25)	(3,656.97)	1.98	15.30	8,173.54	2,804.67	82.50	5.61	6,773.00	12,422.35	20.56	26.53	18.50	66.33
May-09	(874.67)	(3,749.30)	1.62	15.22	8,319.85	2,773.85	82.66	5.86	6,978.19	12,659.88	20.06	27.13	18.50	67.79
Jun-09	(893.08)	(3,841.63)	2.49	15.14	8,466.16	2,743.04	82.83	6.12	7,183.38	12,897.40	20.74	27.73	18.50	69.25
Jul-09	(911.50)	(3,933.96)	0.98	15.06	8,612.46	2,712.23	82.99	6.37	7,388.56	13,134.92	20.50	28.33	18.50	70.72
Aug-09	(929.92)	(4,026.29)	(0.32)	14.98	8,758.77	2,681.42	83.15	6.63	7,593.75	13,372.45	19.65	28.93	18.50	72.18
Sep-09	(948.33)	(4,118.62)	(0.63)	14.90	8,905.08	2,650.61	83.32	6.88	7,798.93	13,609.97	18.37	29.52	18.50	73.64
Oct-09	(966.75)	(4,210.96)	(0.21)	14.82	9,051.38	2,619.80	83.48	7.14	8,004.12	13,847.50	18.04	30.12	18.50	75.10
Nov-09	(985.17)	(4,303.29)	(1.01)	14.74	9,197.69	2,588.98	83.64	7.39	8,209.31	14,085.02	16.92	30.72	18.00	76.56
Dec-09	(1,003.58)	(4,395.62)	(0.26)	14.66	9,343.99	2,558.17	83.81	7.65	8,414.49	14,322.55	15.97	31.32	18.00	78.02
Jan-10	(1,022.00)	(4,487.95)	(0.40)	14.58	9,490.30	2,527.36	83.97	7.90	8,619.68	14,560.07	14.78	31.92	18.00	79.48
Feb-10	(1,139.25)	(4,523.01)	0.12	14.56	9,920.35	2,586.53	84.25	8.41	8,772.51	15,079.20	14.23	32.09	16.00	80.76
Mar-10	(1,256.50)	(4,558.07)	(0.54)	14.55	10,350.40	2,645.70	84.52	8.92	8,925.33	15,598.33	13.32	32.26	16.00	82.05
Apr-10	(1,373.75)	(4,593.12)	(0.11)	14.53	10,780.45	2,704.87	84.80	9.44	9,078.16	16,117.46	11.66	32.44	15.00	83.33

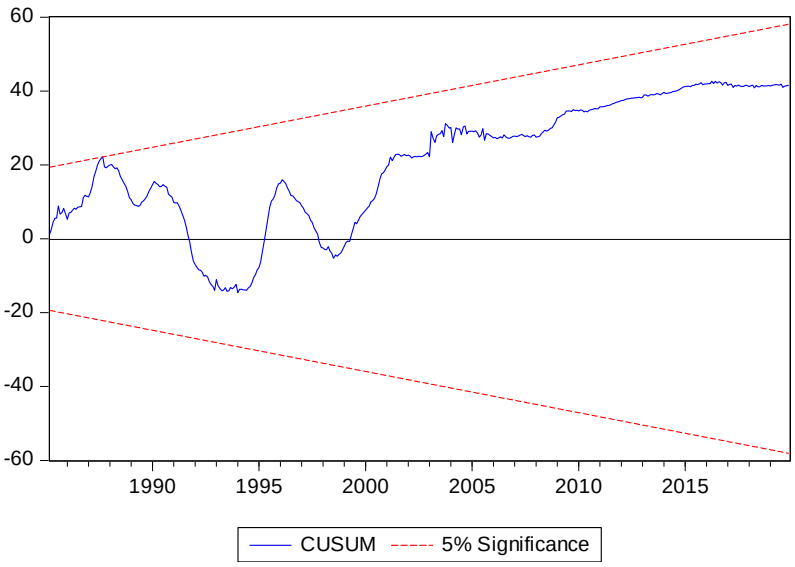
May-10	(1,491.00)	(4,628.18)	(0.07)	14.52	11,210.50	2,764.04	85.07	9.95	9,230.99	16,636.59	10.68	32.61	15.00	84.61
Jun-10	(1,608.25)	(4,663.24)	0.41	14.50	11,640.55	2,823.21	85.35	10.46	9,383.81	17,155.72	9.52	32.78	15.00	85.90
Jul-10	(1,725.50)	(4,698.30)	0.71	14.48	12,070.59	2,882.38	85.63	10.97	9,536.64	17,674.85	9.46	32.96	13.50	87.18
Aug-10	(1,842.75)	(4,733.35)	(0.16)	14.47	12,500.64	2,941.54	85.90	11.49	9,689.47	18,193.98	9.44	33.13	13.50	88.46
Sep-10	(1,960.00)	(4,768.41)	(0.04)	14.45	12,930.69	3,000.71	86.18	12.00	9,842.29	18,713.10	9.38	33.30	13.50	89.75
Oct-10	(2,077.25)	(4,803.47)	(0.13)	14.43	13,360.74	3,059.88	86.45	12.51	9,995.12	19,232.23	9.38	33.48	13.50	91.03
Nov-10	(2,194.50)	(4,838.53)	0.44	14.42	13,790.79	3,119.05	86.73	13.02	10,147.94	19,751.36	9.08	33.65	13.50	92.31
Dec-10	(2,311.75)	(4,873.59)	1.13	14.40	14,220.84	3,178.22	87.00	13.53	10,300.77	20,270.49	8.58	33.82	13.50	93.60
Jan-11	(2,429.00)	(4,908.64)	1.80	14.38	14,650.89	3,237.39	87.28	14.05	10,453.60	20,789.62	9.08	33.99	13.50	94.88
Feb-11	(2,375.67)	(4,931.85)	2.08	14.41	14,835.59	3,242.06	87.69	13.65	10,607.10	21,072.51	9.16	33.26	13.50	94.81
Mar-11	(2,322.33)	(4,955.05)	0.60	14.44	15,020.29	3,246.73	88.10	13.25	10,760.61	21,355.41	9.13	32.52	13.50	94.74
Apr-11	(2,269.00)	(4,978.25)	(0.29)	14.47	15,204.99	3,251.40	88.52	12.86	10,914.12	21,638.30	9.02	31.78	13.50	94.67
May-11	(2,215.67)	(5,001.45)	(0.64)	14.50	15,389.69	3,256.07	88.93	12.46	11,067.63	21,921.19	8.90	31.04	13.00	94.60
Jun-11	(2,162.33)	(5,024.66)	0.17	14.53	15,574.39	3,260.74	89.34	12.07	11,221.14	22,204.08	8.59	30.31	13.00	94.53
Jul-11	(2,109.00)	(5,047.86)	0.03	14.56	15,759.09	3,265.41	89.75	11.67	11,374.64	22,486.98	8.39	29.57	12.50	94.47
Aug-11	(2,055.67)	(5,071.06)	0.34	14.59	15,943.79	3,270.08	90.16	11.27	11,528.15	22,769.87	8.41	28.83	12.50	94.40
Sep-11	(2,002.33)	(5,094.26)	1.37	14.62	16,128.49	3,274.75	90.57	10.88	11,681.66	23,052.76	8.40	28.09	12.50	94.33
Oct-11	(1,949.00)	(5,117.47)	1.56	14.65	16,313.19	3,279.42	90.99	10.48	11,835.17	23,335.65	8.56	27.35	12.50	94.26
Nov-11	(1,895.67)	(5,140.67)	0.77	14.68	16,497.89	3,284.09	91.40	10.09	11,988.68	23,618.55	8.55	26.62	12.50	94.19
Dec-11	(1,842.33)	(5,163.87)	0.92	14.71	16,682.59	3,288.76	91.81	9.69	12,142.18	23,901.44	8.58	25.88	12.50	94.12
Jan-12	(1,789.00)	(5,187.08)	5.16	14.74	16,867.29	3,293.43	92.22	9.29	12,295.69	24,184.33	8.73	25.14	12.50	94.05
Feb-12	(1,741.58)	(5,279.16)	0.74	14.52	16,835.89	3,287.84	92.44	9.13	12,400.04	24,180.13	8.64	24.67	13.50	94.38
Mar-12	(1,694.17)	(5,371.24)	3.13	14.30	16,804.49	3,282.25	92.66	8.96	12,504.38	24,175.94	8.78	24.20	13.50	94.71
Apr-12	(1,646.75)	(5,463.33)	3.67	14.09	16,773.09	3,276.66	92.88	8.80	12,608.73	24,171.74	9.11	23.73	14.50	95.03
May-12	(1,599.33)	(5,555.41)	4.16	13.87	16,741.69	3,271.06	93.10	8.63	12,713.07	24,167.54	9.34	23.26	14.50	95.36
Jun-12	(1,551.92)	(5,647.49)	1.61	13.66	16,710.29	3,265.47	93.32	8.47	12,817.42	24,163.35	9.44	22.79	15.00	95.69
Jul-12	(1,504.50)	(5,739.58)	1.35	13.44	16,678.89	3,259.88	93.55	8.30	12,921.76	24,159.15	9.54	22.32	15.00	96.02
Aug-12	(1,457.08)	(5,831.66)	(0.07)	13.22	16,647.49	3,254.29	93.77	8.14	13,026.11	24,154.95	9.46	21.85	15.00	96.34
Sep-12	(1,409.67)	(5,923.75)	(1.15)	13.01	16,616.09	3,248.70	93.99	7.97	13,130.45	24,150.76	9.43	21.38	15.00	96.67
Oct-12	(1,362.25)	(6,015.83)	(1.11)	12.79	16,584.69	3,243.11	94.21	7.81	13,234.80	24,146.56	9.24	20.91	15.00	97.00
Nov-12	(1,314.83)	(6,107.91)	0.29	12.58	16,553.29	3,237.51	94.43	7.64	13,339.14	24,142.36	9.31	20.44	15.00	97.33
Dec-12	(1,267.42)	(6,200.00)	(0.05)	12.36	16,521.89	3,231.92	94.65	7.48	13,443.49	24,138.16	8.84	19.97	15.00	97.65
Jan-13	(1,220.00)	(6,292.08)	0.83	12.14	16,490.49	3,226.33	94.87	7.31	13,547.83	24,133.97	8.76	19.50	15.00	97.98
Feb-13	(1,213.67)	(6,099.88)	0.57	12.28	16,397.30	3,237.22	95.22	6.94	13,376.01	23,879.07	9.97	20.98	15.00	97.58
Mar-13	(1,207.33)	(5,907.67)	1.43	12.41	16,304.11	3,248.11	95.57	6.58	13,204.19	23,624.18	10.44	22.47	15.00	97.18
Apr-13	(1,201.00)	(5,715.47)	1.49	12.54	16,210.92	3,259.00	95.92	6.21	13,032.37	23,369.29	10.09	23.95	15.00	96.78
May-13	(1,194.67)	(5,523.27)	0.25	12.67	16,117.73	3,269.88	96.27	5.84	12,860.55	23,114.40	10.40	25.43	16.00	96.38
Jun-13	(1,188.33)	(5,331.06)	0.81	12.81	16,024.54	3,280.77	96.62	5.47	12,688.73	22,859.50	10.78	26.91	16.00	95.98
Jul-13	(1,182.00)	(5,138.86)	0.21	12.94	15,931.35	3,291.66	96.98	5.10	12,516.91	22,604.61	10.87	28.40	16.00	95.58
Aug-13	(1,175.67)	(4,946.66)	0.20	13.07	15,838.16	3,302.55	97.33	4.74	12,345.09	22,349.72	11.02	29.88	16.00	95.17
Sep-13	(1,169.33)	(4,754.45)	0.12	13.21	15,744.98	3,313.44	97.68	4.37	12,173.26	22,094.82	11.63	31.36	16.00	94.77
Oct-13	(1,163.00)	(4,562.25)	1.34	13.34	15,651.79	3,324.33	98.03	4.00	12,001.44	21,839.93	11.79	32.84	16.00	94.37

Nov-13	(1,156.67)	(4,370.05)	2.77	13.47	15,558.60	3,335.21	98.38	3.63	11,829.62	21,585.04	11.45	34.33	16.00	93.97
Dec-13	(1,150.33)	(4,177.84)	3.83	13.60	15,465.41	3,346.10	98.73	3.27	11,657.80	21,330.14	11.95	35.81	16.00	93.57
Jan-14	(1,144.00)	(3,985.64)	10.91	13.74	15,372.22	3,356.99	99.08	2.90	11,485.98	21,075.25	13.09	37.29	16.00	93.17
Feb-14	(1,087.08)	(4,012.71)	5.24	13.83	15,496.02	3,343.27	99.14	2.84	11,295.58	21,175.58	13.22	36.32	18.00	89.46
Mar-14	(1,030.17)	(4,039.78)	6.21	13.93	15,619.81	3,329.54	99.19	2.78	11,105.18	21,275.90	13.50	35.34	18.00	85.75
Apr-14	(973.25)	(4,066.85)	4.25	14.03	15,743.61	3,315.82	99.25	2.72	10,914.77	21,376.23	13.80	34.36	18.00	82.04
May-14	(916.33)	(4,093.91)	3.51	14.12	15,867.41	3,302.09	99.30	2.66	10,724.37	21,476.56	14.00	33.39	18.00	78.33
Jun-14	(859.42)	(4,120.98)	3.79	14.22	15,991.21	3,288.37	99.36	2.60	10,533.97	21,576.88	14.50	32.41	18.00	74.62
Jul-14	(802.50)	(4,148.05)	1.07	14.32	16,115.01	3,274.65	99.42	2.54	10,343.57	21,677.21	14.70	31.43	19.00	70.91
Aug-14	(745.58)	(4,175.12)	3.28	14.41	16,238.81	3,260.92	99.47	2.48	10,153.17	21,777.53	14.80	30.46	19.00	67.21
Sep-14	(688.67)	(4,202.19)	2.04	14.51	16,362.61	3,247.20	99.53	2.42	9,962.76	21,877.86	15.00	29.48	19.00	63.50
Oct-14	(631.75)	(4,229.26)	(0.06)	14.61	16,486.40	3,233.47	99.58	2.36	9,772.36	21,978.19	15.30	28.50	19.00	59.79
Nov-14	(574.83)	(4,256.33)	0.00	14.70	16,610.20	3,219.75	99.64	2.30	9,581.96	22,078.51	15.90	27.53	21.00	56.08
Dec-14	(517.92)	(4,283.40)	0.14	14.80	16,734.00	3,206.02	99.69	2.24	9,391.56	22,178.84	16.50	26.55	21.00	52.37
Jan-15	(461.00)	(4,310.46)	1.25	14.90	16,857.80	3,192.30	99.75	2.18	9,201.16	22,279.17	16.90	25.57	21.00	48.66
Feb-15	(451.17)	(4,206.81)	7.23	14.86	16,928.63	3,216.72	99.87	2.28	9,365.36	22,255.61	17.00	25.32	21.00	48.21
Mar-15	(441.33)	(4,103.15)	7.85	14.82	16,999.47	3,241.13	99.99	2.39	9,529.57	22,232.05	17.00	25.06	21.00	47.77
Apr-15	(431.50)	(3,999.50)	2.72	14.78	17,070.30	3,265.55	100.11	2.50	9,693.77	22,208.50	16.40	24.81	21.00	47.32
May-15	(421.67)	(3,895.85)	3.85	14.75	17,141.14	3,289.97	100.22	2.60	9,857.98	22,184.94	16.50	24.55	22.00	46.87
Jun-15	(411.83)	(3,792.19)	8.25	14.71	17,211.98	3,314.38	100.34	2.71	10,022.18	22,161.39	16.60	24.29	22.00	46.42
Jul-15	(402.00)	(3,688.54)	(20.17)	14.67	17,282.81	3,338.80	100.46	2.81	10,186.39	22,137.83	16.80	24.04	22.00	45.97
Aug-15	(392.17)	(3,584.88)	17.11	14.63	17,353.65	3,363.22	100.58	2.92	10,350.60	22,114.27	16.90	23.78	24.00	45.53
Sep-15	(382.33)	(3,481.23)	(7.20)	14.60	17,424.48	3,387.63	100.70	3.02	10,514.80	22,090.72	17.10	23.52	25.00	45.08
Oct-15	(372.50)	(3,377.57)	0.82	14.56	17,495.32	3,412.05	100.82	3.13	10,679.01	22,067.16	17.90	23.27	25.00	44.63
Nov-15	(362.67)	(3,273.92)	0.02	14.52	17,566.15	3,436.47	100.93	3.24	10,843.21	22,043.61	17.30	23.01	26.00	44.19
Dec-15	(352.83)	(3,170.26)	0.22	14.48	17,636.99	3,460.88	101.05	3.34	11,007.42	22,020.05	17.40	22.76	26.00	43.74
Jan-16	(343.00)	(3,066.61)	0.97	14.44	17,707.82	3,485.30	101.17	3.45	11,171.62	21,996.49	17.40	22.50	26.00	43.29
Feb-16	(326.00)	(2,951.55)	1.24	14.31	17,961.02	3,466.11	101.75	3.84	11,125.72	22,261.20	17.60	21.96	26.00	43.92
Mar-16	(309.00)	(2,836.49)	(1.25)	14.18	18,214.21	3,446.92	102.34	4.23	11,079.81	22,525.91	17.70	21.43	26.00	44.54
Apr-16	(292.00)	(2,721.44)	(0.92)	14.05	18,467.40	3,427.73	102.92	4.62	11,033.91	22,790.62	18.99	20.89	26.00	45.17
May-16	(275.00)	(2,606.38)	1.02	13.92	18,720.60	3,408.53	103.51	5.01	10,988.00	23,055.33	18.47	20.35	26.00	45.79
Jun-16	(258.00)	(2,491.33)	2.33	13.79	18,973.79	3,389.34	104.09	5.40	10,942.10	23,320.03	19.22	19.82	26.00	46.42
Jul-16	(241.00)	(2,376.27)	0.61	13.66	19,226.99	3,370.15	104.68	5.80	10,896.20	23,584.74	18.71	19.28	26.00	47.05
Aug-16	(224.00)	(2,261.21)	(0.06)	13.53	19,480.18	3,350.96	105.26	6.19	10,850.29	23,849.45	18.89	18.75	26.00	47.67
Sep-16	(207.00)	(2,146.16)	0.67	13.40	19,733.37	3,331.77	105.84	6.58	10,804.39	24,114.16	18.37	18.21	26.00	48.30
Oct-16	(190.00)	(2,031.10)	(0.17)	13.26	19,986.57	3,312.58	106.43	6.97	10,758.48	24,378.87	16.72	17.67	26.00	48.92
Nov-16	(173.00)	(1,916.04)	0.41	13.13	20,239.76	3,293.38	107.01	7.36	10,712.58	24,643.57	16.86	17.14	25.50	49.55
Dec-16	(156.00)	(1,800.99)	5.52	13.00	20,492.96	3,274.19	107.60	7.75	10,666.67	24,908.28	17.21	16.60	25.50	50.17
Jan-17	(139.00)	(1,685.93)	1.69	12.87	20,746.15	3,255.00	108.18	8.14	10,620.77	25,172.99	15.77	16.07	25.50	50.80
Feb-17	(20.08)	(1,604.25)	4.86	12.69	20,943.39	3,232.83	108.66	7.99	10,907.56	25,386.96	15.52	16.04	25.50	52.00
Mar-17	98.83	(1,522.58)	(3.60)	12.52	21,140.63	3,210.67	109.15	7.83	11,194.35	25,600.93	15.36	16.01	23.50	53.21
Apr-17	217.75	(1,440.90)	(3.03)	12.34	21,337.87	3,188.50	109.63	7.67	11,481.14	25,814.90	13.35	15.99	23.50	54.41

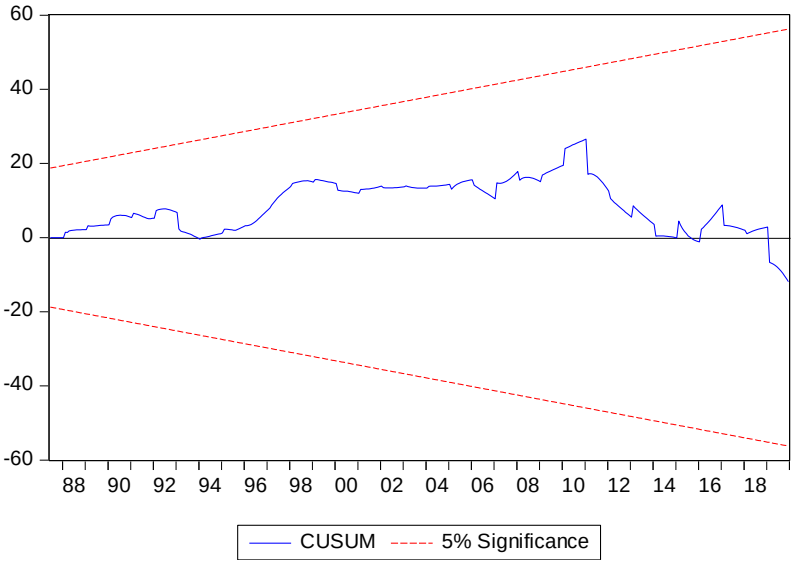
May-17	336.67	(1,359.22)	2.36	12.16	21,535.11	3,166.33	110.11	7.52	11,767.93	26,028.88	13.21	15.96	22.50	55.61
Jun-17	455.58	(1,277.54)	1.80	11.98	21,732.35	3,144.17	110.59	7.36	12,054.72	26,242.85	12.78	15.94	22.50	56.81
Jul-17	574.50	(1,195.87)	0.26	11.81	21,929.59	3,122.00	111.08	7.20	12,341.51	26,456.82	13.04	15.91	21.00	58.02
Aug-17	693.42	(1,114.19)	0.57	11.63	22,126.83	3,099.83	111.56	7.05	12,628.30	26,670.79	12.58	15.89	21.00	59.22
Sep-17	812.33	(1,032.51)	(0.11)	11.45	22,324.07	3,077.67	112.04	6.89	12,915.09	26,884.76	12.10	15.86	21.00	60.42
Oct-17	931.25	(950.83)	(0.41)	11.27	22,521.31	3,055.50	112.52	6.73	13,201.88	27,098.73	11.90	15.84	21.00	61.62
Nov-17	1,050.17	(869.16)	0.82	11.10	22,718.55	3,033.33	113.01	6.58	13,488.67	27,312.70	12.30	15.81	20.00	62.83
Dec-17	1,169.08	(787.48)	0.08	10.92	22,915.79	3,011.17	113.49	6.42	13,775.46	27,526.67	12.17	15.79	20.00	64.03
Jan-18	1,288.00	(705.80)	0.19	10.74	23,113.03	2,989.00	113.97	6.26	14,062.25	27,740.65	11.64	15.76	20.00	65.23
Feb-18	1,308.42	(756.65)	(0.12)	10.80	23,359.88	2,975.50	114.33	6.28	14,067.01	28,040.87	11.74	16.23	20.00	64.54
Mar-18	1,328.83	(807.49)	(0.32)	10.86	23,606.74	2,962.00	114.69	6.30	14,071.77	28,341.09	11.82	16.69	18.00	63.86
Apr-18	1,349.25	(858.33)	0.08	10.92	23,853.59	2,948.50	115.04	6.32	14,076.54	28,641.32	10.35	17.16	18.00	63.17
May-18	1,369.67	(909.17)	0.34	10.98	24,100.44	2,935.00	115.40	6.34	14,081.30	28,941.54	10.58	17.63	18.00	62.48
Jun-18	1,390.08	(960.02)	2.27	11.05	24,347.30	2,921.50	115.76	6.35	14,086.06	29,241.76	10.00	18.09	17.00	61.80
Jul-18	1,410.50	(1,010.86)	3.79	11.11	24,594.15	2,908.00	116.12	6.37	14,090.82	29,541.99	9.55	18.56	17.00	61.11
Aug-18	1,430.92	(1,061.70)	0.63	11.17	24,841.01	2,894.50	116.47	6.39	14,095.58	29,842.21	9.90	19.02	17.00	60.42
Sep-18	1,451.33	(1,112.55)	1.13	11.23	25,087.86	2,881.00	116.83	6.41	14,100.34	30,142.44	9.80	19.49	17.00	59.74
Oct-18	1,471.75	(1,163.39)	0.26	11.29	25,334.71	2,867.50	117.19	6.42	14,105.10	30,442.66	9.50	19.96	17.00	59.05
Nov-18	1,492.17	(1,214.23)	0.34	11.35	25,581.57	2,854.00	117.55	6.44	14,109.86	30,742.88	9.30	20.42	17.00	58.36
Dec-18	1,512.58	(1,265.08)	0.29	11.41	25,828.42	2,840.50	117.90	6.46	14,114.62	31,043.11	9.40	20.89	17.00	57.68
Jan-19	1,533.00	(1,315.92)	2.71	11.47	26,075.28	2,827.00	118.26	6.48	14,119.38	31,343.33	9.00	21.35	16.00	56.99
Feb-19	1,405.25	(1,645.26)	4.54	11.61	25,803.63	2,747.73	118.26	5.98	14,119.38	31,121.58	9.20	21.94	16.00	56.99
Mar-19	1,277.50	(1,974.61)	(1.77)	11.75	25,531.98	2,668.46	118.26	5.48	14,119.38	30,899.84	9.30	22.52	16.00	56.99
Apr-19	1,149.75	(2,303.95)	0.09	11.90	25,260.34	2,589.20	118.26	4.99	14,119.38	30,678.09	9.50	23.11	16.00	56.99
May-19	1,022.00	(2,633.30)	2.22	12.04	24,988.69	2,509.93	118.26	4.49	14,119.38	30,456.34	9.40	23.69	16.00	56.99
Jun-19	894.25	(2,962.64)	1.11	12.18	24,717.05	2,430.66	118.26	3.99	14,119.38	30,234.60	9.10	24.27	16.00	56.99
Jul-19	766.50	(3,291.99)	(0.04)	12.32	24,445.40	2,351.39	118.26	3.49	14,119.38	30,012.85	9.40	24.86	16.00	56.99
Aug-19	638.75	(3,621.33)	0.46	12.46	24,173.75	2,272.12	118.26	3.00	14,119.38	29,791.10	7.80	25.44	16.00	56.99
Sep-19	511.00	(3,950.67)	0.66	12.60	23,902.11	2,192.85	118.26	2.50	14,119.38	29,569.36	7.60	26.02	16.00	56.99
Oct-19	383.25	(4,280.02)	0.40	12.74	23,630.46	2,113.59	118.26	2.00	14,119.38	29,347.61	7.70	26.61	16.00	56.99
Nov-19	255.50	(4,609.36)	3.53	12.88	23,358.82	2,034.32	118.26	1.50	14,119.38	29,125.86	8.20	27.19	14.50	56.99
Dec-19	127.75	(4,938.71)	0.15	13.02	23,087.17	1,955.05	118.26	1.01	14,119.38	28,904.11	7.90	27.78	14.50	56.99

Appendix 5. Stability Diagnostics

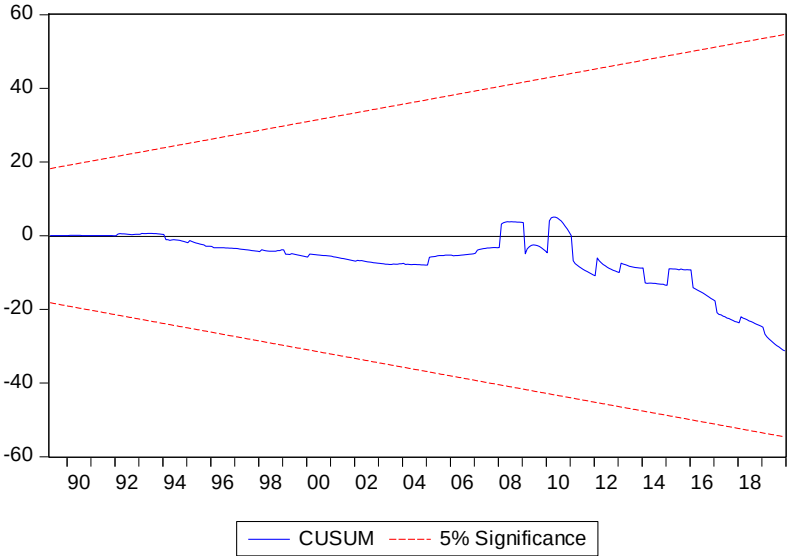
Inflation



GDPG



FDI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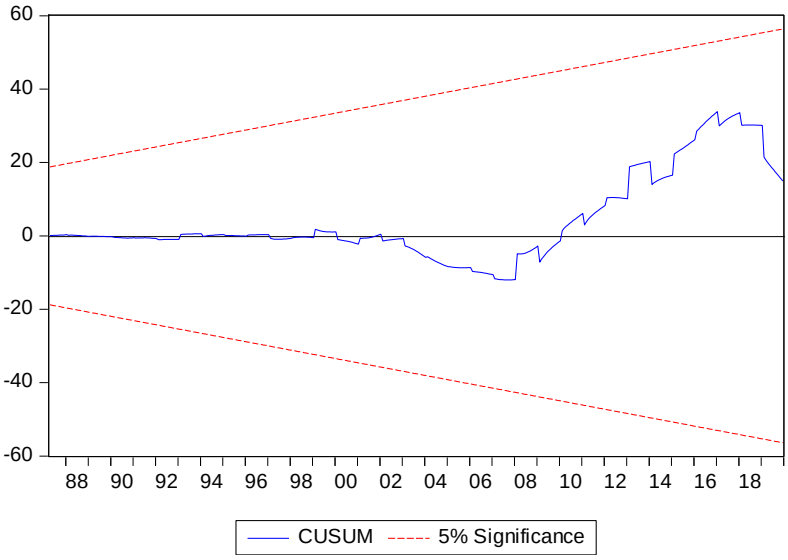
20
0
-20
-40
-60
90 92 94 96 98 00 02 04 06 08 10 12 14 16 18
CUSUM
5% Significance

BOT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-60
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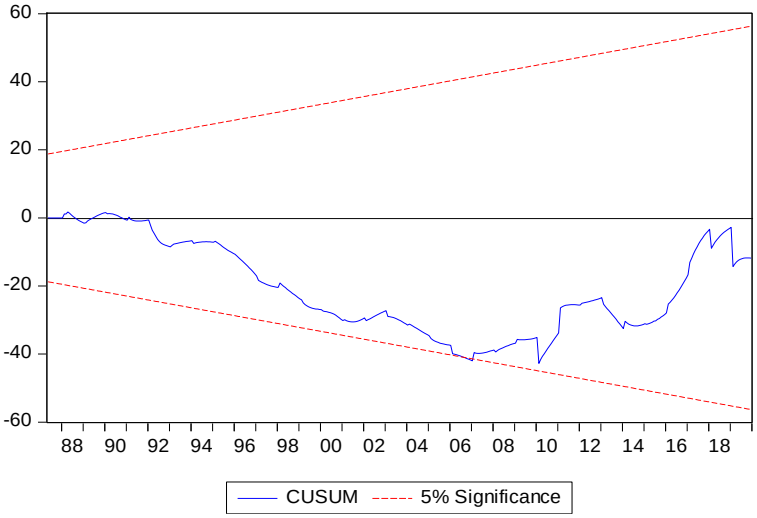
CUSUM
5% Significance

BOP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04
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12
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16
18
CUSUM
5% Significance