FINANCIAL SECTOR DEVELOPMENT AND ECONOMIC GROWTH: THE CASE OF GHANA (1980-2009)

DANIEL FRIMPONG YEBOAH

ACADEMIC THESIS SUBMITTED TO OBTAIN A MASTER OF ARTS DEGREE IN ECONOMIC POLICY MANAGEMENT AT THE UNIVERSITY OF GHANA, LEGON, UNDER THE SUPERVISION OF PROFFESSOR AMOAH BAAH-NUAKOH

MARCH 2011
DECLARATION

I, DANIEL FRIMPONG YEBOAH, do hereby declare that except for references made to other works which have been duly acknowledged, this thesis is entirely my work and that no part of it has been submitted for another degree elsewhere.
ABSTRACT

This study examines the relationship between Financial Sector Development and Economic Growth in Ghana using time series data from 1980-2009. The study investigates empirically the impact of financial sector development on economic growth in Ghana using the Granger Causality Test, the Johansen Cointegration and the Error Correction Modeling (ECM) techniques. The intent of the framework used is to find out whether there exists a long-run relationship between growth and finance.

The study concludes that there exist a positive long run relationship between economic growth and financial sector development with financial sector developments Granger causing economic growth in Ghana. An enabling environment and financial sector interventions such as low interest rate that will enhance transfer of credit to the private sector must be pursued to enhance the economic development of Ghana.

Government should put in place appropriate fiscal and monetary policies to encourage the increase of credits to the private sector of the economy. This will boost economic growth immensely as shown by the results from our analysis.

Government should encourage domestic producers with favourable tax incentives to enable them produce more for export which will intend increase the country’s GDP to a great extent.

Government policy should focus on ensuring that capital stock is allocated efficiently to the productive sectors of the economy such as industry and agriculture.

Policies should be put in place to increase and improve upon the human capital accumulation of skills in all areas, both financial and real sectors of the economy, to have a positive effect on the Ghanaian economy.
ACKNOWLEDGEMENTS

I am grateful to the Almighty God for protecting and seeing me throughout my master’s degree programme.

I am extremely grateful to my supervisor, Professor Amoah Baah-Nuakoh, for his patience, constructive criticisms and encouragement. His painstaking effort in reading the draft and final work, the immense suggestions and guidance I received from him has doubtlessly contributed to the successful completion of this research work.

I am grateful to the lecturers and management of the Economic Management and Capacity Building Programme, whose teachings and advices provided the basis for this research work.

My sincere thanks go to Mr. Paul Buadu who provided me that technical support and advice for the quantitative analysis of this project.

My thanks go to my parents and siblings. God bless you all for your support and encouragement during the period of pursuing this programme.
DEDICATION

This work is dedicated to the Almighty God, in whom I live and move and have my being.

This work is also dedicated to all my loved ones.
TABLE OF CONTENTS

| TITLE                                  | PAGE |
|----------------------------------------|------|
| Declaration                            | ii   |
| Abstract                               | iii  |
| Acknowledgements                       | iv   |
| Dedication                             | v    |
| Table of Contents                      | vi-viii |
| List of Tables                         | ix   |
| List of Abbreviations                  | x-xi |

CHAPTER ONE: INTRODUCTION

1.1 Overview                             | 1-5 |
1.2 Background and Economic Overview of Ghana | 5-9 |
1.3 The Ghanaian Financial system         | 9-11 |
1.3.1 The Ghanaian Banking Industry      | 11-14|
1.3.2 Importance of the Financial Sector in the Ghanaian Economy | 14 |
1.4 Statement of the Problem             | 14-15|
1.5 Objectives of the Study              | 15   |
1.6 Significance of the Study            | 15-16|
1.7 Organization of the Study            | 16   |
CHAPTER TWO: THEORETICAL AND EMPIRICAL LITERATURE REVIEW

2.1 Theoretical Literature 18-39
2.1.1 Financial Development and Economic Growth 18-32
2.1.2 Endogenous Growth Literature 32-35
2.1.3 Development Hypothesis 35-36
2.1.4 Neo-classical Production Function Hypothesis 36-37
2.1.5 Evidence on the Direction of Causation 37-39
2.2 Empirical Literature 39-50

CHAPTER THREE: THEORETICAL FRAMEWORK AND METHODOLOGY

3.1 Theoretical Framework 51-56
3.2 Methodology 56
3.3 Model Specification 56-57
3.4 Expected Impact of Model Variables on Growth 57
3.5 Hypotheses 58
3.6 Data Exploration Techniques 58
3.6.1 Analysis of Stationary 58-59
3.6.2 Unit Root Test for Stationary 59-61
3.6.3 Granger Causality 62-63
3.6.4 Cointegration and Error Correction Modeling 63-64
3.6.5 Johansen Cointegration Procedure 64-68
3.6.6 Scope and Limitation of the Study 68
3.6.7 Data Used and Sources 68
CHAPTER FOUR: ESTIMATION AND INTERPRETATION OF RESULTS

4.0 Introduction 69
4.1 Stationarity Test 69-70
4.2 Cointegration Test 71
4.3 Regression Results 71-73

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

5.0 Introduction 74
5.1 Summary of Findings 74
5.2 Conclusions 75
5.3 Policy Recommendations 75

REFERENCES 76-83

APPENDIX 1 84
APPENDIX 2 85
LIST OF TABLES

| Table | Description                                                                 | Page |
|-------|-----------------------------------------------------------------------------|------|
| 1.1   | Trends in Real GDP Growth Rates, Inflation and Exchange Rate: 1984-2002      | 9    |
| 1.2   | Ghana Financial System Structure                                           | 10   |
| 1.3   | Financial Sector Development Indicators                                    | 14   |
| 4.1   | Augmented Dickey-Fuller Tests at Levels                                   | 69   |
| 4.2   | Augmented Dicky-Fuller Test at Levels at first difference                 | 70   |
| 4.3   | Cointegration Test                                                         | 71   |
| 4.4   | Regression Results                                                        | 71   |
| Abbreviation | Description                          |
|--------------|--------------------------------------|
| ACF          | Autocorrelation Function             |
| ADB          | Agricultural Development Bank        |
| ADF          | Augmented Dikey-Fuller              |
| BoG          | Bank of Ghana                       |
| CMC          | Capital Market Committee             |
| CPS          | Credits to the Private Sector        |
| DCs          | Developing Countries                 |
| DF           | Dickey-Fuller                        |
| DFID         | Department for international development |
| DW           | Durbin-Watson                        |
| ECA          | Exchange Control Act                 |
| ECM          | Error Correction Modeling            |
| ERP          | Economic Recovery Programme          |
| FI           | Financial Institutions               |
| FINSAP       | Financial Sector Adjustment Programme|
| FINSSP       | Financial Sector Strategic Plan      |
| FD           | Financial Depth                      |
| FSDI         | Financial Sector Development Indicators |
| GCB          | Ghana Commercial Bank                |
| GCF          | Gross Capital Formation              |
| GDP          | Gross Domestic Product               |
| GNP          | Gross National Product               |
| Abbreviation | Full Form |
|--------------|-----------|
| HDR          | Human Development Report |
| IFS          | International Financial Statistics |
| IMF          | International Monetary Fund |
| K            | Physical Capital Formation |
| LDCs         | Least Developed Countries |
| LF           | Labour Force |
| MLE          | Maximum Likelihood Estimate |
| NTHC         | National Trust Holding Company |
| OAU          | Organization of African Unity |
| OLS          | Ordinary Least Squares |
| PNDC         | Provisional National Defense Council |
| RCBs         | Rural and Community Banks |
| SDR          | Special Drawing Right |
| SIC          | State Insurance Company |
| SMEs         | Small-Medium Enterprises |
| SSNIT        | Social Security and National Insurance Trust |
| UN           | United Nations |
| USD          | United States Dollars |
| VAR          | Vector Auto regression |
| WACB         | West African Currency Board |
| WB           | World Bank |
| WHO          | World Health Organization |
| WT           | World Tables |

xi
CHAPTER ONE

INTRODUCTION

1.1 Overview

The finance services industry encompasses a broad range of organizations that deal with the management of money. In Ghana, the financial services industry is categorized into three main sectors:

• Banking and Finance (including Non-Bank Financial Services and Forex Bureau)
• Insurance and
• Financial market/capital markets

The operating institutions include both foreign and local major banks, Rural and Community Banks (RCBs), Savings and Loans Companies (SLCs) and other finance and leasing companies.

Through the implementation of the Financial Sector Strategic Plan (FINSSP) the Government of Ghana intends to promote the evolution of a financial sector which is appropriate for the needs of a country moving towards middle income status. The vision is one of a financial sector which is responsive to the needs of the 21st Century, particularly given the prospect of greater international and regional competition and opportunity for Ghanaian financial market participants.

Financial Development

The costs of acquiring information, enforcing contracts, and making transactions create incentives for the emergence of particular types of financial contracts, markets and intermediaries. Different types and combinations of information, enforcement, and transaction
costs in conjunction with different legal, regulatory, and tax systems have motivated distinct financial contracts, markets, and intermediaries across countries and throughout history.

In arising to ameliorate market frictions, financial systems naturally influence the allocation of resources across space and time (Merton and Bodie, 1995, p. 12). To organize a discussion of how financial systems influence savings and investment decisions and hence economic growth, Ross Levine focused on five functions provided by the financial system. That is, in easing information, enforcement, and transactions costs, financial systems provide five broad categories of services to the economy. While there are other ways to classify the functions of the financial system (Merton, 1992; Merton and Bodie, 1995).

Financial development occurs when financial instruments, markets, and intermediaries ameliorate – though do not necessarily eliminate – the effects of information, enforcement, and transactions costs. Thus, financial development involves improvements in the (i) production of ex-ante information about possible investments, (ii) monitoring of investments and implementation of corporate governance, (iii) trading, diversification, and management of risk, (iv) mobilization and pooling of savings, and (v) exchange of goods and services. Each of these financial functions may influence savings and investment decisions and hence economic growth. Since many market frictions exist and since laws, regulations, and policies differ markedly across economies, improvements along any single dimension may have different implications for resource allocation depending on other frictions.

In terms of integrating the links between finance and growth theory, two general points are worth stressing from the onset. First, a large growth accounting literature suggests that physical capital accumulation per se does not account for much of economic growth. Thus, if finance is to explain
economic growth; we need theories that describe how financial development influences resource allocation decisions in ways that foster productivity growth.

Second, there are two general ambiguities between economic growth and the emergence of financial arrangements that improve resource allocation and reduce risk. Specifically, higher returns ambiguously affect saving rates due to well-known income and substitutions effects. Similarly, lower risk also ambiguously affects savings rates (Levhari and Srinivasan, 1969). Thus, financial arrangements that improve resource allocation and lower risk may lower saving rates. In a growth model with physical capital externalities, therefore, financial development could retard economic growth and lower welfare if the drop in savings and the externality combine to produce a sufficiently large effect.

There will be a look at how market frictions motivate the emergence of financial systems that provide these five financial functions and also describe how the provision of these functions influences resource allocation and economic growth\(^1\).

An effective and efficient financial sector that is well performing is expected to promote economic growth by positively influencing the rate of accumulation and efficiency of capital. Financial intermediaries play an important role in lowering the costs of potential investments, exerting corporate control, managing risk and mobilizing savings and allocative investment in ways that may alter long-run growth paths\(^2\).

\(^1\) Merton and Bodie, 1995, p.12; Ross Levine (2003)

\(^2\) Gross, D.M (2001).
Until lately, the role of financial markets was not given much attention by economic theory as directly important for development while technological progress and population growth were considered as the main driving forces behind growth. Orthodox thinking changed with the advent of development growth models that state that investment in research and development in physical and human capitals are major determinants of economic growth. Against this backdrop, mounting concerns as to how to finance these investments and how financial intermediaries allocate funds naturally became important questions not just for growth but also in terms of distributional effects of growth at the macroeconomic level (Gross, 2001).

One of the debates in growth theory is the extent to which financial development leads to economic growth. It is not implausible to posit a positive correlation between growth in the financial and real sectors. However, the causal relationship is not clear. Which is the cause and which is the effect? Is finance the leading engine of economic development or does it simply follow growth from elsewhere?

Empirical studies have been conducted to establish this causality. Cross country regressions support the supply leading finance thesis wherein financial intermediation supports and sustains the growth process. Goldsmith (1969) motivated his path breaking study of finance and growth as follows: “One of the most important problems in the field of finance, if not the single most important one… is the effect that financial structure and development have on economic growth. (p. 390)” Thus, he sought to assess whether finance exerts a causal influence on growth and whether the mixture of markets and intermediaries operating in an economy influences economic growth. Toward this end, Goldsmith (1969) carefully compiled data on 35 countries over the period 1860 to 1963 on the value of financial intermediary assets as a share of economic output. A time series study will be performed on Ghana.
In view of the above, a motivation for this study was envisaged. Hence the topic “Financial Sector Development and economic Growth: The case of Ghana” where the study models relationship between economic growth and financial sector development for Ghana from the period 1980 to 2009 with the aim to studying the links between these two sectors.

1.2 Background and Economic Overview of Ghana

Ghana, once called the Gold Coast is situated on the west coast of Africa. It was the first country south of the Sahara to attain independence and undoubtedly one of the countries in Africa with unique characteristics with regard to its strategic geographic position, rich political history and immense natural resources. It occupies a total land area of 238,539 square kilometers (92,100 square miles) and lies between latitudes 4 and 11.5 degrees north and longitudes 3.11 degrees west and 1.11 degrees east of the Equator. Ghana shares boundaries with Burkina Faso to the North, Ivory Coast to the West, Togo to the East and the Atlantic Ocean to the south. One remarkable feature about this country is its closeness to the centre of the world as the Greenwich Meridian passes through Tema; the industrial city of the country. Ghana has an estimated population of 23 million (2009 UN estimates) with English as its official language. There are two major seasons in the country, namely the rain season, (between April and October) and the dry season (November to March).

Ghana is one of the most naturally endowed countries in Africa based on its agricultural, mineral and water resources. 57% of the total land area of Ghana is suitable for agriculture and out of this figure only 39% is currently under cultivation by a 60% of the population. At present, Ghana is not only the second largest producer of cocoa in the world, but also the third largest producer of timber and second largest exporter of wood and wood product in Africa. Cocoa production shot up from 437 thousand metric tons in 2000 to 740 thousand metric tons by the end of 2006.
During the colonial era, the colonial government restricted itself to monetary stability, and monetary growth was tied to export performance. Banking was established with the object of providing banking services for the British trading enterprises and the British Colonial Administration. Between 1912-1957, the West African Currency Board (WACB) functioned as a central bank, operating a Sterling Exchange Standard through a guaranteed convertibility of the West African pound to sterling. There were no exchange controls. The West African Currency Board did not have any central banking functions. It did not exercise control over the volume of currency or issue; nor could the Colonial Administration exercise any control over the currency supply.

In the immediate post-independence era, the government of Kwame Nkrumah adopted socialist development strategy under which the state was to be predominant in all aspects of economic policy making and implementation. This period was characterized by:

1. Import Licensing: A comprehensive system of import licensing was instituted in November 1961.

2. Exchange Controls: The Exchange Control Act of 1961 imposed all-embracing exchange Controls over the entire range of international transactions.

3. Quantitative restrictions on interest rates.

4. Forced lending programs, including requirements for banks to lend to sectors of the economies that were considered priority sectors by the government.

The implementation of the provisions of the Exchange Control Act together with the system of import licensing moved Ghana significantly towards a closed economy.
Within the banking sector, the following developments were taking place:

1. The Bank of Ghana became the pivot of all international banking activities, whether these related to remittances, letters of credit, collections, allocation of foreign exchange, travel or tourism.

2. In response to the changing macroeconomic environment, the Bank of Ghana Act (1963) was passed. The Bank was required to submit a report to the government anytime the money supply growth exceeded 15% for any year, stating the reasons for such a rise and recommending measures to contain the associated inflationary pressures.

3. The Bank of Ghana was empowered to set ceilings on advances or investments by commercial banks and given powers to control the banking system.

4. New credit control measures were introduced in 1964 to control and direct the granting of credit to be in accordance with the government’s economic policy.

Ghana has experienced several decades of poor economic performance as a result of domestic policy-induced distortions, shocks in external trade and other exogenous factors. The poor economic performance led to declining standards and intolerable socio-economic hardships. To stem this deplorable state of affairs and usher in real economic growth, the PNDC government in consultation with the IMF and the World Bank launched an Economic Recovery Programme (ERP) in 1983. The main thrust of the ERP included a minimalist state participation in economic activity with stabilization and structural adjustment policies, allocative efficiency policies and cost-effectiveness in the production and delivery of goods and services, especially those produced by the public sector.

The economic reforms, so far, appear to have yielded results as the declining trends observed in key macroeconomic variables prior to its inception have been arrested. For example, the GDP growth rate was over 8 percent in 1984, and has averaged about 4.7 percent between 1984-2002.
Similarly, the annual rate of inflation fell from 122.8 percent in 1983 to 10.4 percent in 1991, with the average for the 1984-2002 period being 27.6 percent. Since the 1990s, economic performance has been moderate. Table 1.1 shows the trends in GDP growth, inflation and exchange rate between 1984 and 2002.

Whilst the policy measures of the ERP have generally been successful in turning the economy round, it is doubtful if this could have been achieved without the massive inflows of World Bank and IMF financial resources, not to mention other bilateral financial assistance occasioned by the ERP. For example, between 1983-1991 the IMF's financial resource inflows to support the ERP amounted to SDR1, 208 million. Indeed, government budgets are largely donor dependent as over 40% of total government revenue is from external financing. Virtually all capital expenditure components of the development budgets are donor driven. But the issue is how long can such foreign inflows be relied on to sustain growth? Obviously, the external resources inflow cannot be expected to continue indefinitely so if domestic financial resources are not increased, Ghana’s vision to raise per capita income to $1,000 by 2012 will falter. Even if external financing were to continue indefinitely, the high dependence of government budget on external financing would have serious implications for the sustainability of the growth process. As more of the country's export earnings are diverted to debt amortization, instead of being used to increase productive capacity of the economy, future growth prospects are jeopardised. The unsustainability of Ghana's external debt repayment has led to Ghana electing to take advantage of the Heavily Indebted Poor Countries Initiative. Thus unless foreign assistance becomes structurally ingrained as a substitute for domestic resources, rather than complementing such domestic resources, domestic financial resources must necessarily be increased to promote the required growth rate of about 13 to 17 percent to attaining a per capita income of $1,000.
### Table 1.1 Trends in Real GDP Growth Rates, Inflation and Exchange Rate: 1984-2002

| Year | GDP Growth | Inflation rate (year-on-year percentage changes) | Exchange Rate Cedi/dollar exchange rate | Rate of currency depreciation |
|------|------------|-----------------------------------------------|---------------------------------------|--------------------------------|
| 1984 | 8.6        | 39.6                                          | 50.00                                 | 40.00                          |
| 1985 | 5.1        | 10.39                                         | 59.99                                 | 16.65                          |
| 1986 | 5.2        | 24.6                                          | 90.01                                 | 33.35                          |
| 1987 | 4.8        | 39.8                                          | 176.06                                | 48.88                          |
| 1988 | 5.6        | 26.6                                          | 229.89                                | 23.42                          |
| 1989 | 5.1        | 30.5                                          | 303.03                                | 24.14                          |
| 1990 | 3.3        | 35.9                                          | 344.82                                | 12.12                          |
| 1991 | 5.3        | 10.3                                          | 390.63                                | 11.72                          |
| 1992 | 3.9        | 13.3                                          | 520.85                                | 25.00                          |
| 1993 | 5.0        | 27.7                                          | 819.67                                | 36.46                          |
| 1994 | 3.8        | 34.2                                          | 1,052.63                              | 22.37                          |
| 1995 | 4.0        | 70.8                                          | 1,449.28                              | 27.37                          |
| 1996 | 4.6        | 32.7                                          | 1,754.39                              | 17.39                          |
| 1997 | 4.2        | 20.8                                          | 2,272.73                              | 22.81                          |
| 1998 | 4.7        | 15.7                                          | 2,325.58                              | 3.39                           |
| 1999 | 4.4        | 13.8                                          | 3,535.14                              | 33.45                          |
| 2000 | 3.7        | 40.5                                          | 7,047.65                              | 29.84                          |
| 2001 | 4.2        | 21.3                                          | 7,321.94                              | 3.75                           |
| 2002 | 4.5        | 13.0                                          | 8,438.82                              | 13.2                           |
| Average for 1984 - 2002 | 4.7 | 27.4 | - | 24.48 |
| Average for 1992 - 2002 | 4.3 | 27.6 | - | 23.17 |

Source: IMF Statistics

### 1.3 The Ghanaian Financial System

The financial sector includes a broad range of institutions, with the banking system accounting for most of the sector’s assets (Table 1). The bank assets-to-GDP ratio stood at 39 percent at end-2002. The aggregate balance sheets of the rural banks and other nonbank financial institutions have grown rapidly, but are very small, amounting to 5 percent of GDP in 2002. The insurance and pension sector is dominated by SSNIT, and is otherwise small.

The level of financial intermediation in the economy is low by the standards of sub-Saharan
Africa. M2 as a share of GDP was a modest 19 percent in 2002, and the relatively high level of currency in circulation (8 percent of GDP) suggests that cash continues to be an important medium of exchange for economic transactions.

Table 1.2 Ghana: Financial System Structure, December 2002

| Commercial Banks           | Institutions | Number of Branches | (Billions of Cedis) | Financial Sector Assets (% of Sub-Total) | (% of GDP) |
|----------------------------|--------------|--------------------|--------------------|----------------------------------------|------------|
| Commercial Banks           | 9            | 229                | 13,055             | 69.9                                   | 27.3       |
| Large Commercial Banks     | 4            | 217                | 12,058             | 64.6                                   | 25.2       |
| Ghana Commercial Banks(GCB)| 1            | 134                | 4,624              | 24.8                                   | 9.7        |
| Foreign-Owned Banks        | 3            | 83                 | 7,434              | 39.8                                   | 15.6       |
| Small Commercial Banks     | 5            | 12                 | 997                | 5.3                                    | 2.1        |
| Development Banks          | 3            | 62                 | 2,738              | 14.7                                   | 5.7        |
| Merchant Banks             | 5            | 18                 | 2,875              | 15.4                                   | 6.0        |
| Sub-Total                  | 17           | 309                | 18,668             | 100.0                                  | 39.1       |
| **Rural Banks**            | 115          | 353                | 864                | 100.0                                  | 1.8        |
| Insurance Companies        |              |                    |                    |                                        |            |
| Insurance Companies        | 19           | …                  | 4,383              | 95.4                                   | 9.2        |
| Social Security and National Insurance Trust | 1 | 45 | 3,873 | 84.3 | 8.1 |
| Other Insurance Companies  | 18           | …                  | 510                | 11.1                                   | 8.1        |
| Reinsurance Companies      | 2            | …                  | 213                | 4.6                                    | 1.1        |
| Sub-Total                  | 21           | …                  | 4,596              | 100.0                                  | 9.6        |
| **Other Nonbank Financial Institutions** | | | | | |
| Building Societies         | 2            | 8                  | 11                 | 0.7                                    | 0          |
| Discount Houses            | 3            | …                  | 442                | 28.9                                   | 0.9        |
| Finance Companies          | 13           | …                  | 191                | 12.5                                   | 0.4        |
| Leasing Companies          | 6            | …                  | 202                | 13.2                                   | 0.4        |
| Mortgage Finance           | 1            | 1                  | 345                | 22.6                                   | 0.7        |
| Savings and Loans          | 9            | 10                 | 143                | 9.3                                    | 0.3        |
| Venture Capital Funds      | 2            | …                  | 46                 | 3                                      | 0.1        |
| Credit Unions              | 250          | …                  | 152                | 9.9                                    | 0.3        |
| Sub-Total                  | 286          | …                  | 1531               | 100                                    | 3.2        |
| **Total Financial Sector** | 439          |                    | **25659**          |                                           | **53.7**   |

**Sources:** Bank of Ghana and IMF staff calculations
The Ghanaian financial sector is also confronted by a large number of development challenges. Competition in the banking sector appears to be weak, and banks need to overcome several major obstacles before they can expand lending to small and medium-sized borrowers and provide more housing finance.

Moreover, the government’s planned divestiture of Ghana Commercial Bank (GCB) has been suspended due to public concern about the potential foreign domination of Ghana’s banking sector, and the attendant risk that the interests of ordinary Ghanaians could be overlooked. As for other sectors, the insurance industry and financial markets are undeveloped and have yet to play a meaningful role in intermediating medium– to long–term funds for the economy. To develop the financial sector, and given the importance of financing for SMEs, the authorities could: (i) improve corporate governance and financial reporting for Ghanaian firms; (ii) introduce a suitable legal framework to facilitate the operation of credit reference bureaus; (iii) address the inadequacies identified in property titles and weak judicial enforcement of foreclosure processes; and (iv) ensure timely payment of the government’s obligations.

1.3.1 The Ghanaian Banking Industry

In the early 1960s, the Bank of Ghana provided capital for the establishment of development banks, which were new banking institutions, created with clearly specified roles. This was a response to the feeling that commercial banks – with their policies of “borrowing short and lending short” were not suited to the task of mobilizing funds to finance medium and long-term investments. The following banks were incorporated to undertake the financing of specific projects in industry, agriculture, housing and merchant banking, respectively:

1. National Investment Bank, 1963 (Industry)

2. Agricultural Credit and Cooperative Bank, 1965 (Agriculture)
3. Bank for Housing and Construction, 1972 (Housing)

4. The Merchant Bank (1972) to offer one-stop corporate banking services. Its main functions were: Taking wholesale deposit of corporate funds, Providing venture capital, Term lending to the corporate sector, Dealing in stocks and shares, Financing of imports and exports, Financial consultancy and advisory services

The development banks obtained long-term credit from the Bank of Ghana to support their lending operations. In addition, the Bank of Ghana provided credit guarantees to the banks to cover loans and advances to industrial and agricultural enterprises.

**Rural Banking**

In 1964, a rural credit department was established at the Bank of Ghana to devise appropriate methods for financing the agricultural sector in line with the seven-year development plan. By the 1970s, it had become evident that the Agricultural Development Bank, which was designed to provide a vehicle for reaching the small-scale farmer, did not have the capability to provide adequate rural coverage. This realization led to the establishment of a rural banking system, modelled on the rural banking system in the Philippines. The objective was to extend banking services to the rural areas by having a system of unit banks. The first rural bank was set up in 1976. As at June 2002, there were 105 rural banks. The number of rural banks in Ghana currently stands at 135.

**Non-Bank Financial Sector**

The non-bank financial sector was relatively undeveloped. The State Insurance Corporation
(SIC) was set up in 1962 and given a monopoly over the government sector. The National Trust Holding Company (NTHC) was established by legislative instrument in 1976 to operate as a national mutual fund. The objective was to use NTHC to support the government’s indigenization program. NTHC acquired the shares of foreign companies and sold them to Ghanaians in what was essentially an over-the-counter market, the first and only one of its kind in Ghana at the time.

The banking sector in Ghana is undergoing rapid change driven partly by technological change and the rapid growth of competing nonbank financial institutions. Key features of the banking industry are as follows:

1. A general lack of financial innovation leading to lack of competition within the industry;
2. High spreads between deposit and lending rates;
3. A re-emergence of non-performing loan asset portfolios. Recent evidence indicates that the average quality of bank loan portfolios (measured by the ratio of nonperforming to total loans) dropped from 25.1% in 1997 to 12.1% in 2000. However, as at September 2002, nonperforming loans had increased to 19.2% of total loans.

Limited credit facilities for private sector; A high rate of investment in government securities compared to loans and advances to the private sector; low rate of savings reflected in a high level of currency outside the banking system; and efficient credit operations are constrained by the lack of a credit information system.

The Ghanaian banking sector is now very vibrant and modern. Most banks now employ cutting edge technologies to roll out their products to their Ghanaian customers. Banking halls are
housed in ultra-modern buildings, staffed with well-trained smart looking ladies and gentlemen. Ghanaians living in the big commercial towns are now spoilt for choice. Twenty three banks are chasing the about 10 percent of the bankable segment of the population. Nigerian banks are well represented in the new banking sector in Ghana.

1.3.2 Importance of the Financial Sector in the Ghanaian Economy

Table 1.3: Financial Sector Development Indicators

| Indicators                  | 2003 | 2004 | 2005 | 2006 | 2007 |
|-----------------------------|------|------|------|------|------|
| Private Credit/GDP (%)      | 11   | 12   | 13   | 16   | n.a  |
| Stock market cap/GDP (%)    | 14   | 23   | 20   | 19   | 19   |
| Liquid Liabilities (2000 USD ml) | 1,731 | 1,929 | 1,835 | 2,325 | n.a |
| Net Interest Margin (%)     | 10   | 10   | 10   | 8    | 7    |
| Remittances/GDP             | 1    | 1    | 1    | 1    | 1    |
| GDP (USD ml, Current Prices) | 7,628 | 8,877 | 10,726 | 12,729 | 15,031 |
| Branches per 100,000 Inhabitants | 2   | n.a. | n.a. | n.a  | n.a  |

Source: FSDI

As can be seen in Table above, the contribution of private credits as a percentage of total GDP increased progressively from 2003 to 2006 and stock market capitalization as a percentage of total GDP also increased from 2003 to 2004 and fell from 2005 continuously to 2007. but the overall effect of the financial sectors contribution to GDP was positive from 2003 to 2007. In view of the selected years, the financial sector is seen to have positive correlation with economic growth.

1.4 Statement of the Problem

In so far as economic growth performance and financial sector development are concerned in Ghana, there has been little empirical research done to investigate the direction of causality or to determine whether a relationship exists between economic growth and financial sector
developments.

In the face of this research insufficiency in Ghana about the contributions of the financial sector to economic growth, this research work seeks to empirically establish whether financial development in Ghana for the period under consideration positively impacted economic growth and whether a long-run relationship exists between the two variables.

1.5 Objectives of the Study

In view of how important financial development is to economic growth, the general objective of this work is to examine the impact of financial development on economic growth in Ghana through the harnessing of financial savings for investment ventures.

The specific objectives of the study are as follows:

i) Find out empirically the impact of financial development on economic growth with the view to establishing whether or not financial development causes growth or growth causes financial development in Ghana; and

ii) Investigate whether there is a long-run relationship between financial development and economic growth in Ghana.

1.6 Significance of the Study

The study is very significant in the sense that it is one of the researches to be conducted on the subject matter and shall provide greater incentive that could raise the confidence level for policy-makers in addressing reform needs, especially in the financial sector that is very much underdeveloped and now facing numerous issues of confidence crisis, adequate resource pooling and transferring in terms of loan availability investment projects whose purpose will be to enhance the growth process of an emerging nation.
Moreover, this research paper shall add to the expansion of the frontier of knowledge in Ghana.

1.7 Organization of the Study

The study is structured into five (5) chapters with chapter 1 covering the introduction. Chapter 2 deals with the literature review followed by Chapter 3 that focuses on the theoretical framework, methodology and model specification that capture the empirical relationship between financial sector development and economic growth, hypotheses to be tested and data sources. Chapter 4 hinges on estimation and interpretation of empirical results while Chapter 5 concludes the study.
CHAPTER TWO

2.0 THEORETICAL AND EMPIRICAL LITERATURE REVIEW

Nobel Prize Laureates and other influential economists disagree sharply about the role of the financial sector in economic growth. Finance is not even discussed in a collection of essays by the “pioneers of development economics,” which includes three winners of the Nobel Prize (Meier and Seers, 1984). Nobel Laureate Robert Lucas (1988) dismisses finance as a major determinant of economic growth calling its role “over-stressed.” Joan Robinson (1952, p. 86) famously argued that "where enterprise leads finance follows." From this perspective, finance does not cause growth; finance responds automatically to changing demands from the “real sector.” At the other extreme, Nobel Laureate Merton Miller (1988, p.14) argues that, “[the idea] that financial markets contribute to economic growth is a proposition too obvious for serious discussion.” Similarly, Bagehot (1873), Schumpeter (1912), Gurley and Shaw (1955), Goldsmith (1969), and McKinnon (1973) have all rejected the idea that the finance-growth nexus can be safely ignored without substantially impeding our understanding of economic growth.

Resolving the debate and advancing our understanding about the role of financial factors in economic growth will help distinguish among competing theories of the process of economic growth. Furthermore, information on the importance of finance in the growth process will affect the intensity with which researchers study the determinants, consequences, and evolution of financial systems. Finally, a better understanding of the finance-growth nexus may influence public policy choices since legal, regulatory, tax, and macroeconomic policies all shape the operation of financial systems. Given that the principal interest of this study is to examine whether financial developments in Ghana have brought about economic growth, it is prudent to look at reviewed literatures on financial development and economic growth, both theoretical and
empirical. This is indeed the central focus of this chapter.

2.1 Theoretical Literature

2.1.1 Financial Development and Economic Growth

In reviewing theoretical literature on financial sector development and economic growth, the importance of financial systems for economic growth, and the connections between the operation of the financial sector and economic growth will be looked at. Theoretical models show that financial instruments, markets, and institutions arise to mitigate the effects of information and transaction costs.

Furthermore, theory demonstrates that differences in how well financial systems reduce information and transaction costs may influence saving rates, investment decisions, technological innovation, and steady-state growth rates. A comparatively less-developed theoretical literature examines how changes in economic activity can also influence financial systems with dynamic implications for economic growth. In all of these models, therefore, the financial sector provides a real service: it ameliorates information and transactions costs. Thus, these models eliminate the veil that sometimes rises between the so-called real and financial sectors.

Financial Development refers to the costs of acquiring information, enforcing contracts, and making transactions create incentives for the emergence of particular types of financial contracts, markets and intermediaries. Different types and combinations of information, enforcement, and transaction costs in conjunction with different legal, regulatory, and tax systems have motivated distinct financial contracts, markets, and intermediaries across countries and throughout history.

In arising to ameliorate market frictions, financial systems naturally influence the allocation of
resources across space and time (Merton and Bodie, 1995, p. 12). To organize a discussion of how financial systems influence savings and investment decisions and hence economic growth, the focus will be on five functions provided by the financial system. That is, in easing information, enforcement, and transactions costs, financial systems provide five broad categories of services to the economy. While there are other ways to classify the functions of the financial system (Merton, 1992; Merton and Bodie, 1995), the following five categories are helpful in organizing a review of the theoretical literature and tying this literature to the history of economic thought on finance and growth.

In particular, financial systems:

- Produce information ex ante about possible investments and allocate capital
- Monitor investments and exert corporate governance after providing finance
- Facilitate the trading, diversification, and management of risk
- Mobilize and pool savings
- Ease the exchange of goods and services

While all financial systems provide these financial functions, there are large differences in how well financial systems provide these functions.

Financial development occurs when financial instruments, markets, and intermediaries ameliorate – though do not necessarily eliminate – the effects of information, enforcement, and transactions costs. Thus, financial development involves improvements in the (i) production of ex ante information about possible investments, (ii) monitoring of investments and implementation of corporate governance, (iii) trading, diversification, and management of risk, (iv) mobilization and pooling of savings, and (v) exchange of goods and services. Each of these
financial functions may influence savings and investment decisions and hence economic growth. Since many market frictions exist and since laws, regulations, and policies differ markedly across economies, improvements along any single dimension may have different implications for resource allocation depending on other frictions.

In terms of integrating the links between finance and growth theory, two general points are worth stressing from the onset. First, a large growth accounting literature suggests that physical capital accumulation per se does not account for much of economic growth. [King and Levine (1994), Jorgensen (1995), and Easterly and Levine (2001)]. Thus, if finance is to explain economic growth; we need theories that describe how financial development influences resource allocation decisions in ways that foster productivity growth.

Second, there are two general ambiguities between economic growth and the emergence of financial arrangements that improve resource allocation and reduce risk. Specifically, higher returns ambiguously affect saving rates due to well-known income and substitution effects. Similarly, lower risk also ambiguously affects savings rates (Levhari and Srinivasan, 1969). Thus, financial arrangements that improve resource allocation and lower risk may lower saving rates. In a growth model with physical capital externalities, therefore, financial development could retard economic growth and lower welfare if the drop in savings and the externality combine to produce a sufficiently large effect.

Producing information and allocating capital is critical in financial development. There are large costs associated with evaluating firms, managers, and market conditions. Individual savers may not have the ability to collect, process, and produce information on possible investments. Since
savers will be reluctant to invest in activities about which there is little reliable information, high information costs may keep capital from flowing to its highest value use. Thus, while many models assume that capital flows toward the most profitable firms, this presupposes that investors have good information about firms, managers, and market conditions. (Bagehot, 1873, p. 53)

Financial intermediaries may reduce the costs of acquiring and processing information and thereby improve resource allocation (Boyd and Prescott, 1986). Without intermediaries, each investor would face the large fixed cost associated with evaluating firms, managers, and economic conditions. Consequently, groups of individuals may form financial intermediaries that undertake the costly process of researching investment possibilities for others. In Boyd and Prescott (1986), financial intermediaries look like banks in that they accept deposits and make loans (Kashyap, Stein, and Rajan, 1998). Allen (1990), Bhattacharya and Pfeiderer (1985), and Ramakrishnan and Thakor (1984) also develop models where financial intermediaries arise to produce information on firms and sell this information to savers. Unlike in Boyd and Prescott (1986), however, the intermediary does not necessarily both mobilize savings and invest those funds in firms using debt contracts. For our purposes, the critical issue is that financial intermediaries -by economizing on information acquisition costs-- improve the ex-ante assessment of investment opportunities with positive ramifications on resource allocation.

By improving information on firms, managers, and economic conditions, financial intermediaries can accelerate economic growth. Assuming that many entrepreneurs solicit capital and that capital is scarce, financial intermediaries that produce better information on firms will thereby fund more promising firms and induce a more efficient allocation of capital (Greenwood and
Besides identifying the best production technologies, financial intermediaries may also boost the rate of technological innovation by identifying those entrepreneurs with the best chances of successfully initiating new goods and production processes (King and Levine, 1993b). This lies at the core of Joseph Schumpeter’s (1912, p. 74) view of finance in the process of economic development:

*The banker, therefore, is not so much primarily a middleman ... He authorizes people in the name of society ... (to innovate).*

Stock markets may also stimulate the production of information about firms. As markets become larger and more liquid, agents may have greater incentives to expend resources in researching firms because it is easier to profit from this information by trading in big and liquid markets (Grossman and Stiglitz, 1980) and more liquid (Kyle, 1984; and Holmstrom and Tirole, 1993). Intuitively, with larger and more liquid markets, it is easier for an agent who has acquired information to disguise this private information and make money by trading in the market. Thus, larger more liquid markets will boost incentives to produce this valuable information with positive implications for capital allocation (Merton, 1987). While some models hint at the links between efficient markets, information, and steady-state growth (Aghion and Howitt, 1999), existing theories do not draw the connection between market liquidity, information production, and economic growth very tightly.

Monitoring firms and exerting corporate governance. Standard agency theory defines the corporate governance problem in terms of how equity and debt holders influence managers to act
in the best interests of the providers of capital (e.g., Coase, 1937; Jensen and Meckling, 1976; Fama and Jensen, 1983a,b; Myers and Majluf, 1984). The absence of financial arrangements that enhance corporate governance may impede the mobilization of savings from disparate agents and thereby keep capital from flowing to profitable investments (Stiglitz and Weiss, 1983). To the extent that shareholders and creditors induce managers to maximize firm value, this will improve the efficiency with which firms allocate resources and make savers more willing to finance production and innovation.

Others, however, hold that large informational asymmetries between firm managers and potential investors, however, may (a) keep diffuse shareholders from effectively exerting corporate governance, (b) allow managers to use their effective control rights to pursue projects that benefit themselves rather than the firm (for citations, see Shleifer and Vishny, 1997), and therefore (c) hurt resource allocation unless alternative financial arrangements arise to improve corporate governance. Small shareholders frequently lack the expertise and incentives to monitor managers. General voting rights frequently do not work effectively because managers have enormous discretion over the flow of information. Furthermore, the elected representatives of shareholders, the boards of directors, often do not represent the interests of the minority shareholders because they are “captured by management.” Also, in many countries, legal codes do not protect the rights of minority shareholders and legal systems frequently do not enforce the legal codes that are actually on the books concerning minority shareholder rights. Thus, the large costs associated with verifying managerial performance may impede diffuse equity holders from overseeing firm behavior effectively, with adverse effects on resource allocation and potentially economic growth.

Aghion, Dewatripont, and Rey (1999) link the use of debt contracts to growth. Using Jensen’s
“free cash flow argument,” Aghion, Dewatripont, and Rey (1999) show that debt instruments reduce the amount of free cash available to firms. This in turn reduces managerial slack and accelerates the rate at which managers adopt new technologies.

In an extraordinarily influential paper, Diamond (1984) develops a model in which a financial intermediary improves corporate governance. The intermediary mobilizes the savings of many individuals and lends these resources to firms. This “delegated monitor” economizes on aggregate monitoring costs and eliminates the free-rider problem since the intermediary does the monitoring for all the investors. Furthermore, as financial intermediaries and firms develop long-run relationships; this can further lower information acquisition costs.

Financial intermediaries that reduce informational asymmetries may ease external financing constraints and facilitate better resource allocation. Boyd and Smith (1992) show that capital may flow from capital scarce regions to capital abundant regions if the capital abundant regions have financial intermediaries that are sufficiently more effective at reducing the costs of monitoring than the capital scarce regions. Thus, even though the physical product of capital is higher in the capital scarce areas, investors recognize that their actual returns depend crucially on the monitoring performed by intermediaries. Poor financial intermediation will lead to suboptimal allocation of capital.

In terms of economic growth, Bencivenga and Smith (1993) show that financial intermediaries that improve corporate governance by economizing on monitoring costs will reduce credit rationing and thereby boost productivity, capital accumulation, and growth. Sussman (1993) and Harrison, Sussman, and Zeira (1999) develop models where financial intermediaries facilitate the
flow of resources from savers to investors in the presence of informational asymmetries with positive growth effects. Focusing on innovative activity, De la Fuente and Marin (1996) develop a model in which intermediaries arise to undertake the particularly costly process of monitoring innovative activities. This improves credit allocation among competing technology producers with positive ramifications on economic growth.

Turning to equity markets, a large literature debates the importance of well-functioning stock markets in promoting corporate governance. Influential work advertises the important governance role of markets (Jensen and Meckling, 1976). For example, public trading of shares in stock markets that efficiently reflect information about firms allows owners to link managerial compensation to stock prices. Linking stock performance to manager compensation helps align the interests of managers with those of owners (Diamond and Verrecchia, 1982; and Jensen and Murphy, 1990). Similarly, if takeovers are easier in well-developed stock markets and if managers of under-performing firms are fired following a takeover, then better stock markets can promote better corporate control by easing takeovers of poorly managed firms. The threat of a takeover will help align managerial incentives with those of the owners (Scharfstein, 1988; and Stein, 1988). Many, however, argue that well-functioning stock markets actually hurt corporate governance.

Risk amelioration. With information and transactions costs, financial contracts, markets and intermediaries may arise to ease the trading, hedging, and pooling of risk with implications for resource allocation and growth. This discussion is divided into three categories: cross-sectional risk diversification, inter-temporal risk sharing, and liquidity risk.

Traditional finance theory focuses on cross-sectional diversification of risk. Financial systems
may mitigate the risks associated with individual projects, firms, industries, regions, countries, etc. Banks, mutual funds, and securities markets all provide vehicles for trading, pooling, and diversifying risk. The financial system’s ability to provide risk diversification services can affect long-run economic growth by altering resource allocation and the saving rates. The basic intuition is straightforward. While savers generally do not like risk, high-return projects tend to be riskier than low return projects. Thus, financial markets that ease risk diversification tend to induce a portfolio shift toward projects with higher expected returns (Gurley and Shaw, 1955; Patrick, 1966; Greenwood and Jovanovic, 1990; Saint-Paul 1992; Devereux and Smith, 1994; and Obstfeld, 1994).

Acemoglu and Zilibotti (1997) carefully model the links between cross-sectional risk, diversification, and growth. They note that (i) high-return, risky projects are frequently indivisible and require a large initial investment, (ii) people dislike risk, (iii) there are lower-return, safe projects, and (iv) capital is scare. In the absence of financial arrangements that allow agents to hold diversified portfolios, agents will avoid the high return, risky projects because they require agents to invest disproportionately in a risky endeavor. Acemoglu and Zilibotti (1997) endogenize the degree of diversification and examine the impact of diversification choices on economic growth. Financial systems that allow agents to hold a diversified portfolio of risky projects will permit society to invest more in high-return projects with positive implications for growth.

In terms of technological change, King and Levine (1993b) show that cross-sectional risk diversification can stimulate innovative activity. Agents are continuously trying to make technological advances to gain a profitable market niche. Engaging in innovation is risky,
however. The ability to hold a diversified portfolio of innovative projects reduces risk and promotes investment in growth-enhancing innovative activities (with sufficiently risk averse agents). Thus, financial systems that ease risk diversification can accelerate technological change and economic growth.

Besides cross-sectional risk diversification, financial systems may improve intertemporal risk sharing. In examining the connection between cross-sectional risk sharing and growth, theory has tended to focus on the role of markets, rather than intermediaries. However, in examining intertemporal risk sharing, theory has focused on the advantageous role of intermediaries in easing intertemporal risk smoothing (Allen and Gale, 1997). Risks that cannot be diversified at a particular point in time, such as macroeconomic shocks, can be diversified across generations. Long-lived intermediaries can facilitate intergenerational risk sharing by investing with a long-run perspective and offering returns that are relatively low in boom times and relatively high in slack times. While this type of risk sharing is theoretically possible with markets, intermediaries may increase the feasibility of intertemporal risk sharing by lowering contracting and transactions costs.

A third type of risk is liquidity risk. Liquidity is the ease and speed with which agents can convert financial instruments into purchasing power at agreed prices. Liquidity risk arises due to the uncertainties associated with converting assets into a medium of exchange. Informational asymmetries and transaction costs may inhibit liquidity and intensify liquidity risk. These frictions create incentives for the emergence of financial markets and institutions that augment liquidity.

In Diamond and Dybvig's (1983) seminal model of liquidity, a fraction of savers receive shocks
after choosing between two investments: an illiquid, high-return project and a liquid, low-return project. Those receiving shocks want access to their savings before the illiquid project produces. This risk creates incentives for investing in the liquid, low-return projects. The model assumes that it is prohibitively costly to verify whether another individual has received a shock or not. This information cost assumption rules out state-contingent insurance contracts and creates an incentive for financial markets -- *markets where individuals issue and trade securities* -- to emerge.

Levine (1991) takes the Diamond Dybvig (1983) set-up, models the endogenous formation of equity markets, and links this to a growth model. Specifically, savers receiving shocks can sell their equity claims to the future profits of the illiquid production technology to others. Market participants do not verify whether other agents received shocks or not. Participants simply trade in impersonal stock exchanges. Thus, with liquid stock markets, equity holders can readily sell their shares, while firms have permanent access to the capital invested by the initial shareholders. By facilitating trade, stock markets reduce liquidity risk. Frictionless stock markets, however, do not eliminate liquidity risk. That is, stock markets do not replicate the equilibrium that exists when insurance contracts can be written contingent on observing whether an agent receives a shock or not. Nevertheless, as stock market transaction costs fall, more investment occurs in the illiquid, high-return project. If illiquid projects enjoy sufficiently large externalities, then greater stock market liquidity induces faster steady-state growth.

Financial systems can also promote the accumulation of human capital by easing liquidity constraints. In particular, financial arrangements may facilitate borrowing for the accumulation of skills. If human capital accumulation is not subject to diminishing returns on a social level,
financial arrangements that ease human capital creation help accelerate economic growth (DeGregorio, 1996).

Another form of liquidity involves firm access to credit. Holmstrom and Tirole (1998) note that firm production processes are long-term, uncertain, and subject to liquidity shocks. Thus, some firms may receive shocks after receiving outside financing and need additional injections of capital to complete the project. In the presence of informational asymmetries, intermediaries can sell an option to a line of credit during the initial financing of the firm that entitles the firm to access additional credit at an intermediate stage in certain states of nature. This improves the efficiency of the capital allocation process.

Pooling of savings. Mobilization - *pooling*- is the costly process of agglomerating capital from disparate savers for investment. Mobilizing savings involves (a) overcoming the transaction costs associated with collecting savings from different individuals and (b) overcoming the informational asymmetries associated with making savers feel comfortable in relinquishing control of their savings. Indeed, much of Carosso’s (1970) history of Investment Banking in America is a description of the diverse costs associated with raising capital in the United States during the 19th and 20th centuries.

In light of the transaction and information costs associated with mobilizing savings from many agents, numerous financial arrangements may arise to mitigate these frictions and facilitate pooling. Specifically, mobilization may involve multiple bilateral contracts between productive units raising capital and agents with surplus resources. The joint stock company in which many individuals invest in a new legal entity, the firm, represents a prime example of multiple bilateral
mobilizations.

To economize on the costs associated with multiple bilateral contracts, pooling may also occur through intermediaries, where thousands of investors entrust their wealth to intermediaries that invest in hundreds of firms (Sirri and Tufano 1995, p. 83). For this to occur, "mobilizers" have to convince savers of the soundness of the investments (Boyd and Smith, 1992). Toward this end, intermediaries worry about establishing stellar reputations, so that savers feel comfortable about entrusting their savings to the intermediary (DeLong, 1991; and Lamoreaux, 1995).

Financial systems that are more effective at pooling the savings of individuals can profoundly affect economic development. Besides the direct effect of better savings mobilization on capital accumulation, better savings mobilization can improve resource allocation and boost technological innovation. Without access to multiple investors, many production processes would be constrained to economically inefficient scales (Sirri and Tufano, 1995). (Bagehot 1873, p. 3-4) argued that a major difference between England and poorer countries was that in England the financial system could mobilize resources for “immense works.” Bagehot was very explicit in noting that it was not the national savings rate per se, it was the ability to pool society’s resources and allocate those savings toward the most productive ends. Furthermore, mobilization frequently involves the creation of small denomination instruments. These instruments provide opportunities for households to hold diversified portfolios (Sirri and Tufano, 1995). Acemoglu and Zilibotti (1997) show that with large, indivisible projects, financial arrangements that mobilize savings from many diverse individuals and invest in a diversified portfolio of risky projects facilitate a reallocation of investment toward higher return activities with positive ramifications on economic growth.
Easing Exchange. Financial arrangements that lower transaction costs can promote specialization, technological innovation and growth. The links between facilitating transactions, specialization, innovation, and economic growth were core elements of Adam Smith’s (1776) Wealth of Nations. He argued that division of labor -- specialization -- is the principal factor underlying productivity improvements. With greater specialization, workers are more likely to invent better machines or production processes (Smith, 1776, p. 3).

Men are much more likely to discover easier and readier methods of attaining any object, when the whole attention of their minds is directed towards that single object, than when it is dissipated among a great variety of things.

Smith (1776) focused on the role of money in lowering transaction costs, permitting greater specialization, and fostering technological innovation. Information costs, however, may also motivate the emergence of money. Since it is costly to evaluate the attributes of goods, barter exchange is very costly. Thus, an easily recognizable medium of exchange may arise to facilitate exchange (King and Plosser, 1986; and Williamson and Wright, 1994). The drop in transaction and information costs is not necessarily a one-time fall when economies move to money, however. Transaction and information costs may continue to fall through financial innovation.

Greenwood and Smith (1996) have modeled the connections between exchange, specialization, and innovation. More specialization requires more transactions. Since each transaction is costly, financial arrangements that lower transaction costs will facilitate greater specialization. In this way, markets that promote exchange encourage productivity gains. There may also be feedback
from these productivity gains to financial market development. If there are fixed costs associated with establishing markets, then higher income per capita implies that these fixed costs are less burdensome as a share of per capita income. Thus, economic development can spur the development of financial markets.

2.1.2. Endogenous Growth Literature

In the Solow model growth can arise only through continuous changes in technology and therefore is purely exogenous. Savings by itself does not generate growth. One recent avenue of research has been to question the relevance of the exogeneity assumption is the Solow model. In two broad approaches have been developed, one that sees all inputs reproducible and the other that is based on externalities. In one particular case the externalities take the form of human capital building. In both approaches, the savings rate plays a key role in the growth of a capital and output per worker.

The first approach is the so-called AK-model (Rebelo, 1991). It is based on the hypothesis that all inputs are reproducible and in particular the state of knowledge through research and development. Therefore, the diminishing marginal productivity of capital, which in the neo-classical model leads to constant steady state values of capital and output per worker, is here compensated by an increasing quality of machinery. It can then be shown that using the same investment and saving hypotheses as in the neo-classical model, the steady state rate of growth of capital per worker in the AK-model is.

\[ G_y = g_k = A - n \]  

(2.10)

---

\(^3\) See Bermanke and Gurkaynak (2001) for a formal testing of the relevance of the hypothesis that growth is exogenous.
Which implies that, for constant savings rate and population growth, \( sA > n \), capital per worker can grow without bound. Moreover, an increase in the savings rate permanently raises the rate of growth of capital and output per worker.

The second approach introduces the externalities in the production process such that an increase in the output level of one firm affects positively factor productivity in another firm. Not all types of externalities, however, necessary linked to the production process and one type of externalities which is of particular interest concerns labor (Lucas, 1998 and Mankiw et al. 1992). In this model, labour is endogenously determined and it is not just the quantity of labour, which is relevant, but it quality. Household can save by investing in human capital in addition to saving to invest in physical capital. In doing so, households produce labour with skills, labor that can create ideas and handle sophisticated technologies. The theoretical set-up is very similar to that of the Solow model but with human capital deliberately accumulated (i.e. endogenous). Production per worker can be represented by,

\[
y = k^a h^{1-a}
\]

(2.11)

where \( y \) and \( k \) are the same as in the Solow model, say output and capital per worker and \( h \) is human capital per worker. In Solow’s model, the quantity of labor available to the economy is determined by population growth and that there is no quality of skill effect, this model, output is consumed and saved as before except that there are two ways to save. \(^4\) A fraction is saved for capital accumulation (\( k = sy \)) as before and another fraction \( q \) is saved to increase human capital quality (\( h = qy \)). In that case, the steady state, \( y, k \) and \( h \) grow at the same rate which is determined by the two savings rates such that,

\(^4\) Population is assumed to be constant here to clearly isolate the effect of endogenous labor
\[ g_k = s a q^{1-a} = y \]

The major implication of this equation is that both savings rates have growth rate effect and not just level effects. As a consequence, growth is no longer determined by arbitrary physical or human capital. Clearly, this conclusion leaves room for policies that stimulate savings in either factor of production to affect the growth of the economy. As an illustration, Robertson (2000) for example evaluates the trade off between polices stimulate human capital building and polices that improve the productivity of physical capital in developing economies.

The major conclusions that can be draw from growth models with no explicit modeling of the financial sector can be summarized as follows:

1) The neo-classical theory of growth (i.e. the Solow growth model) shows that the savings rate has an effect on the level of capital per worker but not on its growth rate. An increase in savings generates accumulation of capital temporarily until a new steady state level of capital per capital per worker is reached. Then savings reverts to its role of providing capital for the new workers in every period on the basis of existing capital/labor ratio.

2) The AK-model of endogenous growth states that if improvement in the quality of capital through research and development can compensate for decreasing marginal returns of capital, the savings rate will affect the growth rate also in steady state; and

3) The growth model with endogenous labour and skill determination postulates that two types of savings matter for growth: saving for investment in physical capital and savings for investment in human capital. An increase in any of the two savings rates will increase the growth rate of per capital output.

Hence, without introducing financial markets explicitly, there are ground to believe that
incentives of the population to save and more efficient channeling of saving can affect growth. The latest developments in endogenous growth literature have shown how financial intermediaries affect the growth process directly.

2.1.3 Development Hypothesis

The development hypothesis ascribes considerable importance to the financial system in economic development. Lack of a developed financial system restricts economic growth and therefore government policy should be directed towards encouraging the growth of the financial system. This hypothesis views the financial systems as a necessary input into the development process (Kitchen, 1986).

Financial development has a dual effect on economic growth. First, the development of the domestic financial market may enhance the efficiency of capital accumulation and on the other hand, financial intermediation can contribute to raising the savings rate and thus investment rate.

In the literature, the proxy of financial development on economic growth is the level of real interest rate and the financial intermediation ratio (measure of the money supply as a ratio of total GDP). The money supply selected must reflect to a greater extent the development of the financial system and the potential for intermediation. Measurement of financial development seems more controversial because countries differ in the institutional environment and have drastically different financial structures according to their development stages. Two alternative proxies of financial development are employed. The first proxy is the currency ratio that is defined as the ratio of currency to the narrow definition of money, M1 that consists of currency outside banks plus demand deposits. A decrease in the currency ratio reflects real growth in the economy, especially at the economy’s early stages, as there exists more diversification of
financial assets and liabilities and more transactions will be carried out in the form of non-financial assets and liabilities and more transactions will be carried out in the form of non-currency. The second proxy is the ratio of M2 (which consists of M1 plus call, savings, notice and time deposits) to nominal GDP or GNP that is widely regarded as a monetization variable. The monetization variable is designed to show the real size of financial sector of a growing economy. We would expect the ratio to increase over time if the financial sector develops faster than the real sector. Roubini and Sala-i-Martin (1992) analyze the relationship between financial intermediation and growth by emphasizing the role of government policy. They develop a model in which financial repression becomes a tool that governments may use to broaden the abuse of the inflation tax. Thus financial repression yields higher seigniorage to finance government expenditures.

In the context of Fry (1988) a positive real interest rate stimulates financial savings and financial intermediation, thereby increasing the supply of credit to the private sector thus stimulating investment and growth.

### 2.1.4 Neo-Classical Production Function Hypothesis

The basis of this theoretical framework is a two-sector production function, with the two sector being developed by Feder (1983) in his study on exports relative to the framework employed, the two sectors consist of the financial and non-financial sector or the real sector as outlined by Odedukun (1998). The model shows how growth of the financial sector affects economic growth. Equation 2.14 below describes the production function where output of the financial sector (F) depends on the quantity of labor (L_F) and capital (K_F) employed:

\[ F = F(L_F K_F) \]
Also, the output of the real sector (R) depends on the quantities of labour \((L_R)\) and capital \((K_R)\) engaged there. In addition, because of the possibility of externalities or positive external effects which the output of the financial sector (i.e. financial intermediation) might have on the real sector, the real sector’s output can be described as a function of the financial sectors’ output so that the production function in the real sector is specified as equation 2.14 seen below:

\[
R = R (L_R, K_R, F)
\]  
(2.15)

Because only two sectors are recognized to exist, we have the relationships described below, where \(Y\), \(L\) and \(K\) denote the GDP, total labour force, and total capital stock respectively:

\[
Y = F + R
\]  
(2.16)

\[
L = L_F + L_R
\]  
(2.17)

\[
K = K_F + K_R
\]  
(2.18)

In view of the above, Odedokun (1998) formulated a model that he used to test the relationship between financial development and economic growth. The model that Odedukun used can be seen below as:

\[
GY = \lambda AGK + \beta GL + \alpha GX + \theta GF
\]  
(2.19)

Where \(GY\) is real GDP growth rate; \(GL\), labour force growth rates; \(GK\), the growth rate of capital stock; \(GX\), the growth rate of exports; \(GF\) being the growth rate of financial sector’s output and \(\lambda\), \(\beta\), and \(\theta\) are coefficients.

2.1.5 Evidence on the Direction of Causation

There are two possible causal relationships between financial development and economic
growth. Patrick (1966) identified the two relationships as the demand following’ and the ‘supply leading’. The demand following views demand for financial services as dependent upon the growth of real output and upon the commercialization and financial institutions, their financial assets and liabilities and related financial services are a response to the demand for these services by investors and savers in the economy. As real national income grows, there will be more demand by enterprise for external funds, and hence a need in the increase in the level of financial intermediation so as to transfer saving to fast growing industries from the slow-growing ones. By so doing the expansion of the financial system is indeed a consequence of real economic growth.

The supply leading causal relationship has two functions. These are, to transfer resources form traditional low-growth sector to the modern high-growth sectors and to promote and stimulate a entrepreneurial response in the modern sector (Patrick, 1966). This implies that the creation of financial institutions and their services occurs in advance of the demand for them. Montiel (1997) used AK production to formalize the supply-leading hypothesis. This is a production were aggregate output is a linear function of the aggregate physical capital stock. The supply-leading hypothesis can be stated as follows:

\[
Y = AK \tag{2.20}
\]

\[
K = I \tag{2.21}
\]

\[
I = \Phi sY \tag{2.22}
\]

Where equation 2.20 is the aggregate production function in which output is expressed as a proportion to the capital stock, equation 2.21 establishing the goods-market equilibrium condition that equates savings with investment and equation 2.22 showing the dynamics of the capital stock. It is assumed that the saving rate is constant with the values giving by the
parameters, but that the process of financial intermediation absorbs a fraction \((1-\Phi)\) of all saving that is diverted into consumption (Montiel, 1997). A substitution of equations 2.21 and 2.22 into equation 2.20 yields equation 2.23 below:

\[
Y = A \Phi s Y
\]  

(2.23)

A differentiation of equation 2.23 with respect to \(Y\) gives equation 2.24, which represents the behavior of economic growth as depicted below:

\[
Y = A \Phi s
\]  

(2.24)

Where \(Y\) is the growth rate of real GDP.

Consequently innovations in financial development can affect economic growth through three main channels. These are, through improved efficiency of intermediation (increased \(\Phi\)), improved efficiency of the capital stock, measured by increases in the parameter \(A\) and an increase in the saving rate \(s\). As a result the supply-leading hypothesis proposes that financial development causes economic growth.

**2.2 Empirical Literature**

Early empirical studies simply used a case study approach of relating cross-country growth rate with the level of financial development, e.g. IMF (1983) and McKinnon (1973). Others consist of just the examination of the direction of causation between economic growth and the level or growth of financial intermediation as in the case of studies reported by Jung (1986) and Odedokun (1992a), among others. Some others like Fritz (1984); Jao (1976); and Lanyi and
Saracoglu (1983); adopted the approach of testing for the effects of financial intermediation variables (e.g. financial depth and the growth of real money balances) in the economic growth equations. Other recent empirical studies that were based on a similar approach include Gertler and Rose (1991); Ghani (1992); King and Levine (1993a; 1993c); Odedokun (1992b); and Roubini and Sala-i-Martin (1991). Most of these studies have reported effects of financial intermediation on economic growth.

Empirical work on finance and growth assesses the impact of the operation of the financial system on economic growth, whether the impact is economically large, and whether certain components of the financial system, e.g., banks and stock markets, play a particularly important role in fostering growth at certain stages of economic development.

The organization of the empirical evidence advertises an important weakness in the finance and growth literature: there is frequently an insufficiently precise link between theory and measurement. Theory focuses on particular functions provided by the financial sector – producing information, exerting corporate governance, facilitating risk management, pooling savings, and easing exchange – and how these influence resource allocation decisions and economic growth. While empirical studies focus on measures of the size of banks or stock markets, Petersen and Rajan (1997) and Demirguc-Kunt and Maksimovic (2001) show that firm frequently act as financial intermediaries in providing trade credit to related firms. This source of financial intermediation may be very important, especially in countries with regulatory restrictions on financial intermediaries and in countries with undeveloped legal systems that do not effectively support formal financial development. This further advertises the sub-optimal connection between theory and measurement in much of the finance and growth literature.

While fully recognizing this problem, many of the biggest advances in empirical studies of
finance and growth have been methodological. The discussion is organized around econometric approaches. While serious improvements have been made in measuring financial development, future research that more concretely links the concepts from theory with data will substantively improve our understanding of the finance and growth link.

Empirical work done by some economists (Goldsmith, 1969) and McKinnon (1973) illustrates close ties between financial and economic development for a few countries. Other studies (Khan and Lintel, 1999), been M’rad (2000) looked at the causal relationship between financial development and economic growth. Different measures of financial development were used in various studies.

Jao (1976) used two measures of financial development (growth of per capital real money balances and ratio of wide money stock) to test for the relationship between financial development and economic growth. He sought to determine the cross-country effects of these measures on economic growth over 67 countries, both developed and developing countries over the period 1967-72. The measures were found to have a positive impact on economic growth for all the 67 countries combined, but the growth rate of per capital real balance’s was found to have the effect when developing countries were considered separately.

King and Levine (1993) studies whether higher levels of financial development are positively associated with economic development using data on over 80 countries form 1960-1989. They investigated whether higher levels of financial development are significantly and robustly correlated with current and future rates of economic growth, capital accumulation and economic efficiency improvements. They constructed three indicators of financial development that are designed to measure the services provided by financial intermediaries. First, these were to compute the traditional measures of financial depth, which equals the overall size of the financial
intermediary system, that is, the ratio of liquid liabilities to GNP. Liquid liabilities consist of
currency held outside the banking system plus demand deposits and interest bearing liabilities of
bank and non-bank financial intermediaries. Second, they distinguish among financial
institutions conducting intermediation – by examining the importance of deposit banks relative to
the central bank in allocating domestic credit. Third, to examine where the financial system
distributes assets using two measures: credit issues by non-financial private firms divided by
total credit and credit issued to non-financial private firms divided by GDP.

Schumpeter (1912) emphasizes the positive influence of the development of a country’s financial
sector on the level and the rate of growth of its per capita income. The argument essentially is the
services the financial sector provides, that is, of reallocating capital to the highest value use
without substantial risk of loss through moral hazard\(^5\), adverse selection or transaction costs-are
an essential catalyst of economic growth. Specifically, theorists argue that financial markets and
institutions help firm overcome problems of moral hazard and adverse selection\(^6\), thus reducing
the firm’s cost of raising money from their growth.

Demirgue-Kunt and Vojislav (1996) used micro data to develop a test of the influence of
financial development on economic growth. Using firm level data, they estimated the proportion
of firms whose rate of growth exceeds the growth that could have been supported only by
internal resources; they run a cross-country regression and find that this proportion is positively
related to the stock market turnover and to a measure of law enforcement. In other worlds, access

\(^5\) Occurs when a policyholder can take care to reduce his/her probability of a loss, but the
insurance company cannot distinguish between loss due to careless and loss due to a random
event that is the policyholder could have prevented.

\(^6\) Occurs when different groups have different intrinsic probability for sustaining loses but the
insurance cannot distinguish one from the other.
to resources through financial markets leads to higher economic growth.

Jung (1986) selected 56 countries having at least 15 annual observations on all variables of which 19 countries were developed countries. For each country they ran four (4) regressions two (2) using the case of currency ratio and income and the other two(2) of the monetization and income. In order to avoid the possible serial correlation in the residuals autocorrelation of the residuals was used in all regressions. Where → symbolizes “causes”, C denoting the currency ratio and M representing monetization variable. We have regressions for the following:

\[ C \rightarrow Y \]
\[ Y \rightarrow C \]
\[ M \rightarrow Y \]
\[ Y \rightarrow M \]

It was found out that the number of cases for \( C \rightarrow Y \) and \( M \rightarrow Y \) was 22 and 34 respectively, slightly exceeding that of \( Y \rightarrow C \) and \( Y \rightarrow M \), which was 20 and 28. A statistical test (binomial) indicates that the hypothesis of equal probability for the two causal relations, regardless of which measure of financial development is used, is not rejected even with more than 40% type one error. Jung (1986) found out that there exists some evidence indicating that LDCs have a supply-leading causality pattern more frequently than a demand-following pattern.

In the context of Jung (1986), LDCs are characterized by the causal direction running from financial to economic development and the developed countries (DCs) by the reverse causal direction, regardless of which causality concept is employed. On the other hand, monetization variable does not appear to distinguish the DCs from the LDCs.
In addition to cross-country studies, Khan and Senhaji (2000) carried out a study on 84 countries of the period (1960-1989) using four measures of financial development. These include liquid liabilities of banks and non-bank institutions as a share of GDP, the ratio of domestic credit and the private credit as a ratio of GDP. The regression analysis revealed that financial development is an important determinant in the cross-country growth differences. Furthermore they found out that even though the level of financial development explains the level of growth, it is precisely in the financial structures that are related to changes in economic growth for a given country.

In line with Odedokun (1998), most existing empirical studies on the role of finance on economic growth have no framework with standard theoretical underpinnings. They generally estimate regression equations of the following form:

\[ \text{Economic Growth} = f(\text{Financial Development}) \]  
\[ \text{(2.25)} \]

He later identified a framework that would accommodate some other repressors in Equation 2.25, based on the conventional neo-classical one sector aggregate production function in which financial development constitutes an input as seen below:

\[ Y = f(L_t, K_t, F_t, Z_t) \]  
\[ \text{(2.26)} \]

Where \( Y \) is aggregate output, \( L \) is labor force, \( K \) is capital stock, \( F \) is the measure of the level of financial development, \( Z \) is a vector of the other factor that can be regarded as inputs in the aggregate production process and \( t \) is time period.

He carried out a study involving 71 LDCs using the model to test the effect of financial development on economic growth. In summary the study showed several findings. Firstly, Odedokun found out that financial intermediation promotes economic growth and growth
promoting effects of financial intermediation are more predominant in the low-income than in the high-income developing countries. Furthermore, he found out that the effect on growth of the financial development variable is positive and significant and occurs only in over 45% of the cases. The negative effects of financial development on growth are generally insignificant and occur in only 15% of the cases. The results are completed by panel data estimates, which show that the coefficients of financial variables are statistically significant in all the equations.

Demetrades and Khaled (1996) employed times series vector autoregression (VAR) on a sample of 16 developing countries and examined the relationship between financial developments and economic growth. They used two proxies to measure financial development, that is, ratio of bank deposit liabilities to nominal GDP and the ratio of bank claims on the private sector to nominal GDP. Their findings provide little support that finance is a leading sector in economic growth.

Matsheka (1997) carried a study on the financing of economic growth and development in Botswana. It is devoted to the investigation of the financial aspects of economic growth and development in the economy, that is, to investigate the process by which domestic resources have been mobilized to promote capital formation in the economy of Botswana. Under the same study, the role of the state, through taxation, in the financing of economic development was also considered.

He developed his models with the intention of testing the main elements of the McKinon-Shaw hypothesis in explaining savings and investment behavior and extent to which they affect growth in Botswana. The level of real interest rates was used as a proxy for measuring the effect of financial development on economic growth. The test was based on the following model:

\[ g = \pi_1x + \pi_2r + \pi_3Fs + \pi_4sg + \pi_5Pc \]  

(2.27)
Where $g$ is the growth rate of income, $x$ is export growth, $Fs$ is foreign savings, $sg$ is government saving, $Pc$ is private sector credit ratio,

Where $\pi_1=\frac{\sigma \varphi_2}{1-\varphi,\sigma}$

$\pi_2=\frac{\sigma \varphi_3}{1-\varphi,\sigma}$

$\pi_3=\frac{\sigma (1+\varphi_4)}{1-\varphi,\sigma}$

$\pi_4=\frac{\sigma}{1-\varphi,\sigma}$

$\pi_5=\frac{\sigma \varphi_5}{1-\varphi,\sigma}$

$\varphi$ is the structural parameters and $\sigma$ is the productivity of investment.

From the study, he found that both real deposit rate and export growth affect economic growth positively but insignificantly whereas private sector credit and government saving affect it positively and insignificantly. Overall, the study found that increases in interest rates lead to higher savings, investment and hence economic growth, that is, through financial liberalization an economy can achieve positive economic growth rates. In addition, he did not use recent developments in econometric techniques such as cointegration and unit root tests; whereas this study makes use of them.

Odedokun (1998) conducted another study that regards monetary asset as a vital input in the production process. He applied the equation that he adopted from Feder (1983) and added exports as an input in the production function. The function is given below as:
\[ GY = \lambda GK + \beta GL + \Theta GF + \gamma GX \]  

(2.28)

Where \( GY \) is the growth rate of real GDP, \( GL \) is the growth rate of labor force, and \( GF \) is the growth rate of financial sector’s output, \( GK \) is the growth rate of real capital stock, \( GX \) is the growth rate of export, \( \lambda, \beta, \Theta, \) and \( \gamma \) are coefficients of capital stock, labor force, financial sector’s output and exports, respectively.

He applied the model to cross section data for the period 1970-1980 and 1980-1990 covering developing countries. Two discoveries were made, that; growth of financial aggregates in real terms has positive impacts on economic growth of developing countries irrespective of the economic development attained and that financial deepening promotes economic growth in the low-income developing countries but has no perceptible effect in the high-income developing countries.

Khan and Luintel (1999) examined the long run causality relationship between financial development and economic growth in a multivariate autoregression (VAR) setting using data from 10 countries. They used annual data, which had a time span between 36 and 41 years. The VAR consisted of 4 variables; financial depth (FD) measured as a ratio of total populations (LYP), the logarithm of real per capital stock (LKP) and real interest rate (R). They found bi-directional causality between financial development and economic growth in all the sample countries they analyzed.

Kar and Pentecost (2000) examined the causal relation between financial development and economic growth in Turkey using five alternative proxies for financial development. They used the Granger Causality test to estimate the causality relationship. Their study was based on annual data that covered the period 1963-1995. Proxies that were used included ratio of broad money to
gross national product (GNP), ratio of bank deposit liabilities to GNP, share of private sector credits in the domestic credit and the ratio of domestic to GNP.

In running the regressions, their statistical tests failed to reveal which side the causality was running in Turkey. They failed to determine whether the causality was a ‘supply-leading’ or a ‘demand following’ relationship. Their conclusion was that the direction of causality between financial development and economic growth is sensitive to the choice of measurement for financial development.

Kalima (2001) carried a study of financial markets and economic development in Zambia. The main focus of the study was on whether financial market indicators like real interest rates, domestic credit, exchange rate, inflation and financial depth play a role in stimulating economic growth. She used time series data from 1965-1999. The results were mixed as compared to previous studies. According to the study, the size of financial sector was negatively related to economic growth. Inflation was found to have a positive effect on growth. This was contradictory to a priori expectations where it was expected to have a negative effect. Even though the results are mixed one cannot clearly ascertain the cause but in her comment on the limitations of the study was the unavailability of some data.

Amusa (2001) investigated the effects of financial development on South Africa’s economic growth. In this study, he looked at the financial depth-economic growth link in South Africa using an endogenous growth model. He adopted the model that was used by King and Levine (1993). The model included financial development indicators covering both banking and securities market. The following indicators were used to proxy financial for financial depth in the banking sector; ratio of commercial bank assets to the Reserve bank plus commercials bank assets, the ratio of commercial liabilities to GDP and the ratio of private sector to GDP. For the
securities market he used stock market capitalization to GDP and the ratio of stock plus bond market capitalization to GDP. In his conclusion, he found out that financial development exerts a positive and statistically significant effect on economic growth in South Africa. He further noted that the effect on economic growth varies with each of the different measures of financial development.

Waqabaca (2004) examined the relationship between financial development and growth in Fiji using time series data from 1970-2000 based on a cross-section study by Beck, Demirgue-Kunt and Levine (1999). Results reveal a positive relationship between financial development and economic growth for Fiji with the direction of causality predominantly running form economic growth to financial development.

Lee (2005) conducted a study aimed at examining the relationship between financial intermediation and economic performance in Canada for the periods 1870-1926 and 1948-2002 using time series econometrics. Granger causality tests found evidence that financial development leads to economic growth for the period 1948-2002 sample and no evidence of the reverse. In 1870-1926, only the monetary base variable was significant while the other variable were insignificant.

In view of the above, the literature reviewed demonstrates that financial sector development plays an important role in economic growth. The main findings of Gockel, 1995 posit that;

“That financial development is a necessary condition for economic development has been demonstrated by our discussion of the theoretical literature and the empirical experiences of Britain, Germany and France. Quite correctly, Ghana realized the pivotal role of financial development in economic growth and structural change and accordingly, steps were taken to
establish financial institutions, of which the banking system was the most significant.”

However, findings from other studies are unclear and ambiguous due, in part, to limitation of data and at times to statistical bias. The other problem has been the inconclusiveness of the direction of causality between economic growth and financial development relative to uni-directional causality or bi-directional causality. In the context of Khan and Luintel (1999), this is dependent on the proxies used. In their study the results showed strong support for the supply-leading hypothesis when monetary aggregates and monetization variables were used as proxies for financing growth.
CHAPTER THREE

3.0 THEORETICAL FRAMEWORK AND METHODOLOGY

The chapter under consideration discusses the theoretical framework as well as methodology involved in this study on financial sector development and economic growth in Ghana. The first aspect of this chapter deals with a theoretical framework that links the theory behind financial development and its impact on economic growth. The other aspects deal with the model adopted, definitions of variables, estimation technique or methodology, scope and limitations of the study, data used and sources.

3.1 Theoretical Framework

The theoretical framework employed in this study is patterned after an adaptation of the model used by Odedokun, which was developed by Feder (1983) for evaluating the impact of export expansion on economic growth. Basically, the basis of Odedokun’s theoretical framework is a two-sector production, with the two sectors being the financial and non-financial (or real) ones. The output of the financial sector (F) depends on the quantity of labour (L_F) employed in this sector so that the production function in the sector can be seen below as

\[ F = F(L_F, K_F) \]  \hspace{1cm} (3.10)

The output of the non-financial sector also depends on the quantities of labour (L_R) and capital (K_R) engaged there. In addition, because of the possibility of externalities or positive external effects that the output of the financial sector (i.e. financial intermediation) might have on the real sector, the real sectors’ output can be described as a function of the financial sector’s output so that the production function in the real sector is specified as equation 3.11 below:
Because only two sectors are recognized to exist, we have the relationships described below, where total output (Y) is made of output from the financial sector and non-financial sector and non-financial sector total as well as labour force (L) and total capital stock (K):

\[ Y = F + R \] (3.12a)

\[ L = L_F + L_R \] (3.12b)

\[ K = K_F + K_R \] (3.12c)

By permitting the marginal productivity of each of the two factors of production to differ between the financial and real sector in such a way that the inter-sectoral marginal productivity ratio of labour (\( \frac{MPL_F}{MPL_R} \)) equals the inter-sectoral marginal productivity ratio of capital (\( \frac{MPK_F}{MPK_R} \)), we have:

\[ \frac{MPL_F}{MPL_R} = \frac{MPK_F}{MPK_R} = 1 + \delta \] (3.12d)

Where: \( MPL_F \) = marginal productivity of labour in the financial sector;

\( MPL_R \) = marginal productivity of labour in the real sector

\( MPK_F \) = marginal productivity of capital in the financial sector;

\( MPK_R \) = marginal productivity of capital in the real sector; and

\( \delta \) = an indicator of the sector with higher marginal productivity.

It can be easily observed that if \( \delta > 0 \), it is the financial sector where the marginal productivities of both factor inputs are higher, with the reverse being the case if \( \delta < 0 \). A manipulation of the
equations 3.12a, 3.12b, and 3.12c as done by Feder (1983), yields the aggregate output (or real GDP) growth equation thus:

\[ GY = \lambda GK + \beta GL + \left[ \delta/(1+\delta) - \theta \right] GF(F/Y) + \theta GF \]  

(3.13a)

or

\[ GY = \alpha(I/Y) + \beta GL + \left[ \delta/(1+\delta) - \theta \right] GF(F/Y) + \theta GF \]  

(3.13b)

Where the letter G before a variable indicates its growth rate so that GY, GL, GF, and GK are the growth rates of real GDP, labour force, financial sector’s output and the real capital stock respectively while I is the investment or change in capital stock respectively while I is the investment or change in capital stock, \( \Delta K \). The definitions of other parameters in the equations are as follows:

\( \alpha \): the marginal productivity of capital in the non-financial sector, which is denoted by \( MPK_R \) in equation 3.12d above;

\( \lambda \): the elasticity of there all sector’s output ( \( R \) ) with respect to capital stock ( \( K \) );

\( \beta \): the elasticity of the real sector’s output ( \( R \) ) with respect to labour force ( \( L \) );

\( \theta \): the elasticity of the real sector’s output ( \( R \) ) with respect to the financial sector’s output ( \( F \) ) or \( \partial R/\partial F \) from equation 3.11 multiplied by F/R ratio. (It should be noted that \( \theta \) and \( \partial R/\partial F \) are measures of the external effects of the increase in the financial sector’s output on the rest of the economy or the real sector).

The two equations above are equivalent. The only exception being that while investment /GDP
(I/Y) ratio features in the second equation so that I signifies the marginal productivity of capital stock, it is the growth rate of capital stock (dK/K or GK) which features in the first equation instead so that the λ represents the elasticity of real GDP with respect to the capital stock. By assuming that θ is constant across the small observations, equation 3.13a can be rotationally simplified to the following (with the same being equally applicable to equation 3.13b which we henceforth refrain from writing to any longer, for the sake of brevity):

\[ GY = \lambda GK + \beta GL + \pi GF (F/Y) + \theta GF \]  

Equation 3.14a is amenable to estimation, with estimates being separately provided for δ (or inter-sectoral factor productivity differential) and θ (a measure of the external effects of increase in financial intermediation on the real sector). If there inter-sectoral productivity differential so that δ=0, it can be seen that the coefficient of GF would be equal to that of GF (F/Y).

By setting value of π in equation 3.14a to zero, we shall have a special case of this equation that can be written as:

\[ GY = \lambda GK + \beta GL + \theta GF \]  

Equation 3.14b is the form that can easily be arrived at simply introducing financial intermediation as an input in the aggregate production function, which would then take the form: Y = Y (L,K,F). One advantage of this equation over equation 3.14a is that while collinearity is likely to exist between GF(F/Y) and GF, equation 3.14a may reduce the precision of the estimates of π and \[ \Box \]; such an econometric problem is not applicable to equation 3.14b.

However, equations 3.14a and 3.14a and 3.14b should be regarded as being complementary to one another. The particular form of equation 3.14b actually estimated in Odedokun’s study was arrived at regarding export as an input in the production process to obtain the following
economic growth equation:

\[ GY = \lambda GK + \beta GL + \theta GF + \gamma GX \]  

(3.14c)

Where \( GX \) is the export growth and \( \gamma \) is its coefficient.

Instead of considering growth of financial intermediation (G/F) to be the determinant of economic growth as in equation 3.14c, it is the level of financial depth (F/Y) that is sometimes considered as the appropriate proxy of financial intermediation that affects economic growth equations accordingly, another variant of economic growth, equation 3.14c was estimated but with the financial intermediation growth regressor (GF) now replaced by the level of financial depth (F/Y) thus:

\[ GY = \lambda GK + \beta GL + \phi (F/Y) + \gamma GX \]  

(3.14d)

Where \( \phi \) is the coefficient of the level of financial depth F/Y.

Finally, it can be postulated that it is the marginal productivity of financial services employed as an input in the real sector (i.e. \( \partial R/\partial F \) from equation 3.11) which is constant across the sample of observations, instead of the elasticity of real sector’s output with respect to these financial services (i.e. instead of \( \theta \) or \( \partial R/\partial F \) multiplied by F/R ratio) that was postulated in deriving equation 3.14a. In this case, equation 3.13 a can be written as:

\[ GY = \gamma GK + \beta GL + [\delta/ (1+ \delta) + \partial R /\partial F] GF (F/Y). \]  

(3.15)

The derivation of equation 3.15 from 3.13a in provided in Feder (1983). As was done in the case of equation of equation 3.13a, Odedokun presented 3.15 in notationally simplifies equation as:

\[ GY = \lambda GK + \beta GL + \phi GF (F/Y) \]  

(3.16)
Where $\phi = \delta / (1+\delta) + \partial R / \partial F$, which is constant across the sample observations since $\delta$ is defined to be constant in equation 3.12d and $\partial R / \partial F$ also is now being postulated to be a constant, instead of $\theta$.

3.2 Methodology

The study adopts both descriptive and empirical analytical approaches. A test for unit root or stationarity will be conducted so as to establish the order to integration of the variables with the view to finding out whether there exists evidence of cointegration amongst the variables using the Johnansen and Juselius (1990) cointegration procedure where a determination of the existence of a long-run relationship between economic growth and financial sector development will be established. Moreover, the causal relationship (be it uni-directional or bi-directional) will be examined with the help of the Grander-causality approach. Estimation of the model will be done using cointegration and Error Correction Modeling (ECM) to check the availability of long run relationship among the variable that will be found to be most important determinant of economic growth.

3.3 Model Specification

The study adopts a model (equation 3.17 below) based on a modification of the model used by Odedokun (1998) where he used two alternative measures of financial intermediation, the stock of domestic credit to the private sector and the stock of liquid liabilities while this study uses the stock of domestic credit to the private sector as a proxy to investigate the role of financial sector development on economic growth in Ghana (country specific).

The GDP growth equation to be estimated in this study is seen below as:
LnGDP = α₀ + α₁ Ln CPS + α₂ LnK + α₃ LnX + α₄ LnL + ε  

(3.17)

Where α₀, α₁, α₂, α₃, α₄, α₅ are coefficients, ε is the error term assumed to be Gaussian white noise, GDP stands for gross domestic product (GDP), CPS is domestic credit to the private sector, K is capital stock, L being labor force, X represents exports and Ln stands for natural logarithm.

3.4 Expected Impact of Model Variables on Growth

LnX, exports affects economic growth through investment. An increase in export earnings can boost a country’s import capacity where capital goods are bought with less difficulty. Capital investment goods are important because they are used in domestic investment. The expected sign between export and economic growth is positive. LnCPS, the level of domestic credit to the private sector excludes credit to the public sector and it represents more accurately the role of financial intermediaries in channeling funds to private market participants. In developing countries, most financial developments have occurred within the banking system and the use of CPS as a proxy for financial sector development seems appropriate (De Gregorio and Giudotti, 1995). CPS is expected to show a positive relationship on economic growth.

LnK, capital stock accumulation plays a major role in economic growth. In this study, gross capital formation (GCF) is used as a proxy for capital stock. It comprises of the government and the private sector. The coefficient of capital stock is expected to have a positive sign demonstrating that there is a positive relationship between capital stock and economic growth.

LnL, labour force is expected to affect economic growth in two ways. When there is full employment, a positive relationship is obviously expected. However, when there is high unemployment level, labour force is expected to have a negative impact on economic growth.
3.5 Hypotheses

The following specific hypotheses will be tested:

(1a) the null that there is no positive relationship between financial sector development and economic growth,

(1b) the alternate that there is a positive between financial sector development and economic growth; and

(2a) the null that there is no long-run relationship between financial sector development and economic growth,

(2b) the alternate that there is a long-run relationship between financial sector development and economic growth.

3.6 Data Exploration Techniques

Time series data for the period 1980-2009 are employed in this study and OLS applied for estimation purposes. Both Stationarity and Cointegration tests, recent developments in time series econometrics, would be applied during the estimation process.

3.6.1 Analysis of Stationarity

A stationary stochastic process is a process whose characteristics and structure are invariant with respect to time. Defined in terms of stochastic process, stationary implied that the mean and variance are constant over time and the value of covariance between two time periods depend only on the distance or lag between the two time periods and not on the actual time at which the covariance is computed (Gujurati, 1995). If the series is non-stationary, the series has to be made
stationary to stationary can be done through differencing the non-stationary series.

A non-stationary series is referred to as homogenous. The number of times the original series must be differenced before stationarity is called the order of homogeneity. Empirical work based on time series data assumes that the underlying time series is stationary. But in the real world, many economic time series are non-stationary, meaning that the mean and the variance depend on time. In this case, regressing one time series variable on another may result not only in a very high t ratios and high $R^2$ although there might be no meaningful relationship between the two but also it may lead to a very low Durbin-Watson statistic. This problem results in spurious regression, which can lead to meaningless (nonsense) economic interpretation as well as forecast. That is, we can show the models containing non-stationary lead to a problem of spurious regression, wherein the results obtained suggest that there are statistically significant relationships between the variables in the regression model when in fact all that is obtained is evidence of contemporaneous correlations rather than meaningful casual relations. Under such circumstance, the standard statistical tests based on t, F and other statistics are invalid even though they may show promising diagnostic test statistics.

### 3.6.2 Unit Root Test for stationarity

The issue of non-stationary series is of major concern to any econometric investigation being conducted by a researcher. Stationary ties series is one whose basic properties do not change over time while a non-stationary variable has some sort of upward or downward trend (Studenmund, 1997). For example, time series variable $X_1$ is said to be stationary if:

1) the mean of $X_t$ is constant overtime

2) variance of $X_t$ is constant overtime
3) The simple correlation coefficient between \( X_t \) and \( X_{t-k} \) depends on the length of the lag \( k \) and on no other variables (for all \( k \)).

Consider equation 3.18, the popularly used test for testing stationarity in time series models below:

\[
Y_t = Y_{t-1} + u_t
\]  
(3.18)

Where \( u_t \) is the stochastic error term/white noise error term. Equation 3.18 is a first order or AR(1) regression in that we regress the value of \( Y \) at time \( t \) or its value at time \( t-1 \), if the coefficient of \( Y_{t-1} \) is equal to 1, we face what is known as the unit root problem (non-stationary situation).

Assume:

\[
Y_t = \rho Y_{t-1} + u_t
\]  
(3.19)

If equation 3.19 is run and we find that \( \rho = 1 \), then the stochastic variables \( Y_t \) has a unit root and thus the time series data will be known as a random walk. A time series data that has a unit root is known as a random walk, which is an example of non-stationary time series.

If a time series data is differenced once and the differenced series is stationary, we say that the original random walk series is integrated of order 1, I(1), and if it has to be differenced twice before becoming stationary, the original series is integrated of order 2, I(2). Generally, if a time series is to be differenced \( d \) times before it becomes stationary, it is integrated of order \( d \), I(\(d\)). The presence of an integrated time series of order 1 or greater, results in a non-stationary time series, which often results in spurious correlation amongst economic variables and makes the t and F statistics statistically unreliable for significance of parameters.
There are several ways of detecting whether time series data is stationary. First, is to visually examine the data, where a quick glance for many times series data will tell you that the mean of a variable is increasing dramatically over time, implying that the series is non-stationary. Second, use the t test and the F test to find out whether the autocorrelation function (ACFs) for a variable tend to zero as the length of the lag increases. If the ACFs tend to zero fairly quickly, the variable tend to zero fairly quickly, the variable is stationary, but if not, then the variable is non-stationary. Last, the most popular method used for testing non-stationarity is the Dickey Fuller (DF) test that was designed by Dickey and Fuller (1979). The test normally examines the hypothesis that the variable in question has unit root and as a result is likely to benefit from being expressed in first difference form.

The following equations are estimated in order to run a DF test:

\[\Delta Y_t = \delta Y_{t-1} + u_t\]  
(3.20)

\[\Delta Y_t = \beta_o + \delta Y_{t-1} + u_t\]  
(3.21)

\[\Delta Y_t = \beta_o + \beta_1 Y_{t-1} + \delta Y_{t-1} + u_t\]  
(3.22)

Where t is the time variable and in each case the null hypotheses is that \(\delta = 0\) signifying a unit root. In the case where all the error term \(u_t\) is autocorrelated, the equation can be modifies as

\[\Delta Y_{t-1} = \beta_0 + \beta_1 t + \delta Y_{t-1} + \alpha_1 \Sigma \Delta Y_{t-1} + \varepsilon_t\]  
(3.23)

Under the situation where the DF test is applied to equation 3.23 it is called the Augmented Dickey-Fuller (ADF) test. The ADF test involves adding an unknown number of lagged first differences of the dependent variable to capture autocoreelated-omitted variables that would otherwise enter the error term, \(u_t\).
3.6.3 Granger Causality

The detection of causal relationship among a set of variables is one of the objectives of empirical research. Granger (1969) formulated a procedure for detecting a causal relationship among the variables. The concept of causality in the Granger sense is mainly based on the following two assumptions: That future cannot cause past, it is the past and the present which cause future and that detection of causality is only possible between two stochastic process that should be linear and covariance stationary.

In the Granger sense then, a series \( X_t \) said to cause \( Y_t \), if \( Y_t \) is better predicted by model using the past values of \( X_t \) and \( Y_t \) than by a model using \( Y_t \) alone (Pindyck and Rubinfeld, 1991). Inclusion of variable \( X_t \) enhances the predictive power to the model in a statistical sense. To conclude that \( X_t \) causes \( Y_t \), we must reject the hypothesis that “\( X_t \) does not cause \( Y_t \)” , and accept the hypothesis “\( Y_t \) does not cause \( X_t \)”. In the current study the dependent variable is the domestic credit to the private sector (LnCPS) that is lagged on present values of itself and regressed on past values of gross domestic product (LnY). The process is then reversed. F-statistic and final prediction FPE criterion developed by Akaike (1969) were used to determine whether or not the inclusion of lags is any important. To test whether LnCPS causes LnY, we thus proceed as follows:

First, test the null hypothesis “LnY does not cause LnCPS” by running two regressions.

Unrestricted regression:

\[ \text{LnCPS}_t = \Sigma \alpha_i \text{LnCPS}_{t-i} + \Sigma \beta_i \text{LnY}_{t-i} + \epsilon_t \]  

(3.24)

Restricted regression:

\[ \text{LnCPS}_t = \Sigma \alpha_i \text{LnCPS}_{t-i} + \epsilon_t \]  

(3.25)

And use the sum of squared residuals from each regression to calculate an F statistic and test whether the group of coefficients \( \beta_1, \beta_2, \ldots, \beta_m \) is significantly different from zero. If they are, we can reject the hypothesis that “LnY does not cause LnCPS”.  

62
Secondly, test the null hypothesis “LnCPS\textsubscript{t} does not cause LnY\textsubscript{t}” by running the same regression as above, but switching LnY\textsubscript{t} and LnCPS\textsubscript{t} and testing whether lagged values of LnCPS\textsubscript{t} are significantly different from zero. The concept of causality in the Granger sense is based on the assumption of stochastic process that are stationary that makes it advisable to undertake unit root tests before performing the granger causality test.

### 3.6.4 Cointegration and Error Correction Modeling

If time series data reveal non-stationarity, cointegration can be used to remedy the situation. Cointegration is a situation in which two non-stationary series integrated of the same order have long run relationship (Engle and Granger, 1987). The fact that two series are of the same order of integration, say I (1), does not necessarily mean that the series are cointegrated. For the variables to be cointegrated, they must be of the same order as well as having common stochastic trends. The necessary condition for cointegration is that the residual obtained from the regression of the two series should be stationary. Cointegration can also be interpreted as follows: if two or more series are linked to form an equilibrium relationship spanning the long run and then even though the series themselves may contain stochastic trends they will nevertheless move closely together overtime and the difference between them will be stable.

The error correction model (ECM) formulation starts from the recognition that the variables are non-stationary (perhaps integrated of order one) but move together in the long-run, such that there exists a stationary linear combination of these variables (integrated of order zero). If such linear combination exists, then the variables are said to be cointegrated and that stationary linear combination is the ECM. ECM captures the long-run relationship. It reflects attempt to correct deviations from the long-run equilibrium path and its coefficient can be interpreted as the speed of adjustment or the amount of disequilibrium transmitted each period to economic growth. Thus
Cointegration is the statistical equivalence of the existence of a long-run equilibrium relationship. When there are two or more I(1) variables under consideration, the residual-based cointegration tests may be inefficient and may lead to contradictory results (Perseran and Perseran, 1997). A more satisfactory approach would then be used, and this involves methods like Johansen Maximum Likelihood procedure.

3.6.5 Johansen Cointegration Procedure

The Johansen’s approach begins by setting vector autoregressive (VAR) system of the variables of interest. The standard vector autoregressive, VAR, model takes the following form:

\[ X_t = \Pi_1 X_{t-1} + \ldots + \Pi_k X_{t-k} + \mu + \varphi t + \theta D_t + \varepsilon_t \]  

(3.26)

Where \( X_t \) is defined as an \( N \times 1 \) vector of the variables of interest, \( \mu \) is a vector of constants which can be entered as restricted or unrestricted, \( t \) is a vector of trend, \( D \) is a vector of centered seasonal dummies while \( \varepsilon_t \) is a vector of identically and independently distributed, iid (0, \( \Omega \)) error terms. Having a trend in the cointegrating vectors can be understood as a type of growth in target problem, sometimes motivated by things like productivity growth due to technological development. In other situations we conclude that there is some growth due to technological development. In other situations we conclude that there is some growth in the data, which the model cannot account.

Equation 3.26 can be re-parameterized into an error correction model as:

\[ \Delta X_t = \Gamma_1 \Delta X_{t-1} + \ldots + \Gamma_{k-1} \Delta X_{t-k+1} + \Pi X_{t-p} + \mu + \varphi t + \theta D_t + \varepsilon_t \]  

(3.27)

Where:

\[ \Gamma_1 = -1 + \Pi_1 + \Pi_2 + \ldots + \Pi_k, I = 1, \ldots, k \]  

(3.28a)
and

$$\Pi = -(1-\Pi_1+\Pi_2-\ldots-\Pi_i), \text{ } i = 1\ldots k-1 \quad (3.28b)$$

The procedure employed by Akoena (1996) in deriving equation 3.27 is as follows:

$$X_t = \Pi_1 X_{t-1} + \Pi_2 X_{t-2} + \Pi_3 X_{t-3} + \ldots$$

Adding \(-X_{t-1}\) to both sides and collecting like terms together gives:

$$X_t - X_{t-1} = \Delta X_{t-1} = (\Pi_1 - 1) X_{t-1} + \Pi_2 X_{t-2} + \Pi_3 X_{t-3} + \ldots \quad (3.29)$$

Next we add \(-(\Pi_1 - 1) X_{t-2}\) to both sides of the equation 3.29 to obtain:

$$\Delta X_t - (\Pi_1 - 1) X_{t-2} = - (\Pi_1 - 1) X_{t-1} + (\Pi_2 - 1) X_{t-2} + \Pi_3 X_{t-3} + \ldots$$

Collecting like terms gives:

$$\Delta X_t = (\Pi_1 - 1) \Delta X_{t-1} + (\Pi_2 - 1) X_{t-2} + (\Pi_3 - 1) X_{t-3} + \ldots \quad (3.30)$$

We then add \(-(\Pi_1 + \Pi_2 - 1) X_{t-3}\) to both of equation 3.30 and collect like terms. Proceeding in this fashion and collecting like terms leads to 3.27. The main task is to investigate whether the coefficients contained in the matrix containing long-run information. Taking the number of variables in the vector \(X_t\) to be \(N\), and hence the number of equations in the VAR, and the rank of \(\Pi\) matrix to be \(r\), three cases can be distinguished:

a) \(\text{Rank}(\Pi) = N = r\): this implies that the \(\Pi\) matrix has full rank and that the process \(X_t\) is stationary.

b) \(\text{Rank}(\Pi) = 0 = r\): this implies that the \(\Pi\) matrix is null and hence equation 3.30 corresponds to the traditional differenced vector of the time series variables, hence the variables are not cointegrated.
c) Rank ($\Pi$) = N > r but not zero: this is interesting case where the $\Pi$ matrix is less than full rank. In this case the rank r is equal to the number of indistinct cointegrating vectors linking variables in $X_t$, as such r is known as the cointegrating rank.

In the case when rank $\Pi = r < N$, the $\Pi$ matrix can be decomposed into two P x r matrices, $\Pi$ and $\beta$ such that $\Pi = \alpha \beta'$, where $\beta$ represents the matrix containing coefficients of the cointegration vectors. Rows of form (r) distinct cointegration vector enters each equation. The actual mechanics of Johansen (1988) procedure shows how estimate $\alpha$ and $\beta$ vectors in the $\Pi$ matrix, given that the latter has a reduced rank. The solution starts from conditioning out the short run dynamics, as well as the effects of the dummy variables on $\Delta X_t$ and $X_{t-k}$ respectively. According to (Sjöö, 1997), we first regress first difference of $X_t$ on its lagged values and a column of ones (dummy) and save the residuals as $R_{1t}$. Then we regress $X_{t-k}$ also on lagged values and a column of ones (dummy) and save the residuals as $R_{2t}$. For example, the residuals $R_{1t}$ and $R_{2t}$ can be obtained as follows:

$$\Delta X_t = \sum \rho_{1t} X_{t-i} + \gamma_1 D_t + R_{1t}$$  \hspace{1cm} (3.31a)

$$X_{t-k} = \sum \rho_{2t} \Delta X_{t-i} + \gamma_2 D_t + R_{2t}$$  \hspace{1cm} (3.31b)

Assuming our reparameterized error correction model is:

$$\Delta X_t = \sum \Gamma_{t-i} \Delta X_{t-i} + \Pi X_{t-k} + \theta D_t + \epsilon_t$$  \hspace{1cm} (3.32)

Then, we can re-write it in terms of residuals above as:

$$R_{1t} = \alpha \beta' R_{2t} + \epsilon_t$$  \hspace{1cm} (3.33)

In general, the fitted residuals are used to construct the following product moment matrices:

$$S_{ij} = (1/t) \sum \hat{R}_{1i} \hat{R}_{jt}$$  \hspace{1cm} (I, j = 0, k)  \hspace{1cm} (3.34)
These product moment matrices are then used in order to find the maximum likelihood estimate (MLE) of $\beta$, the cointegrating vectors. This is done by solving the determinant:

$$|\lambda S_{kk} - S_{ko} S_{k}^{-1} S_{ok}| = 0 \quad (3.35)$$

which yield $p$ estimated eigenvalues ($\lambda_1, \ldots, \lambda_p$) and also the $p$ estimated eigenvectors ($V_1, \ldots, V_r$), which are normalized such that $V'S_kkV =1$ where $V$ is the matrix of estimated eigenvectors, that is:

$$\beta = (V_1, \ldots, V_r) \quad (3.36a)$$

and

$$\alpha = S_{ok} \beta \quad (3.36b)$$

The problem is that of determining how many of the eigenvectors represent significant cointegrating relationships. The Johansen-Juselius (1990) procedure employs two test statistics, the $\lambda$ - max (or maximum eigenvalue test) and the trace test. The maximum eigenvalue test, whose test statistics is denoted by $\lambda$-max, is constructed as:

$$\lambda$ - max = $-T \log (1 - \lambda_{r+1})$ for $r=0, 1, 2, \ldots \quad (3.37)$$

Where $T$ is the number of observations $\lambda$ is the eigenvalue and $r$ represents the cointegrating vectors. The null is that, there exist ($r$) cointegrating vectors against the alternative $r+1$ cointegrating vectors. The trace test is:

$$\lambda$ - trace = $-T \lambda \log (1 - \lambda_i) \quad (3.38)$$

This is a likelihood ratio test statistics denoted by $\lambda$ -trace. The null hypothesis is that there exists $r \leq p$ cointegrating vectors against the alternative $r > p$ cointegrating vectors. It has been found
that trace test is a better test, since it appears to be more robust to skewness and excess kurtosis (Sjöö, 1997). Furthermore, the trace test can be adjusted for degrees of freedom, which is important in small samples. In this study, the decision will depend on both the trace test and the maximum eigenvalue test.

3.6.6 Scope and Limitations of the study

The period of coverage for this study spans 1980-2009. Published data on all of the variables selected in this study were not all available in one whole but where gathered bit by bit from various sources.

3.6.7 Data Used and Sources

As stated before the study uses time series (annual) data spanning 1980 to 2009. The data used in the study were sourced from the International Financial statistics (IFS, Yearbooks 1989 and 1995); World Tables, 1995; World Development Report, 1978 and Bank of Ghana Annual Reports and Bulletins.
4.0 Introduction

The chapter under deals with the estimation of the economic growth model under consideration and the interpretation of the results. It begins with an assessment of the stationarity of the variables of the model. This set pace for the further examination of long run relationship between the dependent variables and the explanatory variables. Validation of said existence necessitated the estimation of the error-correction model (ECM) based on the cointegrating vector, Stata 10 was used for analysis of the data.

4.1 Stationarity Test

In order to assess the stationarity of the variable used in the models, all the variables were transformed into natural logarithm and Augmented Dicky-Fuller test was performed on the variables. The test was performed under the assumption: 1) that the times series variables follow a give trend – that is Augmented Dicky-Fuller test with trend and 2) the vice versa - Augmented Dicky-Fuller without trend. The importance of this is to determine whether trend variable must be included in the final model for estimation or not. The results are shown in table 4.1 below.

| Variable | Without trend | With trend | Without trend | With trend |
|----------|---------------|------------|---------------|------------|
| Test statistics | p-value | Test statistics | p-value | Test statistics | p-value |
| GDP      | 0.733         | 0.9905     | -0.888        | 0.9574     |
| CPS      | 0.426         | 0.9974     | -2.324        | 0.4208     |
| Export   | -0.159        | 0.9433     | -2.427        | 0.3655     |
| LF       | -3.983        | 0.0015     | 1.767         | 1          |
| K        | -0.406        | 0.9091     | -2.279        | 0.4455     |
| -3.723   | -2.989        | -2.625     |               | -4.343     |

Mackinnon approximate p-value: Without trend: -3.723 (1%), -2.989(5%), and -2.625 (10%)

With Trend: -4.343 (1%), -3.584 (5%), and -3.23 (10%)

As shown in Table 4.1, the test statics and the p-values indicates that all the variables, except the
natural log of labour force, were not stationary at level- that is they were not integrated at order zero \([I(0)]\). This means that there exist unit root among the variables. In order to use such variable to generate regression coefficient that are unbiased and efficient they must be made stationary. Consequently, the first difference of the real gross domestic product (GDP), credit to the private sector (CPS), export of good and services (Export) and physical capital formation (K) were taken and Augmented Dicky-Fuller test was performed on the variables. The results are shown in Table 4.2.

**Table 4.2: Augmented Dicky-fuller test at levels as first difference**

| Variable | Test statistics | p-value | Test statistics | p-value |
|----------|-----------------|---------|-----------------|---------|
| GDP      | -4.009          | 0.0014  | -4.143          | 0.0055  |
| CPS      | -4.563          | 0.0002  | -4.471          | 0.0017  |
| Export   | -4.677          | 0.0001  | -4.533          | 0.0013  |
| K        | -5.137          | 0.0000  | -4.965          | 0.0002  |

Mackinnon approximate p-value: Without trend: -3.736 (1%), -2.994 (5%), and -2.628(10%)
With Trend: -4.352 (1%), -3.588 (5%), and -3.233 (10%)

As shown in table 4.2 the first different of GDP, CPS, Export and K are all stationary. That is they are all integrated in order one \([I(1)]\). Theory posit that when two or more variables are integrated of other one then there might be a long run relationship between the variable which can be captured using error correction model (Engle and Granger, 1987). Granger causality test was performed to detect a causal relationship among between economic growth and the explanatory variables(Granger, 1969). Cointegration test was performed to assess the possibility of a long run relationship between the variables. The results indicated one cointegrating relationship as indicated in Table 4.3.
4.2 Cointegration Test

Table 4.3 shows the results of the cointegration test. The coefficient is negative and statistically significant at one (1) percent. This indicates that there exist a long run relationship between economic growth and explanatory variable.

Table 4.3: Cointegration test

| Variable | Coefficient | Std. Err. | T     | p>t  | [95% Conf. Interval] |
|----------|-------------|-----------|-------|------|---------------------|
| RES      | -0.736      | 0.1797641 | -4.09 | 0.000| -1.10551            |
|          |             |           |       |      | -0.36649            |

It also gives credence to the use of error correction model in order to capture both long run and short run variations in economic growth and the explanatory variable under consideration. The result of the final economic growth model estimated in this study is presented in Table 4.4.

4.3 Regression Results

Table 4.4: Regression Results

| Source | SS      | Df  | MS          | Number of observations | 27 |
|--------|---------|-----|-------------|------------------------|----|
|        |         |     |             | F( 6, 20)              | 4.53 |
| Model  | 0.473949| 6   | 0.078991446 | Prob.> F               | 0.0047 |
| Residual | 0.348715| 20  | 0.017435751 | R-squared              | 0.5761 |
|        |         |     |             | Adj. R-squared         | 0.4489 |
| Total  | 0.822664| 26  | 0.031640912 | Root MSE               | 0.13204 |

| Source   | Coef.    | Std. Err. | T     | P>t  | [95% Conf. Interval] |
|----------|----------|-----------|-------|------|---------------------|
| Dlngdp_1 | 0.132891 | 0.2114491 | 0.63  | 0.537| -0.3081843           |
|          |          |           |       |      | 0.573966            |
| Dlnbps   | 0.323284 | 0.1099436 | 2.94  | 0.008| 0.0939453           |
|          |          |           |       |      | 0.552622            |
| dlnexport| 0.197767 | 0.1498765 | 1.32  | 0.202| -0.1148699           |
|          |          |           |       |      | 0.510404            |
| Dlnk     | 0.142557 | 0.1255157 | 1.14  | 0.269| -0.1192639           |
|          |          |           |       |      | 0.404378            |
| Lnlf     | 0.181202 | 0.1076509 | 1.68  | 0.108| -0.0433537           |
|          |          |           |       |      | 0.405758            |
| RES_1    | -0.28062 | 0.3038263 | -0.92 | 0.367| -0.9143949           |
|          |          |           |       |      | 0.353146            |
| _cons    | -1.62064 | 0.9520486 | -1.7  | 0.104| -3.60658             |
|          |          |           |       |      | 0.365297            |
As shown in Table 4.4 the error correction term RES_1 is negative as expected, though statistically insignificant, it indicate a fast rate of adjustment to the equilibrium. Credit to the private sector (CPS) had a positive sign as expected and statistically significant at one(1) percent significant level. The result shows that a percentage increase of credit to the private sector will lead to 0.32 percentage increase in economic growth. This result is in line with a study conducted by Kamara (2007) on financial sector development and economic growth in Liberia.

Exports of good and service also had a positive sign as expected. The results indicate that a percentage increase in export leads to 0.2 percentage increase in economic growth. However, this is statistically insignificant at even 10 percent level.

Capital formation (Investment) also had a positive sign as expected. It shows that a percentage increase in capital formation (K) will leads to 0.14 percentage increase in economic growth (GDP) but this is not statistically significant. The results also indicate that labour force contribute positively to economic growth. A percentage increase in labour force leads to 0.18 percent increase in economic growth, although this is not statistically significant.

The intercept has a negative sign which indicates that all other variables excluded in the model contribute negatively to economic growth; however, this is not statistically significant.

The R-squared value of 0.5761 indicates shows that about 57.6 percent of the variations in economic growth are explained by the regressors in the model, when adjusted for degree of freedom this account for about 44.9 percent. The F-statistic of 4.53 with the associated p-values
of 0.0047 indicates that all the variables included in the model together statistically significantly explain the variations in the dependent variable.

In all the results reveal a positive relationship between financial development and economic growth in Ghana with the direction of causality predominantly running from financial development to economic growth.
CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This study sort to examine the impact of financial development on economic growth in Ghana through the harnessing of financial savings for investment ventures in order to offer policy recommendation to enhance accelerated development in Ghana. More specifically the study sort to find out empirically the impact of financial development on economic growth with the view to establishing whether or not financial development causes growth or growth causes financial development in Ghana; and Investigate whether there is a long-run relationship between financial development and economic growth in Ghana. Time series data macroeconomic variables from 1980-2009 was used to run the error correction model in order to answer the hypothesis of this study.

5.1 Summary of Findings

The study found out that financial sector development ,that is, credit to the private sector, and increases in exports, capital formation and use of labour force have positive effect on economic growth in Ghana. More specifically developments that increases credit to the private sector turn out to increased economic growth by 0.32 percent. This is statistically significant and represents the main thrust to enhance economic growth. The Granger causality test revealed a one-way causation between economic growth and financial sector developments with financial sector developments Granger causing economic growth. This results was affirmed by the coefficient of the lagged dependent variable which is positive, though, but statistically insignificant. The results also show that there exist a long run relationship between economic growth and financial sector development with a fast rate of adjustment to the equilibrium of about 0.28 percent.
5.2 Conclusions

In line with the above findings the study concludes that there exist a positive long run relationship between economic growth and financial sector development with financial sector developments Granger causing economic growth in Ghana. The enabling environment and financial sector interventions such as low interest rate that will enhance transfer of credit to the private sector must be pursued to enhance the economic development of Ghana.

5.3 Policy Recommendations

Government should put in place appropriate fiscal and monetary policies to encourage the increase of credits to the private sector of the economy. This will boost economic growth immensely as shown by the results from our analysis.

Government should encourage domestic producers with favourable tax incentives to enable them produce more for export which will intend increase the country’s GDP to a great extend as supported by the data analysis.

Government policy should focus on ensuring that capital stock is allocated efficiently to the productive sectors of the economy such as industry and agriculture. This should be done by factoring in the appropriate technology.

Policies should be put in place to increase and improve upon the human capital accumulation of skills in all areas, both financial and real sectors of the economy, to have a positive effect on the Ghanaian economy. Quality labour force adds to savings by investing in human capital.

Lack of a developed financial system restricts economic growth and therefore government policies should be directed towards encouraging the growth of the financial sector of the Ghanaian economy.
REFERENCES

Akaike, H. (1969). “Fitting Autoregression for Prediction” Annals of the Institute of Statistical Mathematics. Pp. 243-47.

Akoena, S.K. (1996). “Demand for Money in Ghana: A Cointegration and Error Correction Approach and Comparison of Alternative Models.” Unpublished Ph.D Thesis, University of Manitoba, Winnepeg, Canada.

Alderman, H., J.R. Behrmann, D.R Ross and R. Sabot (1996). “The Return to Endogenous to Human Capital in Pakistan’s Rural Wage Labour Market”, Oxford Bulletin economic Statistics. Vol, 58 (1), pp. 29-55

Amusa, A. (2001). “The Impact of Financial Development on Economic Growth: The Case of South Africa.” University of Pretoria, South Africa. Unpublished.

Bandiera, O., G. Cpirio, P. Honohan and F. Schiantarelli (1998). “Does Financial Reform Raise or Reduce savings?” Boston College Working Papers in economics, 413, Boston College Department of Economics. (2000.) “Does Financial Reform Raise or Reduce Savings?” Review of Economics and Statistics. Vol. 82(2), pp. 239-63.

Baomol. W.J (1986). “Productivity, Growth, Convergence and Welfare. What the Long Run Data Show”, American Economic Review. Vol. 76 (5), pp. 1072-85.

Beck, T., A. Demirgue, and Ross Lenine (1999). A New Database on the structure and Development of the Financials Sector, World Bank Economic Review, September, 14 (3), 597-605.

Beleky, L.P (1973). “The Development of Liberia” The Journal of Modern African studies, Vol. 11, No. 1, pp. 43-60.

Bencivenga, V. and B.D. Smith (1991). “Financial Intermediation and Endogenous Growth:
Ben M’Rad, F. (2000). “Financial Development and Economic Growth: Time Series Evidence from South Mediterranean Countries.” Universite Paris IX, Daupine.

Bermanke, B. S. and R.S Gurkaynak (2001). “Is Growth Exogenous? Taking Mankiw, Romer and Weill Seriously.” NBER Working Paper No. 8365. Cambridge, Massachusetts: National Bureau of Economic Research.

Chandakar, A. (1992). “Of Finance and Development: Neglected and Unsettled Questions”. World Development Report, 22:58-84.

Central Bank of Liberia Economic Bulletin, Annual Report, Several Issues.

De Gregorio, J. (1993). “Inflation, Taxation and Long-Run Growth”, Journal of Monetary Economics, 31:271-98

_____ and P.E. Guidotti (1995). “Financial Development and Economic Growth”, World Development, vol. 23 (3), pp. 433-448.

De Melo, J. and J. Tybout (1986). “The Effects of Financial Development Cause Economic Growth? Time Series Evidence from 16 countries”, Journal of Development economics, vol. 51:387-411.

Demirgue-Kunt, A. and M. Vojislav (1996). “Financial Constraints, Uses of Funds and Firm Growth: An Intermediation Comparison.” Working Paper, World Bank.

Dickey, D. and Fuller, W. (1979). “Distribution of the Estimators for autoregressive Time Series with a Unit Root.” Journal of the American Statistical associates, vol. 74, pp.427-31.

Doornik, J.A. and Hendry, D.F (1994). PcGive 8.0 Interactive econometric Modeling of Dynamic Systems, Internationals Thomson Publishing, London.

Engle, R.F. and Granger, C.WJ (1987). “Cointegration and Error Correction: Representation,
Estimating and Testing.” Econometrical, vol. 55, pp. 251-76.

Feder, G. (1983). “On Export and economic Growth.” Journal of Development Economics, vol. 35: 59-73.

Financial Sector Reform Document (FINSSP I & II) - Ministry of Finance and Economic Planning, Ghana.

Friedman, M. (1959). “The Demand for Money: Some Theoretical and Empirical Results” Journal of Political Economy, volume 76, pp. 327-51.

Fritz, R. G. (1984). “Time Series Evidence on the Causal Relationship between Financial Deepening and economic Development”, Journal of Economic Development July, pp. 91-112.

Fry, M. (1988). Money, Interest and Banking in Economic Development. Blimore, mayland and London, England: John Hopkins University Press.

Galbis, V. (1977). “Financial Development and Economic Growth in Less Developed Counties: A Theoretical Approach.” Journal of Development Studies, January, pp. 58-72.

Gerler, M and A. Rose (1991). “Finance, Growth and Public Policy”, World Bank Working Paper No. 814.

Ghani, E. (1992). “How Financial Markets Affect Long-Run Growth: A Cross-Section study.; PPR Working Paper WPS 843, January, World Bank, Washington D.C.

Gockel, A.F. (1995). “The Role of Finance in Economic Development: The Case of Ghana.” Ph.D Thesis, university of Manchester.

Goldsmith, R.W. (1969). Financial Structure and Development, New Haven, CT, Yale University of Press.

Granger, C.W.J (1969). “Investigating Causal Relationships by Econometric Model and
Cross-Spectra Methods”, Econometrical, 37:540-52.

Greenwood, J. and B. Jovanovic (1990). “Financial Development. Growth and the Distribution of Income”, Journal of Political Economy, 98 (5), 1076-1108.

Gross, D. M. (2001). “Financial Intermediation: A Contributing factor to economic Growth and employment”, International Labour Office, Working Paper Paper, pp. 1-29.

Gujurati, D.N. (1995). Basic Econometrics. United States Military Academy, est. Point McGraw-Heill.

Gurley, J. and E. Shaw (1955). “Financial Aspects fo economic development.” American Economic Review, 45, 515-38.

International Monetary Fund (IMF) country Report No. 03/275, Liberia: Selected Issues. And Statistical Appendix, Washington D.C.

__________, (1983). “Interest Rate Policies in developing Economies”, Occasional Paper No. 22, Washington D.C.

Jao, Y.C. (1976). “Financial Deepening in economic Growth: A Cross-Section Analysis” Malasian economics, Vol. 109 (1): 83-109.

Johansen, S. (1998). “Statistical Analysis of Cointegraion Vectors”, journal of Economic Dynamics and Control, Vol. 12:231-54.

_____ and Juselius K. (1990). “Maximum Likelihood Estimation and Inference on Cointegraion with Application to the Demand for Money”, Oxford Bulletin Economics and Statistics, vol. 52, pp. 169-210.

Johnson, H.G (1969). “Inside Money, Outside Money, Income, Wealth and Welfare in Monetary Theory”, Journal of Money, Credit and Banking, Vol. 1, pp. 30-45.

Jung, W.S. (1986). “Financial Development and Economic Development and Cultural Change, Vol. 45:324-78.
Kalima, B. M. (2001). “Financial Markets and economic Growth in Zambia.” Unpublished MA (Economics) Dissertation, University of Botswana.

Karl, M. and Pentecost, E. (2000). “Financial Development and Economic Growth in Turkey: Further Evidence on the Causality Issue,” Department of economics, paper No. 00/27. Loughborough University, UK.

Karpur, B.K. (1976). “Alternative stabilization Policies for Less developed Countries”, Journal of Political economy, vol. 21, pp. 77-95.

Khan, M.S and Luintel, K.L (1999). “A Quantitative Reassessment of the Finance Growth Nexus: Evidence form multivariate VAR.” Journal of Development Economics, Vol. 60, pp. 3812-405.

____ and Senhaji, S.S. (2000). “Financial Intermediation and economic Growth: An Overview”, A Working paper of the IMF, WP/00/209.

King, R. and Levine, R. (1993a). “Financial Entrepreneurship and Growth: Theory and evidence”, Journal of monetary economics, Vol. 32 (3), pp. 513-542.

______, (1993b). “Financial Intermediation and Economic Development” In Mayer, C. and Vives, X. (Eds), Capital Markets and Financial Intermediation, Center for Economic Policy Research, London.

______, (1993c). “Finance and Growth: Schumpeter Might be Right”, Quarterly Journal of Economics, Vol. 108 (3), pp.717-37.

Kitchen, R. (1986). “Finance for Developing Countries”, Chichester, Wiley.

Lanyi, A. and Saracoglu, R. (1983). “Interest Rate Policies in developing countries”, occasional Paper 22, IMF, Washington, D.C..

Lee, J. (2005). “Financial Intermediation and economic Growth; Evidence from Canada” Discussion Paper at the Eastern economics Association, New York, March 4.
Levhari, D. and Patinkin, D. (1968). “the Role of Money in a Simple Growth Model”, American Economic Review, Vol. 58:713-54.

Levine, R. (1997). “Financial Development and Economic Growth: Views an Agenda”, Journal of economic Literature, Vol.35 (2), pp. 688-726.

______, Loayza, N. and Beck, T. (2000). “Financial Intermediation and Growth: Causality and Causes”, Journal of Monetary economics, Vol. 46 (1): 31-71.

Lucas, R.E., Jr. 91998). “Stock Market, Banks and economic Growth; Journal of Monetary Economics, Vol. 22, pp. 3-42.

Liberia Banking Commission Report (1998), Monrovia, Liberia.

Mankiw, N.G. (1986). “The Allocation of Credit and Financial Collapse.” Quarterly Journal of economics, 101: 455-70.

______, Romer, P. and Weil, D. (1992). “A Contribution to the Empirics of Economic Growth.” Quarterly Journal of Economics, 107: 407-38.

Matheison, D.J. (1980). “Financial reform and stabilization Policy in a Developing Economy.” Journal of development Economics, Vol. 7, pp 359-95.

Matsheka, T.C. (1995). “The Financing of Economic Growth and Development in Botswana: 1973-1994”, Ph.D (Economics) Dissertation, University of Kent, Canterbury.

McKinnon, R. L. (1973). Money and Capital in Economic Development , the bookings Institutions, Washington, D.C..

Montiel, P.J. (1997). “Financial Policies and Economic Growth: Theory, Evidence and Country-Specific form sub-Saharan Africa. “Journal of African Economics, Vol. 5 (3).

Muellbauer, J. and Murphy, A. (193). “Income Expectations, Wealth and Demography in the
Odedokun, M. O (1998). “Financial Intermediation and Economic Growth in Developing Countries”, Journal of Economic Studies, Vol. 25 (3), pp.203-224.

______, (1992a). “Supply-Leading and demand- Following Relationship between economic activities and development Banking in Developing Countries: An international Evidence”, Singapore Economic Review, April, pp. 46-58.

______, (1992b). “Multi-Country Evidence on the Effects of Macroeconomic, Financial and Trade Polices on Efficiency of resource Utilization in developing Countries.” IMF Working Paper WP/92/53, Washington, D.C..

Patinkin, D. (1965). Money, Interest and Policies, 2nd Ed., Harper and Row, New York, NY.

Patrick, H.T. (1966). “Financial Development and Economic Growth in Underdeveloped Countries.” Economic Development and cultural Change, Vol. 14 (2): 174-89.

Perseran, H. and Perseran, B. (1997). Micros fit 4.0 for Windows, Oxford University Press.

Pindyck, R.S. and Rubinfeld, D.L (1991). Econometric Model and economic Forecasts, 3rd Ed., McGraw-Hill Inc., Singapore.

Quartey, P. (1997). “Financial Sector Development, Savings Mobilization and Poverty Reduction in Ghana,” ISSER, University of Ghana Research Paper No. 2005/71.

Rebelo, S. (1991). “Long-run Policy Analysis and Long-Run Growth.” Journal of Political Economy, vol. 99, pp. 500-21.

Romer, P. (1986). “Increasing Returns to Scale and Long-Run Growth”, Journal of Political Economy, Vol. 94 (5), pp. 1002-1037.

Roubini, N. and Sala-i-Martin, x, (1991). “financial development, the Trade Regime and economic growth”, NBER Working Paper No. 876.
Rousseau, P.L. (1998). “The Permanent Effects of Innovation on Financial Depth: Theory and U.S. Historical Evidence from Unobservable Component Model”, Journal of Monetary economics, Vol. 42, pp. 387-425.

Schumpeter, J.A (1912). “The Theory of economic Development.” Cambridge, MA: Harvard University Press.

Shaw, E.S. (1973). “Financial Deepening in economic Development”. New York, Oxford University Press.

Sjöö (1997). “An Introduction to Unit-Root Tests”, Discussion Paper, JFE Nairobi.

____, (1997). “Non-Stationary and Cointegration-An Introduction”, Discussion Paper, JFE Nairobi.

Stiglitz, J. and Weiss, A. (1981). “Credit Rationing in Markets with Imperfect Information.” American economic Review, Vol. 71 (3), pp. 393-410.

Studenmund, A. H. (1997). Understanding Econimetrics: A Practical Guide, 3rd Ed., Reading Massachusetts, Addison-Wesley Longman, Inc..

Waqabaca, C. (2004). “Financial development and Economic Growth in Fiji.” Working Paper/03, December 2004, Economics Department, Reserve Bank of Fiji.

World Bank, (1989). World Development report, Oxford University Press.

World Health Organization, WHO, (2005) Estimates.

www.gipcghana.com

www.bog.gov.gh

www.databank.worldbank.org
APPENDIX 1

SOME MACROECONOMIC INDICATORS

| Year | GDP (in ML$) | Credit to the Private Sector (in ML$) | Export (in ML$) | Labour Force (in Thousands) | Gross Capital Formation (in ML$) |
|------|--------------|----------------------------------------|----------------|-----------------------------|---------------------------------|
| 1980 | 4,445.23     | 97.35                                  | 376.35         | 4,241.49                    | 271.06                          |
| 1981 | 4,222.44     | 78.12                                  | 200.81         | 4,382.98                    | 199.42                          |
| 1982 | 4,035.99     | 72.65                                  | 134.73         | 4,554.96                    | 142.53                          |
| 1983 | 4,057.28     | 62.48                                  | 225.42         | 4,744.18                    | 152.60                          |
| 1984 | 4,412.28     | 97.51                                  | 354.92         | 4,912.14                    | 302.37                          |
| 1985 | 4,504.34     | 140.08                                 | 479.91         | 5,090.62                    | 429.24                          |
| 1986 | 5,727.60     | 207.91                                 | 949.41         | 5,256.44                    | 532.41                          |
| 1987 | 5,074.83     | 159.86                                 | 997.84         | 5,426.75                    | 525.77                          |
| 1988 | 5,195.04     | 163.12                                 | 994.64         | 5,597.88                    | 583.90                          |
| 1989 | 5,248.94     | 306.53                                 | 878.81         | 5,775.33                    | 690.56                          |
| 1990 | 5,886.00     | 290.18                                 | 993.43         | 5,962.96                    | 846.77                          |
| 1991 | 6,599.58     | 241.54                                 | 1,119.52       | 6,170.25                    | 1,044.28                        |
| 1992 | 6,412.63     | 316.78                                 | 1,104.63       | 6,378.38                    | 816.71                          |
| 1993 | 5,965.70     | 288.74                                 | 1,208.29       | 6,630.76                    | 1,418.98                        |
| 1994 | 5,440.52     | 285.63                                 | 1,374.20       | 6,890.06                    | 1,228.17                        |
| 1995 | 6,457.44     | 327.39                                 | 1,581.84       | 7,154.24                    | 1,364.51                        |
| 1996 | 6,925.53     | 416.22                                 | 2,223.94       | 7,422.62                    | 1,405.79                        |
| 1997 | 6,884.02     | 564.49                                 | 2,231.13       | 7,695.83                    | 1,640.84                        |
| 1998 | 7,474.02     | 699.57                                 | 2,531.55       | 7,974.69                    | 1,671.46                        |
| 1999 | 7,709.81     | 968.35                                 | 2,473.18       | 8,260.52                    | 1,578.00                        |
| 2000 | 4,977.49     | 695.36                                 | 2,429.13       | 8,554.24                    | 1,149.71                        |
| 2001 | 5,309.16     | 629.14                                 | 2,401.49       | 8,808.94                    | 1,440.00                        |
| 2002 | 6,159.57     | 742.23                                 | 2,624.98       | 9,068.52                    | 1,156.46                        |
| 2003 | 7,624.16     | 902.70                                 | 3,101.44       | 9,331.80                    | 1,748.75                        |
| 2004 | 8,871.87     | 1,160.44                               | 3,486.94       | 9,585.05                    | 2,517.62                        |
| 2005 | 10,720.35    | 1,665.94                               | 3,907.48       | 9,852.13                    | 3,109.13                        |
| 2006 | 20,388.32    | 3,625.04                               | 5,136.37       | 10,120.32                   | 4,411.16                        |
| 2007 | 24,632.48    | 4,379.65                               | 6,041.12       | 10,376.03                   | 4,953.02                        |
| 2008 | 28,526.92    | 5,072.08                               | 7,140.13       | 10,647.45                   | 6,119.68                        |
| 2009 | 26,169.34    | 4,652.90                               | 7,982.09       | 9,767.50                    | 5,122.23                        |

Source: Compiled from World Development Indicators (WDI) and Global Development Finance (GDF) of the World Bank data bank (http://databank.world.org).
APPENDIX 2

PROCESSED DATA FOR REGRESSION ANALYSIS

| Year | InGDP     | InCPS    | InK        | InL        | InX        | GDPgr  |
|------|-----------|----------|------------|------------|------------|--------|
| 1980 | 9.154765443 | 2.192616 | 6.097732   | 4414493    | 8.466349   | 0.471696 |
| 1981 | 5.323162037 | 1.847382 | 4.722826   | 4561505    | 4.755872   | -3.50307 |
| 1982 | 2.982035802 | 1.80235  | 3.53148    | 4.733583   | 3.338307   | -6.92365 |
| 1983 | 5.988980652 | 1.542268 | 3.76118    | 4.923084   | 5.55918    | -4.56374 |
| 1984 | 10.77062194 | 2.209409 | 6.852976   | 5.10775    | 8.044013   | 8.647569 |
| 1985 | 13.58942058 | 3.108399 | 9.295515   | 5.455488   | 5.091618   | 5.199160 |
| 1986 | 20.13563152 | 3.62811  | 10.36027   | 5.624646   | 16.57605   | 5.085873 |
| 1987 | 26.18555587 | 3.154155 | 11.23952   | 5.794163   | 18.18342   | 5.62817 |
| 1988 | 24.06208101 | 5.844565 | 13.15616   | 5.969727   | 16.74262   | 5.085873 |
| 1989 | 24.34322452 | 8.446620 | 14.38623   | 6.155312   | 16.8779    | 3.328818 |
| 1990 | 25.85025734 | 4.928698 | 15.82342   | 6.343083   | 16.96353   | 5.281826 |
| 1991 | 25.52479452 | 4.928698 | 15.82342   | 6.343083   | 16.96353   | 5.281826 |
| 1992 | 28.76762747 | 4.941929 | 12.736     | 6.548112   | 17.22594   | 3.879419 |
| 1993 | 36.41520478 | 4.838176 | 23.78554   | 6.787758   | 20.25393   | 4.850000 |
| 1994 | 36.76251422 | 5.844565 | 22.57445   | 7.042752   | 25.25864   | 3.300000 |
| 1995 | 32.92665219 | 5.073565 | 21.13085   | 7.302054   | 24.49644   | 4.112419 |
| 1996 | 40.09276506 | 6.005079 | 20.29866   | 7.554800   | 32.11218   | 4.602461 |
| 1997 | 52.991546  | 8.195094 | 23.8355    | 7.821648   | 32.41029   | 4.196358 |
| 1998 | 46.7281927 | 9.358847 | 22.36355   | 8.093553   | 33.87135   | 4.700391 |
| 1999 | 49.62676403 | 12.56208 | 20.46744   | 8.371846   | 32.07834   | 4.399997 |
| 2000 | 67.2461737 | 13.97149 | 23.09813   | 8.519839   | 48.80226   | 3.700000 |
| 2001 | 64.81283824 | 11.85487 | 27.12292   | 8.738087   | 45.23302   | 4.000000 |
| 2002 | 54.87299147 | 12.04547 | 18.77495   | 8.959114   | 42.61625   | 4.500000 |
| 2003 | 56.60810264 | 11.83515 | 22.93693   | 9.169358   | 40.67904   | 5.200000 |
| 2004 | 56.60810264 | 11.83515 | 22.93693   | 9.169358   | 40.67904   | 5.200000 |
| 2005 | 60.3670092  | 13.07972 | 28.37751   | 9.392065   | 39.30333   | 5.600000 |
| 2006 | 61.72229716 | 15.54407 | 29.90214   | 9.614093   | 36.44922   | 5.900000 |
| 2007 | 40.73029274 | 17.78869 | 30.40100   | 9.821465   | 25.19272   | 6.400000 |
| 2008 | 40.82908463 | 6.100000 | 34.05459   | 10.11048   | 24.52500   | 6.099999 |
| 2009 | 44.48471928 | 7.16000  | 31.96119   | 11.016000  | 25.02943   | 6.200000 |
| 2010 | 41.34734241 | 6.16000  | 29.707060  | 10.239073  | 30.50169   | 5.762732 |