A Structural Macroeconometric Model for Analysing Stabilization and Structural Adjustment in a Developing Country: The Case of the Economic Recovery Program in Ghana

by

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A STRUCTURAL MACROECONOMETRIC MODEL FOR ANALYSING STABILIZATION AND STRUCTURAL ADJUSTMENT IN A DEVELOPING COUNTRY:

THE CASE OF THE ECONOMIC RECOVERY PROGRAM IN GHANA

by

JOHN KOFI BAFFOE

A Thesis submitted to the Faculty of Graduate Studies of the University of Manitoba in partial fulfillment of the requirements for the degree of

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Abstract

The objectives of the study are threefold. First to develop an analytical framework that attempts to capture the salient structural features of the Ghanaian economy; second to use the framework to evaluate the impact of changes in macroeconomic and trade variables on the Ghanaian economy; and third to use the results of the analysis to investigate the factors that contributed to the initial success of the Economic Recovery Program (ERP) in Ghana and those that inhibited the sustenance of the initial positive gains in the late 1980's and the early 1990's.

A structural macroeconometric simulation model that integrates four sub-models, namely, expenditure sector sub-model, fiscal sector sub-model, monetary sector sub-model, and output, price and wages sector sub-model, is used in the analysis. Twelve behavioural equations and forty-seven definitional equations and/or identities make up the full structural model. The model is estimated using a two-stage least squares (2SLS) estimation technique with 6 principal components which cumulatively account for 97 percent of the variation in the predetermined variables used as instruments in the first stage of the 2SLS technique. Autocorrelation is avoided through correct specifications of the behavioural equations. The data for the estimation covers the period from 1970 to 1990.

Using the parameter estimates, two sets of within sample simulations are performed with the complete model (including the identities). In the first set, the simulation is carried out with the observed data without any changes. Graphical illustrations of the observed and simulated values of endogenous variables over time and three quantitative measures, the root mean square error, the root mean square percent error, and the Theil index, are used to validate the model's ability in tracking historical movements of endogenous variables. In the second set, various simulation experiments are carried out by changing macroeconomic and trade variables in the

model, and evaluating the impact of the changes on the Ghanaian economy.

The main finding regarding the structure of the Ghanaian economy is that the Ghanaian economy has characteristics that are typical of less developed countries, and they seem to support the structuralist view of LDC economies. Specifically, the results indicate the high import dependence of the Ghanaian economy; the importance of foreign exchange to the economy; that the public sector has a role to play in promoting growth; that Ghanaian export sector is highly vulnerable to the fallacy of composition; that the financial system in Ghana is relatively underdeveloped and renders monetary policies ineffective; that high rates of inflation are mainly due to structural more than monetary factors; and that output in Ghana is very much dependent on foreign exchange, imports and some exogenous variables like weather.

The simulation experiments clearly indicate that the positive impact of the massive foreign capital inflow during the early stages of the ERP negated the recessionary impact of fiscal restraint and tight monetary policies, and resulted in the high economic growth. Upward pressure on inflation persisted mainly because of structural factors. Consistently, the analysis indicate that reduced foreign capital inflow and declining export price impacted on the economy and resulted in the problems with the ERP in the late 1980's and the early 1990's.

The implication of these results for other LDCs, and most importantly, the IMF and the World Bank, is that solving economic problems in LDCs require more than tight monetary policy and fiscal restraint. External financial assistance is crucial for most LDCs to correct their structural deficiencies and be able to alleviate their economic crisis, and adjust to external shocks.

Acknowledgements

I would like to express my deep appreciation and sincere thanks for the invaluable guidance, cooperation, assistance, advice, support, and comments of my advisor Dr. John Loxley throughout the various stages of the study. I have been fortunate to have him as my advisor.

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I owe much to my immediate family, my mother, and the rest of my extended family. The dedication of this thesis to my mother, my wife, and my children therefore is not an empty gesture.

To My Mother, My Wife, and My Children

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Introduction

1.1 Introduction

The Ghanaian economy which had exhibited steady progress until the late 1960s, started showing signs of decline during the early 1970s. The mounting economic problems peaked in the early 1980s which forced the Government of Ghana to launch an Economic Recovery Program (ERP) with financial assistance from the International Monetary Fund (IMF) and the International Bank for Reconstruction and Development (IBRD or World Bank).

The introductory chapter looks at the nature of the economic crisis in Ghana, the causes and impacts, and the need for launching the ERP. The chapter also looks at a brief overview of the various measures laid down as conditions for the receipt of the financial assistance which were translated into specific policy measures in the ERP. A general evaluation of the overall results of the ERP in Ghana is given recognizing the major areas of concern, and the need to address these concerns. Lastly, the chapter addresses the importance of an open-economy macroeconometric simulation model which adequately captures the structural characteristics of the Ghanaian economy.

1.2 The Economic Crisis in Ghana

When on March 6, 1957, Ghana became the first independent nation in sub-Saharan Africa, the country had about the highest per capita income in sub-Saharan Africa, had a skilled manpower, and enjoyed a rich endowment of natural resources. The 1970s however saw a steady deterioration of the Ghanaian economy. The deterioration developed into an economic crisis in the early 1980s.

The economic crisis in Ghana was multidimensional in nature. The economy saw a continuous decline in Real Gross Domestic Product (RGDP), acute shortages of food and foreign exchange, very high rates of inflation, a grossly imbalanced government budget, a marked deterioration in the infrastructure including roads, railways, electricity and telecommunications, and a reduction in the capacity utilization of industrial plants. For example, between 1970 and 1983, RGDP fell by 11 percent, and real per capita GDP by 38 percent. Also between 1980 and 1983, merchandise exports fell by 60 percent (See Table 1.1).

The decline in merchandise exports was due to lower outputs of virtually all the major tradable commodities, namely, cocoa, which contributed about 70 percent of the country's total value of exports in the mid-70s; minerals, which contributed about 12 percent; and forestry products, which contributed about 9 percent. Cocoa production fell by about 62 percent between 1970 and 1983, gold production by about 57 percent, bauxite by 79 percent, diamonds by 86 percent, and manganese by 49 percent. Production of logs and sawn timber also declined by 64 percent and 47 percent respectively (See Table 1.1).

The declining level of exports, and the lack of external finance constrained import demand, resulting in a steady decline in merchandise imports. The decline in merchandise imports led to positive trade balances between 1970 and 1983 except for 1971, 1974, 1981, and 1983. However, current account deficits were recorded

TABLE 1.1: TREND OF SELECTED ECONOMIC INDICATORS (1970-1983)

	1970	1975	1980	1981	1982	1983
National Product						
Real GDP in millions of 1975 cedis	5349	5283	5536	5344	4974	4747
Index of Real GDP (1975=100)	101	100	105	101	94	90
Population in millions	8.5	9.8	11.1	11.4	11.7	12.2
Real GDP per capita (1975 cedis)	629	539	499	469	425	389
Index of Real GDP per capita (1975=100)	117	100	93	87	79	72
Balance of Payments						
Merchandise Exports in millions of dollars	481	728	1104	711	641	439
Merchandise Imports in millions of dollars	449	651	972	1021	631	539
Trade Balance in millions of dollars	32	77	132	-310	10	-100
Current Account Balance in millions of dollars	-79	-51	-55	-508	-158	-230
Index of Trade						
Quantity of Exports (1968=100)	87	56	40	41	46	33
Quantity of Imports (1968=100)	107	62	40	45	26	18
Output of Major Commodities						
Cocoa ('000 tons)	413	394	258	225	180	157
Gold ('000 kgs)	19.9	16.5	11.0	10.6	10.3	8.6
Diamonds ('000 carats)	2550	2336	1149	836	684	347
Bauxite ('000 tons)	337	325	225	181	64	70
Manganese ('000 tons)	372	415	250	223	160	190
Logs (m. cubic meters)	1.6	1.3	0.5	0.6	0.4	0.6
Sawn Timber ('000 cu.met)	0.4	0.4	0.2	0.2	0.2	0.2

Sources : Central Bureau of Statistics/Statistical Services: Quarterly Digest of Statistics, Economic Survey.

Bank of Ghana: Annual Reports, Quarterly Economic Bulletin.
Ghana Cocoa Marketing Board/Cocoa Board,
Ministry of Finance and Economic Planning.

Own Calculations.

TABLE 1.2: TREND OF SELECTED ECONOMIC INDICATORS (1970-1983)

	1970	1975	1980	1981	1982	1983
Staple Food Production						
Maize ('000 tons)	482	343	382	378	346	172
Rice ('000 tons)	49	71	78	97	36	40
Cassava ('000 tons)	2388	2398	2322	2063	2470	1721
Yam ('000 tons)	909	709	650	591	588	866
Plantain ('000 tons)	1644	1246	734	829	749	342
Central Gov't Financing						
Revenue and Grants in millions of cedis	496	815	3279	4855	5253	10241
Recurrent Expenditure in millions of cedis	378	997	6329	8603	8029	13403
Development Expenditure in millions of cedis	108	441	1390	927	817	1354
Total Expenditure in millions of cedis	486	1438	7719	9530	8846	14757
Budget Deficit in millions of cedis	10	-623	-4440	-4675	-3693	-4516
Price Indices and Lending Rates						
Nominal Cocoa Export Price (U.S.$ per ton)	497	1033	1898	1516	1274	1520
Consumer Price Index (1977=100)	13.6	29.6	401	869	1062	2367
Rate of Inflation in Percent per annum	9.0	29.8	50.1	117	22.3	123
Nominal Lending Rate(%)	10.9	12.5	18.5	18.5	18.5	19.0
Real Lending Rate	1.0	-17.3	-31.6	-98.5	-3.8	-104

Sources: Central Bureau of Statistics/Statistical Services: Quarterly Digest of Statistics, Economic Survey.

Bank of Ghana: Annual Reports, Quarterly Economic Bulletin.

Ghana Cocoa Marketing Board/Cocoa Board, Ministry of Agriculture, Ministry of Finance and Economic Planning.

Financial Statistics, IMF; Own Calculations.

throughout the period because of net payments on intangibles (See Table 1.1).

Production of all major staple foods also fell between 1970 and 1983. Production of maize fell by about 64 percent, rice by 18 percent, cassava by 30 percent, plantain by 79 percent and yams by about 5 percent (See Table 1.2).

Low food production, coupled with the constrained imports, and a high population growth, resulted in high inflationary pressures in the economy. The annual rate of inflation increased steadily from 1970 to a peak of 123 percent in 1983 (See Table 1.2). This led to a declining level of real income, and hence, real consumption fell drastically. Domestic savings and investment also collapsed. A reduced government revenue, especially due to a low cocoa duty, resulted in severe imbalances in the government's revenue and expenditures, and consequently in huge fiscal deficits from 1971 to 1983 (See Table 1.2).

1.3 The Causes of the Economic Crisis

The major causes of the economic crises were shortages of food and foreign exchange. Growth in food production could not keep pace with the population growth and resulted in food shortages. The food problem reached a catastrophic level in the early 1980's as a result of a severe drought.

Domestic and external factors contributed to the shortage of foreign exchange. The major external factor was a persistent deterioration in the terms of trade after 1970 (See Table 1.3).

By 1983, Ghana had suffered a 52 percent decline in her terms of trade relative to 1968, due to oil price increases, and a declining world cocoa price. A deterioration of this magnitude would inevitably lead to severe economic problems, and with no compensatory mechanism in the international commodity market to offset the impact

TABLE 1.3: ECONOMIC FACTORS EXPLAINING CAUSES OF THE CRISIS

	1970	1975	1980	1981	1982	1983
Index of Trade						
Index of Value of Exports (1968=100)	129	298	652	421	320	2014
Index of Value of Imports (1968=100)	123	312	686	682	663	4197
Terms of Trade (1986=100)	105	96	95	62	48	48
Official Exchange Rate in Cedis per US$1.00	1.02	1.15	2.75	2.75	2.75	20.0
Cocoa Industry						
Average f.o.b. Export Price of Cocoa in Cedis per ton	643	1526	6300	5000	30558	60000
Producer Price of Cocoa in Cedis per ton	293	585	40000	12000	12000	20000
Index of Real Producer Price of Cocoa ('63=100)	71	65	32	45	37	28
Cocoa Export Duty in Cedis per ton	271	544	253	0.0	7446	22701
Producer Price as a % of f.o.b. price	46	38	63	240	39	33
Export Duty as a % of f.o.b. price	42	36	0.04	0.0	24	39
Cocoa Duty as a % of Gov't Revenue	35	22	0.7	0.0	-	27
Monetary Sector						
Broad Money Supply (M2) in millions of Cedis	427	1386	7920	12029	15072	20945
Gov't Borrowings from Central Bank in millions of Cedis	-	605	3226	1672	434	2572
Gov't Borrowings as a % of Money Supply	-	43	40	14	3	12

Sources: Central Bureau of Statistics/Statistical Services: Quarterly Digest of Statistics, Economic Survey.

Bank of Ghana: Annual Reports, Quarterly Economic Bulletin.

Ghana Cocoa Marketing Board/Cocoa Board, Ministry of Finance and Economic Planning.

Own calculations.

of such external shocks, domestic governments would have to adjust their policies to counteract these shocks. Successive Governments of Ghana however, failed to adjust their policies as was evident in the domestic policies on exchange rate and the cocoa industry. For example, between 1974 and 1983, despite the deteriorating state of the economy, and the higher rate of inflation vis-a-vis Ghana's major trading partners, the official exchange rate was hardly adjusted (See Table 1.3). As a result, there was a strong appreciation of the real exchange rate and the development of a highly profitable underground market. Export producers who used the official channels suffered from the highly overvalued exchange rate, while importers benefited, especially if they imported at the official rate and sold at the underground market prices.

Cocoa producers were severely hit by the situation. Despite periodic large increases in the nominal producer price, the real producer price continued to fall, and by 1983, was less than a third of the 1970 level (See Table 1.3). Many cocoa farmers were unable to pay the labour cost to maintain and harvest the crop. In many instances, it was uneconomical to rehabilitate cocoa farms, because they had exceeded their economically productive life. The exchange rate policy was also responsible for the large decline in the exports of minerals and forestry products.

Other non-price factors also contributed to the declining cocoa output. Over half of the cocoa trees were reaching the end of their productive lifetime, and swollen shoot and capsid reduced output by 10 percent per annum (Lass and Wood, 1985). Poor extension services, lack of access to credit, acute shortage of sprayers, insecticides and transportation due to foreign exchange shortages, and poor rainfall in the late 1970s, all contributed to the decline (World Bank, 1981, p. 15-17).

The drought in the early 1980s led to a low level of the Akosombo dam, below the minimum necessary for hydro-electric generation. This interfered seriously with industrial production for local use and for exports. Furthermore, the local manufac-

turing industries which depended on imported inputs suffered from a foreign exchange squeeze.

The impact of the huge deterioration in the terms of trade, the exchange rate and producer price policies, and the non-price factors, was a 60 percent decline in the value of merchandise exports between 1980 and 1983 (See Table 1.1), which undermined the balance of payments and the import capacity of the country. The reduction in the cocoa duty from 35 percent of government revenue and grants in 1970, to 0.7 percent of government revenue and grants in 1980, and 0.0 percent in 1981 (See Table 1.3), destabilized the budget and was partly responsible for the deficits in 1980 and 1981. Large subsidies on petroleum, kerosene, and fertilizers, also contributed to the deficit position. The deficits were financed mainly through borrowings from the domestic banking system which led to excess liquidity and high rates of inflation (See Table 1.3).

Other government policies also exacerbated the already precarious economic conditions. Attempts were made to control domestic consumer prices as well as a fixed exchange rate. However, as the shortage of consumer goods mounted due to the foreign exchange squeeze, price controls had the effect of stimulating parallel market activities (Kanpur et al. 1991, p. 2).

1.4 Consequences of the Economic Crisis

The major consequence of the economic crisis was that majority of Ghanaians experienced a substantial reduction in their living standards. In most urban centres, real wages and salaries were so low that they were simply impossible to live on. At the peak of the inflation, the minimum wage was estimated to cover only 2.6 percent of a minimum socially acceptable household budget for a family of five, while

salaries of middle level civil servants covered just 5.9 percent (Unicef, 1986). Ghanaians had to supplement wages by taking second and third jobs and/or engaging in petty trading. Most workers also adjusted by producing more of their own food and other requirements where possible. Illicit means of raising money such as theft, corruption and underground economic activities became very rampant. Despite all these adjustments, real income and consumption levels of urban workers fell considerably and overall poverty increased substantially. This induced a large part of Ghana's relatively well educated labor force to emigrate and seek better opportunities elsewhere (Kanpur et al. 1991, p. 2).

In addition to the reduction in personal income and consumption, reduction in real state expenditure had some adverse effects on the welfare of Ghanaians. Transport and basic infrastructure fell into disrepair, physical conditions in schools, hospitals and health centres deteriorated, and water supply facilities which had improved considerably in the 1970s, began to deteriorate due to lack of maintenance.

It was against this background of economic and social deprivation that the government of the Provisional National Defence Council (PNDC), realizing that the crisis could not be arrested without massive infusion of foreign exchange into the economy, turned to the International Monetary Fund (IMF) and the World Bank for assistance. Typical of any IMF and World Bank financially assisted economic program, a series of measures were layed down as conditions for the receipt of IMF and World Bank credits. These measures were eventually embodied in the Ghana Government's Three Phase Economic Recovery Program (ERP). Phase I from 1984 - 1986, Phase II from 1987 - 1988 and Phase III from 1989 - 1990.

1.5 The ERP Strategy and Results

The strategy of the ERP was to lay a foundation for sustained growth, and to solve the balance of payments problems. The key elements of the strategy were:

- to realign relative prices to encourage production activities and exports, and strengthen economic activities;
- to shift away from direct control and intervention towards a greater reliance on market forces;
- to restore fiscal and monetary discipline;
- to rehabilitate economic and social infrastructure;
- to introduce structural and institutional reforms to improve efficiency and encourage private savings and investment.

The implementation of these policies has led to a major turnaround in Ghana's overall economic and financial performance since 1983.

The economy has seen growth in real GDP, productivity in the major productive sectors has improved, inflation has declined, the government has recorded budget surpluses, the overall balance of payments has switched from a deficit position to a surplus position, external payments arrears have been eliminated, and the creditworthiness of Ghana has been restored internationally.[1] Growth in the Ghanaian economy, however, slowed down in the early 1990s even though positive growth was still recorded.

[1]A detailed discussion of the ERP and its evaluation is given in Chapters Four and Five.

1.6 The Analytical Problem

The economic recovery in Ghana has been realized through a successful implementation of stabilization and adjustment programs advocated by the World Bank and the International Monetary Fund (IMF). The specific policy prescriptions made available to the Ghana Government can be categorized into three broad headings.[2] These are:

- demand restraint policies using monetary and fiscal instruments;
- exchange rate and other major relative price adjustments;
- liberalization measures.

The first set of policy measures seeks to improve internal and external balance by reducing total government expenditure as well as expenditure on imported goods. Such policies restrain domestic spending and release domestic goods for export. By curbing demand, they also reduce demand pull inflationary pressure, which may further strengthen the balance of payments by making local goods more competitive with imported goods.

The second and third measures aim at allowing market forces to determine price levels and relative prices. The objective is to stimulate production through price incentives and to switch the composition of output and demand towards exports and investment, and away from imports and consumption.

Despite a coherent underlying theory of stabilization and adjustment programs, many sub-Saharan African countries including Zambia, Tanzania and Uganda, as well as many Latin American countries including Argentina, Brazil and Peru have had to abandon the programs or make adjustments to them because of the contractionary

[2]Refer to Chapter Two for a more comprehensive review of the theory on stabilization and structural adjustment.

impact on the economy, the inflationary impact, the regressive impact on wage earners, the associated high external debt, and the high social cost. The programs have fallen short of expectations because they fail to integrate into their theoretical analysis the problems arising from structural bottlenecks in the productive sectors. These structural bottlenecks can be characterised by the inelastic supply of food products, the nature of tradable commodities, lack of foreign exchange, rigidities in the tax and expenditure structure, the import dependency of intermediate inputs, constraints on the supply of intermediate inputs, difficulties in raising savings, and the lack of credit. Furthermore, the effect of the adjustment policies on inflationary expectations is not incorporated in the theoretical analysis. As a result, contradictory results in terms of economic growth and inflation have been observed by many countries that have implemented the programs.[3]

1.7 Objective

Whereas many less developed countries have had problems with stabilization and adjustment programs, the Ghana model seemed to have worked until the early 1990s. The program recorded some remarkable gains in the economy until the early 1990s when it started showing some weaknesses, and resulted in a considerable slow down of economic activity. This makes one curious to investigate the factors that contributed to the initial success of the Ghana model, and the slow down later. Hence, the study attempts to identify and evaluate factors that facilitate and/or impede economic growth during stabilization and structural adjustment programs, using the Ghana model as a case study. The investigation is carried out within the context of a small open-economy macroeconometric model that attempts to capture the structural

[3]Refer to Chapter two for an evaluation of stabilization and structural adjustment programs, and a critique of the programs.

characteristics of the Ghanaian economy adequately. The objectives of the study are threefold. First to develop an analytical framework that attempts to capture the structural features of the Ghanaian economy; second, to use the framework to evaluate the impact of changes in key macroeconomic and trade variables on the Ghanaian economy; and third to use the results of the analysis to investigate the factors that contributed to the initial success of the ERP and those that inhibited the sustenance of the initial positive gains. The key variables are public sector expenditure, domestic credit, foreign capital flow, exchange rate, and external terms of trade. Changes in these variables are either contained in a package of recommendations by the IMF and the World Bank during a stabilization/adjustment program, or result from the implementation of policies recommended by the two multilateral financial institutions.

1.8 Methodology

A multi-sector macroeconometric simulation model that integrates four sub-models from three sectors and one sub-sector of Ghana's economy is used in the analysis. The first is the expenditure sector sub-model which has equations for the components of aggregate demand, namely, consumption, gross domestic investment, government expenditure and the balance of goods and non-financial services. The second is the monetary sector sub-model which has equations for demand for real cash balances, and money supply. The third sub-model has equations for aggregate supply, wages, and prices, and the fourth is a sub-model for the fiscal sub-sector which has equations for total tax revenue, government current and capital expenditure, and fiscal surplus or deficit.

The three sectors and the sub-sector are inter-linked. The monetary sector is linked to the expenditure sector through net internal credit and gross domestic investment; and the balance of goods and non-financial services, international reserves,

and money supply. The fiscal sub-sector is linked to the expenditure sector through tax revenues and consumption; and tax revenues and public sector expenditures. The fiscal and monetary sectors are linked through internal credit and fiscal deficit financing; and through money supply and net capital flows to the public sector. The output, price, and wages sector is linked to the monetary sector through money supply and is therefore linked to the fiscal and expenditure sectors.[4]

The specifications in the four sectors are solved simultaneously for the structural coefficients of the equations in the model, and the coefficients used to simulate the entire model. A sensitivity analysis is then carried out by changing some key macroeconomic policy variables and evaluating the impact of different policy options. The policy options include nominal devaluation, a reduction in fiscal deficit, a reduction in internal credit, an improvement in external capital inflow, and an external terms of trade deterioration.

1.9 Data Source

The principal source of data is that published by the Ghana Statistical Services for the period 1970 - 1990. This is however, supplemented by data in the publication: "Statistical Tables on the Economy of Ghana 1950 - 1985" published by Dr. Kwodwo Ewusi, Director of the Institute of Statistical Social and Economic Research (ISSER). Other supplementary secondary data sources include International Financial Statistics published by the International Monetary Fund (IMF) and World Tables published by the World Bank.

[4]Refer to Chapter Six for a detailed description of the model including the behavioural functions and the linkages.

1.10 Organisation of the Thesis

The thesis is divided into nine chapters. The first chapter gives background information on the economic crisis in Ghana, the need for the economic recovery program (ERP), and a brief review of the positive impact of the ERP on Ghana's economy. It also gives an overview of problems arising from stabilization and structural adjustment programs in many less developed countries, and hence the need to investigate the factors that contributed to the initial notable improvements in the Ghanaian economy, and the slow down later. The objectives of the study, an overview of the methodology employed, and the data sources are also mentioned. The second chapter reviews the literature on the IMF/World Bank stabilization and structural adjustment programs. It looks at the theoretical underpinnings of the programs, evaluates the impact of structural adjustment on developing economies, and considers an alternative approach to structural adjustment. The structure of the Ghanaian economy is discussed in chapter three. The fourth chapter gives a comprehensive review of Ghana's ERP, and the fifth chapter an evaluation of the ERP. The analytical framework and the econometric model are discussed in chapter six. Chapters seven and eight are devoted to the analysis of the results, and the evaluation of policy options. The summary and concluding remarks are reserved for the last chapter.

Chapter 2

Stabilization and Structural Adjustment Programs - Concepts and Performance: A Selective Review of the Literature

2.1 Introduction

This chapter discusses IMF stabilization programs and World Bank structual adjustment programs. Since the introduction of the two programs, they have attracted vast literature. The IMF, the World Bank, UN-ECA, OECD, UNICEF, research institutions, academicians, etc. etc. have conducted elaborate research exercises on these programs. It is almost impossible to review the whole literature on stabilization and structural adjustment. The literature review in this chapter is quite selective and focuses on the concepts and performance of the two programs as they relate to Ghana's Economic Recovery Programs (ERP).

The chapter looks at the rationale, the concepts, and objectives of the IMF and World Bank programs; it discusses the conditionality of the programs, the policies involved, and the critiques; it assesses the performance of the programs, and looks at possible alternatives to the programs.

2.2 Objectives of IMF Stabilization Programs

An IMF stabilization program consists of a comprehensive set of economic measures supposedly designed to achieve broad macroeconomic goals. Among these are an improvement in the balance of payments, a better utilization of productive potential, and an increase in medium and long-term economic growth.

An adoption of a stabilization program is motivated by the presence of an imbalance between aggregate demand and aggregate supply, i. e. internal imbalance, which may create inflationary pressures, or require a high level of external borrowing and consequently a large external deficit, i. e. external imbalance.

Since the global economic crisis of the 1980s, the IMF has provided a financially assisted adjustment program for the member countries faced with internal and external imbalances, with the objective of fostering economic growth and improving their balance of payments position. Scores of less developed countries which have adopted the IMF program have had to abandon or adjust their programs because of problems with them. To appreciate the dilemma facing many less developed countries, a clear understanding of the theoretical underpinnings of the program, the conditionality, and the policy measures involved, is imperative.

2.3 A General Macroeconomic Framework for Stabilization Programs

2.3.1 Facilities and Conditionality

The IMF advances credit to member countries through various types of facilities for balance of payments support, and to facilitate an adjustment process. The oldest and the most important facility of the IMF is drawings in the reserve and credit tranches. Member countries are allowed to draw up to 125 percent of their quota in five tranches of 25 percent each (Loxley, 1986, p. 96). The first 25 percent, called the reserve tranche, does not attract any interest payment and members are not required to repay because they draw against the portion of their quota subscriptions. The other four tranches are interest bearing, usually 6.5 percent, and are payable within three to five years (Hogendorn, 1992, pp 221- 223).

Furthermore, in response to the debt crisis of the 1980s, and the declining world commodity prices, the IMF initiated several special facilities, that allowed loans of longer duration at low interest rates (Hogendorn, 1992, p. 221). Examples of these are the Extended Fund Facility (EFF), the Structural Adjustment Facility (SAF), the Enhanced Structural Adjustment Facility (ESAF), and the Compensatory and Contingency Financing Facility (CCFF).

Conditionality is however exercised when drawing from the upper credit tranche and the special facilities. It is through the conditionality that the IMF exerts a pervasive influence in shaping the economies of the less developed countries using the stabilization program. The term "conditionaltiy" refers to the policy measures a member country is required to take for borrowing from the Fund. The conditionality is imposed for two main reasons. First to maintain the revolving nature of Fund resources, and most importantly, as a regulatory device for member countries to solve

their balance of payments problems and other problems by pursuing policies that are consistent with the IMF (Loxley, 1986).

The IMF conditionality is based on the premise that members' external imbalances are the result of excessive demand pressure on resources and market regulations which are the result of excessive money creation through credit and government interventions. The Fund's position is that the imbalance can only be mitigated by demand restraint policies, policies that would remove quantitative restrictions, and policies to change relative prices such as devaluing the exchange rate to appropriate levels.

Member countries negotiate a stabilization program with the IMF. The results of the negotiations are then embodied in a letter of intent which would normally contain three undertakings by the member. These are preconditions, performance criteria, and other conditions. Unless the preconditions (the most common of which is a devaluation) are met, the program and the assistance would not be put in place. Once the program is in effect, performance criteria would have to be met for IMF credits to continue. The performance criteria include qualitative criteria like removing all restrictions on trade or payments or transfers, and not introducing multiple currency practices; and quantitative criteria include ceilings on domestic credit, public sector credit and sometimes a minimum level of foreign exchange resources (Loxley, 1986).

The stabilization program is usually formulated with the assistance of Fund staff. For the earlier years, such programs relied on the primary instruments of demand management policies, i. e. monetary and fiscal policies, to influence macroeconomic performance (IMF, 1987a). Since the 1980s, the conceptual framework and structure of such programs has evolved and expanded. Modifications have been made to include a wide range of medium and long-term policy packages aimed at an improved utilization of resources, and an increase in the productive capacity. Nevertheless, the primary focus of the programs still remains the use of demand management to correct balance of payments problems.

2.3.2 The Theoretical Framework

The demand management policies are based on the absorption relationship in national income accounting where the value of domestic production (Y), is the sum of private consumption (C), domestic investment (I), government expenditure (G), and the balance of goods and services, i. e. exports minus imports (X - M):

$$Y = C + I + G + (X - M) \tag{2.1}$$

Using a narrower concept of current account (CA) that excludes net private and official transfers, current account is the balance of trade in goods and services:

$$CA = (X - M) \tag{2.2}$$

Hence, from (1):

$$Y = C + I + G + CA \tag{2.3}$$

The sum of private consumption, domestic investment, and government expenditure is called absorption (A). Therefore:

$$Y = A + CA \tag{2.4}$$

$$CA = Y - A \tag{2.5}$$

If income (Y) exceeds absorption (A), current account shows a surplus, otherwise, it shows a deficit. A current account deficit has to be financed using foreign reserves which leads to a running down of net foreign assets. This is illustrated by a balance of payments identity as follows:

$$\triangle R = CA + \triangle FI \tag{2.6}$$

$\triangle R$ is the change in net foreign assets of the banking system including the international reserves of the monetary authorities; and $\triangle FI$ is the change in net foreign indebtedness of nonbank residents. Substituting for CA, we have:

$$\triangle R = Y - A + \triangle FI \tag{2.7}$$

The above shows that if an excess of absorption is not financed by foreign borrowings it leads to a running down of net foreign assets. The stock of foreign assets is however limited, therefore there is a limit to which absorption can be financed by net foreign assets.

From equation 2.5, a desired reduction in a current account deficit can be achieved by some combination of increased output (Y) and reduced absorption (A). There might be induced secondary impacts of increased output and income on absorption but these are always less than the initial change that induced them. It is generally easier to reduce absorption than to increase production. For this reason, policies

affecting absorption are often the first to be introduced when a rapid decline in current account deficit is necessary. The policies that affect absorption influence domestic demand and are called demand management policies.

2.3.3 Standard Policies for a Stabilization Program

Given the theoretical framework for stabilization programs, the Fund focuses on a limited number of macroeconomic variables that emphasize, but are not restricted to demand management policies. The demand management policies are related to the monetary approach to the balance of payments and also form a foundation for other related policies such as those of the supply side and those that improve international competitiveness.

Demand management policies aim at correcting an internal imbalance, which is often traced to widespread government intervention and inappropriate domestic policies that expand aggregate demand too rapidly relative to the growth of the productive capacity of the economy. The Fiscal deficit is often identified as the source of excessive domestic demand and therefore an internal imbalance. Hence, the first choice of instruments aim at reducing public sector outlays and increasing revenue. Second, private consumption is reduced by raising taxes, removing subsidies, and liberalizing prices. Third, domestic demand is reduced through a reduction in the credit level to the private sector, which is the monetary aggregate underlying domestic demand and balance of payments (IMF, 1987a).

In general it is difficult to achieve internal and external balance simultaneously. Demand management policies normally restore internal balance and alleviate but not eliminate external imbalance. Under such circumstances, further restraint of domestic demand to achieve external balance would result in the underutilization of productive resources. Hence the IMF goes further to use expenditure-switching policies designed

to change relative prices of foreign and domestic goods (IMF, 1987a). An example of such policy is a devaluation of the exchange rate. This entails a rise in incentives to produce goods for export or goods competing with imports, and a fall in incentives to produce goods that are not potentially traded. Other expenditure-switching policies include price liberalization, and the removal of price controls and quantitative trade restrictions. These policies aim at correcting price distortions that favour foreign over domestic goods.

In summary,the Fund's package for demand management policies often includes the following;

- placing limits on the money supply and credit to restrain excessive demand;
- devaluation of overvalued exchange rates;
- increasing interest rates to real positive levels;
- reducing government capital and recurrent expenditures;
- increasing public good prices (i. e. reducing subsidies on social programs and services, removing price controls, and liberalizing prices to market levels);
- freezing wages;
- liberalizing trade, payments, and foreign exchange.

Since the global economic crisis of the early 1980s, there have been increasing cases of member countries of the IMF encountering disequilibrium in their balance of payments that could not be eliminated in the short run using demand management policies. After criticisms from LDC Governments, sympathizers, academicians, etc. etc. on the need to shift emphasis from reducing absorption to increasing output, the Fund's program has been modified to include medium to long term strategies to

increase economic growth and at the same time keep domestic demand and balance of payments under strict control (IMF, 1987a, p. 1). The strategy involves supply side policies designed to increase the domestic productive sector and ensure a better utilization of potential capacity.

The IMF also advocates supply side policies aimed at increasing the level of domestic output. These policies can be categorized into two broad headings. First are policies to improve the efficiency with which labour, capital, and other scarce resources are allocated among competing ends. This category includes measures to reduce price distortions, i. e. "getting prices right", such as price liberalization, trade, exchange rate, and interest rate liberalization, raising agricultural producer prices especially for tradables, and allocating credit through competitive rather than bureaucratic processes. Second are policies to increase the rate of growth of productive capacity. This includes policies to increase domestic savings and investment such as maintaining realistically high interest rates, re-allocating fiscal expenditure towards those with strongest benefits for growth and development, and directing new resources to investments with highest rates of return. These policies are intended to increase economic growth over the medium and long term (IMF, 1987a).

2.3.4 Eclecticism of the IMF Approach

The approach by the IMF is quite eclectic in that the best of competing theories are used without losing the consistency in the strong monetarist bias. Whereas the Fund talks about supply factors and structural adjustment (i. e. long term policy issues), the principal performance criteria continue to be short-term demand oriented and very strongly monetarist in character. The issue of eclecticism is elaborated on in the case of devaluation and liberalization of prices, foreign exchange and trade.

Devaluation

The IMF asserts that an over-valued exchange rate causes an increased demand for foreign exchange which would lead to external imbalance, rationing of foreign exchange (inefficient allocation of foreign exchange), increasing cost of bureaucracy and corruption, capital flight, an underground market in foreign exchange, and a trade regime biased against tradables. Advocates of devaluation argue that it would increase prices of tradable and non-tradable goods and services, thus reducing the real value of money balances and consumption. In this respect, the outcome is similar to that of the monetary approach. Also, if prices of tradables rise more than proportionately to those of non-tradables, as one would expect from a devaluation, resources would move into tradable production. This would cause an increase in quantity and value of exports. Thus a devaluation can improve the balance of payments by affecting both demand and supply sides through a reduction in real balances and hence absorption, and by reallocating resources through relative price changes. Together, these would serve to increase exports and reduce import demand. Other arguments for devaluation include a greater opportunity for export profits given improved competitiveness from devaluation, and thus attracting foreign investors and efficient reallocation of resources.

Liberalization of Prices, Foreign Exchange and Trade

The IMF advocates a deregulation of the economy by removing price, interest rate, trade and exchange controls, and subsidies. The rationale for this is that government intervention is a major source of inefficiency, especially in the allocation of resources. The Fund contends that the market is a superior mechanism for allocation of resources, given the adverse effects of regulation. The IMF therefore emphasizes the importance of "getting prices right", as a necessary condition for efficient allocation

of resources through the market process, which would bring about balanced growth and economic stability. However, price liberalization is advocated because it would not only eliminate price distortions caused by imperfect markets, government regulations, taxes, subsidies, and other quantitative restrictions but also because it would reduce absorption and hence improve internal and external balance.

It is argued that trade liberalization is advocated to promote exports and growth by correcting the shortcomings of import substitution or inward oriented strategies of development. These shortcomings include:

- the development of the manufacturing sector to the neglect of the other sectors;
- higher domestic cost of production resulting from inefficient plant size;
- increased unemployment because of the capital intensive nature of the strategy;
- small foreign exchange savings because of increased capital goods importation;
- distortions and welfare losses resulting from higher prices of manufactures goods and lower relative prices for agricultural output;
- increased budget deficits resulting from decreased revenue.

Belassa (1982), and Krueger (1981), argue that liberalization would cause resources to shift from import competing activities to export activities. Production would occur according to comparative advantage where there would be an increase in both traditional and non-traditional exports, and increasing returns to scale. Krueger (1981), argues that liberalization of trade and payments provides the potential for LDCs to raise their long-term annual growth rate and that import substitution strategies are inefficient because of misallocation of resources. With trade liberalization, there would be expenditure switching from import substitution and increased investment in favour of the export sector.

Foreign exchange liberalization is advocated to eliminate distortions of foreign exchange controls, which result in misallocation of resources of import transactions and restrictions, rationing which leads to favouritism and corruption, and an establishment of an underground market where something similar (or greater than) the free market price normally emerges. Krueger (1974), and Nowak (1984), argue that the consequence of the underground market is often devastating to the economy. Sheikh (1974), also argues that the promotion and production of tradables decreases the presence of smuggling.

2.4 Critique of IMF Conditionality

There have been numerous concerns raised regarding the nature and form of IMF conditionality, and the appropriateness of the Fund programs. The Fund is often accused of applying simple monetary analysis to problems faced by the members. The Fund gives credence to this by always imposing credit restraint ceilings in its conditionality, by being quite explicit that the monetarist approach to the balance of payments underlies the guidelines it imposes, and by the use of liberalization measures and market pricing which is in line with the monetarist philosophy. We have seen, however, that the Fund's approach, while firmly based on monetarism, is really eclectic.

A second concern is that the Fund ignores the different origins of balance of payments deficits and seeks to cure all of them using demand restraint. It is argued that where deficits are the result of global crisis, it is costly to deal with them using demand restraint. Rather, it would be appropriate to provide unconditional financing for general import price increases. The Fund's position is that demand restraint is indispensable in adjustment, and it does not matter what the source of the balance of payments imbalance is (Loxley, 1986).

A third concern is the preference for large, sudden adjustments in exchange rates, interest rates, subsidies, and prices. This shock treatment in many cases involves high initial costs in terms of growth, and employment. The costs have been documented in a number of specific country cases (See Foxley, 1981), and have given rise to riots in recent years in countries such as Zambia and Peru.

Fourth is the concern that the establishment of performance criteria in Fund conditionality and the withdrawal of IMF funding for failure to meet these criteria is very rigid and irritates borrowers. It is argued that the assumptions underlying the criteria should be well specified so that if the assumptions are not met for reasons beyond the control of the borrower, then the criteria could be amended. The Fund's response is that performance criteria give unambiguous indications, and that they cover variables that are monitored by the government (Loxley, 1986).

Fifth is the concern that the Fund programs do not address how the burden of adjustment would be distributed among different social groups. There is no attempt to guarantee employment levels, and no attempt for the preservation or extension of basic needs provisions. Some argue that the Fund programs have a bias toward shifting income from workers to property owners. There is some evidence that IMF programs cause sharp falls in real wages (See Foxley, 1981), because of the imposition of ceilings on money wages, in the face of general inflation, the removal of subsidies or price controls on basic consumption items, the raising of taxes or fees and reduction of government services, and an increase in unemployment due to demand restraint policies (Foxley, 1981). These policies, it could be argued, fit into the profit restoration approach to economic recovery which is also in line with the monetarist philosopy. The Fund takes the position that it has no mandate to interfere in matters of income distribution or basic needs provision.

Last is the concern that the IMF conditionality is pushing members to integrate into the world economy through trade liberalization and liberalization of payments.

On the trade side, the emphasis is on export promotion and equalization of domestic prices with world prices. On a larger scale, this helps restore the global rate of profit by reducing the real wages to workers in developing countries. On the payments side, IMF policies serve to enhance the internationalization of capital in the form of bank debt and direct investment. Hence the Fund encourages LDCs to remove obstacles to such flows and to place greater emphasis on policies designed to attract foreign direct investment. Fund conditionality might therefore be considered inconsistent with development strategies that emphasize national economic integration.

In addition to these criticisms, the IMF conditionality and the associated stabilization program has been criticized on both theoretical and empirical grounds. However, this critique is also appropriate for the World Bank structural adjustment programs and will be discussed after looking at those programs.

2.5 World Bank's Structural Adjustment Progam

The World Bank initiated its structural adjustment lending in 1980 with the objective of assisting developing countries experiencing balance of payments problems. Structural adjustment lending was to provide a quick-disbursing balance of payments financing alongside the traditional project lending. Originally it was expected that Structural Adjustment Loans (SALs) to a country would continue for three to five years (World Bank, 1988b, p. 1). However, adjustment lending has intensified because of the deteriorating terms of trade position of most developing countries, the debt crisis, and world wide recessions. These events have worsened the balance of payments problem in developing countries. Moreover, the scope of adjustment lending has widened with the introduction of Sectoral Adjustment Loans (SECALs). By 1988, the share of SALs and SECALs in the Bank's lending was about 25 percent (World Bank, 1988b, p. 1).

The World Bank has two alternative approaches to dealing with the balance of payments problem. If a payments imbalance is the consequence of an external shock which does not require a re-alignment of macroeconomic policies, the shock is normally short lived, and could be covered by short-term borrowing. Under this circumstance, the World Bank employs investment lending rather than adjustment lending (Jasperson and Shariff, 1990, p. 1). If on the other hand, the balance of payments problem is the consequence of internal imbalance stemming from mismanagement of domestic macroeconomic policies, then there is the need to correct such policies. Under such circumstances, adjustment lending is employed (Jasperson and Shariff, 1990, p. 1).

During the early 1980s, many of the countries that were candidates for the World Bank's SALs were pursuing expansionary demand policies. These policies manifested themselves in large fiscal deficits, rapid monetary expansion, accelerating inflation, unsustainable current account deficits, and large external debt. With such macroeconomic imbalances, any assistance to foster economic growth and development would require a comprehensive attempt to correct the imbalances. Two types of policy responses were initiated under the SAL. First was stabilization, and second, structural adjustment (World Bank, 1988b, p. 1). Hence, the SAL also has a macroeconomic policy conditionality aimed at correcting macroeconomic imbalances.

2.5.1 Conceptual Framework of World Bank Macroeconomic Policy Conditionality

The conceptual framework of the World Bank's macroeconomic policy conditionality is based on the "Berg Report". The Report: "Accelerated Development in sub-Saharan Africa: An Agenda for Action", was published by the World Bank in 1981. The report's major finding was that the macroeconomic imbalances in the countries

that were candidates of the SALs, were the cumulative effects of policy induced distortions in the factor and goods market which were created by rigidites in the countries, and weak institutions. These policies included price controls, over-valued exchange rates, administrative controls of interest rates which resulted in negative real interest rates, and large fiscal deficits. The large fiscal deficits, the report argued, resulted from external shocks, unsustainable high levels of government spending, inelastic tax systems, direct subsidies to state enterprises, indirect subsidies to consumers through reduced prices of goods and services by the public sector, and high interest payment on external and internal debt.

Such distortions often lead to an economy operating below its production possibility frontier, and the level of aggregate expenditure exceeds the output level. This creates an excess demand for both tradables and non-tradables. Excess demand for tradables results in current account deficit, while the excess demand for the non-tradables results in an increase in the price of non-tradables in absolute terms, and relative to the prices of tradables that are determined on the world market. The increase in the price of non-tradables leads to a real appreciation of the exchange rate.

If the resulting current account deficit is financed either by borrowing abroad or by running down reserves, the real appreciation of the exchange rate would hold. With the real appreciation of the exchange rate, there would be switching of expenditure and production patterns in the economy. On the expenditure side, there would be a switch from non-tradables to tradables, and on the production side there would be a switch from tradables to non-tradables. The consequence would be that the excess demand for non-tradables would be corrected at the expense of larger current account deficit.

If however, external funds are not available, then the nominal exchange rate would have to depreciate to offset the increase in the price of non-tradables. Under this cir-

cumstance, as long as the excess demand persists, there would be a continuous devaluation and inflation. For an economy in such a situation, there would be the need to re-align aggregate demand and aggregate supply, i. e. to stabilize the economy. Second, it would be necessary to effect a structural change that would increase the level of efficiency and flexibility of the economy, i. e. to undertake structural adjustment.

In response to criticisms from governments of recipient countries, academicians, and other critics, the World Bank has modified its initial approach to structural adjustment. The World Bank has realized that providing a stable macroeconomic foundation needs to be complemented by institutional reforms and supply side policies to increase economic growth. The experience of many developing countries that pursued structural adjustment policies in the 1980s drew attention to the impact of the adjustment program on the needs of the poor. The World Bank has attempted to address this issue by considering the social cost of adjustment policies in its program, and supporting policies and institutional changes to mitigate the social cost of the adjustment. The World Bank has also recently begun supporting policies and institutional reforms that enhance the role of women and protect the environment.

Based on this conceptual framework and modifications, structural adjustment policies can be categorized into three main groups. These are:

- absorption reduction policies;
- expenditure-switching policies;
- supply-side growth oriented policies and institutional reforms.

2.5.2 Tools of Structural Adjustment Programs

The tools of structural adjustment programs can be classified into three groups alongside the objective of the program mentioned above. Regarding absorption reduction,

the conventional tools are fiscal and monetary policies. The fiscal policy focuses on deficit reduction which is always identified as the major element explaining excess demand. This requires a reduction in government expenditure, and efforts to increase government revenues. This is accompanied by a tight monetary policy.

To complement aggregate demand reduction are expenditure-switching policies aimed at restoring internal balance through relative price changes. This include relative price increases of tradables through real depreciation of the domestic currency which allows the re-allocation of resources away from the non-tradables to the tradables, deregulation, and wage policy reforms.

The supply side growth oriented policies and institutional reforms focus on trade liberalization, sectoral reforms, especially the manufacturing and industrial sector, the agricultural sector, and the energy sector, financial sector reforms, improving the supervision of the banks, improving the infrastructural network, rationalization of government finance and administration, public enterprise reforms, privatization, improving managerial skills, enhancing and supporting women in the small-scale industrial sector, supporting the provision of basic social needs like primary health care, family planning, nutrition, and primary education to the poor, and supporting policies for environmental improvements such as the removal of subsidies that encourage excessive use of fossil fuels, irrigation water and pesticides, and excessive logging (World Bank, 1990, 1991, 1992).

2.5.3 Stabilization versus Structural Adjustment

The IMF is usually associated with stabilization and the World Bank with structural adjustment. However, as is evident in the previous sections, the activities of the two multilateral financial institutions overlap in many areas making it difficult to identify the IMF with stabilization and the World Bank with structural adjustment.

It would therefore be appropriate to distinquish between stabilization and structural adjustment at this point.

Stabilization describes the process of restoring the balance between supply and demand in the economy with respect to goods and services, and foreign exchange. It traditionally implies short run policy changes that affect macroeconomic variables like balance of payments, gross domestic product, rate of inflation etc. etc. with a major emphasis on demand management, and a residual role for supply stimulation.

Structural adjustment goes beyond stabilization to include policies to stimulate production. Thus, it involves changes in the structure and direction of the economy like changes in sectoral priorities, as well as institutional changes.

The theoretical and conceptual framework of IMF and World Bank supported programs in the previous sections clearly indicates that neither of the two multilateral financial institutions is strictly involved in either stabilization or structural adjustment. The Fund supported program goes beyond stabilization to include supply side policies aimed at full and efficient utilization of existing production capacities through its Extended Fund Facility (EFF), Structural Adjustment Facility (SAF), and the Enhanced Structural Adjustment Facility (ESAF). On the other hand, the World Bank supported program also has a wide range of macroeconomic policies with a provision for balance of payments support. There is, however, a formal provision for information sharing which was enhanced with the introduction of adjustment loans. The World Bank relies on the IMF for views on exchange rate, monetary and fiscal policies, and foreign borrowing policies including the establishment of medium term targets for current account portion of the balance of payments. The IMF on the other hand, relies on the World Bank for views on development priorities, including the size and composition of investment programs, recurrent outlays in development programs, efficiency of resource use, and micro pricing decisions. An expression of co-operation is shown in the normal practice of the World Bank in not advancing Structural Ad-

justment Loans (SALs) until countries have first reached an agreement with the IMF, even if the countries have strong disagreement with the IMF on its policy measures. It must be mentioned, however, that in general, conditions for repayment of World Bank loans are preferable to those of the IMF because of their lower interest rates and longer maturity dates. Furthermore, the size of the Bank's loan is not limited to the member's subscription. As a result of the overlap in the programs of the two institutions, subsequent discussions treat the two programs jointly.

2.6 Critique of Stabilization and Structural Adjustment Programs

Because of their chequered performance stabilization and structural adjustment programs have been frequently criticised by governments, and others in recipient and other countries. Most developing countries therefore invite the IMF/World Bank policy conditionality as the last resort. The criticisms are mostly associated with two main viewpoints, the Keynesian and the Structuralist schools of thought.

2.6.1 Keynesians Critique of Stabilization and Structural Adjustment Programs

The Keynesian school of thought criticizes the absorption approach of the IMF on the following grounds:

- the concentration on monetary factors to the exclusion of other real factors;
- the reliance on the Walrasian law of general equilibrium;
- the assumption of full employment and constant velocity of circulation.

In the absorption approach, reduction in public expenditure is pursued to correct internal imbalance. However, government expenditures in education, health facilities, sanitation, roads, bridges, and agricultural services, can raise income and productivity, and are justified on development grounds. This was implied by Frenkel and Johnson (1976), when they argued that the absorption approach pays little attention to real income and resource allocation in the economy. The Fund's view on this is that the logic of this criticism is the establishment of tax preferences, subsidies, price controls, selective credit and interest regulations, which may impede the correction of balance of payments disequilibrium and trade liberalization.

The IMF approach has been criticized also on the basis of its theoretical underpinning of the Walrasian law of general equilibrium. Tsiang (1977), argues that Walras' law applies to simultaneous settlement of all exchange transactions in all markets at a single set of prices. This he argues, cannot be achieved in the real world since transactions and expenditures are not synchronized. The general equilibrium theory tries to ensure "Pareto efficiency". This is however achieved when markets are perfect. In less developed countries, there is a prevalence of highly imperfect, fragmented, and under-developed product and resource markets, making the achievement of Pareto efficiency very difficult.

Furthermore, the use of the Walrasian law of general equilibrium that focuses on the money market with very little attention to the other markets also leaves some room for questioning. From the theory of "second best", it is inefficient to liberalize some markets and not others, hence trade liberalization is unlikely to achieve optimal solutions when the financial sector and other markets are imperfect.

The credibility of the approach is also questioned on the validity of the assumptions of full employment and the constancy of velocity of circulation. The experience of most developing countries is the prevalence of less than full employment of all factors. Furthermore, the Keynesians argue that the velocity of circulation is a function of a

number of variables including the price level, interest rates, wealth, and real income. Variations in these variables may therefore result in variations in the velocity of circulation (Frenkel and Johnson, 1976).

2.6.2 Structuralists Critique of Stabilization and Structural Adjustment Programs

The structuralists argue that the demand restraint measures recommended by the IMF are detrimental to the growth of most developing countries. The argument is based on the premise that the characteristics of less developed economies are significantly different from those of developed economies. As a result, the impacts of the IMF's stabilization program on the economies of less developed countries are different from those on developed countries. Examples of these characteristics are, the dependency on imported capital and consumer goods, the inelastic food supply, the reliance on primary commodity exports for foreign exchange, low productivity of the agricultural sector, imperfect market structures and under-developed financial institutions.

The structuralists argue that the balance of payments problem facing most LDCs is the result of increased importation of capital and intermediate goods for industralization. Restraining demand to correct balance of payments problems is therefore synonymous with the retardation of growth resulting from unavailability of capital inputs. Taylor (1983), also argues that restricting credit causes an increase in interest rates, and consequently an increase in capital cost. The increase in capital cost in turn decreases importation of intermediate goods which may lead to a recession.

The under-developed financial sector in most LDCs limits the efficacy of price signals in the stimulation and switching of production (Loxley, 1986). Efforts to mobilise savings may be relevant only to urban areas since most rural areas do not have access to banking institutions. Futhermore, savings and capital flows tend to

be influenced more by the political climate and the nature of the economic system in LDCs, than by interest rates. Savings and capital flows may not increase in a politically unstable system regardless of the magnitude of the increase in interest rate.

The program emphasizes demand management for correcting imbalances. However, most LDCs have economies constrained by supply rather than demand, and it would seem more appropriate to emphasise supply expansion rather than demand restraint to correct imbalances.

Other criticisms stem from the shortcomings of the export oriented strategy to growth for the LDCs (Taylor, 1983). First, the primary commodities of the LDCs are very vulnerable to price decreases, while import prices tend to be relatively stable on the world market. Hence, LDCs are very vulnerable to external terms of trade deterioration which could have far reaching adverse effects on their economies. Second, relative price increases that are biased toward the tradable sector may turn the internal terms of trade against non-tradables which could undermine important domestic sectors like the food crop sector. Third, external shocks, like recession in developed countries, could impact on the external trade sector of the LDCs.

Furthermore, the infusion of foreign capital together with the IMF and World Bank conditionalities, has forced LDCs into a debt trap. Avramovic (1991), found that external debt in sub-Saharan Africa is growing at 10 percent per year as interest is added on interest. As a result, the LDCs are spending a considerable amount of export revenue to service their foreign debt, leaving few funds to support domestic investment.

Regarding inflation, the structuralists argue that the emphasis on demand restraint policies to control inflation implies that inflation in the LDCs is essentially demand pulled. However, structural characteristics in the economies like low agri-

cultural output, could have a considerable impact on inflation. Worse still, some of the policies of the programs are themselves inflationary. For example, the reliance on market forces for price determination could result in high prices due to shortages; elimination of price controls and subsidies could cause prices to increase; an increase in interest rates to positive real levels to motivate savings and contract credit, could lead to cost push inflation. High rates of inflation could also lead to wage push inflation as labour fights to preserve purchasing power.

On devaluation, the structuralists argue that the efficacy of a devaluation depends on the demand elasticity of exports and imports, as well as on inflation. For a country facing an inelastic demand for its exports, a devaluation is likely to result in deteriorating terms of trade which could have adverse effects on the trade balance and the balance of payments. Also, short run supply responsiveness of LDC's exports to a devaluation induced producer price increase is very slow relative to the long run, because of the gestation period of most of the exports, and the lag time between investment and realization of outputs.

Devaluation increases the domestic cost of imported capital, intermediate and consumer goods, and usually translates into an increased general price level. The increased general price level could result in decreased demand and consequently a reduced supply. The reduced supply could then lead to higher unemployment, hence stagflation. Also, continuous devaluation together with foreign exchange liberalization could increase capital flight, and hence destabilize the economy by worsening the external imbalance.

The structuralists have also criticized the distributional impacts of these programs. It is often argued that the programs tend to serve the interests of the owners of capital and producers of tradable commodities at the expense of working and other classes through reduced real wages and social services.

Even though the World Bank has made some attempts to address these issues in the modifications to the structural adjustment program, for example the supply-side growth oriented policies, the institutional changes, and the poverty alleviation policies, there is still scope for improvement.

2.7 An Evaluation of Stabilization and Structural Adjustment Programs

Conceptually there are a number of different yardsticks for evaluating stabilization and structural adjustment programs (Loxley, 1990). The various alternatives are:

- comparing the economic performance during the program to the economic performance prior to the program - the before-after approach;
- comparing actual economic performance under the program to the specific targets or objectives set out at the beginning of the program - the actual versus target approach;
- comparing the economic performance under the program to what the performance would have been without the program - the counterfactual approach;
- comparing the economic performance of the countries with the program to the economic performance of the countries without the program - the with-without approach.

All of these alternatives have their shortcomings. The studies tend to aggregate all or most countries together, expressing results in broad percentages. This hides the extremes and different performance by different countries. The before-after approach

has a problem regarding the extent to which the programs were actually implemented, and whether the programs or exogenous factors were responsible for actual performance. The performance criteria throws more light on the relationship between performance and performance criteria. The exclusion of countries whose progams were cancelled because of failure to comply with agreed terms limits the usefulness of the analysis. With the with-without approach, most countries turn to the Fund and the Bank for assistance only when their economic situation is untenable, and few develop any alternative program even if they disagree with the IMF and the World Bank. This is mainly because if foreign exchange is a critical constraint, there are very few alternatives but to turn to the Fund and the Bank. Most studies draw on the first and last of these and their findings have been, at best, ambiguous, although it appears that Fund/Bank programs performed slightly better in the later 1980's than in earlier periods. With these reservations, a summary of evidence of the extent to which the IMF and the World Bank programs have impacted on the economies of countries that have implemented them is given below.

Comparing the economic performance of 24 countries during an IMF program to the economic performance prior to the program, Killick (1984), found that balance of payments and current accounts balance deteriorated, inflation was reduced, and that economic growth was higher in the first year but was eroded in subsequent years. Pastor (1987), using the same approach for 18 Latin American countries, concluded that balance of payments improved but that there was no effect on current account, inflation, nor growth in nominal GDP. In a study on Latin American southern cone countries, Diaz-Alejandro (1981), observed rather disappointing results regarding inflation which he attributed to the frequent devaluation of the domestic currency. Diaz-Alejandro also observed that although exports responded favourably to trade liberalization policies, the crawling peg exchange rate policy worsened the balance of payments because increased capital flows caused an appreciation of domestic currency

and made exports less attractive.

Donovan (1981, 1982), compared the economic performance of a group of 78 countries made up of countries with the IMF program and countries without an IMF program. He concluded that the balance of payments and current account positions improved for countries with the programs, but such countries did no better in terms of inflation and economic growth than countries without programs. Applying the same tests to a group of 38 least developed economies, Loxley (1984), observed that on the average, the least developed countries with programs did not do any better in terms of current account, balance of payments, and economic growth, than other least developed countries without the programs. Goldstein and Montiel (1986), argued that for a sample of 58 developing countries made up of program and non-program countries, there was higher inflation, slower growth, larger current account deficit, and larger overall balance of payments deficit in the preprogram period in program countries relative to non-program countries. After adjusting for these program differences, they observed that there was no statistically significant effect of the programs on current account, balance of payments, rate of inflation, and economic growth.

Zulu and Nsouli (1985), constructed before and after measures for 22 African countries. They found that for 60 percent of the cases, growth was lower or the same in the year after the program, and that there was an even split for current account and inflation with as many countries showing an improvement in current account and inflation as those showing a worsening change.

These studies have been criticized for not using appropriate statistical techniques to test for the significance of the differences in the evaluations. Hence, Kahn (1990), used econometric techniques to test three alternative estimators; the before-after estimator, the with-without estimator, and a generalized evaluation estimator that corrects for the biases in the two estimators. He observed that there was no conclusive evidence that IMF programs lead to high rates of inflation and declining economic

growth. He observed that in the first year, there was an improvement in the balance of payments and current account, a reduction in inflation, and a decline in economic growth. During the medium term, he observed that demand reducing elements dominated, with depressed output, improved balance of payments and inflation. In the long run, the positive effect on the balance of payments and inflation were strengthened while the negative effect on growth was reduced. He also observed that supply-side enhancing policies took effect after a lag.

The World Bank also observed that on the average, countries that received adjustment lending in the 1980s had moderately higher imports, exports, and GDP growth than others (World Bank, 1988b). Regarding specific policy areas, the following assessments were made. In trade, there was a strong response to export volume; trade balance in most adjusting countries improved but in some instances, the improvement was the result of unavailability of financing for imports. In external sector, it was observed that the external debt of developing countries rose rapidly relative to exports. Fiscal policy and expenditure cuts could not be maintained; initial deficit reduction could not be sustained, and tax reforms had limited success. In public sector management, institutional reforms and divestiture were slow especially in sub-Saharan Africa; there was a reduction in enterprise losses but that was mainly through price increases rather than efficiency improvements. In the financial sector, the reforms were often protracted and required a sound macroframework. In the agricultural sector, there were some improvements in pricing policies but supply response to price was constrained by institutional factors. Reform of the parastatals was slow. In the industrial sector, the reforms had not received much attention. Lastly, the Bank concluded that the social costs of adjustment efforts, especially the impact on the poor, needed more attention.

Corbo and Rojas (1991), argued that an evaluation of the effectiveness of the structural adjustment program is influenced by non-program shocks to the economy

such as drought, earthquake, and world economic conditions; hence these effects have to be isolated. Isolating the external shocks and conditions, they observed that adjustment lending programs increase the rate of growth of GDP, exports to GDP ratio, increase saving to GDP ratio, and decrease the investment to GDP ratio.

The review of the literature on the evaluation of IMF and World Bank supported programs indicates that the programs have had very little impact in improving the socio-economic conditions in developing countries. Fischer (1986), observed that many of the adjusting countries were burdened by overwhelming debt and had to implement austerity measures which provided little room for growth. The World Bank (1989b, p. 2), admits that as a result of deteriorating external factors and policy weaknesses in the 1980s, the economic performance of developing countries has fallen short of expectations.

From these later studies, therefore, it appears that IMF/Bank programs do tend to help exports recover but they are uniformly accompanied by reduction in the rate of investment with possibly serious consequences for future growth. Much of any short-term improvements in the economy appear debt-driven while supply side reforms appear to be more difficut to achieve than first envisaged.

2.8 An Alternative Approach to Stabilization and Structural Adjustment

The evaluation of the IMF and World Bank programs reveals that the programs have not achieved the primary objective of stimulating and sustaining economic growth with price stability. It is questionable whether LDCs can emerge out of the current economic problems on the basis of the orthodox stabilization and structural adjustment programs. The programs have not been effective because of the following:

- the programs address symptoms rather than causes of the economic problem;
- the programs ignore the structural characteristics of respective developing economies;
- the programs ignore other factors that are essential for the development in developing countries.

The inability of these programs to produce desired results in developing economies is not a justification for the abandonement of stabilization and adjustment programs but an incentive to explore an alternative approach to stabilization and adjustment. In trying to explore an alternative approach, it is important not to downplay the contribution of the governments of developing countries to the economic crisis. It is true that external shocks have contributed significantly to the poor economic performance of developing countries, inappropriate economic policies by governments of developing countries like unproductive spending on bureaucracy, defence, luxury consumption, and poor investment, as well as discrimination against the rural sector and export products, have played a part in exacerbating the economic situation in developing countries. The alternative policy package should be tailored to the specific structural characteristics of the economy in question; should rely more on selective policy instruments designed to influence particular sectors or industries rather than those designed to have an economy-wide impact; should be more sensitive to distributional impacts especially in the provision of basic needs, goods and services; and should avoid a blanket commitment to an export-oriented model of growth. The emphasis should be on a gradual approach and a more equitable adjustment that would lead to a well integrated national economy. Economic growth should be viewed as a necessary but not a sufficient condition for economic development in developing countries. Specific policy measures to consider include the following:

- foreign exchange rate adjustments;

- improving public revenue and its distributional patterns;
- tailoring the pattern of international finance and trade to satisfy needs;
- providing institutional support for the adjustment program;
- relaxing IMF and World Bank loan conditionalities and providing more concessional loans;
- providing debt relief for developing countries.

These specific policy measures are discussed below. It must be mentioned that some of the policy measures advocated contradict those of the IMF and the World Bank while others complement the efforts of the two multilateral institutions in ensuring a self-sustaining economic growth and development with equity.

2.8.1 Foreign Exchange Adjustments

Even though sympathetic to the structuralists arguments discussed earlier, it should be realized that sometimes under a fixed exchange rate regime, the domestic currency becomes so over valued in real terms that a general devaluation becomes necessary. Critics of devaluation frequently quote Nicholas Kaldor, who argued against devaluation emphasizing the inability of devaluation to improve balance of payments and the inflationary impact of devaluation (Kaldor, 1983). However, Kaldor also pointed out that under situations where the costs of production of a country's staple exports get seriously out of line with world prices expressed in real terms of local currency at the prevailing exchange rate, devaluation is warranted (ibid). Under a such situation, the task is to implement the devaluation policy and still minimize its impacts. To accomplish this, a gradual approach should be preferred to the shock treatment in the form of large devaluations recommended by the IMF. Initially, the rate should

be devalued sufficiently enough to enable the government to pay increased producer prices in real terms and reduce the budget deficit, while protecting the basic needs expenditures. After the initial adjustment, small frequent adjustments should be implemented to gradually approach the recommended level. Most importantly, there should be a 'front-end loading' of the balance of payments support from the IMF, the World Bank, and bilateral donors, where the initial devaluation is preceeded by a significant inflow of foreign exchange to improve import capacity. This would provide the necessary intermediate inputs, and remove the physical impediments to supply side expansion. For economies with a very strong underground market in foreign exchange, and a lot of private remittances and transfers, a policy to institutionalize foreign exchange bureaux, i. e. legitimizing the underground market in foreign exchange, as the IMF has pursued in some countries, would help stabilize the exchange rate, remove enormous pressure on foreign exchange demand in the central bank, switch transactions from unofficial to official channels, and provide extra tax revenue. Under this, there would be a dual or multiple exchange rate system. An official central bank rate would be established at an appreciated rate to prioritize the allocation of foreign exchange for essential imports, goods and services, and other rates established under a competitive market system at a formalized parallel rate. The exchange rate established by the market forces is often at a depreciated rate to discourage non-essential imports and to provide incentives for non-traditional exports. The foreign exchange bureaux should however be under the strict supervision of the central bank.

2.8.2 Improving Public Revenue and its Distributional Pattern

The market economy serves to secure an efficient use of resources in the provision of private goods. Consumers reveal their preferences by bidding what they wish to buy. Producers produce what consumers want to buy at the least cost, and competition ensures the proper mix of goods to satisfy consumers preferences. This view is a highly idealized picture of the market system but many difficulties may arise. For example the market system cannot function effectively in the presence of externalities where the social benefits of the program exceed the private benefits, or where consumption cannot be limited and charged to particular consumers (non-excludability), or benefits could accrue to individuals simultaneously without mutual interference (non-rivalry). Under these conditions, public policy and the pattern of its expenditure is paramount in ensuring the availability of social needs. The IMF/World Bank programs in many ways aim at curtailing the role of government in economic activities on the assumption that governments are inefficient and ineffective. As much as there might be an element of truth in this allegation, one should not lose sight of the fact that governments do have an obligation to cater for the welfare of the people, and have delivered the goods in many instances where the private sector has failed in improving the welfare of the people. The solution, therefore, does not necessarily lie in curtailing the role of the government, but rethinking the role of the state in the economy, improving the revenue generating potential of governments to finance expenditures, and eliminating superfluous expenditures.

The alternative approach should therefore remove waste in the public sector, find ways of generating revenue, and have only a limited and realistic use of deficit financing. Specific policies should include a review of the tax laws to broaden the tax base; an improvement in the efficiency and probity of the tax collection machinery;

imposition of high tax rates on conspicuous consumption; reduction in government expenditure on defence and on non-productive public sector activities; removing subventions to parastatals except for those in the social sector and the nationally strategic industries; restructuring parastatals to enable them contribute positively to government revenue; restricting the use of deficit financing for infrastructure and profitable productive investments that have very little import content; switching public expenditure patterns to cater for education, health, sanitation, and the provision of good drinking water without necessarily increasing total government spending; and adopting pricing policies and selective subsidies for essential commodities to ensure their availability and affordability. Availability of health care facilities together with social amenities are critical in satisfying the social needs of the population. This would help raise living standards. Investment in human capital would provide the essential knowledge and skills needed for development. An improvement in the infrastructural network would facilitate development.

Fiscal policy needs to be more nuanced, therefore, than current IMF/IBRD approaches, which would undoubtedly, encompass some of the above measures, and much more sensitive to social concerns.

2.8.3 Tailoring the Pattern of International Finance and Trade to Satisfy Needs

The pattern of international finance should be considered against the background of economic growth in developing countries. There is the need to generate foreign exchange from both domestic and international sources to support the quest for economic stability and growth in developing countries. Specific policies should include efforts to increase the level of foreign credit from bilateral and multilateral agencies to developing countries; negotiations to limit debt service ratios to levels consistent with

the sustenance and acceleration of growth and development; strengthening monetary and financial co-operation and trade; and negotiating for bilateral and multilateral agreements on primary export commodities.

2.8.4 Providing Institutional Support for the Adjustment Program

Inefficient operations of institutional structures in developing economies impede development. Hence, an improvement in the operations of these institutions would undoubtedly accelerate the developmental process. Institutional changes or reforms are therefore necessary to support the stabilization/adjustment process. These should include a reform of the financial institutions to ensure strict financial discipline, accountability, and effective supervision from the central bank (with which the IMF/IBRD would undoubtedly agree); the creation and strengthening of rural financial institutions for increased mobilization of rural savings; the creation of special funds for loans to food crop farmers, small-scale industrialists, and agro-based industrialists; strengthening agricultural research that focuses on production, storage and processing; improving extension services for dissemination and application of research findings; establishing community development institutions, especially non-governmental organizations that would support self-help projects; and establishing institutions that would ensure a greater mass participation in decision making and implementation of programs.

2.8.5 Relaxing IMF and World Bank Loan Conditionalities and Providing More Concessional Loans

Some changes are needed in the conditionality of loans so as to improve the relations between the LDCs and international lending agencies, and to have a co-operative effort in stabilization and adjustment. First, member country governments requesting adjustment assistance should be encouraged to submit their own programs of adjustment instead of the agencies preparing country programs. Second, the agencies should decide on the loans on the basis of their assessment of the debt-servicing capacity and financial management of borrower. This would modify the current system where the conditionality influences the national economic policy in a particular direction. Third, a system should be established where there would be regular exchange of views between the borrowers and the agencies. This would enable a policy dialogue to continue in a consultative manner.

2.8.6 Providing Debt Relief for Developing Countries

Debt relief is needed for a self-sustaining economic growth and development in many LDCs. Availability of foreign exchange is needed to support domestic growth and settle balances in international trade. The foreign debt burden in many LDCs and the decline in export commodity prices, have impacted on the foreign exchange availability and consequently on economic growth and development. Furthermore, at the current level of domestic savings, and international commodity prices, most LDCs cannot undertake reconstruction, modernization, and expansion of domestic resources without foreign capital inflow. However, the capital inflow would not take place until the debt is cleared. Hence, the need for a debt relief. Despite the political and technocratic efforts made since 1986 to arrest the debt crisis, the actual results have been very disappointing. The traditional form of debt rescheduling on conventional terms has

proved ineffective, and has led to a steady accumulation of debt to bilateral creditor governments (Avramovic, 1991). Debt forgiveness of official bilateral debt, has also had limited effect especially in low income African countries. For example, by the end of 1989, the total amount of debt forgiven or converted from official bilateral debt was about 6 billion U. S. dollars. This reduction represented less than 10 percent of the total bilateral debt of 64 billion U. S. dollars (Avramovic, 1991). The World Bank, as a matter of policy, neither reschedules its loans nor scales them down. Despite the introduction of Structural Adjustment Facility (SAF), and the Enhanced Structural Adjustment Facility (ESAF), IMF has been withdrawing resources from sub-Saharan Africa for several years. Net transfer from sub-Saharan Africa to IMF averaged about 0.7 billion U. S. dollars per year from 1986-1990 (Mistry, 1991).

There is the need for a more coherent framework for debt-relief from all forms of debt: bilateral, multilateral, and private. The policy reforms should include the implementation of the "Trinidad Terms" which were first introduced by the British Prime Minister John Major, when he was the Chancellor of the Exchequer, at the Commonwealth Finance Ministers meeting in Trinidad in 1990. The measures include the rescheduling of the entire stock of debt instead of the current renegotiations in tranches; increasing the amount of relief provided by cancellation of outstanding debt from one-third to two-thirds; capitalizing all interest payments (at market rates) on the remaining one-third debt stock for a period of five years and requiring phased repayment with a steady increase in line with export and output growth of the debtor economy; and extending repayments of the remaining one-third stock over a period of twenty five years with a flexible repayment schedule. Furthermore, the Dutch Development Co-operation Minister Jan Pronk's proposal at the second UNO Conference on LDCs in Paris in September 1990, urging creditor countries to cancel all bilateral official debt to the LDCs that are severely debt-distressed and other low-income countries pursuing acceptable economic reform programs, should be adopted. Efforts

should be made to reduce the interest rates applied to rescheduled debt especially for lower- income countries. On multilateral debt, the international community should pressure the IMF Management and Board to reconsider the conditionality blocking access by some LDCs to the SAF and ESAF, and adopt a policy of zero net transfers to LDCs, through a replacement of debt service on Upper Tranche facilities with E-SAF disbursements, for at least a decade. The Fund's membership should agree to a special release of SDRs to anable the IMF write off its debt to low-income debt distressed countries. The World Bank should improve its debt-relief efforts by reducing the IBRD obligations through a restructuring of IDA financing.

2.9 Need for a Country Specific Macroeconometric Simulation Model

The critique and evaluation of the stabilization and structural adjustment programs clearly identify some important issues that need to be addressed. First, rather than having a blanket application of the policies for all LDCs, the program has to be country specific. Second, as the Fund and the Bank would argue, macroeconomic stability is essential for economic growth and development. Third, the inappropriate use of the Walrasian general equilibrium concept for the LDCs, as argued by the Keynesian school of thought, suggests that a simulation model rather than a general equilibrium model might be more appropriate. Fourth, the analytical framework should capture the structural characteristics of the respective countries regarding the nature of external trade, the nature of the fiscal sector, the wage-price determination process, etc. etc. Fifth, the framework should have intereactions and linkages between different sectors of the macroeconomy. In an attempt to address this issues, a country specific macroeconometric simulation model that attempts to capture the structural

characteristics of the Ghanaian economy, is used to evaluate the impact of IMF and World Bank policy prescriptions during Ghana's economic recovery program.

Chapter 3

The Structure of the Ghanaian Economy

3.1 Introduction

The primary objective of the thesis, as stated in the first chapter, is to build a macroeconometric model that adequately captures the structural characteristics of the Ghanaian economy, and to use the model to analyse the impact of domestic policies and external events on the Ghanaian economy. To understand and be able to rationalize the essential features of the model, a knowledge of the structure of the Ghanaian economy is necessary. The chapter therefore gives a comprehensive account of the structure of the Ghanaian economy with respect to the major productive sectors, the financial sector, and the nature of Ghana's external trade.

3.2 Ghana's Economic Structure

Essentially, Ghana has an agricultural and minerals based economy oriented towards the production of primary commodities and minerals for export. The foundations for the existing structure of the economy were laid during the last decade of the nineteenth century, and the first decade of the twentieth century, through the development and transformation of the forest belt to increase agricultural production for export. Small export trade existed before this but was based largely on the collection of naturally occuring forest produce like palm fruits, palm kernels, kola nuts and wild rubber (Birmingham et al. 1966). The transformation resulted in the replacement of the export trade by two major economic activities, namely, cocoa farming and gold mining. Cocoa farming and gold mining have since dominated Ghana's economy and dictated the pace of economic growth.

Despite the predominance of the cocoa and the gold mining sectors, other agricultural/forestry activities, for example, food crop farming, oil palm production, production of logs and sawn timber, as well as other mineral production like manganese, bauxite and diamonds, also contribute to the real sector of the economy. During the early 1960s, there was a considerable effort to expand the manufacturing and industrial sectors of the economy, and to industralize the agricultural sector (Birmingham et al. 1966).

The energy sector also contributes to the Ghanaian economy through the generation of hydro-electric power by the Akosombo and the Kpong hydro plants, and the drilling of oil on a minor scale along the coast of Saltpond and Tano.

The major productive sectors of Ghana's economy are, therefore, the agricultural and forestry sector, the cocoa sector, the mining sector, the manufacturing and industrial sector, and the energy sector. The services sector, dominated by petty trading and transportation, is another important sector. Detailed discussions of the various

sectors are given below.

3.2.1 The Agricultural and Forestry Sector

Ghana is predominantly an agricultural country. Agricultural activities including livestock, fisheries, and forestry account for about 51 percent of the country's gross domestic product (GDP), and about 57 percent of its employment. The principal export crop, cocoa, accounts for about 65 percent of the country's export earnings (World Bank, 1983). The cocoa sector is enough to warrant separation from the other agricultural activities and is therefore discussed separately in the next section.

The dominance of the agricultural industry in Ghana is permitted by the diverse vegetation in the country resulting from climatic factors, especially the volume and distribution of rainfall. The highest rainfall occurs in the extreme south-western corner of the country which coincides with the rain forests area. Lesser rainfall is however recorded in the rest of the south-west and the south-east resulting in semi-deciduous forest areas. The rainfall declines towards the north, and the forest zones give way to the savannah woodland. Apart from these, two main vegetational zones, i. e. forest and savannah woodland, there are relatively small areas of coastal scrub and grassland. In terms of fertility of the soil, the forest zones are highly fertile, while the savannah zone is low in fertility.

The agricultural production pattern follows the vegetational zones. The savannah zone is used primarily for the production of maize, rice, millet, groundnuts, guinea corn, tomatoes, yams, and for cattle ranching. The forest zones are used for the production of plaintain, cocoyam, cassava, oil palm, citrus, banana, and maize on a minor scale. The coastal scrub and grassland are used for maize, cassava, copra, rice, onions, and livestock (Birmingham et al. 1966).

Agricultural production in Ghana uses relatively large inputs of land and labour

and scarcely any conventional capital input except on the savannah woodland in the north and the coastal grassland, i. e. the Accra plains. Farmers rely mostly on traditional implements, for example, cutlasses and hoes, the natural fertility of the soil, and rainfall, in their production practices. The average size of holdings is small, about three acres, and farmers practice mostly shifting cultivation. Average crop yields are relatively low, and farmers produce basically for subsistence.

The performance of the agricultural sector leaves room for improvement. The impact of improved production practices like the use of improved high yielding hybrid seeds, fertilizer and insecticide application, and the use of bullock-drawn ploughing implements in the savannah areas, are still to be felt. Lack of good and effective agricultural extension programs, poor agricultural policies, and scarcity of foreign exchange for the importation of technologically improved appropriate equipments and other inputs, are among the various reasons for the poor performance of the agricultural sector. The continued reliance on rainfall for agricultural production puts the country's food security at big risk since the effect of delayed rains or rain failure are very devastating on the food crop sector.

From the vegetational zoning in the country, forests cover over a third of the total area making the forestry sector one of the major productive sectors. Timber and forest products account for about 5 percent of the GDP, employ about 15 percent of the total labour force, and are the third highest foreign exchange earner after cocoa and gold (World Bank, 1983). Production of forestry products mainly logs and sawn timber is carried out by private entrepreneures.

Lack of managerial and organizational skills coupled with some bottlenecks like the deterioration of port facilities, breakdown of the transportation system, especially the railway system, and the lack of foreign exchange for the importation of equipments and spare parts, are some of the reasons for the low productivity of the forestry sector. An orientation of the forestry industry towards vertically integrated

operations emphasising processed and manufactured forestry products rather than logging, which currently dominates the industry, could improve the productivity of the forestry sector.

3.2.2 The Cocoa Sector

The importance of the cocoa industry in the Ghanaian economy cannot be over-emphasised. The cocoa industry contributes about 11 percent to the GDP, employs about 24 percent of the total labour force, and accounts for about 65 percent of the total export earnings (World Bank, 1983). Tax revenue from the cocoa industry, i. e. cocoa export tax and tax on domestic cocoa production, is a major source of government revenue.

There are three major cocoa products demanded on the world market. These are cocoa beans, cocoa butter and cocoa powder. The cocoa butter comprises about 55 of the usable content of the raw bean, and the cocoa powder, the non-fatty component, comprises about 45 percent of the raw bean. The two major products manufactured from these are cocoa powder and chocolate. Ghana exports predominantly the dried cocoa beans which are fermented and dried by individual farmers at the farm level.

Cocoa production in Ghana occurs in the semi-deciduous forest areas concentrated in the Ashanti, Brong-Ahafo, Western, Central, Eastern, and Volta Regions. With the exception of the cocoa plantations of the Ghana Cocoa Board, (Cocobod), which produce cocoa on a relatively larger scale using capital intensive production techniques, cocoa production in Ghana is predominantly on a smaller scale using labour intensive production techniques involving mainly family labour, with very little mechanization.[5] The labour intensive production technique is primarily due to the climatic conditions suitable for the cultivation of cocoa, i. e. adequate rainfall and

[5]The plantations were placed on the divestiture program in the ERP.

good protection from the sun's rays by the presence of tall tress, which render mechanized production techniques very difficult and expensive. A large number of the farms are however placed under the care of share-croppers, for example, the "Abusa system", where the caretaker takes a third of the proceeds. A hardier and high yielding hybrid variety is currently being cultivated in place of the old variety, the Amelonado, and the Amazonian. The hybrid variety is early bearing, after 3-4 years, compared to 6-7 years for the old variety. The cocoa tree comes into full bearing after 25 years and has an economically productive life span of between 50 and 60 years (Lass and Wood, 1985).

The Ghana Cocoa Board (Cocobod) has the sole right of purchase and export of cocoa in the country. The Cocobod is responsible for the inspection, grading, purchasing, storage, and transportation of cocoa to the ports through the Produce Buying Division (PBD) of the Cocobod which has buying centres in the production areas. The farmer is paid a set price, i.e. producer price, formally set by the government in collaboration with the Cocobod.

Of late, the cocoa industry has fallen on hard times. From the time of its introduction, cocoa output increased consistently, and attained its maximum output level of 571,000 tons in 1964-65 (Ewusi, 1986), accounting for 38 percent of the world's supply of cocoa beans, and made Ghana the world's leading exporter of cocoa beans (Ewusi, 1986). Cocoa output started falling thereafter and reached the lowest output level of 154,000 tons in 1983-84, accounting for only 11 percent of the world's supply (World Bank, 1987). Ghana then lost its leading producer status for a distant third after Ivory Coast and Brazil. Several factors accounted for the decline in cocoa production. The relatively low real producer price for cocoa which compelled farmers to re-allocate their resources in favour of food crops, the ageing cocoa trees, smuggling, and the lack of foreign exchange which constrained the importation of pesticides and insecticides for the control of the swollen shoot and capsid diseases, were some of the

major factors that accounted for the decline (Lass and Wood, 1985).

3.2.3 The Mining Sector

The importance of the mining industry in Ghana's economy dates as far back as the fifteenth century when the Portuguese traded in gold dust along the banks of the Pra river and out of which the original name of the Gold Coast evolved. Ghana has a lot of valuable mineral deposits particularly gold, diamonds, manganese and bauxite. Mineral production in Ghana is primarily for export, and accounts for about 19 percent of all export earnings (World Bank, 1987).

Gold, the most important mineral, accounts for about 17 percent of export earnings. Two distinct types of operations are used in the extraction of gold. These are the highly mechanized, capital intensive underground mines at Obuasi, Bibiani, Konongo and Tarkwa. The Obuasi mines is managed by the Ashanti Goldfields Corporation, a private company. The rest are managed by the State Gold Mining Corporation. Dredging of gold from the banks of the Offin river in Dunkwa managed by the State Gold Mining Corporation is on a very small scale. Labour intensive small scale operations by private individuals popularly known as "Galamsey", is very popular of late.

Capital intensive open cast technique is used in extracting diamonds, mainly industrial diamonds, in the Birim basin under the management of the Ghana Consolidated Diamonds Limited. Again small scale labour intensive operations are carried out by private individuals. Other minerals produced in the country are manganese at Nsuta and bauxite at Awaso.

Like most productive sectors in the economy, the output of all major minerals declined steadily from the mid 1970s to the early 1980s. Major reasons for the decline include shortage of foreign exchange to import spare parts for the mainte-

nance and rehabilitation of the mines, lack of capital investment for exploration and development, lack of skilled personnel, and infrastructural deterioration.

3.2.4 The Energy Sector

The energy sector in Ghana comprises the domestic production of offshore petroleum at Saltpong and Tano, and the generation of hydro-electric power at the Akosombo and the Kpong Dams.

The domestic petroleum production of 1200 barrels per day at Saltpong, and 7000 barrels per day at Tano, account for 47 percent of the country's requirement (World Bank, 1987). The remaining requirement is imported in the form of crude oil and refined domestically.

The hydro-electric power generated in the country more than meets the country's potential requirement of 2000 megawatts, with the residual exported to the neighbouring countries of Togo and Benin. Export of residual oil and electricity account for about 9 percent of the total export earnings of the country (World Bank, 1987). The ability of the Volta River Authority to generate enough power to meet the potential requirements in future has been questionned because of the varied levels of the Volta Lake which is the main storage resevoir for the Akosombo and Kpong hydro plants. The Volta river catchment area falls in the drought susceptible Sahel zone.

3.2.5 The Manufacturing Sector

The foundations for the manufacturing sector in Ghana's economy were laid in the years after independence. Heavy investments were directed towards the expansion of the manufacturing sector as well as the mechanization of the agricultural sector. Large state farms using mechanized techniques were established, and state enterprises

set up in nearly all sectors of the economy. These initiatives had successful impacts on the economy up until the late 1960s. Between 1970 and early 1980, mismanagement, inefficiencies, and low capacity utilization, reversed the initial positive impact. The trend was again reversed after 1985, with the manufacturing sector attempting to regain its status in the Ghanaian economy.

The contribution of the manufacturing sector to the GDP rose from 10 percent in 1960 to 14 percent in 1970, but declined to 8 percent in 1983 (World Bank, 1983, 1985). In 1985, the manufacturing sector accounted for 15 percent of the GDP and employed 15.3 percent of the total labour force (World Bank, 1987).

The manufacturing sector in Ghana comprises of a large number of small establishments, a very small number of medium sized establishments, and a few large establishments mostly under the management of the Ghana Industrial Holding Corporation (GIHOC).

The manufacturing sector is dominated by establishments for food processing, wood products, textiles, beverages, cigarettes and garments; and a petroleum refinery. Other important sub-sector establishments include non-ferrous metals and metal products, and chemical products.

The declining productivity of the manufacturing sector in the late 1970s and early 1980s reflects the chronic problem of acute shortage of foreign exchange for the importation of intermediate raw materials for production, spare parts for maintaining the existing plants, as well as the importation of new manufacturing equipments.

3.2.6 The Services Sector

The services sector in Ghana accounts for 43.5 percent of the GDP and employs 27.5 percent of the total labour force (World Bank, 1987). The services sector is dominated by wholesale and retail trade of consumer goods and agricultural produce.

Ghana has a relatively well developed transportation network. This include an extensive road network, a railway line, lake transport, two ocean ports, and three airports one of which is an international airport. The transportation infrastructure however deteriorated sharply during the economic crisis basically due to the lack of foreign exchange for the importation of new equipments, and spare parts for maintenance. This was compounded by the sharp increase in the price of imported petroleum.

3.2.7 The Financial Sector

The formal financial institutions in Ghana are made up of the Central Bank, i. e. Bank of Ghana, three main commercial banks, i. e. Ghana Commercial Bank, Barclays Bank of Ghana Limited, and the Standard Bank of West-Africa Limited, and a host of secondary banks including the Agricultural Development Bank, National Investment Bank, Bank for Housing and Construction, Co-operative Bank, Social Security Bank and the Merchant Bank Ghana Limited.

The Central Bank performs all the traditional duties of a central bank including the sole right of issuing bank notes and coins, the Government's bank, the bank for the commercial banks, and the responsibility of administering and monitoring the monetary policies of the government.

The informal financial institution is the local money lender who provides credit mainly for the farming/rural population especially in the cocoa growing areas. Two major reasons account for the provision of credit to the cocoa farms. First, the seasonality of income flow for cocoa farmers makes it necessary for the receipt of short-term loans during the off-season. Second, cocoa farms provide a suitable form of collateral for long-term loans. However, lack of information on the operations of this informal sector makes any detailed study difficult. It must be noted that this

unorganized money market is indisputably an important component of the credit market in Ghana.

Prior to the ERP, the interest rate in Ghana was institutionally determined. The Central Bank fixed the bank rate, and required the commercial banks to determine the lending and deposit rates in accordance with a given range prescribed by the Central Bank. During the ERP, interest rates were deregulated to encourage competition.

Prior to 1983, a fixed exchange rate regime was practised. Since 1983, the exchange rate regime has been gradually liberalized to its current flexible exchange rate regime. With the abolition of the foreign exchange auction system, exchange rates are determined through interbank market operations, and are announced by the central bank.

A unique characteristic of the financial and monetary sector in Ghana is the prevalence of a strong parallel market for foreign exchange. The parallel market constitutes the main source of foreign exchange for petty traders involved in the importation of consumer goods and for travellers. The parallel market for foreign exchange was formally legalized in 1988 by the issuing of licences for the operation of foreign exchange bureaux by the PNDC Government. The parallel market rates are established by individual bureaux usually at a premium. The main sources of foreign exchange for the parallel market are remittances, repatriation from individuals with foreign accounts, and from foreign visitors.

Chapter 4

The Economic Recovery Program (ERP) in Ghana

4.1 Introduction

The Economic Recovery Program (ERP) in Ghana is being acclaimed as a huge success by the international financial community and other international organisations. It is currently labelled the model of growth worthy of emulation by other sub-Saharan African countries.

Many interested parties including other sub-Saharan African countries would undoubtedly be interested in knowing the policies involved, how the policies were implemented, the factors that contributed to the huge success, the uniqueness of the Ghanaian program, and the degree of success of the program. These issues are critical in assessing the replicability and/or adaptability of the model.

This chapter addresses these issues by looking at the ERP in Ghana in a more comprehensive manner. The various policies formulated, the implementation process, and an evaluation of the program are reviewed. Also, the chapter looks at the

uniqueness of the Ghana model, and assesses the possibility of its replicability and/or adaptability by other sub-Saharan African countries.

4.2 The Specifics of Ghana's Economic Recovery Program (ERP)

Having experienced an uprecedented massive decline in the Ghanaian economy in the early 1980s, the Provisional National Defence Council (PNDC) Government of Ghana, under the chairmanship of Flight Lieutenant Jerry John Rawlings with Dr. Kwesi Botchwey as the Minister of Finance and Economic Planning, launched an Economic Recovery Program(ERP) aimed at arresting and reversing the declining trend in the economy. Financial assistance for the program was provided by the IMF, the World Bank and other donor agencies including the Overseas Development Agency (ODA). The ERP was launched in Three Phases. Phase I which was the stabilization phase, was from 1984 to 1986. Phase II, the structural adjustment phase, was from 1987 to 1988, and Phase III, the sustenance phase, from 1989 to 1990.

The ultimate goal of the ERP was to resolve the structural weaknesses in the Ghanaian economy, and to create a competitive, efficient, export oriented, and a well-integrated growth economy (Ghana Government, 1984). The specific goals of the ERP were as follows:

- to arrest and reverse the declining level of production especially in the agricultural sector;
- to control Inflation;
- to stimulate exports and curb the consumption of luxury imports;

- to restore the eroded overseas confidence in Ghana;
- to rehabilitate the highly deteriorated production and social infrastructure;
- to mobilize domestic and foreign resources into restoring the standard of living of Ghanaians;
- to ensure economic growth of about 1.5 percent per annum;
- to stimulate the levels of savings and investment in the economy;
- to improve the chronic balance of payments problem;
- to improve public sector management.

Explicit policy measures were taken by the Ghana Government aimed at achieving the stated goals of the ERP with the approval of the the IMF and the World Bank. The financial programming model of the IMF and the structural adjustment model of the World Bank constituted the theoretical underpinnings of the policy measures.[6]

The policy measures included the following:

- liberalization of the exchange rate system;
- introduction of measures to liberalize trade and encourage exports;
- introduction of reforms in the cocoa sector;
- introduction of stringent fiscal policy measures;
- introduction of tight monetary policy measures and other monetary reforms;
- rationalization of the state owned enterprises (SOEs);

[6]The theoretical base of the two models and their recommendations for stabilization/structural adjustment programs are discussed in the second chapter.

- liberalization of prices;
- improvement in the climate for private investment;
- introduction of policies to reduce arrears;
- introduction of a program of action to mitigate the social cost of the adjustment (PAMSCAD).

4.2.1 Liberalization of the Exchange Rate System

The exchange rate regime was liberalized starting with an initial large devaluation of about 627 percent in 1983, i. e. from 2.75 cedis to 1.00 United States dollar to 20.00 cedis to 1.00 United States dollar. This was followed by periodic adjustment up to an exchange rate of 90.00 cedis to 1.00 United States dollar in January 1986. In January 1986, a two window system was introduced, where the second window rate was determined by an auction system and the first window rate pegged at 90.00 cedis to 1.00 United States dollar. The two windows were unified in February 1987, and a Dutch Auction System introduced. Various banks had to bid for their customers with successful bidders paying a 100 percent payment of their request upfront at the rate equal to their bids. The quoted exchange rate was however set at the marginal rate that exhausted the available foreign exchange (Kanpur et al. 1991, p. 18 - 19).

The average weekly supply of foreign exchange in the auction increased steadily from an equivalent of 2.5 million U. S. dollars in 1986 to 3.9 million U. S. dollars in 1987, 4.9 million U. S. dollars in 1988, 6.7 million in U. S. dollars in 1989, and 7.7 million U. S. dollars in 1990 (Kanpur et al. 1991, p. 20).

Industry received the highest share accounting for about fifty percent of the total amount. The largest amount went to the textile manufacturing companies followed by metal products and breweries. Transport accounted for ten percent, commerce twelve

percent and agriculture seven percent (World Bank, 1989, p. 18). The currency demanded was dominated by the United Stated dollar which accounted for sixty percent of the total demand, followed by the British pound which accounted for twenty percent.

In an attempt to reduce the profit levels of illegal rent-seekers involved in the strong parallel foreign exchange market, encourage the flow of additional resources through official channels, as well as improve the operation of the exchange system particularly the process of obtaining small amounts of the foreign currency on daily basis, the Government more or less legalized the underground market by permitting the establishment of foreign exchange bureaux on February 1, 1988, for the purchase and sale of foreign exchange.

The foreign exchange bureaux are licensed by the Bank of Ghana, and are subject to some rules and regulations. Transactions are confidential but the monthly volume of sales and purchases are reported to the Central Bank.

The bureaux were not allowed to bid for foreign exchange at the auction during the operations of the auction. However, retention accounts (except for cocoa and mining), interest earnings, commissions and remittances that are held by the public, could be sold at the bureaux. Purchases at the bureaux increased from an equivalent of about 1.9 million U. S. dollars per month in the second quarter of 1988, to about 21.1 million U. S. dollars per month in the second quarter of 1990, while sales increased from 1.8 million U. S. dollars per month in the second quarter of 1988 to 20.9 million U. S. dollars per month in the second quarter of 1990 (Kapur et al. 1991, p. 21).

It was the expectation of the monetary authorities that there would be a convergence of the auction and bureau rates. This was not however realized until April 1990. Initially there was a significant differential of about 30 percent between the bureau buying rate and the auction, and a spread of about 45 percent between the bureau

selling rate and the auction rate (Kanpur et al. 1991, p. 22). The differential narrowed to between 15 and 25 percent in May and June of 1988, but by mid-November to December 1988, the differential had widened again to between 40 and 50 percent (World Bank, 1989, p. 18). By late 1989, the bureau rate stabilized, while the auction rate continued to depreciate. Hence, an increase in the supply of foreign exchange at the auction reduced a spilled over excess demand in the forex bureaux, and improved the chances of a convergence. The differential between the auction and bureau rates declined to 8 percent in April 1990 (Kanpur et al. 1991, p. 22). Consequently, in April 1990, a fully unified foreign exchange market was institutionalized. A single exchange rate was set through the supply and demand forces within the existing institutional structures and thus removed the differential between the auction and bureaux rates. The foreign exchange auction system was abolished in 1992. Currently, the exchange rate is determined by interbank market activities.

4.2.2 Introduction of Measures to Liberalize Trade and Encourage Exports

Various policy measures were taken to complement the liberalization of the exchange rate regime in an attempt to liberalize trade and encourage exports. Exporters of non-traditional goods like pineapples, oranges, ginger, onions, fish, wood products, etc, were allowed to retain a portion of their foreign exchange earnings to meet their own essential requirements. The retention was initially set at twenty percent but was later increased to thirty percent (Loxley, 1991. p. 16). Different ratios were however established for the traditional exports. The retention ratio for the Ghana Cocoa Board was 5 percent and that for log exporters was 20 percent (World Bank, 1989, p. 18). Furthermore, non-traditional exporters were exempted from foreign exchange surrender requirements. Export duty on minerals and timber was abolished

in January 1987 (World Bank, 1987, p. 17). With the establishment of the foreign exchange auction system in 1987, and the removal of import controls, the government started eliminating the retention accounts to augment the supply of foreign exchagne to the auction. In March 1987, the Ghana Cocoa Board's foreign exchange retention ratio was reduced from 5 percent to 2 percent, and in September 1987, the ratio for the log exporters was lowered from 20 percent to 5 percent. The retention for the log exporters was abolished in December 1988 (World Bank, 1989, p. 18).

Measures to simplify the trade tax system were also taken. The import licensing system was streamlined, then liberalized and finally abolished. After a review of trade taxes and the tariff system, the Government took the following measures in its 1988 budget: unified sales tax on goods of similar nature whether imported or domestically produced; simplified the system into four categories, namely, exempt, concessionary, standard, and luxury; and reduced the import duties on the standard, and luxury categories by 5 percent (World Bank, 1989, p. 81). For a bulk of goods bearing a custom duty of 15 percent or higher, the nominal tariff was uniformly reduced by 5 percent (World Bank, 1989, p. 19). To provide temporary protection to selected industries, a 10 percent tax was levied on some import categories including selected drugs, garments, cosmetics, juices, mineral waters, soaps, and some food products. In January 1989, the government abolished the import licensing scheme altogether and by April 1990, Ghana's trade system did not have any restrictions on payments and transfers for current transactions (Kanpur et al. 1991, p. 26).

4.2.3 Introduction of Reforms in the Cocoa Sector

A major objective of the Government's program is to provide better incentives to cocoa farmers. In line with this, the producer price of cocoa has been increased steadily since 1983. The producer price of cocoa was increased from 20,000 cedis per

metric ton in 1983, to 85,000 cedis per metric ton in 1986/87, 140,000 cedis per metric ton in 1987/88, 165,000 cedis per metric ton in 1988/89, 174,000 cedis per metric ton in 1989/90, and 224,000 cedis per metric ton in 1990/91 (World Bank, 1989, p. 19; IMF, 1991, p. 21). The changes raised the farmers' share of the f. o. b. price (valued at the official nominal exchange rate) from about 9 percent in 1984/85 to about 23 percent in 1986/87, 33 percent in 1987/88, 40 percent in 1988/89, 43 percent in 1989/90, and 49 percent in 1990/91 (World Bank, 1989, p. 20; IMF, 1991, p. 21). It must be mentioned that these changes have been made possible by the continuous depreciation of the domestic currency. Between 1988 and 1990, the changes were not enough to offset the rate of inflation and resulted in declines in real terms. The relatively large increase in 1990/91 reflected in part the impact of the elimination of a broad range of input subsidies for fungicides, insecticides, pesticides, and sprayers, which had been provided by the Ghana Cocoa Board (Cocobod).

Historically, cocoa farmers in Ghana have been excessively taxed. One of the explanations for the excessive taxation was the inefficient operations of the Ghana Cocoa Board (Cocobod). As a result, during 1987/1988, the Cocobod undertook some restructuring measures to reduce costs. These included a retrenchment of staff and the placement of unviable plantations on divestiture. As a result, operating cost fell from 29 percent of f. o. b. price in 1985/1986 to about 17 percent of f. o. b. price in 1986/1987 (World Bank, 1989, p. 21). The corporate plan for 1987/88 to 1990/91 aimed at reducing the Board's share of the f. o. b. price to 15 percent (World Bank, 1989, p. 21). Measures to reduce the operating cost in the corporate plan included the phasing out of input subsidies, shedding the responsibility for input supply, reducing the role of the Board in transportation, reducing the cost of evacuation, divesting additional plantations and improving accounting and management information. In mid-March 1992, the government announced that it would liberalize the cocoa marketing sector by authorising private companies to compete with the Cocobod.

4.2.4 Introduction of Fiscal Policy Reforms

The economic crisis of the 1970s and the early 1980s resulted in the complete erosion of the country's resource and infrastructural base. These was further accompanied by a lack of fiscal discipline which resulted in budgetary crisis. The revenue base dwindled, public expenditure was severely reduced, and there was a complete collapse of infrastructure. The Government addressed these issues by initiating fiscal policy measures which were directed at three areas. These were:

- revenue mobilization measures;
- measures to restructure recurrent expenditure;
- measures to augment capital expenditure.

Specific policy measures in these areas are discussed below.

Revenue Mobilization Measures

At the beginning of the ERP in 1983, the tax system in Ghana had virtually collapsed with the total tax revenue being about 4.6 percent of the GDP (Kanpur et al. 1991, p. 30). It was imperative that efforts to restore fiscal stability had to include revenue mobilization. The Government therefore introduced measures to improve the efficiency of the tax system and restore fiscal stability. The measures included a broadening of the tax base, a reduction in direct tax, and an improvement in tax collection. The measures began with various exercises by the government to ensure tax compliance among the self employed including the institution of a policy of tax clearance as a pre-requisite for the renewal of business licences and registration of new businesses. Measures were also taken to educate the public on their tax obligations, and monitor corporate accounts more closely. Second, the Government began to reform the

tax structure. The reforms focused on lowering the personal tax burden, improving incentives, rationalizing indirect taxes, and expanding the role of taxes on consumption. The standard tax exemption for single individuals which was raised from 10,000 cedis per annum in 1987 to 24,000 cedis per annum in 1988, was further increased to 38,000 cedis per annum in 1989, and 60,000 cedis per annum in 1991 (Government of Ghana, 1989, 1990, 1991). Similar increments were made for married couples from 15,000 cedis per annum in 1987 to 36,000 cedis per annum in 1988, 57,000 cedis per annum in 1989, and 91,000 cedis per annum in 1991.

The progressivity of the tax system was also reduced. The top level taxable income was increased from incomes above 310,000 cedis per annum in 1987 to incomes above 984,000 cedis per annum in 1988, 1.2 million cedis per annum in 1989, and 2.1 million cedis per annum in 1991 (Government of Ghana, 1989, 1990, 1991). Furthermore, the top marginal tax rate was lowered from 55 percent to 50 percent in 1991 (Government of Ghana, 1991). In order to broaden the personal income tax base, all allowances paid to employees in both the public and private sectors were consolidated into the basic wage structure in July 1991 (Government of Ghana, 1991).

Corporate tax for manufacturing, farming and exporting was lowered from 55 percent to 45 percent in 1988 (Government of Ghana, 1989). In 1989, a three-tier system was introduced. A 55 percent corporate tax for businesses in banking, insurance, and printing; a 45 percent corporate tax for firms in manufacturing, farming, and exporting; and a 50 percent corporate tax (down from 55 percent) for the remaining firms (Kanpur et al. 1991, p. 33). A further reduction to 35 percent in corporate tax was provided to agriculture, manufacturing, real estate, construction, and services in the 1991 budget (Government of Ghana, 1991). In 1991, capital allowances provided in the investment code were extended to all enterprises in the manufacturing sector, and the capital gains tax rate reduced to 5 percent. Withholding of tax on dividends was also reduced from 30 percent to 15 percent (Kanpur et al. 1991. p. 33).

The import tax policy was reformed, and has resulted in an increase in the share of import duties to total revenue from 14.0 percent in 1984 to about 25 percent in 1990, and 20.2 percent in 1991 (Kanpur et al. 1991, p. 30). A major increase in the domestic value of imports stemming from the depreciation of the exchange rate, a sharp increase in the volume of imports resulting from the gradual removal of import licensing requirements, changes in duty rates, and an improved tax administration, all contributed to the increase in receipts from import duties. Duty rates were lowered by 5 percentage points in 1988. Currently, the import tarriff rate applied to most goods is 25 percent. However, a special import tax policy gives a nominal protection of up to 60 percent for some products (Kanpur et al. 1991, p. 34). Export duty which is levied exclusively on cocoa, has declined from 28.6 percent of total revenue in 1983, to 10.3 percent of total revenue in 1991 (Kanpur et al. 1991, p. 30). The cocoa levy is determined as a 100 percent duty on all proceeds from cocoa exports, net of payments to cocoa farmers and the marketing and operational costs of the Ghana Cocoa Board.[7] The decline in the share of the total revenue is a reflection of weakening world cocoa prices,[8] as well as substantial increases in the producer price paid to cocoa farmers.

The system of indirect taxation was also reformed. In 1987, all excise duties on products other than petroleum, beverages, and tobacco were abolished. The revenue loss was compensated for by an increase in general sales tax from 10 percent to 20 percent and subsequently to 25 percent. The rate was reduced to 22.5 percent in 1989 and further reduced to 17.5 percent in 1991 (Kanpur et al. 1991, p. 34). Petroleum taxation was increased as a means of raising revenue and bringing petroleum prices in line with those of neighbouring countries. As a result, the retail price of regular

[7]Income from cocoa farming both for individuals and companies is exempt from direct taxation.

[8]Cocoa prices declined from 2395.7 U. S. dollars per metric ton in 1984 to 1274.4 U. S. dollars per metric ton in 1990 (United Nations, 1991, p. 394).

gas was increased steadily from 180 cedis per gallon in 1987, to 230 cedis per gallon in 1988, 275 cedis per gallon in 1989, 300 cedis per gallon in 1990, and 1000 cedis per gallon in 1992 (World Bank, 1989, p. 83; Kanpur et al. 1991, p. 34).

These measures have resulted in a steady increase in tax revenue from 4.6 percent of GDP in 1983 to 12.7 percent of the GDP in 1987, and 13.8 percent of the GDP in 1991 (Kanpur et al. 1991, p. 30).

Measures to Restructure Recurrent Expenditure

The Government restructured the recurrent public expenditure with the objective of holding it within about 11 percent of the GDP (World Bank, 1989, p. 63). The first step towards this goal was to improve the efficiency and effectiveness of the civil service. A study by the Management Service Division of the Office of the Head of the Civil Service, with technical assistance from the Overseas Development Administration of the United Kindgom, identified that over 50 percent of the civil servants were unskilled workers at the junior level of the grade structure. Furthermore, that while the higher levels of the grade structure in the civil service were understaffed, the junior levels were 20 to 40 percent overstaffed (World Bank, 1989, pp 25-26). Hence, the Government introduced some reforms in the civil service which aimed at reducing staffing in the junior levels, raising remuneration and increasing salary differentials.

The Government introduced a retrenchment program to remove redundancies in the civil service. Between 1987 and 1990, 50,000 mainly unskilled civil servants were redeployed and about 20,000 skilled staff hired. The net reduction of 30,000 was about 10 percent of the civil servants (Kanpur et al. 1991, p. 34). A further redeployment of about 5,000 workers was also planned for 1991. A "special efficiency" budget was established in 1987 to cover the costs of retraining and supporting redeployed public sector employees. The efficiency budget accounted for between 2.0 and 4.7 perecent

of the total government expenditure between 1987 and 1991 (Kanpur et al. 1991, p. 38). The estimated ratio of savings on the salary bill to compensation and training cost was about 1 to 3 (World Bank, 1989, p. 25). Staff recruitment in the higher level job categories was initiated to strengthen the capacity of the civil service for an effective implementation and monitoring of the adjustment program, while a freeze was placed on hiring lower job categories.

Prior to the adjustment period, the civil service suffered from low salaries and senior civil servants were grossly underpaid. For example, even after some adjustments in 1984 and 1985, the real salary of a Permanent Secretary in 1986 was 10 percent of the 1977 level, while that of a messenger was 50 percent of the 1977 level (World Bank, 1987, p. 33). Quite uncharacteristic of IMF/World Bank programs, the Government introduced measures to raise remuneration of civil servants and increase salary differentials between the highest and the lowest paid civil servants. Expenditure on personnel emoluments was however limited to about 5.5 percent of the GDP (World Bank, 1987, p. 33). In January 1986, the Government raised salaries in the public service which resulted in an increase in the minimum wage to 90.0 cedis per day. This caused an 80 percent increase in the wage bill for 1986 (World Bank, 1987, p. 10). Even with the adjustment, the average wage in real terms was about 40 percent of the 1977 level for senior public servants and 65 percent for the junior civil servants (World Bank, 1987, p. 10). The salary adjustment slightly improved the position of the civil service relative to the private sector. The Government continued to raise wages and salaries in the public service causing the minimum wage to increase from 112 cedis per day in 1987, to 277 cedis per day in 1991. Apart from the across-the- board wage and salary increases, there was an additional stretching of relative remuneration between the highest and lowest paid civil servants as a means of providing incentives to senior civil servants and improving morale and efficiency in the civil service. The differential between the highest and lowest paid civil servants

has been raised from 2.3 to 1 in 1986, to about 10.5 to 1 in 1991 (World Bank, 1987, p. 33; Kanpur et al. 1991, p. 34). The minimum wage in the civil service served as an index to the private sector. However, compliance with the minimum wage was qualified by an ability to pay clause and as a result many employers in the private sector could not match the adjustments.

In 1986, as an expenditure reduction measure and a means to improve the financial performance of the companies involved, the Government introduced and/or increased user fees for the use of public goods and services including electricity, water, telecommunication and postal service. Rates for water were raised by between 150 percent and 1,150 percent, electricity rates by between 47 percent and 80 percent, telecommunication by between 70 percent and 300 percent, and postal rates by 600 percent (World Bank, 1987, p. 74). Fees were also introduced in the health sector in 1986, with the objective of recovering 13.8 percent of total costs between 1986 and 1988 (Loxley, 1991, p. 18).

Regarding education, a two phase program was introduced. The first phase had an overall objective of making education financially more efficient, and ensuring that the reformed education system would be sustained within the budget. The second phase focused on restructuring and expanding senior secondary schools, and cost savings through tightened control on expenditure (IMF, 1991, p. 24). In an attempt to meet this objective, in 1989, the Government replaced boarding and lodging expenses in tertiary educational institutions previously shouldered by the Government, with a student loan scheme of 50,000 cedis per student per annum, and the institution of a government scholarship and bursary scheme for outstanding students.

One important aspect of the restructuring of the recurrent expenditure is its impact on social welfare. The extent to which the government expenditure policy has addressed the social needs of the people is gauged by examining the level of resources directed toward education, health, social security, community amenities, and social

services. In this respect, the expenditure on these has increased steadily from 2.6 percent of GDP in 1983 to 7.1 percent of GDP in 1989, and as a percentage of the government expenditure from 32.5 percent in 1983 to about 51.2 percent in 1989 (Kanpur et al. p. 40).

Measures to Augment Capital Expenditure

At the peak of the economic crisis in 1983, capital expenditure by the Government had declined from 4.5 percent of GDP in 1975 to about 0.6 percent of GDP (Kanpur et al. 1991, p. 31). Ghana's once well-developed infrastructure was in a state of disrepair. The government was quick in realizing that a well developed infrastucture was necessary to facilitate a positive supply response. Also, the Government wanted to break away from the past pattern of allocating funds for public investment on ad hoc basis as a result of which many projects were starved for funds and were only partially completed.

Consequently, in 1986, the Government introduced the first rolling three year Public Investment Program (PIP) as a major component of the ERP, to improve the planning, implementation, monitoring and evaluation of public investments in Ghana. Under the first PIP (1986-88), the Government planned public investment totalled 184.91 billion cedis (in constant 1986 prices) (Government of Ghana, 1987c, p. 7). The total planned investment was about 6 percent of the GDP in 1986, and between 9 and 10 percent of the GDP in 1987 and 1988 (Loxley, 1991, p. 20). The second PIP for the period 1990-92 was introduced in 1990 with a total planned investment of 732.1 billion cedis (in constant 1990 prices), which represented about 10 percent of the GDP for the period (IMF, 1991, p. 15). 75 percent of the total planned investment for the first PIP was financed from foreign resources, mainly from aid, grants, and Overseas Development Assistance (ODA) sources generally, and 25 percent from

domestic resources (Government of Ghana, 1987c, p. iii). For the second PIP, 62 percent of the total planned investment was financed from foreign resources, mainly concessionary ODA sources and commercial borrowing, and 38 percent from domestic resources (Government of Ghana, 1989b, p. 5).

The PIPs focused on the rehabilitation and expansion of basic economic infrastructure - such as feeder roads, railroads, telecommunication and ports, - increased provision of social security, and sector rehabilitation. The bulk of the planned investment, 72 percent in 1986-88 and 62 percent in 1990-92, was allocated to the development of economic infrastructure, mainly in the energy, roads and highway sectors (Government of Ghana, 1987c, p. 8; Kanpur et al. 1991, p. 35). About 22 percent of the resources in both 1986-88 and 1990-92 was devoted to the productive sectors for the development of agricultural infrastructure, improvement in agricultural services, and for rehabilitating the industrial and mining sectors (Government of Ghana, 1987c, p. 8; Kanpur et al. 1991, p. 35). In the manufacturing sector, the emphasis was on rehabilitating selected units of the Ghana Industrial Holding Corporation (GIHOC) and operating the Tema Food Complex Limited. The Government was counting on the private sector to invest in the manufacturing sector. 8.2 percent of the resources in the 1986-88 PIP, and 14 percent of the resources in the 1990-92 PIP was allocated for the social and administrative sectors mainly for an expanded and improved provision of health and education services (Government of Ghana, 1987c, p. 9; Kanpur et al. 1991, p. 35).

The Government also established criteria for selecting projects into the PIP. For projects with a total cost exceeding 5 million U. S. dollars, a minimum Economic Rate of Return (ERR) of 15 percent was required for selection into the "core" PIP (Government of Ghana, 1987c, p. 9). In cases where the ERR criterion was not applicable, priority was given to:

- key projects for rehabilitating the infrastructure and for easing the existing infrastructural bottlenecks;
- export oriented and efficient import substituting projects with relatively short gestation periods and quick returns;
- foreign funded projects or projects capable of attracting at least 60 percent foreign financing;
- ongoing projects;
- projects that generated additional revenue for the government;
- projects that had low minimal recurrent cost;
- projects that contributed to employment creation, poverty alleviation, and improved quality of life in rural areas.

4.2.5 Introduction of Tight Monetary Policy Measures and Other Monetary Reforms

Prior to the ERP, financial discipline in Ghana was very weak. There were large fiscal deficits which were financed by the domestic banking system and resulted in high rates of growth in domestic credit, broad money supply, and fueled inflation. Furthermore, some measures taken by the Government in the early 1980s to eliminate fraud, including the freezing of bank deposits, weakened the public confidence in the banking system. This resulted in a large switch of bank deposits into currency outside the banks. For example, in 1983, currency outside the banks was about 47 percent of broad money supply (Kanpur et al. 1991, p. 43). By 1984, the currency outside the banks grew by about 70 percent (Kanpur et al. 1991, p. 46), and inflation rate averaged more than 70 percent between 1980 and 1983.

Several monetary policy measures were therefore implemented under the ERP alongside the foreign exchange and fiscal policy reforms. Initially the monetary policies focused on controlling credit expansion by the banking system, particularly to the Government, to ensure that money supply grew at a rate compatible with the growth in real GDP so as to achieve price stability. Later, the focus was broadened to include a gradual dismantling of administrative interest rate and credit controls. Regarding the control of credit expansion, the Bank of Ghana relied on quantitative controls in the form of ceilings on the net domestic assets of the banking system, and net bank credit to the Government and the Cocoa Board agreed to in the IMF program. As a result, the Government share of total credit declined steadily from 70 percent in 1983 to about 20 percent in 1988 (World Bank, 1989, p. 144). The annual rate of growth in net domestic credit decelerated from 63.1 percent in 1984 to about 10.3 percent in 1991 (Kanpur et al. 1991, p. 46). This was a reflection of a continued improvement in the government finances and, in particular, a net repayment by the Government to the banking system since 1987 averaging about 1.2 percent of GDP between 1987 and 1991 (Kanpur et al. 1991, p. 33). During the ten-month period to September 1990, the Government paid an equivalent of 12.5 percent of broad money supply to the Bank of Ghana (IMF, 1991, p. 6). Annual rate of growth of credit to the non-Government sector was also slowed down from 295.8 percent in 1984 to about 12 percent in 1989 (Kanpur et al. p. 46). Despite the slow down, the private share of the total credit increased from 17 percent in 1983 to about 57 percent in 1988 (World Bank, 1989, p. 144). By 1991, annual rate of growth of credit to the non- Government sector had increased to 34.9 percent in 1991 (Kanpur et al. 1991, p. 46). The improvements in the government finances, and the net repayments by the Government to the banking system helped moderate the slowdown in private sector credit in an overall restrictive credit policy.

Prior to 1988, allocation of credit to the private sector was influenced by sectoral

limits. In 1985, the distribution of loans and advances for the major sectors were as follows: 24 percent for agriculture; 28 percent for manufactureing; 9 percent for construction; and 18 percent for non-export commerce. In 1987, the distribution was 20 percent for agriculture, 29 percent for manufacturing, 12 percent for construction, and 15 percent for non- export commerce (World Bank, 1989, p. 10). The Government abolished the controls on sectoral allocation of credit in 1988 except for a minimum requirement for loans to the agricultural sector. Loans and advances to the agricultural sector were about 16 percent of the total loans and advances in 1988 (World Bank, 1989, p. 148). The minimum requirement for loans on the agricultural sector was also lifted in November 1990.

Alongside the restrictive credit policy, lending rates were raised from an average of 16.5 percent in 1984 to an average of 24 percent in 1988 (World Bank, 1989, p. 153). In 1990, the Bank of Ghana introduced attractive returns in its financial instruments, and moved closer to a market-oriented financial system. This attracted competition for deposits and forced average bank deposit rate to be increased from between 15 and 20 percent in 1990, to between 18 and 23 percent in 1991. Correspondingly, the average lending rate was raised from between 24 and 28 percent in 1990 to between 28 and 31 percent in 1991 (Kanpur et al. 1991, p. 47). With an annual rate of inflation less than 20 percent in 1991, both the deposit rates and the lending rates became significantly positive in real terms.

Despite the restrictive credit policy, which resulted in a reduced growth in broad money supply from about 72 percent in 1984 to about 19 percent in 1991 (Kanpur et al. 1991, p. 46), the growth still exceeded the target set in the Government's monetary policy and the growth in the nominal GDP. Increases in cocoa financing, credit expansion to the non-Government sector, especially after 1989, larger than expected inflow of external concessional assistance, and a stronger improvement in the balance of payments which resulted in high increases in the net foreign assets of

the banking system, all contributed to the higher than expected annual growth rates in the broad money supply, and hence, the excess liquidity.

Strong growth in deposits coupled with restrictions on credit were the primary reasons for excess liquidity in 1987. Deposits in commercial banks rose by about 60 percent in 1986/1987 of which about 23 percent was provided as required reserves (World Bank, 1989, p. 10). In spite of the high demand for loans by the private sector, the credit ceilings constrained the lending capabilities of the commercial banks. Commercial banks could expand loans only by less than half the net increase in the available funds, leaving them with substantial liquidity. In response, the Bank of Ghana implemented some measures to mop up the excess funds. The required ratio was raised, banks were allowed to increase holdings of commercial paper, and in 1988, the banks were allowed to finance cocoa bills. Nevertheless, in 1988, reserves in the banking system as a whole were about 41 percent of deposits while the required ratio was only 30 percent (World Bank, 1989, p. 11). This reportedly caused many banks to turn away large depositors.

In 1988, the Government introduced monetary policy and financial sector reforms to address the rigidities in the financial sector. The monetary policy reforms involved a shift away from direct controls towards a reliance on market-based instruments of policy. As part of the process, the Bank of Ghana removed the credit controls, rationalized the minimum cash and liquid reserve requirements for banks, introduced new financial instruments (for example, 30-day and 90-day Bank of Ghana bills, 1-year and 2-year treasury bills, and a 5-year government stock), intensified the absorption of excess liquidity from the economy through open-market operations at market determined levels, and strengthened monetary management capacity. In addition, the financial position of the Bank of Ghana was strengthened by converting the revaluation losses accumulated by the end of September 1990 into long-term government bonds. The Bank of Ghana was to use the yield on the bonds to implement monetary

policies.

As a result of these efforts, a large volume of the excess liquidity was sterilized through the sale of non-rediscountable Bank of Ghana instruments and large net repayments by the Government to the Bank of Ghana. This helped to reduce the excess bank cash reserves to modest levels in relation to the total bank deposits. These efforts increased the confidence in the banking system. Growth in velocity of circulation declined from 9.0 percent in 1983 to about 5.6 percent in 1988, but increased to 6.7 in 1990 (Kanpur et al. 1991, p. 46). Furthermore, growth in currency outside the banks also declined from 39 percent in 1988 to 28 percent in 1989, and -3.5 and -2.2 percent for 1990 and 1991 respectively (Kanpur et al. 1991, p. 46).

Interest rates were also deregulated in 1988 to ensure positive real interest rates. However, despite the large volume of open market operations and the slow down in monetary expansion, money market interest rates rose only modestly relative to the rate of inflation until 1990. For example, the commercial banking rate on 6 months fixed deposits increased from 11.5 percent in 1983 to between 19 and 22 percent in 1988 (World Bank, 1989, p. 153), while inflation was about 123 percent in 1983, and averaged about 29 percent between 1984 and 1988 (Kanpur et al. 1991, p. 46). This caused substantial negative real interest rates. The negative real interest rates were responsible for the decline in private savings from 5.4 percent of GDP in 1985 to 2.7 percent of GDP in 1987 and 3.4 percent of GDP in 1988 (World Bank, 1989, p. 91). However, the level of national savings increased from 4 percent of GDP in 1984 to 6.5 percent of GDP in 1988 (World Bank, 1989, p. 91), mainly because of improved savings in the public sector from -0.6 (dissaving) percent of GDP in 1984 to 3.0 percent of GDP in 1988 (World Bank, 1989, p. 91). As a result of the limited responsiveness of interest rate to changes in liquidity, the Bank of Ghana introduced some measures in 1990 and 1991 to strengthen the responsiveness of interest rates. These measures included an increase in the Bank of Ghana's rediscount rate from

26 percent to 35 percent in 1991, and a widening of the access to purchases of Bank of Ghana financial instruments to the non-bank sector. Consequently, the annual yield on the money market instruments rose from between 23 and 29 percent in 1990 to between 31 and 38 percent in 1991 (Kanpur et al. 1991, p. 47). Furthermore, bank deposit rates increased from between 15 and 20 percent in 1990 to between 18 and 23 percent in 1991, while bank lending rates increased from between 24 and 28 percent in 1990 to between 28 and 31 percent in 1991 (Kanpur et al. 1991, p. 91). These increases coupled with an average annual rate of inflation of 29 percent between 1989 and 1991, resulted in positive real money market rates, bank lending rates, and bank deposit rates. The positive real deposit rates were responsible for the increase in private savings from 3.4 percent of GDP in 1988 to 4.7 percent of GDP in 1991 (World Bank, 1989, p. 91). Individual investors responded by converting cash holdings into bank deposits or money market placements. At the same time, however, the higher interest rates impacted on the credit demand decisions of the private sector, and credit allocation decisions of the banks.

Also, in an attempt to mobilize idle resources in the rural areas for gainful investment, the Bank of Ghana embarked on a program to extend the rural banking network to the remote parts of the country. The activities and performance of the rural banks were closely monitored by the Bank of Ghana to ensure that they operated efficiently. Regarding external resources mobilization, in June 1985, the Bank of Ghana offered residents and non-residents the facility of maintaining foreign exchange accounts free from the Bank's control. This together with the deregulation of the foreign exchange market and the establishment of foreign exchange bureaux have contributed significantly to the increase in net private unrequited transfers from 32 million U. S. dollars in 1985 to 202 million U. S. dollars in 1990 (Kanpur et al. 1991, p. 8). A stock exchange was introduced in 1990, and this has enhanced the availability of investment capital.

4.2.6 Rationalization of the State Owned Enterprises(SOE)

One of the significant legacies of the First Republic of Ghana was the establishment of number a of State Owned Enterprises (SOEs) to meet various economic and social objectives. This resulted in the Government having majority interest in 181 enterprises and minority interest in an additional 54 enterprises. The SOEs play a major role in virtually all sectors of the Ghanaian economy. They are involved in mining, manufacturing, utilities, transportation, and the services sectors, and employ a sizeable segment of the labour force. The performance of the SOEs has however been characterized by huge losses and low productivity, and has become a financial and managerial burden to various governments. For example, in 1983, the consolidated final accounts of about 63 enterprises that could provide information, showed a loss equivalent to 0.2 percent of the GDP (World Bank, 1987, p. 26). The current ratio for the sector was about 0.84 in 1984 (World Bank, 1987, p. 26). As a result of the poor financial performance, many of the SOEs had liquidity problems, and arrears payable to the Government, other private enterprises, and other SOEs. In addition, some SOEs were financially supported through Government budgets in the form of subventions, equity, and loans. In 1985, for example, the total transfers out of the budget to SOEs were about 1 percent of the GDP (World Bank, 1987, p. 26).

The Government recognized that an improvement in the performance and efficiency of the SOEs was crucial for the ERP and therefore appointed a Government Task Force to carry out an in-depth review and evaluation of the SOEs, and recommend reforms to rationalize the SOEs. As a recommendation, the Task Force developed a policy framework to address the problems within the SOEs. The framework included a greater management autonomy, a more rational legal framework, progressive reduction in budget transfers to SOEs, investment criteria for the SOEs, clearance of arrears, greater resource transfers to the Government in the form of dividents and

prompt tax payments, an exposure of SOEs to more competition, and a divestiture program. The framework also addressed the issue of overstaffing in SOEs by extending the freeze on hiring to SOEs (except for skilled and professional positions), and the retrenchment of surplus labour identified in individual enterprises.

The recommendations were operationalized in a state enterprises reform program introduced in 1987 which aimed at improving the efficiency and profitability of SOEs, and reducing their demand for financial and managerial resources from the Government. A significant aspect of the reform was a requirement of all key SOEs to prepare a three-year Corporate Plan that established objectives, targets, and strategies for the sector, to constitute the basis for performance evaluation and accountability. The Corporate Plans were negotiable with the Government each year. The State Enterprises Commission was given the responsibility of monitoring and evaluating the performance of the SOEs, making recommendations for managerial bonuses or penalties on the basis of the performance, and advising the Government.

A Divestiture Implementation Committee was formed to implement the divestiture program. The Committee identified 34 enterprises for outright sale or liquidation, and a conversion of 40 enterprises into joint ventures (Loxley, 1991, p. 18). The group of 34 included a mix of both profitable and uprofitable enterprises. The inclusion of the profitable enterprises was an attempt to attract investors. For the unprofitable sectors, liquidation was recommended if sale proved difficult. The performance of the remaining SOEs was closely monitored by the State Enterprises Commission.

The implementation of the reform program was slow initially but gained some momentum after 1990. By May 1991, about 40 SOEs had been divested (Kanpur et al. 1991, p. 38). In May 1991, an additional 28 SOEs, out of an expected 42 SOEs, were placed on the divestiture program including 11 subsidiaries of the Ghana Industrial Holding Corporation (GIHOC). 14 major enterprises that were classified as being of national strategic importance were not placed on the divestiture program. These

included companies and state enterprises operating in the fields of transportation, mining, and petroleum. However, steps were taken to monitor their performance. In the 1993 budget statement, the Government placed major corporate enterprises including Ashanti Goldfields Corporation, Ghana Commercial Bank, National Investment Bank, Standard Chartered Bank, Accra Brewery, Guinness Ghana Limited, Kumasi Brewery, and Pioneer Tobacco, on the divestiture list. The Government then included public share offerings, joint ventures, and worker and/or management buy-outs in the modalities for divestiture (Government of Ghana, 1993).

4.2.7 Liberalization of Prices

Price controls were dismantled to allow market forces to determine price levels. The statutory list of essential commodities whose prices were controlled was reduced to eight, namely, imported rice, sugar, baby food, cement, textiles, drugs, matches and soap (Loxley, 1991, p. 19). It must be mentioned that even with these items, the controls allowed the full cost plus a profit margin to be passed on to the consumer. Controls on distribution of essential commodities were also abolished.

4.2.8 Improvement in the Climate for Private Investment

Whereas the Government undertook the key role of providing adequate and well-maintained infrastructure, and the rehabilitation of some key sectors, investments in many productive sectors especially the manufacturing sector were shifted to private investors. Prior to the ERP, private investment have been impeded by a number of institutional, structural, and financial constraints which were inherent in the Ghanaian economic system. For example, weaknesses in financial intermediation made it difficult for private businesses to find means of financing other than short-term bank credit. Furthermore, low savings rate, complexity of the legal and administrative

framework, and the level of capital and investment income tax, did not encourage private investment. The Government therefore made a determined effort to improve the climate for private investment by eliminating and/or alleviating these constraints as an incentive to trigger positive response from foreign and domestic investors.

New Investment and Mineral Codes were approved by the Government which were designed to encourage domestic and foreign private investment and establish a framework to protect investors. The Government reformed the corporate tax structure with the objective of reducing corporate taxes.[9]

The Government also lifting restrictions on payments and transfers for current international transactions, and initiated a program to clear up the backlog of funds for capital and dividends repatriation that had been blocked. Accessibility to the foreign exchange auction for approved transactions in this respect was permitted during the auction. A process was also inititated where some of the backlog of the blocked funds were converted into equity investments.

Measures were also taken to streamline government regulations and administrative requirements relating to business registration, issuance of manufacturing licenses, restrictions on foreign ownership, technology transfer, tax administration, and labour laws. In 1991, an advisory group was established (with majority of its membership from the private sector), to review and make recommendations about the tax laws and administrative requirements, and make them consistent with the liberalization and deregulation thrust of the Government's policy reforms.

The financial reforms, bank restructuring, and the introduction of a stock exchange, have removed some of the financial constraints for private investment. The divestiture program has also enhanced private investment.

The Government has also forged a closer consultative relationship with the pri-

[9]Refer to the section on Introduction of Reformed Fiscal Policy Measures for a detailed discussion.

vate sector. For example, a tripatite committee of the Government, trade unions, and employers, was formed to address and take decisions on issues affecting the private sector. Futhermore, the private sector was represented on the National Economic Commission (NEC) to communicate the concerns of the private sector in the formulation and implementation of economic policies.

4.2.9 Introduction of Policies to Reduce Arrears

At the beginning of the ERP, the confidence of the international trading and financial community in Ghana had been almost completely eroded because of the accumulation of foreign debt payment arrears for loans contracted since the First Republic of Ghana.

As an essential component of the ERP, the Government instituted measures to gradually reduce the outstanding arrears, in an attempt to gain back the recognition and respect from the international community for financial support of the ERP.

By the end of 1988, 570 million U. S. dollars out of a total foreign arrears of 640 million U. S. dollars in foreign debt contracted since the First Republic, which were overdue for payment between 1984 and 1988, had been paid (People's Daily Graphic, Jan. 26, 1989). The remaining outstanding overdue payment of 70 million U. S. dollars was settled in June 1990. Additionally, 110 million U. S. dollars debt owed to Nigeria was settled.

Regarding current external debt obligations, the Government has stayed on top of all its debt servicing obligations without accumulating any arrears, and has sustained its creditworthiness with the international financial community.[10]

[10]Refer to the section on Financing the ERP for a detailed discussion on Funding, and the section on Assessing the ERP for a discussion on debt servicing.

4.2.10 Introduction of the Program of Action to Mitigate the Social Costs of Adjustment (PAMSCAD)

Undoubtedly, the adjustment policies had adverse impacts on some Ghanaians especially the poor. The price, trade, and exchange rate liberalization policies, the increased taxation on petroleum, and the introduction and/or increase in user fees for public utilities, resulted in a sharp increase in the general price level, and made the affordability of these utilities and services almost impossible. The problem was compounded by the retrenchment program which laid off some employees of the public service and parastatal companies, and deprived them of a source of income. The retrenchment program also increased unemployment. The plight of the poor remained very desparate with limited access to basic needs. The Government and the international financial institutions were criticized for failing to design ameliorative measures to assist the vulnerable groups. This affected the popularity of the Government and threatened the sustainability of the program.

After enormous pressure from the United Nations Children's Fund (UNICEF) and some donor communities including the Canadian International Development Agency (CIDA), the Government developed a Program of Action to Mitigate the Social Costs of Adjustment (PAMSCAD). The program was submitted to donors at the donor conference in February 1988 for funding and received a favourable response from the donor community.

PAMSCAD developed projects based on some criteria to address the social cost of the adjustment. Projects with strong poverty focus, high economic and social rates of return, modest institutional requirements to ensure an easy and speedy implementation, and high visibility to enhance the confidence in the sustainability of the adjustment program, were emphasised.

The specific projects included community intiative projects. These were to enable

communities identify and implement projects aimed at rehabilitating and constructing social and economic infrastructure, and generating employment for the rural and urban unemployed and underemployed. Projects focussing on counselling, placement, and training schemes for the redeployed, were also included to alleviate the hardships of the victims of the retrenchment exercise. Lastly, projects designed to satisfy the basic needs of the vulnerable groups were considered. These included water and sanitation projects, as well as education, health, nutrition and housing projects.

Despite the wide international publicity given to the PAMSCAD as a new departure from the conventional approach, the program proceeded slower than expected. This was due to delays in finalizing commitments, as well as administrative constraints. By January 1990, only 32.7 million U. S. dollars out of a total of 88.4 million U. S. dollars pledged had been disbursed (IMF, 1990. p. 19). Most of disbursed amount was spent on assisting the public sector employees who had been laid off, on promoting labour intensive public works program, and on community initiative projects.

Through PAMSCAD, the groundwork was laid for assessing the distributional impact of the structural adjustment program in the form of a Ghana Living Standards Survey (GLSS). The first part of the five-year period survey was carried out in 1987 and the results formed a benchmark against which to assess the distributional impact of the ERP.

The implementation of PAMSCAD was however speeded up in 1990 focusing on community initiative projects, hand-dug wells, low cost sanitation, and supplementary feeding.

4.3 Financing the Economic Recovery Program (ERP)

As a result of the severity of the economic crisis in Ghana before the launching of the ERP, availability of funds for the program was a major problem. Funds from domestic sources were virtually non-existent, hence, external financial assistance was very critical for the implementation of the program.

Ghana's economic recovery program has been supported by successive arrangements with the IMF, the World Bank, and other creditors and donors. These included a three-year arrangement under the Enhanced Structural Adjustment Facility (ESAF) of the IMF, and some concessional financial assistance from the International Development Association (IDA) of the World Bank, and grants from bilateral donors. Overall, the total amount of IMF financial resources committed to Ghana during 1983 to 1991 amounted to 1.208 million SDRs, equivalent to about 1.5 billion U. S. dollars (Kanpur et al. 1991, p. 2).

Looking at the overall picture of foreign financial support, the total aid disbursements from 1985 to 1991 were as follows: 224 million U. S. dollars for 1985; 357 million U. S. dollars for 1986; 443 million U. S. dollars for 1987; 487 million U. S. dollars for 1988; 568 million U. S. dollars for 1989; 600 million U. S. dollars for 1990; and 605 million U. S. dollars for 1991 (World Bank, 1987, p. 65; World Bank, 1989, p. 73). The share of bilateral donors to the aid commitments has increased steadily from 32.8 percent in 1985 to about 50 percent in 1990 (World Bank, 1987, p. 61; World Bank, 1989, p. 71). Considering the aid disbursements from 1985 to 1991, total inflow of external funds in support of the ERP averaged about 469 million U. S. dollars per annum within the period.

By the end of 1990, Ghana's total external debt stood at 3.6 billion dollars (Home

Front, January 1991). However, the structure of the indebtedness showed a rising share of highly concessional multi-lateral and bilateral loans. The share of the IMF loans in the total debt was projected to decline from about 23.6 percent in 1989 to about 18 percent in 1992, because of the replacement of the standby arrangements and special facilities with Enhanced Structural Adjustment Facility (ESAF), the cheapest funds available from the IMF, as the main source of IMF lending to Ghana. It was also projected that by 1992, three-quarters of Ghana's indebtedness to IMF would arise from ESAF financing. Also, Ghana had access to concessional resources from the World Bank through the International Development Association (IDA).

Chapter 5

Evaluating the Economic Recovery Program (ERP)

5.1 Criteria for Evaluation

A number of different approaches may be used to assess the efficacy of an economic recovery program. The various alternatives which have been reviewed extensively in the literature by Williamson (1983), and Loxley (1984), are as follows:

- evaluating the performance of the economy under the recovery program relative to the performance of the economy before the program was introduced;
- evaluating the performance of the economy relative to specific targets or objectives established at the beginning of the program;
- evaluating the performance of the economy under the recovery program relative to the performance of the economy in the absence of the program;
- evaluating the performance of the economy under the recovery program relative to the performance of other economies with or without programs of their own.

The use of the first alternative in the Ghana program would undoubtedly be biased towards the conclusion of an impressive economic performance under the recovery program because of the massive decline in every sector of the economy before the launching of the economic recovery program.[11]

The counterfactual third alternative is the most difficult to use because of data limitations and the non-existence of explicit alternative programs against which to evaluate the recovery program.

The fourth alternative is also very difficult to use under the Ghanaian situation because of the presence of extraneous factors that affect Ghana and the neighbouring countries differently. These factors include political instability, lack of explicit economic programs, and the availability of foreign exchange in the case of the oil exporting neighbouring countries.

This leaves the second alternative as the most realistic criteria for assessing the economic recovery program since specific targets and objectives were established by the architects of the recovery program before being launched.[12] However, some words of caution are appropriate in assessing the recovery program in Ghana. First, the objectives and targets established by the government and the international institutions should not be the only yardsticks to judge the performance of the recovery program. Other important factors that affect the well-being of Ghanaians at large, need to be considered in the assessment. Second, one has to be careful not to attribute all the shortfalls in achieving the various targets and objectives solely to the government policies. Some extraneous factors outside the control of the government could be responsible for some of the shortfalls and should be carefully identified.

[11] Refer to the section on The Economic Crisis in Ghana for a comprehensive review of the situation.

[12] Refer to the section on The Economic Recovery Program (ERP) in Ghana for the specific objectives.

With these qualifications in mind, and on the basis of the established targets and objectives discussed in the previous chapter, the economic recovery program in Ghana would be assessed from the following viewpoints:

- restoring economic growth by improving economic activities of the productive sectors;
- improving food security and food self sufficiency;
- improving cocoa production by raising the real producer price of cocoa;
- restoring external balance by improving exports, enticing an increased inflow of foreign capital, accommodating a manageable debt service burden, and adopting an exchange rate regime that would ensure an equilibrium exchange rate;
- reducing the rate of inflation;
- improving domestic savings and investment rates;
- restoring fiscal discipline and development budget by increasing real government revenue and expenditure, abolishing deficits and making government savings positive;
- restoring confidence in the banking system;
- encouraging private sector investment including foreign private investment;
- raising per capita consumption levels and reducing luxury consumption;
- providing the minimal social needs of all sections of the Ghanaian society especially the vulnerable groups;
- increasing total employment;

- achieving an equitable distribution of costs and benefits of the adjustment to a degree consistent with the reallocation of economic resources;
- enhancing the participation of ordinary Ghanaians in decisions affecting their livelihood.

5.2 Assessment of the Impact of the ERP

On the basis of the outlined viewpoints, the ERP in Ghana has been remarkably successful, and is currently being regarded as a classic case of "adjustment with growth". Ghana's economic and financial performance has improved significantly since the inception of the ERP.

The economy grew strongly each year from 1984 to 1990, with growth in GDP averaging about 5 percent per annum for the period (See Tables 5.1 and 5.2). This was well in excess of the 1.5 percent growth per annum established by the government. Real per capita GDP and real per capita consumption followed the same pattern. Both real per capita GDP and real per capita consumption rose strongly in 1984, and slowly thereafter, averaging about 2.6 percent and 3 percent respectively between 1983 and 1990.

Growth was characterised by improvements in the main sectors of the economy. Despite a decrease in the contribution of agriculture to real GDP from 53.7 percent in 1983 to 44.7 percent in 1990, the agricultural sector remained the major sector in terms of contribution to GDP followed by the services sector and the industrial sector in that order (See Tables 5.1 and 5.2).

Cocoa production increased steadily each year from 157,000 metric tons in 1983 to 228,000 metric tons in 1986. Production fell to 188,000 metric tons in 1987 due to bad weather conditions, but increased again to 247,000 metric tons in 1990. However,

TABLE 5.1: SELECTED ECONOMIC INDICATORS (1983 - 1986)

	1983	1984	1985	1986
National Product				
Real GDP in millions of 1975 cedis	4747	5158	5420	5705
Real GDP Growth (%)	-4.6	8.6	5.1	5.3
Real GDP per capita (1975 cedis)	389	419	430	439
Real per capita consumption (1975 cedis)	287	318	331	333
Distribution of Real GDP				
Agriculture	53.7	53.9	51.6	50.7
Industry	10.6	11.5	13.0	13.3
Services	35.6	34.6	35.4	36.0
Agricultural Sector				
Cocoa ('000 tons)	157	174	219	228
Maize ('000 tons)	172	574	411	559
Rice ('000 tons)	40	66	90	70
Cassava ('000 tons)	1721	4083	3076	3692
Cocoyam ('000 tons)	720	1866	1569	1005
Plantain ('000 tons)	342	1943	1629	1087
Yam ('000 tons)	866	1178	987	1048
Forestry				
Logs in millions of cubic meters	0.56	0.58	0.62	0.89
Sawn Timber in millions of cubic meters	0.19	0.18	0.22	0.23
Manufacturing Industry				
Index of Manufacturing Production	35.3	39.3	49.3	54.2
Capacity Utilization	30.0	18.0	25.0	40.0
Mineral Sector				
Gold (Kg)	8601	8923	9311	8950
Diamonds ('000 carat	349	346	636	559
Bauxite ('000 tons)	70.4	49.0	169.5	204
Manganese ('000 tons)	190	287	316	259

Sources: Statistical Services, Ghana, 1983 - 1989.
World Bank, 1987, 1989.
IMF, 1991. Own calculations.

TABLE 5.2: SELECTED ECONOMIC INDICATORS (1987 - 1990)

	1987	1988	1989	1990
National Product				
Real GDP in millions of 1975 cedis	5876	6312	6634	6853
Real GDP Growth (%)	4.8	5.6	5.1	3.3
Real GDP per capita (1975 cedis)	449	464	475	478
Real per capita consumption (1975 cedis)	332	350	361	363
Distribution of Real GDP				
Agriculture	48.4	47.2	46.6	44.7
Industry	14.1	14.7	14.5	14.3
Services	37.5	40.8	41.7	43.5
Agricultural Sector				
Cocoa ('000 tons)	188	230	239	247
Maize ('000 tons)	553	600	620	634
Rice ('000 tons)	88	95	98	101
Cassava ('000 tons)	2943	3300	3392	3488
Cocoyam ('000 tons)	1000	1115	1146	1178
Plantain ('000 tons)	1005	1200	1234	1268
Yam ('000 tons)	1001	1200	1232	1263
Forestry				
Logs in millions of cubic meters	0.95	0.97	0.98	1.00
Sawn Timber in millions of cubic meters	0.28	0.29	0.30	0.31
Manufacturing Industry				
Index of Manufacturing Production	56.8	62.1	68.0	74.0
Capacity Utilization	50.0	35.0	-	-
Mineral Sector				
Gold (Kg)	10228	11631	13376	15516
Diamonds ('000 carats)	442	216	195	186.6
Bauxite ('000 tons)	195	287	290	292
Manganese ('000 tons)	254	231	220	208

Sources: Statistical Services, Ghana, 1983 - 1989.
World Bank, 1987, 1989.
IMF, 1991. Own calculations.

cocoa output was still considerably lower than the peak level output of 454,000 tons in 1971.

Production of most staple foodstuffs followed basically the same pattern. For example, in 1990, maize output was 269 percent above the 1983 level; rice, 153 percent above the 1983 level; cassava, 103 percent above the 1983 level; cocoyam, 64 percent above the 1983 level; plantain 270 percent above the 1983 level; and yam 45 percent above the 1983 level (See Tables 5.1 and 5.2). However, favourable exogeneous factors like good weather and rainfall contributed tremendously to the increased production levels.

Production of logs also increased steadily from 0.56 million cubic meters in 1983 to 1.0 million cubic meters in 1990, while sawn timber increased slightly from 0.19 million cubic meters in 1983 to 0.31 million cubic meters in 1990 (See Tables 5.1 and 5.2).

A slight improvement was recorded in the industrial sector in terms of its contribution to real GDP. The contribution of the industrial sector to real GDP rose from 10.6 percent in 1983 to 14.7 percent in 1988, but declined slightly to 14.3 percent of GDP in 1990. Capacity utilization increased from 18 percent in 1984 to about 50 percent in 1987, but declined to 35 percent in 1988 (See Tables 5.1 and 5.2). The positive supply response in the industrial sector was attributed to the provision of foreign exchange for the importation of raw materials and spare parts to rehabilitate broken down equipments. The initial gains in the industrial sector were not sustained due to internal inconsistencies in the policies of the reform program. For example, the introduction of the Dutch auction system coupled with the continuous depreciation of the domestic currency resulted in an increasing import cost of most manufacturing industries. The problem was compounded by the restrictive policy on credit which limited the availability of funds, and worse still, a 100 percent payment upfront for all successful bids at the auction. These problems contributed significantly to the

declining capacity utilization in the manufacturing sector estimated at between 30 and 35 percent for 1989 (Baffoe, 1989).

Mineral production also made a solid recovery. Gold production in 1990 was about 81 percent more than the 1983 level, and bauxite, 315 percent more. Production of diamonds and manganese increased by 88 percent and 33 percent respectively between 1983 and 1985, but declined by about 71 percent and 34 percent respectively between 1985 and 1990 (See Tables 5.1 and 5.2). This was mainly due to the fast approaching exhaustive limit of the diamond and manganese deposits.

An important element in the resurgence of growth in the economy was the steady increase in the level of imports. The ratio of imports to GDP in real terms increased from 2.4 percent in 1983 to 21.2 percent in 1990 (See Tables 5.3 and 5.4). This relieved a critical constraint on the economy. The increase in imports was made possible in part by the availability of foreign exchange from foreign resources, and a welcome improvement in the terms of trade between 1983 and 1986, due to declining oil prices and increasing cocoa prices within the period (See Tables 5.3 and 5.4).

The economy also witnessed a significant recovery in the export sector. The ratio of exports to GDP in real terms increased from 2.1 percent in 1983 to 17.0 percent in 1987, but fell to 15.4 in 1990. Several factors contributed to the recovery of the export sector. Favourable world cocoa prices between 1983 and 1987, and the steady depreciation of the domestic currency, allowed for devaluation-induced increases in the real domestic producer price of cocoa which contributed significantly to the recovery in the export sector. Declining world cocoa price from 1987 to 1990 resulted in a deterioration of Ghana's terms of trade from 103 in 1987 to 78 in 1990, and a reduction in the ratio of exports to GDP from 17.0 percent in 1987 to 15.4 percent in 1990. The deterioration in the terms of trade contributed to the increased trade deficits of 110 million U. S. dollars in 1987, and 337 million U. S. dollars in 1990, after an improvement from a deficit of 61 million U. S. dollars in 1983 to 15

TABLE 5.3: SELECTED TRADE AND ECON.INDICATORS (1983-1986)

	1983	1984	1985	1986
External Trade				
Export Quantity (1985=100)	81.0	82.7	100	111
Import Quantity (1985=100)	71.0	90.2	100	114
Merchandise Exports in millions of U.S. dollars	439	567	633	749
Merchandise Imports in millions of U.S. dollars	500	616	671	734
Trade Balance in millions of U.S. dollars	-61	-49	-38	-15
Overall Balance of Payments in millions of U.S. dollars	-243	37	-116	-57
Nominal Cocoa Export Price (U.S. dollars per ton)	1520	2351	2189	2406
Real Cocoa Export Price (1970/71=100)	49	76	70	78
Current Account Balance in millions of U.S. dollars	-158	-75	-157	-85
Terms of Trade (1985=100)	81.6	106	100	113
Debt Service Ratio (%)	31.9	0.4	54.7	47.8
Expenditure Indicators				
Imports as a % of GDP	2.4	8.2	10.6	2.8
Exports as a % of GDP	2.1	7.5	10.0	13.1
Consumption as a % of GDP	96.7	93.4	92.4	92.0
Gross Investment as a % of GDP	3.7	6.9	9.6	9.7

Sources: Statistical Services, Ghana, 1983 - 1989.
World bank, 1987, 1989.
IMF, 1991. Own calculations.

TABLE 5.4: SELECTED TRADE AND ECON.INDICATORS (1987-1990)

	1987	1988	1989	1990
External Trade				
Export Quantity (1985=100)	119	134	149	156
Import Quantity (1985=100)	131	132	134	141
Merchandise Exports in millions of U.S. dollars	824	828	808	897
Merchandise Imports in millions of U.S. dollars	934	991	1006	1234
Trade Balance in millions of U.S. dollars	-110	-110	-198	-337
Overall Balance of Payments in millions of U.S. dollars	139	125	127	85
Nominal Cocoa Export Price (U.S. dollars per ton)	2278	2102	1490	1309
Real Cocoa Export Price (1970/71=100)	73	68	48	42
Current Account Balance in millions of U.S. dollars	-102	-90	-95	-256
Terms of Trade (1985=100)	103	94	77	78
Debt Service Ratio (%)	58.3	68.0	58.1	37.9
Expenditure Indicators				
Imports as a % of GDP	19.2	19.1	19.2	21.2
Exports as a % of GDP	17.0	16.9	15.6	15.4
Consumption as a % of GDP	92.8	91.7	92.1	93.8
Gross Investment as a % of GDP	13.4	14.2	15.5	16.0

Sources: Statistical Services, Ghana, 1983 - 1989.
World bank, 1987, 1989.
IMF, 1991. Own calculations.

million U. S. dollars in 1986 (See Tables 5.3 and 5.4). Despite the huge trade deficit, the overall balance of payments improved considerably. Overall balance of payments deficit declined from 243 million U. S. dollars in 1983, to 57 million U. S. dollars in 1986. Between 1987 and 1990, balance of payments surpluses were created, with an average of about 119 million U. S. dollars (See Tables 5.3 and 5.4). The improvement in the balance of payments was mainly due to foreign capital inflow from loans, grants, and aid.

The government kept pace with its debt servicing. Total debt servicing peaked at 599 million U. S. dollars in 1988, but decreased to 340 million U. S. dollars in 1990 (See Tables 5.5 and 5.6). By 1989, the Government had reduced its external payment arrears by 96 percent, and eliminated all the arrears in 1990. This was made possible by the large inflow of foreign capital in the form of loans, and grants. By 1991, the total external debt was about 3.6 billion U. S. dollars (Home Front, January, 1991). About 55 percent of the foreign debt is owed to multilateral creditors, 30 percent to bilateral creditors, and 15 percent to financial institutions and other suppliers of credit (World Bank, 1989, p. 76).

The commitment to debt servicing and the repayment of arrears helped restore Ghana's creditworthiness internationally. Donor pledges at the consultative meetings in 1988 and 1989 exceeded the projected minimal requirements. This was indicative of the restored creditworthiness. However, with the increasing debt burden and a deteriorating terms of trade, there was a lot of pressure on the debt servicing. The debt service ratio was 68 percent in 1988, but dropped to 58 percent in 1989, and to 38 percent in 1990 (See Tables 5.3 and 5.4). The debt service ratio was projected at 28.8 percent, 24.3 percent, and 22.7 percent for 1991, 1992, and 1993 respectively, (IMF, 1991, p. 29), due to Ghana's access to concessional resources of both the IMF and the World Bank.

The government was very successful in introducing fiscal discipline in the public

sector, and restoring the development budget. Total revenue and grants increased steadily from about 5.6 percent of GDP in 1983 to about 15.8 percent of GDP in 1990 (See Tables 5.5 and 5.6). Growth in current and capital expenditures were quite pronounced. Current expenditure increased from 7.4 percent of GDP in 1983 to 11.9 percent of GDP in 1986, but decreased to 10.5 percent of GDP in 1990. Capital expenditure increased from 0.6 percent of GDP in 1983 to 2.5 percent in 1990. Total expenditure grew from 8.2 percent of GDP in 1983, to 14.1 percent of GDP in 1990 (See Tables 5.5 and 5.6).

As a result of the trends in the revenues and expenditures outlined above, by 1986, the Government had eradicated budget deficits and was contributing to savings (See Tables 5.5 and 5.6). This led to a reduction or elimination of the contribution of government borrowing to the expansion of money supply. This, together with the monetary policy measures and other monetary reforms helped restore the confidence of Ghanaians in the banking system. For example, growth in the velocity of circulation declined from 9.0 percent in 1983 to 5.6 percent in 1988, but increased to 6.7 percent in 1990, (See Tables 5.5 and 5.6), indicating the desire of the public to hold financial assets rather than currency.[13]

The rate of inflation declined from 123 percent in 1983 to about 10.4 percent in 1985, but increased again to 37.2 in 1990 (See Tables 5.7 and 5.8).

Investment in the economy increased from a level of about 3.7 percent of real GDP in 1983 to about 16.0 percent of real GDP in 1990 (See Tables 5.6 and 5.7). However, the increase was mainly due to an increase in public investment rather than private investment.

Gross national savings increased from 3 percent of real GDP in 1983 to about 15.7 percent of real GDP in 1989, but fell to 11.6 percent of real GDP in 1990. Again the

[13]Refer to the section on Introduction of Tight Monetary Policy Measures and Other Monetary Reforms for a detailed discussion.

TABLE 5.5: GOVERNMENT FINANCIAL INDICATORS (1983-1986)

	1983	1984	1985	1986
Central Gov't Finances				
Payment of Arrears (millions of U.S. dollars)	440	232	175	171
Grand Total of Debt Service (millions of U.S. dollars)	140.1	229	346.3	358
Total Revenue and Grants as a % of GDP	5.6	8.8	12.4	15.9
Current Expenditure as a % of GDP	7.4	8.6	11.2	11.9
Capital Expenditure as a % of GDP	0.6	1.2	2.1	1.9
Total Expenditure and Net Lending as a % of GDP	8.2	10.2	14.0	14.3
Overall Deficit or Surplus as a % of GDP	-2.7	-1.8	-2.2	0.1
Amount of Deficit Financed by the Banking System as a % of GDP	2.3	1.1	1.2	1.0
% Change in Money Supply (M2)	38.1	72.1	59.5	53.7
% Change in Velocity of Circ.	9.0	7.7	6.1	5.9
Tax Revenue and Grants as a % of GDP	5.5	8.4	11.7	14.4
Total Expenditure as a % of GDP	8.0	9.9	13.3	13.8

Sources: Statistical Services, Ghana, 1983 - 1989.
World Bank, 1987, 1989.
IMF, 1991.
Own Calculations.

TABLE 5.6: GOVERNMENT FINANCIAL INDICATORS (1987 - 1990)

	1987	1988	1989	1990
Central Gov't Finances				
Payment of Arrears (millions of U.S. dollars)	99	65	17	0
Grand Total of Debt Service (millions of U.S. dollars)	480.4	599	475.3	340
Total Revenue and Grants as a % of GDP	16.7	16.1	16.8	15.8
Current Expenditure as a % of GDP	10.8	10.6	10.5	10.5
Capital Expenditure as a % of GDP	2.5	2.8	2.7	2.5
Total Expenditure and Net Lending as a % of GDP	14.3	14.3	14.4	14.1
Overall Deficit or Surplus as a % of GDP	0.5	0.4	0.7	0.2
Amount of Deficit Financed by the Banking System as a % of GDP	-0.4	-0.6	-1.1	-1.4
% Change in Money Supply (M2)	53.0	43.0	26.9	18.0
% Change in Velocity of Circ.	5.6	5.6	5.9	6.7
Tax Revenue and Grants as a % of GDP	14.9	14.5	15.9	17.3
Total Expenditure as a % of GDP	13.7	13.7	13.9	13.5

Sources: Statistical Services, Ghana, 1983 - 1989.
World Bank, 1987, 1989.
IMF, 1991.
Own Calculations.

TABLE 5.7: OTHER ECONOMIC INDICATORS (1983 - 1986)

	1983	1984	1985	1986
Other Indicators				
Consumer Price Index (1977=100)	2357	3304	3647	4543
Rate of Inflation (per annum)	123	40.2	10.4	24.6
Nominal Lending Rate (%)	19.0	22.5	23.0	23.0
Real Lending Rate (%)	-104	-17.7	12.6	-1.6
Minimum Wage (Cedis per day)	25.0	35.0	70.0	90.0
Index of Real Wage (1983=100)	100.0	100.01	181	187
Investment as a % of GDP	3.7	6.9	9.6	9.7
National Savings as a % of GDP	3.0	5.9	7.1	8.2
Exchange Rate (Cedis per U.S. dollar)	8.8	35.9	54.4	89.2

Sources: Statistical Services, Ghana, 1983 - 1989.
World Bank, 1987, 1989.
IMF, 1991.
Own Calculations.

TABLE 5.8: OTHER ECONOMIC INDICATORS (1987 - 1990)

	1987	1988	1989	1990
Other Indicators				
Consumer Price Index (1977=100)	6352	8347	10450	14337
Rate of Inflation (per annum)	40	31.4	25.2	37.2
Nominal Lending Rate (%)	26.0	30.3	30.5	30.5
Real Lending Rate (%)	-14.0	-1.1	5.3	-6.7
Minimum Wage (Cedis per day)	113	146	170	218
Index of Real Wage (1983=100)	167	166	153	171
Investment as a % of GDP	13.4	14.2	15.5	16.0
National Savings as a % of GDP	11.3	12.5	13.7	11.6
Exchange Rate (Cedis per U.S. dollar)	153.7	202.3	270	362.2

Sources: Statistical Services, Ghana, 1983 - 1989.
World Bank, 1987, 1989.
IMF, 1991.
Own Calculations.

improvement was mainly due to public sector savings.

Ghana's program did not involve a temporary cut in the minimum wage. The minimum wage increased from 25 cedis per day in 1983 to 218 cedis per day in 1990 (See Tables 5.7 and 5.8). Real wages increased between 1983 and 1986, but declined thereafter until 1990, when they increased again.

The devaluation policy measures and the adoption of a flexible exchange rate regime, beginning with the Dutch auction system, helped stabilize the value of the domestic currency. Futhermore, the establishment of the foreign exchange bureaux helped reduce underground marketeering in foreign exchange, and encouraged the flow of private foreign exchange through official channels. This helped narrow the differential between the auction and bureaux exchange rates until the final unification.

Regarding distributional impacts, the results of the first part of the five year period living standards survey indicated that the annual per capita expenditure ranged from a low of 3,000 cedis to a high of 440,000 cedis. In terms of quintile ranges, the mean annual per capita expenditure ranged from a low of 16538 cedis to a high of 134,198 cedis (World Bank, 1989, p. 30). Using arbitrary poverty lines of the mean annual per capita expenditure, two-thirds of the mean, and one-third of the mean, Baffoe showed that about 62 percent of Ghanaians live below the mean annual per capita expenditure, 41.4 percent live below two-thirds of the mean, and 20 percent live below one-third of the mean (Baffoe, 1992, p. 16). Furthermore, Baffoe observed that 68 percent and 50 percent of the rural and urban dwellers respectively, live below the mean annual per capita expenditure, while 25 percent and 13 percent of the rural and urban dwellers respectively, live below one-third of the mean annual per capita expenditure (Baffoe, 1992, p. 17).

The various economic indicators undoubtedly reveal a remarkable improvement in Ghana's economy since the introduction of the ERP, especially between 1983 and

1989. By 1990, the program had started showing signs of adjustment fatigue which got carried over to 1991 and 1992. Between 1990 and 1992, the Ghanaian economy witnessed a slow down in economic and financial performance, but this was overshadowed by political events. The completion of the electoral process including the holding of a referendum on a new constitution, the conduct of a presidential election on November 3, 1992, and the conduct of a parliamentary election on December 29, 1992, initiated the process of involving ordinary Ghanaians in decisions affecting their livelihood.

Between 1990 and 1992, real GDP grew by an average of about 3 percent compared to more than 5 percent in the preceeding years under the ERP (Government of Ghana, 1993). In 1992, the agricultural sector recorded a decline of 0.6 percent, mainly due to unfavourable weather conditions; the industrial sector by 3.79 percent compared to 5 percent in 1991; and the manufacturing sector grew by 2.7 percent. Other sub- sectors like electricity, road construction, mining and quarring showed about 10 percent growth mainly due to the expansion of the national electricity grid under the rural electrification program, the expansion and upgrade of urban electricity distribution, the expansion and provision of water in rural areas, highway and feeder road development, and an improved recovery in the mining sector.

Inflation rate increased from 25.2 percent in 1989 to 37.2 percent in 1990, and was projected to decline to 10 percent in 1991. However, inflation was about 37 percent in 1991 and 1992. This was due to adverse developments in domestic food supply, and upward revision in the price of petroleum products. For example, the price of petrol was about 360 cedis per gallon in 1990, but was increased to 1000 cedis per gallon in 1992.

In the area of fiscal performance, there were large imbalances in 1992. The budget deficit was 177 billion cedis (about 6.3 percent of the GDP) compared to a programmed surplus of 16 billion (about 0.6 percent of the GDP) (Government of

Ghana, 1993). This was because of the significant shortfall in cocoa export duties, import duties, corporate taxes, and excise duties, resulting from the shrinking of the taxable base itself and the slacking of tax collection. Actual expenditure exceeded programmed expenditure by a third. The major pressure on expenditure came from wage, salary, and related settlements which added 50 billion cedis to the wage bill, and end of service benefits amounting to 20 billion cedis in actual payment (Government of Ghana, 1993).

With these fiscal imbalances, net claims on Government by the banking system increased by over 100 billion cedis compared to a programmed reduction of 72 billion. Also, credit to the private sector expanded significantly. The combined effect of these developments was an increase in broad money supply by 51 percent as against a programmed increase of 12 percent (Government of Ghana, 1993).

On the international scene, the effect of depressing primary commodity prices were felt. Ghana's terms of trade deteriorated by 28 percent between 1991 and 1992, (Government of Ghana, 1993), following a cumulative worsening of about 35 percent between 1986 and 1990 (See Tables 5.3 and 5.4). Cocoa and gold, Ghana's top export commodities, suffered sharp falls in prices. The world price of gold fell from 418 U. S. dollars an ounce in 1990. to 380 U. S. dollars an ounce in 1991, and dropped further to 340 U. S. dollars an ounce in 1992. The price of cocoa continued to fall and for the first time in more than a decade, dropped below 930 U. S. dollars per metric ton. As a result, the cocoa export account had a shortfall of 67 million U. S. dollars. This together with the deteriorating fiscal environment, and the withholding or non- disbursement of about 170 million U. S. dollars in concessional aid, led to an overall balance of payments deficit of more than 140 million U. S. dollars, as against a programmed overall surplus of 140 million U. S. dollars (Government of Ghana, 1993).

The performance of the Ghanaian economy from 1983 - 1989, compared to that

from 1990 - 1992, reveals some potential problems and concerns in the ERP which need to be addressed.

5.3 Problems and Concerns in Ghana's ERP

The performance of the Ghanaian economy from 1983 - 1992 clearly reveals that the Ghanaian economy faces some structural problems which adversely impact on adjustment, allowing signs of adjustment fatigue to be seen in the sustainable phase of the program. The structural bottlenecks could inhibit economic growth and/or the spreading of the benefits of reform if they are not addressed and remedied.

Recent movments in the consumer price index indicate that the potential exists for the resurgence of inflation. After wrestling inflation down from 123 percent per annum in 1983 to 10.4 percent per annum in 1985, inflation increased steadily to 24.6 percent per annum in 1986, 40 percent per annum in 1987, about 37.2 percent per annum in 1990, and averaged about 37 percent between 1990 and 1992. The continuous depreciation of the cedi and the operation of forex bureaux add cost push inflationary pressures. Increases in food prices due to relative scarcities of food under variable weather conditions, and in response to increases in non-food prices, especially petroleum prices, also add some inflationary pressures. Labour negotiations for wage adjustment to keep pace with cost of living also add further pressures, and could lead to price-wage inflationary spiral. High rates of inflation would slow down the willingness of the public to hold financial assets because of negative real interest rates and could slow down the savings rate.

The continuous depreciation of the cedi has resulted in high import cost for many manufacturing firms due to their high import dependency for raw materials. Credit ceilings imposed on financial institutions introduced liquidity problems for most manufacturing firms. These, together with the high cost of borrowed capital due to high

interest rates, threaten the operational viability of many manufacturing firms. Also trade liberalization policies introduced under the ERP have allowed foreign products to compete with those produced by the relatively less efficient domestic producers in the domestic market. These problems have had a retrogressive effect on the growth of the industrial sector with manufacturing output still below the 1977 level.

Despite the tax reforms, deregulation, and the new mineral and investment codes aimed at providing incentives for private investment, there is still a lagging response of private investment to complement public investment. The various bottlenecks that impact adversely on the manufacturing sector, the pervasiveness of the state-owned enterprises, and the high inflation rates, explain the lagging response for private investment. Also, bureaucratic procedures at the Ghana Investment Centre (GIC) result in delays in approving investments. This is compounded by lack of qualified personnel at the GIC. The weakness of the financial sector makes it difficult to intermediate effectively and channel resources to high return projects.

The weak financial sector has hindered the response of the manufacturing and industrial sectors to the improved incentives, and the mobilization of savings. The banks failed to introduce new services in the face of excess liquidity in the economy. Interest rate controls and selected credit policies distorted the banking system prior to the ERP. The distortion was compounded by lack of competition and very weak supervision by the central bank, and resulted in severe financial problems in the financial system. A large volume of non-performing loans still exists, and operating costs are very high because of inefficiency. The capital base is insufficient and the accounting system and managerial information are very weak. Foreign direct investment has not therefore been significant.

Given its resource base, Ghana has the potential to satisfy all domestic food requirements and even to export a surplus. Nevertheless, the per capita output of the staples declined after an impressive recovery in 1984. Per capita output of maize

per annum increased from about 32 lbs in 1983 to 104 lbs in 1984; rice from 7.5 lbs to 12.0 lbs; and cassava from 322 lbs to 744 lbs for the same period. In 1990, the per capita output of maize, rice, and cassava per annum were 99 lbs, 15.7 lbs, and 544 lbs respectively. The per capita output of the staples is likely to decrease between 1990 and 1992 because of the decline in agricultural output. Poor weather and the absence of a comprehensive food policy to solve the structural problems of smallholders who produce about 80 percent of the output account for the decline in the per capita food production. Limited use of improved technology, poor distribution of inputs especially fertilizers, weak agricultural extension services, inadequate infrastructure in the producing areas, and limited availability of credit, are examples of these structural problems. Also, the turning of the domestic terms of trade against food producers relative to exportable crop producers due to the increases in the producer price of exportable crops, has exacerbated the condition with resources being allocated to the production of exportable crops. The expectation that the resultant shortage in food production would eventually drag prices up and provide incentives for food production is ill-conceived for a commodity as critical as food. The guarantee of food security is yet to be felt.

Declining world market prices of Ghana's exports is also a concern. Ghana's terms of trade have deteriorated since 1986. The collapse of the price of cocoa from 2406 U. S. dollars per ton in 1987 to 1390 U. S. dollars per ton in July 1990, cost the country 100 million U. S. dollars in 1988, and 180 million U. S. dollars in 1989 (Ghanaian Times, February 28, 1989). The further decline in the price of cocoa to below 930 U. S. dollars in 1992, also impacted on the foreign exchange position of Ghana. On the other hand, the stock of external debt grew considerably during the ERP. These factors put a lot of pressure on the country's debt service ratio, and limit the availability of foreign exchange from own resources for productive investments.

Various policies in the adjustment program have limited access to health, educa-

tion, social amenities and other services. In addition, some aspects of the program have exacerbated the problems of certain groups of people. For example, reforms in the civil service resulted in the removal of 50,000 unskilled civil servants from the payroll by 1990. It is quite evident therefore that the social cost of the adjustment process is very high.

The problems and concerns for the ERP discussed above point to the need for policies to address them. A comprehensive agricultural food policy is needed to increase agricultural output and contribute to domestic growth.

The collapse of the cocoa price has indeed highlighted the fallacy of composition inherent in IMF/World Bank structural adjustment programs. It is true that the short run emphasis on the cocoa sector was necessary, and that the medium-term prospects of cocoa are better. However, it does mean that the ERP will face severe problems with external balance in the future. This obviously emphasises the need to diversify the export base. Secondly, there is the need to reduce the debt burden further.

Reforms in the financial system are very crucial together with the availability of credit to improve capacity utilization and expand the productive base of the economy. Improvements in management and technical skills as well as in product quality are paramount for improved productivity of the manufacturing sector. The tax base needs to be expanded and the collection of taxes improved to revert the Government's financial position back into a surplus, and the surplus used to retire some of the bank debt and improve lending capability. Improvement in production especially in the agricultural sector, would reduce inflationary pressures and possibly inflation. The PAMSCAD program is very well conceived and well intended. Its implementation should therefore be pursued with all the urgency, diligence and the vigor required.

5.4 The Uniqueness of the Ghana Program

Despite the rather unimpressive track record of IMF/World Bank adjustment programs in Africa, the two multilateral financial institutions remain a dominant source of influence in African economic policy formulation. The Ghana program is one of the very few programs currently hailed as a resounding success as a result of the remarkable improvements in Ghana's economy since the introduction of the economic recovery program.

The multilateral institutions may be tempted to recommend Ghana's program as an applicable growth model for other African countries faced with similar economic crisis. A word of caution is however appropriate in this regard. The structural characteristics of Ghana's economy as well as some extraneous factors during the initial stages of the program contributed immensely to the success.

These factors may be very crucial in determining the replicability of the Ghana program for other African countries.

First, the diversion of cocoa output from the large underground market to the official channel contributed to the large short run supply response to the devaluation induced massive increases in the domestic producer price. The price increases reduced the price differential between Ghana's producer price and those of neighbouring countries, and encouraged the marketing of cocoa through the official channel rather than smuggling them to the neighbouring countries. The smuggling of cocoa out of Ghana was very easy because of the difficulty in policing the large number of small-scale producers scattered around the borders with the neighbouring countries, and the ease with which cocoa is transported. Also, the import content of cocoa production is very low, hence, the devaluation did not have much impact on the production cost. Improved husbandry practices and the cocoa rehabilitation programs can expand cocoa supply over the medium and long term but not in the short term because the

gestation period of cocoa is at least three years.

The initial supply response helped improve the tax revenue through cocoa duties, and reduced inflationary pressures that might have resulted from large deficits. An underground market in the consumer goods (mostly imported and priced using the parallel exchange rate), was also prevalent before the reforms. As a result, the devaluation did not have much impact on the prices of consumer goods. Most manufacturing firms were not in operation, and for those in operation, the capacity utilization was below 20 percent at the initial stages of the ERP and hence they used a very low volume of inputs. Therefore, initially, the devaluation did not have much impact on prices of manufactured goods either. Cost push inflationary pressures resulting from devaluation were therefore not observed. Food production recovered at the initial stages of the program mainly because of good weather conditions, and helped to reduce inflationary pressures as well. All these factors helped reduce the overall rate of inflation.

With the return of variable weather conditions, the formal integration of the parallel foreign exchange market into the Ghanaian economy through the establishment of the forex bureaux, and the trade liberalization policies, cost push inflationary pressures may now be felt more acutely.

Improved terms of trade between 1983 and 1986 together with the large initial supply response in cocoa, helped generate foreign exchange which was a major constraint on production. The improvement in terms of trade was not sustained after 1986 because of the vulnerability of the major export crop, cocoa, to the "fallacy of composition". Increased output levels in Ivory Coast, Nigeria, Brazil, and Malaysia contributed to the decline in world cocoa price which has impacted adversely on the foreign exchange earning potential of Ghana.

Huge capital inflows from the multilateral institutions to support the adjustment

program helped increase imports and reactivate production. Ghana's relatively low debt burden before the program, (31.9 and 40.4 percent debt service ration in 1983 and 1984 repectively (See Table 5.3), and a total external debt of 1.66 million U. S. dollars and 1.93 million U. S. dollars in 1983 and 1984 respectively (Loxley, 1991, p. 47)) limited capital outflow and helped retain a greater portion of the massive capital inflow.

Lastly, the political climate in Ghana was conducive to the fast pace of the recovery program. Almost all avenues for channelling grievances, complaints and concerns were non-existent. A machinery for political consensus was also non-existent. The military government therefore met little or no opposition in the formulation and/or the implementation of the program. This was facilitated by the abysmal economic conditions of 1983 and the speedy recovery in 1984-85 which aroused the confidence of the people in the military government. It must be mentioned that this does not mean a dictatorial government should be a prerequisite for economic development.

The Ghanaian economy remained stable during the ERP, especially during the early phases, because of the depth of the initial crises, the survival strategies of the government, the influence of the government over policy development in the negotiations with the IMF/World Bank, and the maintenance of a strong planning apparatus for setting and meeting economic targets.

Chapter 6

The Analytical Framework And Econometric Model

6.1 Introduction

Since the late 1970s, extensive research has been carried out on stabilization and growth problems in developing countries. Behrman, (1977), Belassa, (1978), Donovan, (1982), and Haque et al. , (1990), are examples of such studies. However, most of the analysis is conducted within a framework which is uncritical of orthodox IMF and World Bank policies.

The orthodox IMF/World Bank stabilization model recommended for developing countries is however beset with three major problems. First, the framework fails to capture adequately, the structural characteristics of developing economies open to trade. These structural characteristics are in the nature of the financial sector, the structure of external trade, the domestic tax structure, the import dependency of the manufacturing and industrial sectors, rigidities in agricultural production, and the dependency of the economy as a whole on foreign exchange availability. Second,

the model attempts to generate "representative" developing country estimates of a set of macroeconomic parameters that are considered important for policy. However, such estimates differ with regard to countries, periods covered, the specification of the behavioural equations, and the methodology employed in producing them. This tend to hide the specifics for different countries. Third, separate sectoral models are often developed and estimated within the framework, under a wide range of assumptions which may not reflect the characteristic features of a developing country. Furthermore, the empirical methodology does not allow a simultaneous solution to a system of sectoral models. Sebastian and Khan (1985), Giovannini (1985), Haque (1988), and Haque and Montiel (1989), are examples of such studies. Consequently, as mentioned in Chapter 2, recommendations from such studies may be ineffective, and they ignore the implications for other sectors of the economy.

For the aforementioned reasons, the objectives of this study are twofold. First, to develop, estimate, and evaluate a simple macroeconometric simulation model that attempts to capture the structural features of the Ghanaian economy; and second, to use the estimated model to simulate and evaluate the impact of key changes in macroeconomic variables contained in an IMF/World Bank package and an external shock on the Ghanaian economy. The key macroeconomic variables are the level of planned fiscal deficit, the level of foreign capital flow, the level of internal credit, and a devaluation of the domestic currency; and the external shock as a deterioration in the terms of trade.

The model follows a basic Keynesian income and expenditure model designed to quantify output, prices, and monetary balances. Twelve behavioural relationships and forty-seven definitional equations and/or identities for three main sectors of the Ghanaian economy (expenditure sector, monetary sector, and price, wage and production sector), and one sub-sector (the fiscal sub-sector), constitute the full structural model. Dynamism in the model is introduced by partial adjustment in some be-

havioural equations. The model shares a number of basic features with other macro models of developing countries (Behrman, (1977); Donovan, (1982); Haque et al. (1990)). However, it differs from the other models in some four important aspects. First, and most importantly, unlike the other models, the behavioural equations are specified to capture the structural features of the Ghanaian economy. Second, the instrument of monetary policy (domestic credit) is endogenized with the behaviour explained by a central bank reaction function. Third, the behaviour of fiscal authority is also endogenized by specifying a net fiscal operations equation. This makes it possible to quantify the impact of changes in macroeconomic variables on net fiscal operations and vice versa. Finally, the various specifications are estimated as a system of equations which brings out the linkages in the various sectors of the Ghanaian economy.

This chapter is devoted to the development of the analytical framework and the econometric model. It begins with a discussion of the theoretical framework for an open economy macroeconomic model. Subsequently, various aspects of the framework are translated into behavioural equations that are modeled to capture the special features of the Ghanaian economy. The behavioural equations together with some definitional equations and identities constitute the macroeconometric simulation model. Finally, the chapter looks at a condensed flow chart of the model which shows the linkages and interactions in the various components of the model.

6.2 Specification of the Model

The model focuses on four key relationships for a developing economy open to trade, namely, a relationship to explain inflation, relationships for internal and external balance, and relationships for the financial market. These relationships are translated into a model that integrates three sectors of the economy, and a one sub-sector. The

three main sectors and the one sub-sector are:

- The Expenditure Sector;
- The Fiscal sub-Sector;
- The Monetary Sector;
- The Wage, Price, and Production Sector.

The model is constructed using fairly simple behavioural equations that are widely accepted for developing country specifications of key behavioural relationships, but modified to reflect the salient institutional and structural features of the Ghanaian economy. The behavioural equations, definitional equations, and identities, are inter-related through various linkages in the model. Simple distributed lags are introduced in some of the specifications as a means of introducing dynamism into the model.

The specifications in the final model are the best from a group of alternatives. The specifications are selected on the basis of some model selection criteria and diagnostic tests. The model selection criteria include having the correct signs for the coefficients vis à vis the expected signs, significant coefficients, a higher value for the coefficient of determination, a significant F-statistic, and no evidence of auto-correlation as indicated by the Durbin Watson or Durbin "h" statistic.

The selected specifications, are also tested for mis-specification using the Ramsey's regression specification error test (RESET) procedure.[14] In all the selected specifications, the calculated Ramsey's RESET F-statistic is lower than the lowest tabulated F- statistic of 2.93, at a 5 percent level, indicating that there is no mis-specification.[15] Details in the model specification are discussed below.

6.2.1 The Expenditure Sector Model

In the expenditure sector, various equations for the components of Keynesian aggregate expenditure are specified. These are real private consumption expenditure, real government expenditure, real private investment expenditure, and real value of external trade balance. The equation is given thus:

$$\begin{aligned} RGDP_t &= RCPR_t + RIPR_t + RCAPEXP_t + RCUREXP_t \\ &\quad + RVALEXPC_t - RVALIMPC_t \end{aligned} \tag{6.1}$$

$RGDP_t$ is real gross domestic product in period t.

[14]The calculated F-statistic for Ramsey's RESET test is given thus:

$$F = \frac{R^2_{new} - R^2_{old}/number\ of\ new\ regressors}{1 - R^2_{new}/(N - number\ of\ parameters\ in\ new\ model)}$$

The new regressors are Y^2, Y^3, Y^4, where Y is the fitted value of the dependent variable (Gujarati, 1988).

The F-statistic calculated above tests the hypothesis that the model is mis-specified. If the F-statistic is significant at a given level, say 5 percent level, then the model is mis- specified.

[15]The Durbin Watson and Durbin "h" statistics together with other statistics for the various specifications are reported in Chapter 7.

$RCPR_t$ is real private consumption expenditure in period t.

$RIPR_t$ is real private investment expenditure in period t.

$RCAPEXP_t$ is real government capital expenditure in period t.

$RCUREXP_t$ is real current government expenditure in period t.

$RVALEXPC_t$ is the real value of exports in period t.

$RVALIMPC_t$ is the real value of imports in period t.

All the variables defined above are measured in millions of 1980 cedis. The specifications for the various components of the aggregate expenditure are given below.

Real Private Consumption Expenditure Function

Private consumption expenditure is an important aspect of the empirical studies on aggregate expenditure because it is from the consumption function that the sensitivity of consumption to changes in income is analysed. Also, a knowledge of the consumption function has proven useful in the Keynesian approach.

A modified simple Keynesian consumption function, close to that used by Haque et al. (1990), is used to estimate the real private consumption expenditure. Real private consumption expenditure, is explained by real disposable income, lagged real disposable income, real lending rate, and lagged real consumption expenditure. Wealth is excluded because of data limitations. A log linear specification of the consumption function is used and it is given as follows:

$$\begin{aligned}\log RCPR_t &= \alpha_0 + \alpha_1 \log RDINC_t + \alpha_2 \log RDINC_{t-1} \\ &\quad + \alpha_3 \log RLENDR_t + \alpha_4 \log RCPR_{t-1} + U_1 \qquad (6.2)\end{aligned}$$

$RCPR_t$ is real private consumption expenditure in millions of 1980 cedis in period t.

$RDINC_t$ is real disposable income in millions of 1980 cedis in period t.

$RLENDR_t$ is the real lending rate in percent in period t.

U_1 is the error term for the consumption function.

Current consumption expenditure of Ghanaian households is severely constrained by current income. Also, the rate of inflation continues to be high, eroding the purchasing power of current real income and making the postponement of current consumption not only irrational but unrealistic. Consequently, real consumption expenditure would increase with increasing real disposable income. The coefficient of real disposable income is therefore expected to be positive. The coefficient of past real income is expected to be positive or zero. However, past real income improves the dynamic properties of the model and removes auto-correlation.

For consumption expenditures financed through borrowing, the level of expenditures would be negatively related to the real lending rate. The coefficient of real lending rate is therefore expected to be negative.

The coefficient of lagged real consumption expenditure is expected to be positive in support of the permanent income model and the fact that households strive to improve past consumption patterns.

Real disposable income (RDINC), is defined as nominal gross domestic product (NGDP), less the nominal total tax payments (NTOTAXR), deflated by the general consumer price index, (GHCPI).

Real private consumption expenditure (RCPR), is defined as nominal private consumption expenditure (CPR), deflated by the general consumer price index. The real lending rate (RLENDR), is the nominal lending rate (LENDR), less the rate of inflation (RINF). The general consumer price index has 1980 as the base year. These definitional equations are given as follows:

$$RDINC_t = [(NGDP_t - NTOTAXR_t)/(GHCPI_t \times 0.01)] \tag{6.3}$$

$$RCPR_t = [CPR_t/(GHCPI_t \times 0.01)] \tag{6.4}$$

$$RLENDR_t = (LENDR_t - RINF_t) \tag{6.5}$$

$RDINC_t$ is real disposable income in millions of 1980 cedis in period t.

$NGDP_t$ is nominal gross domestic product in millions of current cedis in period t.

$NTOTAXR_t$ is nominal total tax revenue in millions of current cedis in period t.

$RCPR_t$ is real private consumption expenditure in millions of 1980 cedis in period t.

CPR_t is nominal private consumption expenditure in millions of current cedis in period t.

$GHCPI_t$ is Ghana's general consumer price index in percent in period t.

$RLENDR_t$ is real lending rate in percent in period t.

$LENDR_t$ is nominal lending rate in percent in period t.

$RINF_t$ is the rate of inflation in percent in period t.

Real Private Investment Expenditure Function

Private investment expenditure is another important component of aggregate expenditure. Private investment expenditure together with public capital expenditure determine gross domestic investment, or the gross fixed capital formation, i. e. the productive base of the country. The gross domestic investment specification sheds light on the underlying factors that explain investment. These factors are essential for policies to promote investment and growth.

Real gross private investment is initially specified as a function of fairly standard variables similar to that of Sundararajan and Thakur (1980), and Blejer and Khan (1984a) and (1984b), where real private investment is related to the real lending rate (RLENDR), real output level (RGDP), and lagged real capital stock ($RCAPST_{t-1}$). The initial specification is modified by the inclusion of three other variables considered critical for private investment in developing countries. These are real internal credit (RINTCRED); the sum of real value of exports, private transfers, government transfers, direct foreign investments, and other capital transfers in dollars (RVEXTDID), as a measure of availability of foreign exchange for the importation of capital goods, intermediate goods, and raw materials; and real effective exchange rate (REEXCH), to capture the impact of changes in the value of domestic currency, relative to foreign currencies, on investment. Following the approach by Haque et. al (1990), a linear

specification is used to allow for first differencing, and avoid the problem of lack of data on capital stock. The initial specification, the first difference transformation, and the final specification, are discussed below.

Real private investment expenditure is initially specified as follows:

$$\begin{aligned} RIPR_t &= \beta_0 + \beta_1 RLENDR_t + \beta_2 RGDP_t \\ &\quad + \beta_3 RINTCRED_t + \beta_4 RVEXTDID_t \\ &\quad + \beta_5 REEXCH_t + \beta_6 RCAPST_{t-1} + U_{21} \end{aligned}$$

A major problem with the above specification of the real private investment is the lack of data for capital stock in Ghana, and for most developing countries. This problem is circumvented by taking the first difference. With this manipulation, the first difference equation is given as follows:

$$\begin{aligned} RIPR_t - RIPR_{t-1} &= \beta_1[RLENDR_t - RLENDR_{t-1}] \\ &\quad + \beta_2[RGDP_t - RGDP_{t-1}] \\ &\quad + \beta_3[RINTCRED_t - RINTCRED_{t-1}] \\ &\quad + \beta_4[RVEXTDID_t - RVEXTDID_{t-1}] \\ &\quad + \beta_5[REEXCH_t - REEXCH_{t-1}] \\ &\quad + \beta_6[RCAPST_{t-1} - RCAPST_{t-2}] + [U_{21} - U_{22}] \end{aligned}$$

This is simplified as follows:

$$\begin{aligned} RIPR_t - RIPR_{t-1} &= \beta_1 \triangle RLENDR_t + \beta_2 \triangle RGDP_t \\ &\quad + \beta_3 \triangle RINTCRED_t + \beta_4 \triangle RVEXTDID_t \\ &\quad + \beta_5 \triangle REEXCH_t + \beta_6 \triangle RCAPST_{t-1} + U_2 \end{aligned}$$

If the change in real capital stock represents the level of real private investment, then:

$$\triangle RCAPST_{t-1} = RIPR_{t-1}$$

Hence,

$$\begin{aligned} RIPR_t - RIPR_{t-1} &= \beta_1 \triangle RLENDR_t + \beta_2 \triangle RGDP_t \\ &\quad + \beta_3 \triangle RINTCRED_t + \beta_4 \triangle RVEXTDID_t \\ &\quad + \beta_5 \triangle REEXCH_t + \beta_6 RIPR_{t-1} + U_2 \end{aligned}$$

The above equation is simplified further as:

$$\begin{aligned} RIPR_t &= \beta_1 \triangle RLENDR_t + \beta_2 \triangle RGDP_t \\ &\quad + \beta_3 \triangle RINTCRED_t + \beta_4 \triangle RVEXTDID_t \\ &\quad + \beta_5 \triangle REEXCH_t + \beta_6^* RIPR_{t-1} + U_2 \end{aligned} \tag{6.6}$$

$$\begin{aligned} \beta_6^* &= (1 + \beta_6) \\ U_2 &= U_{21} - U_{22} \end{aligned}$$

$RIPR_t$ is real private investment expenditure in millions of 1980 cedis in period t.

$\triangle RLENDR_t$ is the change in real lending rate in percent in period t.

$\triangle RGDP_t$ is the change in real gross domestic product in millions of 1980 cedis in period t.

$\triangle RINTCRED_t$ is the change in real internal credit in millions of 1980 cedis in period t.

$\triangle RVEXTDID_t$ is the change in real available foreign exchange in millions of 1980 United States dollars in period t.

$\triangle REEXCH_t$ is the change in real effective exchange rate in period t.

U_2 is the error term for the real private investment function.

Equation 6.6 is the final specification of the real private investment function, where real private investment expenditure is explained by changes in real lending rate, real internal credit, real available foreign exchange, real effective exchange rate, and lagged real private investment. The real lending rate (RLENDR), as defined previously, is the nominal lending rate (LENDR), less the rate of inflation (RINF). The rate of inflation is the percentage change in the general consumer price index. Real internal credit (RINTCRED), is the nominal internal credit (INTCRED), deflated by the general consumer price index (GHCPI). The available real foreign exchange in 1980 dollars (RVEXTDID), is the sum of the nominal dollar values of exports, net private transfers, net government transfers, direct foreign investments, and net other capital transfers (NVAFOREX), deflated by the United States general consumer price index with 1980 as the base year. United States general consumer price index is used

because all the variables are denominated in United States dollars. Real effective exchange rate is the import weighted average of the real exchange rate. The real exchange rate is determined using the nominal exchange rates for the currencies of the major countries of origin of Ghana's imports and the respective ratios of general consumer price index.[16]

Mathematically, the various definitional equations are specified as follows:

$$RIPR_t = [IPR_t/(GHCPI_t \times 0.01)] \tag{6.7}$$

$$RINF_t = [(GHCPI_t - GHCPI_{t-1})/GHCPI_{t-1}] \times 100 \tag{6.8}$$

$$RGDP_t = [NGDP_t/(GDPD_t \times 0.01)] \tag{6.9}$$

$$RINTCRED_t = [INTCRED_t/(GHCPI_t \times 0.01)] \tag{6.10}$$

$$RVEXTDID_t = \frac{NVAFOREX_t}{(USCPI_t \times 0.01)} \tag{6.11}$$

$$\begin{aligned} NVAFOREX_t &= NVALEXPD_t + NPRIVTRD_t + NGOVTRD_t \\ &\quad + DIRINVD_t + OTHCAPD_t \end{aligned} \tag{6.12}$$

$$REEXCH_t = \sum_{i=1}^{N} w_i(\frac{CPI_{it}}{GHCPI_t}) \times EXCR_{it} \tag{6.13}$$

[16]Most of Ghana'a imports originate from United Kingdom, United States, Japan, West Germany, Nertherlands, Belgium, Canada, South Korea, Taiwan, Italy, Switzerland, Sweden, and Australia.

$RIPR_t$ is real private investment expenditure in millions of 1980 cedis in period t.

IPR_t is nominal private investment expenditure in millions of cedis in period t.

$RINF_t$ is rate of inflation in percent in period t.

$RGDP_t$ is real gross domestic product in millions of 1980 cedis in period t.

$NGDP_t$ is nominal gross domestic product in millions of cedis in period t.

$GDPD_t$ is the GDP deflator in percent in period t.

$RINTCRED_t$ is real internal credit in millions of 1980 cedis in period t.

$INTCRED_t$ is nominal internal credit in millions of cedis in period t.

$RVEXTDID_t$ is real value of available foreign exchange in millions of 1980 U. S. dollars in period t.

$NVOFREX_t$ is nominal available foreign exchange in millions of U. S. dollars available in period t.

$NVALEXPD_t$ is the nominal value of exports in millions of U. S. dollars in period t.

$NPRIVTRD_t$ is net nominal private transfers in millions of U. S. dollars in period t.

$NGOVTRD_t$ is net nominal government transfers in millions of U. S. dollars in period t.

$DIRINVD_t$ is nominal direct investments in millions of U. S. dollars in period t.

$OTHCAPD_t$ is nominal net other transfers in millions of U. S. dollars in period t.

$REEXCH_t$ is real effective exchange rate in period t.

CPI_{it} is consumer price index of country i in period t.

$EXCR_{it}$ is the nominal exchange rate of country i's currency in cedis per unit of foreign currency in period t.

w_i is the weight of country i.

Considering equation 6.6, an increase in real lending rate increases the cost of borrowing, which may discourage private investment. The coefficient for the change in real lending rate is therefore expected to be negative. The coefficient for the real gross domestic product is expected to be positive since a positive change in real output helps stimulate private investment. The coefficient for the real internal credit is expected to be positive since a positive change in real internal credit promotes private investment. As a result of the import dependence of the industrial and manufacturing sectors of Ghana, an increase in the level of foreign exchange helps increase investment. Hence, the coefficient for the real available foreign exchange is expected to be positive. Ghanaian private investors rely heavily on foreign private sources of funds for investment. A relatively weak domestic currency increases the domestic value of foreign currency, encourages private capital inflow, and consequently, encourages private investment. Hence, the coefficient for the real effective exchange rate is expected to be positive. The higher the level of private investment in the previous year, the greater the likelihood of an improved investment level in current year. This holding, the coefficient for the lagged private investment is expected to be positive.

The Fiscal Sector sub-Model

The role of government in an economy, especially a developing economy, is an important part of the developmental process. The government plays an active role in ensuring a decent standard of living for the population at large, correcting regional economic imbalances, complementing private investment especially in the area of public utilities and public services, and improving the country's infrastructure. Like any public sector however, the ability of the government to play this role is constrained by the total revenue available to the government. Hence the need for government expenditures and total revenue specifications to analyze public sector finance. The fiscal sector sub-model enables an analysis of public sector finance.

In many macroeconometric studies, government expenditure is usually assumed as exogenous (See for example Haque et al. , 1990). However, in this model, government expenditure is considered endogenous in order to investigate the impact of economic and institutional factors on government expenditure.

The fiscal sector sub-model has specifications for total government revenue, total government expenditure, and government net fiscal operation. Total government revenue comprises total tax revenue and non-tax revenue; total government expenditure comprises of current and capital expenditure.

One behavioural equation and one exogenous entry determine the total government revenue. Total tax revenue is specified as a behavioural function, and non-tax revenue considered exogenous. The total tax revenue function is specified in nominal terms on the assumption that government tax revenue is determined in nominal terms. The sources of tax revenue are international transactions, income tax, property tax, sales tax, and excise tax. The total tax revenue function is therefore explained by the revenue from cocoa exports, non-cocoa export revenue, the level of gross domestic product less exports, and the level of imports. The influence of international trans-

actions is captured by the domestic value of cocoa exports, non-cocoa exports, and imports. Nominal gross domestic product less exports captures income tax, property tax, sales tax, and excise tax.

Using a log-linear specification, the total tax revenue function is given as follows:

$$\begin{aligned}\log NTOTAXR_t &= \delta_0 + \delta_1 \log COCEXR_t + \delta_2 \log OTEXPREV_t \\ &\quad + \delta_3 \log NGDPLEX_t + \delta_4 \log IMPORTS_t + U_3 \quad (6.14)\end{aligned}$$

$NTOTAXR_t$ is nominal total tax revenue in millions of cedis in period t.

$COCEXR_t$ is nominal cocoa export revenue in millions of cedis in period t.

$OTEXPREV_t$ is nominal value of other exports in millions of cedis in period t.

$NGDPLEX_t$ is nominal gross domestic product less the value of exports in millions of cedis in period t.

$IMPORTS_t$ is the value of imports in millions of cedis in period t.

U_3 is the error term for the nominal total tax revenue function.

The coefficients of all the explanatory variables in equation 6.14, are expected to be positive indicating that independent increases in domestic revenue of cocoa exports, non-cocoa exports, gross domestic product less exports, and imports, would result in respective increases in the total revenue.

Nominal total government revenue, (NTOTREV), is defined as the the sum of the nominal total tax and non-tax revenues. The definitional equation is given as follows:

$$NTOTREV_t = NTOTAXR_t + NONTR_t \tag{6.15}$$

$NTOTREV_t$ is the nominal total government revenue in millions of cedis in period t.

$NTOTAXR_t$ is the nominal total tax revenue in millions of cedis in period t.

$NONTR_t$ is the nominal total non-tax revenue in millions of cedis in period t (e.g. grants, fines, license fees).

To determine the real values of the total tax revenue and the total government revenue, the nominal values are deflated by the general consumer price index.

Behavioural equations for current and capital expenditures explain public sector expenditure. Government current expenditure is influenced by the domestically available total revenue, the public debt, and the exchange rate; and capital expenditure by the domestically available total revenue, domestic credit, available foreign funds, public lending rate, and the exchange rate.

Public debt impacts on current expenditure through interest payments on the debt. The public lending rate impacts on capital expenditure through interest payments on borrowed funds. The exchange rate impacts on both current and capital expenditure through the domestic currency equivalent of foreign funds available to the government, and through the impact on domestic prices of government purchases.

Both current and capital expenditure are also influenced by the type of government (military or civilian government). Ghana has experienced both civilian and military

governments, with different commitments to fiscal responsibility, and the distribution of available funds between current and capital expenditure.

On the basis of these institutional and economic factors, current expenditure, specified in a log-linear form, is explained by nominal total revenue (NTOTREV), the public debt (PUBDEBT), the exchange rate (GHEXCR), and a dummy variable for the type of government (GOVDUMY). Capital expenditure, also specified in a log-linear form, is explained by nominal total revenue (NTOTREV), the exchange rate (GHEXCR), internal credit (INTCRED), the sum of the values of exports, net government transfers, direct investments, and other foreign capital transfers, all in dollars (NEXGTDID), public lending rate (PUBLENDR), and a government dummy variable (GOVDUMY). The specifications are in nominal terms on the assumption that government expenditure is determined in nominal terms. The two behavioural equations are given as follows:

$$\begin{aligned} \log NCUREXP_t &= \gamma_0 + \gamma_1 \log NTOTREV_t + \gamma_2 \log PUBDEBT_t \\ &\quad + \gamma_3 \log GHEXCR_t + \gamma_4 GOVDUMY + U_4 \end{aligned} \tag{6.16}$$

$$\begin{aligned} \log NCAPEXP_t &= \omega_0 + \omega_1 \log NTOTREV_t + \omega_2 \log GHEXCR_t \\ &\quad + \omega_3 \log INTCRED_t + \omega_4 \log NEXGTDID_t \\ &\quad + \omega_5 \log PUBLENDR_t + \omega_6 GOVDUMY + U_5 \end{aligned} \tag{6.17}$$

$NCUREXP_t$ is nominal current government expenditure in millions of cedis in period t.

$NTOTREV_t$ is nominal total revenue in millions of cedis in period t.

$PUBDEBT_t$ is public debt in millions of cedis in period t.

$GHEXCR_t$ is Ghana's official exchange rate in cedis per United States dollar in period t.

GOVDUMY is a dummy for the type of government. Zero for years with civilian governments, 1 for years with military governments.

$NCAPEXP_t$ is nominal government capital expenditure in millions of cedis in period t.

$INTCRED_t$ is internal credit in millions of cedis in period t.

$NEXGTDID_t$ is sum of net government transfers, value of exports, direct investments, and other capital transfers, all in millions of United States dollars in period t.

$PUBLENDR_t$ is the public lending rate in percent in period t.

U_4 and U_5 are the error terms associated with the current and capital expenditure functions respectively.

Considering equation 6.16, the coefficients of nominal total revenue and public debt are expected to be positive. An increase in total revenue and public debt would cause an increase in current expenditure. The coefficient for the exchange rate could be positive or negative. If the impact of exchange rate on prices dominates, the coefficient would be negative. If the impact of the exchange rate on the domestic value of foreign funds dominates, the coefficient would be positive. The coefficient for the

government dummy variable is expected to be positive because military governments are notorious for their excessive expenditure.

With equation 6.17, the coefficients of all the explanatory variables are expected to be positive except for public lending rate. Positive changes in total revenue, internal credit, and the availability of of foreign funds to the government would cause positive changes in capital expenditure. Increasing the lending rate would increase the cost of borrowing and reduce capital expenditure. The coefficient of the exchange rate could be positive or negative, as explained previously, but is expected to be positive, because the impact of exchange rates on the domestic value of foreign exchange is likely to dominate the impact on prices in the case of capital expenditure. The coefficient of the government dummy is expected to be positive, basically because of the relatively enormous capital investment made by the PNDC government, within the period of the study.

The sum of the current and current expenditures determines the government total expenditure (NGTEXP). Nominal government deficit (NGOVDEF), is the difference between the total expenditure and the total tax revenue (NTOTAXR). Government net fiscal operation (GOVNFOP), is the difference between government total expenditure and the total revenue (NTOTREV). The identities are defined as follows:

$$NGTEXP_t = NCUREXP_t + NCAPEXP_t \tag{6.18}$$

$$NGOVDEF_t = NGTEXP_t - NTOTAXR_t \tag{6.19}$$

$$PUBDEBT_t = \sum_{i=1}^{t} NGOVDEF_i \tag{6.20}$$

$$GOVNFOP_t = NGTEXP_t - NTOTREV_t \tag{6.21}$$

$$NEXGTDID_t = NGOVTRD_t + NVALEXPD_t + DIRINVD_t + OTHCAPD_t \quad (6.22)$$

$NGTEXP_t$ is nominal government total expenditure in millions of cedis in period t.

$NGOVDEF_t$ is nominal government deficit in millions of cedis in period t.

$PUBDEBT_t$ is public debt in millions of cedis in period t.

$GOVNFOP_t$ is government net fiscal operation in millions of cedis in period t.

$NEXGTDID_t$ is nominal value of foreign exchange available to the government in millions of United States dollars in period t.

$NGOVTRD_t$ is nominal net government transfers in millions of United States dollars in period t.

$NVALEXPD_t$ is nominal value of exports in millions of United States dollars in period t.

$DIRINVD_t$ is direct foreign investments in millions of United States dollars in period t.

$OTHCAPD_t$ is other net capital transfers in millions of United States dollars in period t.

Foreign Trade Sector Model

Behavioural relationships for the foreign trade sector are important components of the expenditure sector model and are very critical to developing economies that rely on trade because of the role of foreign exchange in domestic development. Furthermore, a foreign trade model enables an analysis of the impact of changes in terms of trade on foreign exchange earnings. Two main relationships are specified for the foreign trade sector model. These are the export supply and the import demand functions. The two functions are discussed below beginning with the export supply function.

Ghana exports a variety of traditional primary products including cocoa, gold, bauxite, manganese, diamonds, wood and wood products, and non-traditional products including pineapples, ginger, and fish. To facilitate sectoral policy formulation, specific export equations for the main primary commodities would be desirable. However, considering the highly aggregated nature of the model, and the limitation of data availability for the various primary commodities, an aggregated export supply function is used.

Since the Ghanaian economy is small relative to the world economy, it is assumed that prices of primary commodities supplied on the world market are determined exogenously in the world market. Secondly, it is assumed that the supply of exports is influenced by domestic conditions. With these assumptions, the export supply function is basically derived from the specification by Houthakker and Magee (1969), Khan (1974), Goldstein and Khan (1976), Behrman (1977), Bahmani-Oskooee (1984, 1986), and Arize (1987). The specification assumes a desired quantity of supply of exports (QEXP*), which is related to the real world price of exports in dollars ($RPRXPD_t$), the real domestic producer price of cocoa ($RPCOC_t$), as a proxy for domestic price of exports, the export weighted average of the real income of Ghana's trading partners (RIGHTP), and real aggregate supply (RGDPS). The specification

is modified by the inclusion of the real value of imports in dollars (RVALIMPD), since imported inputs have a significant impact on the level of exports of many developing countries. The trade weighted real income of Ghana's trading partners reflects the main determinant of the demand for Ghana's exports, and the real aggregate supply reflects the domestic output condition. Using a log-linear specification, the desired export supply function is given as follows:

$$\begin{aligned} \log QEXP_t^* &= e_0 + e_1 \log RPEXPD_t + e_2 \log RPCOC_t \\ &\quad + e_3 \log RIGTP_t + e_4 \log RVALIMPD_t \\ &\quad + e_5 \log RGDPS_t + U_x \end{aligned}$$

A stock adjustment mechanism outlined by Houthakker and Taylor (1970), and used by Goldstein and Khan (1976), and Arize (1987), is built into the export supply function. The adjustment mechanism assumes that the quantity of exports adjust to conditions of excess supply on the world market, and therefore the realized change in the quantity of exports is only a fraction of the desired change in the quantity of exports. Mathematically, the adjustment mechanism is given as follows:

$$\log QEXP_t - \log QEXP_{t-1} = \lambda_1 [\log QEXP_t^* - \log QEXP_{t-1}]$$

λ_1 is the coefficient of adjustment.

Simplifying the adjustment mechanism, we have the following:

$$\log QEXP_t = \lambda_1 \log QEXP_t^* - \lambda_1 \log QEXP_{t-1} + \log QEXP_{t-1}$$

$$\log QEXP_t = \lambda_1 \log QEXP_t^* + (1-\lambda_1)\log QEXP_{t-1}$$

Substituting for the desired level of exports, we have:

$$\begin{aligned}\log QEXP_t &= \lambda_1[e_0 + e_1 \log RPEXPD_t + e_2 \log RPCOC_t \\ &\quad + e_3 \log RIGTP_t + e_4 \log RVALIMPD_t \\ &\quad + e_5 \log RGDPS_t + U_x] + (1-\lambda_1)\log QEXP_{t-1}\end{aligned}$$

$$\begin{aligned}\log QEXP_t &= \lambda_1 e_0 + \lambda_1 e_1 \log RPEXPD_t + \lambda_1 e_2 \log RPCOC_t \\ &\quad + \lambda_1 e_3 \log RIGTP_t + \lambda_1 e_4 \log RVALIMPD_t \\ &\quad + \lambda_1 e_5 \log RGDPS_t + \lambda_1 U_x + (1-\lambda_1)\log QEXP_{t-1}\end{aligned}$$

Simplifying the above expression, we have:

$$\begin{aligned}\log QEXP_t &= \pi_0 + \pi_1 \log RPEXPD_t + \pi_2 \log RPCOC_t \\ &\quad + \pi_3 \log RIGTP_t + \pi_4 \log RVALIMPD_t \\ &\quad + \pi_5 \log RGDPS_t + \pi_6 \log QEXP_{t-1} + U_6 \qquad (6.23)\end{aligned}$$

$QEXP_t$ is quantity of exports in period t.

$RPEXPD_t$ is real world price of exports in in 1980 United States dollars in period t.

$RPCOC_t$ is real domestic producer price of cocoa in thousands of 1980 cedis in period t.

$RIGTP_t$ is export weighted real income of Ghana's trading partners in millions of 1980 United States dollars in period t.

$RVALIMPD_t$ is real value of imports in millions of 1980 United States dollars in period t.

$RGDPS_t$ is domestic output in millions of cedis in period t.

$QEXP_t$ is lagged quantity of exports in period t.

U_6 is the error term for the export function.

Equation 6.23 is the final behavioural equation for the export supply function, where quantity of exports is related to real world price of exports, real domestic producer price of cocoa, the export weighted average of the real income of Ghana's trading partners, the real value of imports, real domestic output, and lagged quantity of exports.

The export weighted average of the real income of Ghana's trading partners is estimated as follows:

$$RIGTP_t = \sum_{i=1}^{N} [\frac{VEXP_{it}}{TVEXP_t}][RGDP_{it}] \tag{6.24}$$

$VEXP_{it}$ is value of Ghana's exports to country i, in millions of United States dollars in period t.

$TVEXP_t$ is total value of Ghana's exports in millions of United States dollars in period t.

$RGDP_{it}$ is real gross domestic product of country i in millions of United States dollar equivalent in period t.

N is the number of trading partners.

Considering equation 6.23, all the coefficients for the explanatory variables are expected to be positive. An increase in real price of exports would divert production from domestic to foreign markets, and consequently, increase the supply of exports. Similarly, an increase in domestic price of tradables would lead to reallocation of resources in favour of tradables, and consequently increase the supply of exports. An increase in the income of Ghana's trading partners would lead to an increase in the demand for Ghana's exports, which would lead to an increase in the supply of exports. Production of tradables depend considerably on imported intermediate and capital goods. An increase in the value of imports can be expected to result in an increase in exports. Since exports represent a fair portion of domestic output, an increase in domestic output would lead to an increase in the supply of exports. With a policy objective of striving to exceed the previous level of exports, an increase in lagged exports can be expected to increase current exports.

The nominal value of exports in dollars (NVALEXPD), is the product of the nominal price of exports in dollars (NPEXPD), and the quantity of exports (QEXP).[17] The nominal value of exports in cedis (NVALEXPC), is the product of the nominal price of the exports in cedis (NPEXPC), and the quantity of exports. The real value of exports in cedis is the nominal value of exports in cedis deflated by Ghana's general consumer price index. These identities are specified as follows:

[17]The estimated values of all variables specified in logs are determined by taking the exponent of the estimated log specification of the variable.

$$NVALEXPD_t = (QEXP_t \times NPEXPD_t) \tag{6.25}$$

$$NVALEXPC_t = (QEXP_t \times NPEXPC_t) \tag{6.26}$$

$$RVALEXPC_t = [(NVALEXPC_t)/(GHCPI_t \times 0.01)] \tag{6.27}$$

$NVALEXPD_t$ is nominal value of exports in millions of United States dollars in period t.

$NPEXPD_t$ is nominal price of exports in United States dollars in period t.

$NVALEXPC_t$ is nominal value of exports in millions of cedis in period t.

$NPEXPC_t$ is nominal price of exports in cedis in period t.

$RVALEXPC_t$ is real value of exports in millions of 1980 cedis in period t.

The import demand function is specified along the lines used by Khan (1988), and Haque et al. (1990). Like any demand function, real price of imports influences the quantity of imports demanded. Second, the import capacity depends on the domestic income level. Third, depreciation of domestic currency increases the domestic cost of imports and impacts on the quantity of imports. Fourth, for most developing countries, foreign exchange scarcity leads to imposition of import controls, and hence affects quantity of imports. Fifth, because of delays in bureaucratic procedures,

current levels of foreign exchange tend to influence the level of imports in the following period.

Based on these factors, the desired demand for imports (QIMP*), is explained by the real price of imports in dollars (RPIMPD), the real gross domestic product (RGDP), the real effective exchange rate (REEXCH), the lagged sum of the real values of exports, private transfers, government transfers, direct investments, and other capital transfers, (RVEXTDID), and a time trend (TTREND) to capture changes in the volume of imports with time. The desired level of imports, specified in a log-linear form, is given as follows:

$$\begin{aligned} \log QIMP_t^* &= p_0 + p_1 \log RPIMPD_t + p_2 \log RGDP_t + p_3 \log REEXCH_t \\ &\quad + p_4 \log RVEXTDID_{t-1} + p_5 TTREND + U_p \end{aligned}$$

Due to constraints imposed by foreign exchange, bureaucratic procedures, and time lags, the quantity of imports slowly adjusts to a desired level. Hence a stock adjustment mechanism similar to that for the export supply function, is built into the import demand function. Under this adjustment, the realized change in the quantity of imports demanded is only a fraction of the desired change in the quantity of imports. Mathematically, the adjustment mechanism is expressed as follows.

$$\log QIMP_t - \log QIMP_{t-1} = \lambda_2 [\log QIMP_t^* - \log QIMP_{t-1}]$$

Simplifying the above expression, we have:

$$\log QIMP_t = \lambda_2 \log QIMP_t^* - \lambda_2 \log QIMP_{t-1} + \log QIMP_{t-1}$$

$$\log QIMP_t = \lambda_2 \log QIMP_t^* + (1-\lambda_2)\log QIMP_{t-1}$$

Substituting for the desired level of imports, (QIMP*), we have the following:

$$\begin{aligned}
\log QIMP_t &= \lambda_2[p_0 + p_1 \log RPIMPD_t + p_2 \log RGDP_t \\
&\quad + p_3 \log REEXCH_t + p_4 \log RVEXTDID_{t-1} \\
&\quad + p_5 TTREND + U_p] + (1-\lambda_2)\log QIMP_{t-1} \\
\log QIMP_t &= \lambda_2 p_0 + \lambda_2 p_1 \log RPIMPD_t + \lambda_2 p_2 \log RGDP_t \\
&\quad + \lambda_2 p_3 \log REEXCH_t + \lambda_2 p_4 \log RVEXTDID_{t-1} \\
&\quad + \lambda_2 p_5 TTREND + \lambda_2 U_p + (1-\lambda_2)\log QIMP_{t-1}
\end{aligned}$$

Simplifying the above expression, we have the following:

$$\begin{aligned}
\log QIMP_t &= \theta_0 + \theta_1 \log RPIMPD_t + \theta_2 \log RGDP_t \\
&\quad + \theta_3 \log REEXCH_t + \theta_4 \log RVEXTDID_{t-1} \\
&\quad + \theta_5 \log QIMP_{t-1} + \theta_6 TTREND + U_7
\end{aligned} \tag{6.28}$$

$QIMP_t$ is quantity of imports in period t.

$RPIMPD_t$ is the real price of imports in 1980 United States dollars in period t.

$RGDP_t$ is real gross domestic product in millions of 1980 cedis in period t.

$REEXCH_t$ is real effective exchange rate in 1980 cedis per 1980 United States dollar in period t.

$RVEXTDID_t$ is the real value of available foreign exchange in millions of 1980 United States dollars in period t.

TTREND is time trend.

U_7 is the error term for the import demand function.

Equation 6.28 is the final specification of the demand for imports. Considering equation 6.28, the coefficients of real price of imports in dollars (RPIMPD), and the real effective exchange rate (REEXCH), are expected to be negative, indicating that an increase in the real price of imports and a depreciation of domestic currency would increase the domestic cost of imports and reduce the demand for imports. The coefficients of real gross domestic product (RGDP), and real value of available foreign exchange (RVEXTDID), are expected to be positive since positive changes in these variables would lead to positive changes in the quantity of imports. The coefficient of lagged quantity of imports could be positive or negative. For an economy very dependent on imports, if the objective is to maintain growth in the economy, then lagged quantity of imports would be positively related to current quantity of imports. On the other hand, if the tendency is to reduce the dependence on imports, or if delays in the clearance of previous imports restricts current imports, then lagged imports would be negatively related to current imports. The coefficient of the time trend could be positive or negative. A positive coefficient would indicate a continued dependence of the Ghanaian economy on imports, and a negative coefficient a reduced dependence of the economy on imports.

The nominal value of imports in dollars (NVALIMPD), is the product of the quantity of imports (QIMP), and the nominal price of imports (NPIMPD). The nominal value of imports in cedis (NVALIMPC), is the product of the quantity of imports and the nominal price of imports in cedis (NPIMPC). To determine the real value of

imports in cedis, the nominal value of imports in cedis is deflated by Ghana's general consumer price index. These definitional equations are specified as follows:

$$NVALIMPD_t = (QIMP_t \times NPIMPD_t) \tag{6.29}$$

$$NVALIMPC_t = (QIMP_t \times NPIMPC_t) \tag{6.30}$$

$$RVALIMPC_t = [(NVALIMPC_t)/(GHCPI_t \times 0.01)] \tag{6.31}$$

$NVALIMPD_t$ is nominal value of imports in millions of United States dollars in period t.

$NPIMPD_t$ is nominal price of imports in United States dollars in period t.

$NVALIMPC_t$ is nominal value of imports in millions of cedis in period t.

$NPIMPC_t$ is nominal price of imports in cedis in period t.

$RVALIMPC_t$ is real value of imports in millions of 1980 cedis in period t.

A total of thirty-one equations, comprising of seven behavioural equations and twenty-four definitional equations and/or identities discussed under this section, make up the expenditure sector model.

6.2.2 The Monetary Sector Model

Along the lines of Roca and Priale (1987), and Haque et al. (1990), The role of money in a developing economy is analysed within the broader framework of the functions of financial institutions in economic development. These include efforts by financial institutions to encourage savings, translating the savings into productive investments, and providing the liquidity needed for economic development. In this respect, the central bank, which is responsible for the monetary sector, plays a pivotal role in promoting financial reforms needed for economic development. For example, the central bank exerts a positive influence on the developmental process by encouraging and assisting the establishment of development banks, and financial intermediaries alongside the chartered banks. In addition, the central bank monitors the specifics of government expenditure, government revenue and the balance of payments, and supervises the financial institutions. These functions are analysed within the framework of the demand for and the supply of money.

Therefore, the monetary sector has specifications for demand for money, internal credit, and identities for money multiplier, the balance of payments, and high-powered monetary stock. The specifications are discussed below beginning with the demand for money.

Demand for Money Function

A Keynesian model for explaining the demand for real cash balances is used where the demand for real cash balances is formulated as a function of real income, and the opportunity cost of holding cash balances. In financially developed economies, the opportunity cost of holding cash balances is measured by the yield on alternative financial assets, i.e. the real interest rate. However, in many developing economies, it is widely accepted that the real interest rate is not an appropriate measure of the

opportunity cost of holding cash balances (Agevli and Khan, 1980; Ghatak, 1981; and Khan and Knight, 1981). The following reasons explain the inappropriate use of real interest rate as a measure of the opportunity cost of holding cash balances:

- the limited size of the organized financial market;
- the institutional pegging of the nominal interest rate without much variation;
- the limited opportunities for financial assets;
- the very low degree of subsitution between money and other financial assets (Ghatak, 1981).

In the absence of a well developed financial market, Agevli and Khan, (1980), argued that it is appropriate to measure the opportunity cost of holding money by implicit return on goods, i. e. the expected rate of inflation.

The expected rate of inflation is econometrically determined in a separate model using an adaptive expectations process. The adaptive expectations model postulates that changes in a dependent variable are related to changes in the expected level of explanatory variable. Hence, the rate of inflation is related to the expected rate of inflation as follows:

$$RINF_t = b_0 + b_1 ERINF_t + e_t$$

The expected rate of inflation is defined by a second relationship in which expectations are assumed to be altered by an adjustment between current rate of inflation and the previous expected rate of inflation. This is mathematically expressed as follows:

$$ERINF_t = \rho RINF_t + (1-\rho)ERINF_{t-1}$$

To facilitate econometric estimation, a Koyck transformation is performed on the above by lagging the model period by period, multiplying by $(1-\rho)^i$, where "i" is the number of periods involved in the lag process, and making substitutions (Pindyck and Rubinfield, 1991). After the transformation process the expected rate of inflation is given thus:

$$\begin{aligned} ERINF_t &= \rho[RINF_t + (1-\rho)RINF_{t-1} + (1-\rho)^2 RINF_{t-2} + (1-\rho)^3 RINF_{t-3} + \ldots] \\ &= \rho\sum_{i=0}^{\infty}(1-\rho)^i RINF_{t-i} \end{aligned} \tag{6.32}$$

Hence, the expected rate of inflation is a weighted average of the present and all the previous values of the rate of inflation. Since the weights sum up to unity, the following expression holds.

$$\rho\sum_{i=0}^{\infty}(1-\rho)^i = 1$$

Substituting the expression for the expected rate of inflation in the inflation model gives the following:

$$RINF_t = b_0 + b_1\rho\sum_{i=0}^{\infty}(1-\rho)^i RINF_{t-i} + e_t$$

The above expression is simplified as follows:

$$\begin{aligned} RINF_t &= b_0 + b^*[RINF_t + \lambda RINF_{t-1} \\ &\quad + \lambda^2 RINF_{t-2} + \ldots] + e_t \end{aligned}$$

$$b^* = b_1\rho;\ \lambda = (1-\rho);$$

In the form given above the adaptive expectations model is difficult to estimate because it involves infinite number of regressors. The model is simplified by lagging all observations, multiplying through by λ, and calculating the first difference. With this manipulation, the model simplifies to:

$$RINF_t = b_0(1-\rho) + b^* RINF_t + \lambda RINF_{t-1} + u_t$$

The above equation is estimated and the value of "ρ" determined from the coefficient of the lagged rate of inflation. However the use of ordinary least squares yield inconsistent estimates but instrumental variables yield consistent estimates (Kmenta, 1986; Maddala, 1992). Using the parallel market exchange rate as an instrument for inflation, a "ρ" value of 0.9 is determined in the adaptive expectation model.

With the exception of the use of expected rate of inflation instead of real interest rate, the specification for the demand for real cash balances is identical to that used by Haque et al. (1990). The demand for real cash balances is explained by the expected rate of inflation, real gross domestic product, lagged real gross domestic product, and lagged real demand for money.

Real gross domestic product reflects the transactions motive of the demand for money, and the expected rate of inflation, the speculative motive. Lagged real demand for money introduces a partial adjustment mechanism to capture lagged responses of demand for money. Lagged gross domestic product is introduced to allow demand for money to adjust to changes in income and expected rate of inflation. Using a log-linear form, the demand for real cash balances is specified as follows:

$$\begin{aligned} \log DRBMS_t &= \varphi_0 + \varphi_1 \log ERINF_t + \varphi_2 \log RGDP_t \\ &\quad + \varphi_3 RGDP_{t-1} + \varphi_4 \log DRBMS_{t-1} + U_8 \end{aligned} \tag{6.33}$$

$DRBMS_t$ is real broad money supply in millions of 1980 cedis in period t.

$ERINF_t$ is the expected rate of inflation in percent in period t.

$RGDP_t$ is the real gross domestic product in millions of 1980 cedis in period t.

U_8 is the error term for the demand for money function.

The coefficient of real gross domestic product is expected to be positive to reflect an increase in the demand for real cash balances for transactions purposes, when real income increases. The coefficient of expected rate of inflation is expected to be negative to reflect a decline in the demand for real cash balances, when the opportunity cost of holding cash balances increases. The coefficient of lagged real gross domestic product is expected to be negative since Ghanaians would tend to hold smaller portions of current income as cash in the future due to the erosion of purchasing power.

The coefficient of the lagged demand for real cash balances is expected to be positive since an increase in lagged response leads to an increase in current demand for real cash balances.

The demand for real cash balances is the broad money supply (BMS), deflated by Ghana's general consumer price index. This definitional equation is given as follows:

$$DRBMS_t = [BMS_t/(GHCPI_t \times 0.01)] \tag{6.34}$$

BMS_t is broad money supply in millions of cedis in period t.

Supply of Money Function

Stock of money may be introduced as an exogenous or endogenous variable in a macroeconometric model. If exogenous, the implication is that monetary authorities can control the stock of money to achieve certain set objectives. However, certain exogenous factors external to the economy, and beyond the control of monetary authorities, can affect money supply. Futhermore, for a small-open developing economy with heavy reliance on international trade, and with government deficit financing, exogeneity of monetary stock becomes highly questionable. International trade affects balance of payments and impacts on the stock of money. Also, deficit financing affects the level of credit, and impacts on the stock of money. It becomes appropriate therefore to endogenize money supply, and allow a simultaneous interaction between the demand for and the supply of money. Under a fractional reserve system, nominal broad money supply (BMS), is determined by the stock of high-powered money (HPMONST), and the money multiplier (MONMULT). Following Friedman

and Schwartz (1963), the relationships between broad nominal money supply (BMS), and its components are given by the following expressions:

(i) $BMS_t = (MONMULT_t \times HPMONST_t)$

(ii) $BMS_t = (CURR_t + DEMDEP_t + TIMSDEP_t)$

(iii) $HPMONST_t = (CBRESVS_t + CURR_t)$

$MONMULT_t$ is the money multiplier in period t.

$HPMONST_t$ is high powered monetary stock in millions of cedis in period t.

$CURR_t$ is currency in circulation in millions of cedis in period t.

$DEMDEP_t$ is demand deposits in millions of cedis in period t.

$CBRESVS_t$ is commercial bank reserves in millions of cedis in period t.

$TIMSDEP_t$ is time and savings deposits in millions of cedis in period t.

Dividing (ii) by (iii), we have:

$$(BMS/HPMONST) = [(CURR + DEMDEP + TIMSDEP)/(CBRESVS + CURR)]$$

Dividing the numerator and the denominator of the right-hand side in the above equation by demand deposits, we have:

$$(BMS/HPMONST) = \frac{(CURR/DEMDEP)+(DEMDEP/DEMDEP)+(TIMSDEP/DEMDEP)}{(CBRESVS/DEMDEP)+(CURR/DEMDEP)}$$

The above expression is simplified as follows:

$$(BMS/HPMONST) = [(1+CUDDRAT+TSDDRAT)/(CBRDDRAT+CUDDRAT)]$$

$CUDDRAT_t$ is the currency-demand deposit ratio in period t.

$TSDDRAT_t$ is the time and savings deposit-demand deposit ratio in period t.

$CBRDDRAT_t$ is the commercial bank reserves-demand deposit ratio in period t.

Hence, money supply (MS), is given thus:

$$BMS = [(1+CUDDRAT+TSDDRAT)/(CBRDDRAT+CUDDRAT)] \times HPMONST \quad (6.35)$$

Comparing the above expression to (i), money multiplier (MONMULT), is defined as follows:

$$MONMULT = [(1+CUDDRAT+TSDDRAT)/(CBRDDRAT+CUDDRAT)] \quad (6.36)$$

Equation 6.35 suggests that a change in any one of the determinants, i. e. the proportions of currency to demand deposits, or time and savings deposits to demand deposits, or commercial bank reserves to demand deposits, or the stock of high powered monetary stock, or a combination of any of the determinants would result in a change in the money supply.

Considering the money supply equation (6.35), it would be desirable to look at the portfolio preferences of the public to determine the proportions of the various financial assets. However, the highly underdeveloped nature of the financial markets, and the problem of limited availability of data would greatly undermine such a study. Hence, the three ratios specified in the money supply equation, i. e. CUDDRAT, TSDDRAT, and CBRDDRAT, are assumed to be exogenously determined. With regard to the stock of high-powered money, the level is greatly influenced by institutional and economic factors. For example, the monetary policy of the central bank, the balance of payments, and the government's deficit financing policy all influence the stock of high-powered money. Hence, the stock of high-powered money is determined endogenously.

Determination of High Powered Money

The high-powered money or the monetary base (the assets of the monetary authority), is defined by the following identity:

$$HPMONST_t = INTCRED_t + NINTRESC_t \tag{6.37}$$

$NINTRESC_t$ is the cedi equivalent of the net stock of international reserves held by the banking system in millions of cedis in period t.

$INTCRED_t$ is nominal internal credit, a measure of the net domestic assets of the banking system in millions of cedis in period t.

The cedi equivalent of the net stock of international reserves is determined through the balance of payments identities. A detailed discussion of the identities is under the section on the determination of balance of payments. The net domestic assets of the banking system are determined endogenously using a central bank's reaction function. Theoretically, a central bank's reaction function is obtained through solving an optimization problem, where the bank minimizes a static quadratic loss function subject to the structure of the economy (Mcmillin and Bread, (1980)). The loss function frequently contains the following features:

- the weighted squared deviation of actual from desired levels of inflation;
- the level of net foreign reserves;
- the rate of unemployment;
- the growth rate of GDP or industrial output;
- short term interest rates.

The first four items are measures of macroeconomic stability, namely, the maintenance of price stability, external equilibrium, full employment and rapid economic growth. The last item is employed as a proxy for achieving financial stability.

Solving the constrained optimization model yields a specification of a central bank's reaction function in which the domestic monetary base or its equivalent (the dependent variable), is related to all the macroeconomic variables, and the desired levels of the items in the loss function.

For a small open economy, Miller and Askin (1976); Genberg (1976); and Tullio (1981), all suggested that internal credit (INTCRED), is generally preferred as a dependent variable in a central bank's reaction function, as an equivalent of the domestic monetary base. Porzecanki (1979), also provided evidence to suggest that internal credit is a more appropriate monetary policy indicator for developing economies.

Among the macroeconomic target variables, gross domestic product, interest rate or lending rate, and the level of international reserves, are the most widely used. As was noted by Porzecanki (1979), monetary authorities in many developing countries pursue a principal objective of maintaining price and currency stability, or a principal objective of financing government deficits and fighting unemployment. The latter is true for the Ghanaian economy. This suggests that a specification of the central bank's reaction function should take into account the influence of the government's net fiscal operations (GOVNFOP), on the domestic monetary base. A target variable used by the central bank to control credit from the commercial banks and hence influence domestic credit is the commercial bank required reserve ratio (CBRESRA).

Based on these arguments, the central bank's reaction function is specified with internal credit as a dependent variable, and the nominal gross domestic product (NGDP), the nominal lending rate (LENDR), the commercial bank required reserve ratio (CBRESRA), expected change in international reserves in dollars (ECINTRD), and the government's net fiscal operations (GOVNFOP), as explanatory variables. The central bank reaction function, specified in a log-linear form, is given as follows:

$$\begin{aligned} \log INTCRED_t &= \tau_0 + \tau_1 \log NGDP_t + \tau_2 \log LENDR_t \\ &\quad + \tau_3 \log CBRESRA_t + \tau_4 \log ECINTRD_t \\ &\quad + \tau_5 \log GOVNFOP_t + U_9 \end{aligned} \tag{6.38}$$

$INTCRED_t$ is nominal internal credit in millions of cedis in period t.

$NGDP_t$ is nominal gross domestic product in millions of cedis in period t.

$LENDR_t$ is the nominal lending rate in percent in period t.

$CBRESRA_t$ is commercial banks' required in percent in period t.

$ECINTRD_t$ is the expected change in international reserves in millions of United States dollars in period t.

$GOVNFOP_t$ is the government's net fiscal operations in millions of cedis in period t.

U_9 is the error term for the internal credit function.

The coefficients of the nominal lending rate, and the commercial bank reserve ratio, are expected to be negative indicating that the higher the lending rate or the higher the commercial bank reserve ratio, the smaller the level of internal credit. The coefficient of the gross domestic product is expected to be negative only at cyclical turning points but positive otherwise. For an economy with a strong and viable financial sector, at the peak of the business cycle, monetary authorities restrict internal credit to prevent a higher demand pressure on prices. The reverse is true during the trough. The coefficients of the expected change in the international reserves, and the government's net fiscal operations, are expected to be positive. An increase in the change in the level of international reserves and government's net fiscal operations, would increase domestic credit.

Balance of Payments Identities

For a small-open economy, it is important to examine the extent to which the country's economy is linked to the world economy. This is made possible through the balance of payments account which summarizes all the transactions between residents, firms, and governments of one country, and their counterparts in the rest of the world. The following identities and/or definitional equations are used to determine the overall balance of payments in the model.

$$NVALEXPD_t = (NVMEXPD_t \times NVSEXPD_t) \quad (6.39)$$

$$NVALIMPD_t = (NVMIMPD_t \times NVSIMPD_t) \quad (6.40)$$

$$NMETRBAD_t = (NVMEXPD_t - NVMIMPD)_t \quad (6.41)$$

$$NTRABALD_t = (NVALEXPD_t - NVALIMPD_t) \quad (6.42)$$

$$CURACBAD_t = (NTRABALD_t + NPRIVTRD_t + NGOVTRD_t) \quad (6.43)$$

$$CAPACBAD_t = (DIRINVD_t + OTHCAPD_t) \quad (6.44)$$

$$OVERBALD_t = (CURACBAD_t + CAPACBAD_t + ERROMD_t) \quad (6.45)$$

$$NINTRESD_t = OVERBALD_t \quad (6.46)$$

$$ECINTRD_t = [NINTRESD_t - 1/3(NVALIMPD_t)] \quad (6.47)$$

$$NINTRESC_t = (NINTRESD_t \times GHEXCR_t) \quad (6.48)$$

$NVALEXPD_t$ is nominal value of exports in millions of United States dollars in period t.

$NVMEXPD_t$ is nominal value of merchandise exports in millions of United States dollars in period t.

$NVSEXPD_t$ is nominal value of services exported in millions of United States dollars in period t.

$NVALIMPD_t$ is nominal value of imports in millions of United States dollars in period t.

$NVMIMPD_t$ is nominal value of merchandise imported in millions of United States dollars in period t.

$NVSIMPD_t$ is nominal value of services imported in millions of United States dollars in period t.

$NMETRBAD_t$ is nominal merchandise trade balance in millions of United States dollars in period t.

$NTRABALD_t$ is nominal value of the trade balance in millions of United States dollars in period t.

$CURACBAD_t$ is nominal value of the current account balance in millions of United States dollars in period t.

$NPRIVTRD_t$ is the nominal value of net private transfers in millions of United States dollars in period t.

$NGOVTRD_t$ is nominal value of net government transfers in millions of United States dollars in period t.

$CAPACBAD_t$ is capital account balance in millions of United States dollars in period t.

$DIRINVD_t$ is net direct investments in millions of United States dollars in period t.

$OTHCAPD_t$ is net other capital transfer in millions of United States dollars in period t.

$OVERBALD_t$ is overall balance of payments in millions of United States dollars in period t.

$ERROMD_t$ is error and ommissions in millions of United States dollars in period t.

$NINTRESD_t$ is net international reserves in millions of United States dollars in period t.

$ECINTRD_t$ is expected change in the net international reserves in millions of United States dollars in period t.

Apart from the nominal value of exports and imports that are determined endogenously in the model, all entries in the balance of payments identities are determined exogenously. There are three reasons for making the other entries exogeneous. First, Ghana, like many developing countries, has a limited borrowing power in the world capital market. Second, principal and interest payment on borrowed capital are binding irrespective of the behaviour of the economy; and third, capital outflows are generally controlled by the government.

6.2.3 Other Identities and Ratios on Demand Side

Three ratios and two identities are determined from the model to evaluate the impact of foreign debt on the economy, the investment level, and the productive base of the Ghanaian economy. The three ratios are the debt service ratio, the ratio of debt service to gross domestic product, and the ratio of total debt to the gross domestic product. The identities are real gross domestic fixed capital formation, and real internal absorption. The three ratios and the two identities are determined by the following expressions:

$$DEBTSRAT_t = (EXDEPAD_t/NVALEXPD_t) \quad (6.49)$$

$$EXDSGDPR_t = (EXDEPAD_t/NGDPD_t) \quad (6.50)$$

$$TEXDGDPR_t = (TOTEXDD_t/NGDPD_t) \quad (6.51)$$

$$EXDEPAD_t = (PPEXDTD_t + IPEXDTD_t) \quad (6.52)$$

$$NGDPD_t = (NGDP_t/GHEXCR_t) \quad (6.53)$$

$$RINTABSC_t = (RCPR_t + RIPR_t + RGTEXP_t) \quad (6.54)$$

$$RGDFXKF_t = [NGDFXKF_t/(GHCPI_t \times 0.01)] \quad (6.55)$$

$$NGDFXKF_t = (IPR_t + NCAPEXP_t) \quad (6.56)$$

$DEBTSRAT_t$ is debt-service ratio in percent in period t.

$EXDEPAD_t$ is external debt payment in millions of United States dollars in period t.

$NVALEXPD_t$ is nominal value of exports in millions of United States dollars in period t.

$EXDSGDPR_t$ is external debt service to gross domestic product ratio in percent in period t.

$NGDPD_t$ is nominal gross domestic product in millions of United States dollars in period t.

$TEXDGDPR_t$ is total debt to gross domestic product ratio in percent in period t.

$TOTEXDD_t$ is total external debt payment in millions of United States dollars in period t.

$PPEXDTD_t$ is principal payment on the external debt in millions of United States dollars in period t.

$IPEXDTD_t$ is interest payment on the external debt in millions of United States dollars in period t.

$NGDP_t$ is nominal gross domestic product in millions of cedis in period t.

$GHEXCR_t$ is Ghana's nominal exchange rate in cedis per United States dollar in period t.

$RINTABSC_t$ is real internal absorption in millions of 1980 cedis in period t.

$RGDFXKF_t$ is real gross domestic fixed capital formation in millions of 1980 cedis in period t.

$NGDFXKF_t$ is nominal gross domestic fixed capital formation in millions of cedis in period t.

$GHCPI_t$ is Ghana's general consumer price index in percent in period t.

IPR_t is nominal private investment in millions of cedis in period t.

$NCAPEXP_t$ is the nominal government capital expenditure in millions of cedis in period t.

6.2.4 Aggregate Supply Model

Macroeconometric models are generally criticized for their excessive emphasis on the components of aggregate expenditure to the neglect of the supply side (Klein, 1978;

Nerlove, 1967). It is also argued that the few cases that investigate the supply side do not satisfactorily explain the relationship between employment, output, and factor incomes (Nerlove, 1967). The need for a detailed investigation of the supply side of an economy in any macroeconometric model is now imperative, and this is rationalized in several ways. Firstly, many macroeconometric models fail to explain economic problems that do not result from insufficient demand. For example, under supply shocks policies that increase demand per se, have not been effective in correcting stagflation in western economies. Similarly, in many developing economies, it is a common feature for inflation to persist in the midst of excess capacity and high unemployment. This is attributed to the structural rigidities on the supply side of most developing economies. Examples of these rigidities are the level of imported intermediate and capital goods, the infrastructure, and the weather condition which influences agricultural output. Hence, it becomes necessary to specify an aggregate supply function that captures these structural rigidities.

However, like many developing countries, the modeling of the supply side is hampered by lack of data on the input-output relationships within productive sectors. To circumvent this problem, the study uses an aggregate production function for the supply side. It must be mentioned, however, that the aggregate framework also has some problems that are quite universal. The problems arise because of attempts to formulate generalized expressions to describe an entire behaviour of economic units. The issue is whether the aggregate production function reflects the underlying production relations of individual sectors, i. e. the aggregation problem. Fisher et al. (1971), pointed out that the theoretical conditions for the existence of a production function that aggregates heterogenous outputs or inputs into a total quantity, are too stringent. However, Fisher et al. (1977), demonstrated through simulation experiments that the aggregate production function performs well in terms of relating output to factor shares. Also, several studies on economic growth in developing coun-

tries use an aggregate production function instead of the disaggregated function with satisfactory results. Examples of these studies are Michaely (1977), Belassa (1978), Bardham et al (1979), Ram (1985), and Khan and Reinhart (1990). The use of an aggregate production function is, therefore, not out of place.

Most growth models relate the rate of growth in output to the rate of capital formation, growth in the labour force, and technical progress. However, proponents of export led growth like Belassa (1978), and Ram (1985), suggest that growth in exports be included as a regressor in aggregate production functions. They argue that growth in exports translates into improved foreign exchange earnings of developing countries. This makes resources available for the importation of capital and intermediate goods for the productive sector, and for the development of infrastructure. The link between growth in exports/imports and the productivity of a developing country suggests that growth in exports/imports is an integral part of the growth process in developing countries or anywhere else. However, since exports are eventually translated into imports, and since only a portion of imports allocated for intermediate and capital goods influences productivity directly, only this portion is considered as a regressor in the aggregate production function.

A major contributor to total output in Ghana is the agricultural sector which contributes about 47 percent. As a result, factors that influence agricultural output eventually influence total output in the Ghanaian economy. The agricultural sector in Ghana is highly dependent on the general weather conditions in the country. Total output is high under good weather conditions, and low under bad weather conditions. In order to capture the impact of the weather on total output, a dummy variable for the weather condition is introduced in the aggregate production function.

On the basis of the arguments above, a modified aggregate production function along the lines suggested by Ram (1985), Khan and Reinhart (1990), and Haque et al. (1990), is used. Real aggregate supply function is represented by a Cobb-Douglas

production function which relates output to real gross domestic fixed capital formation (RGDFXKF), the employed labour force (ELABF), the real value of imported intermediate and capital goods (RVCIMPD), a weather dummy (WEADUMY), and lagged real aggregate supply $RGDPS_{t-1}$. The specification of the real aggregate supply is as follows:

$$\begin{aligned} RGDPS_t &= A \times RGDFXKF_t^{\eta_1} \times ELABF_t^{\eta_2} \times RVCIMPD_t^{\eta_3} \\ &\quad \times e^{\eta_4 WEADUMY_t} \times RGDPS_{t-1}^{\eta_5} \times e^{U_{10}} \end{aligned}$$

The conventional econometric approach to estimating a Cobb-Douglas production function is to estimate the linearized version. The linearized version is given as follows:

$$\begin{aligned} \log RGDPS_t &= \log A + \eta_1 \log RGDFXKF_t + \eta_2 \log ELABF_t + \eta_3 \log RVCIMPD_t \\ &\quad + \eta_4 WEADUMY_t \log e + \eta_5 \log RGDPS_{t-1} + U_{10} \log e \end{aligned}$$

This simplifies to:

$$\begin{aligned} \log RGDPS_t &= \eta_0 + \eta_1 \log RGDFXKF_t + \eta_2 \log ELABF_t \\ &\quad + \eta_3 \log RVCIMPD_t + \eta_4 WEADUMY_t \\ &\quad + \eta_5 \log RGDPS_{t-1} + U_{10} \end{aligned} \tag{6.57}$$

$RGDPS_t$ is real gross domestic product at factor cost in millions of 1980 cedis in period t.

$RGDFXKF_t$ is the real gross domestic fixed capital formation in millions of 1980 cedis in period t.

$ELABF_t$ is the employed labour force in millions of workers in period t.

$RVCIMPD_t$ is real value of imported capital and intermediate goods in millions of 1980 United States dollars in period t.

$WEADUMY_t$ is a weather dummy in period t. Zero for years with unfavourable weather conditions, 1 for years with favourable weather conditions.

U_{10} is the error term for the real aggregate supply function.

All the coefficients of the explanatory variables are expected to be positive. This implies that independent increases in real gross domestic fixed capital formation, employed labour force, value of imported capital and intermediate goods, and an improvement in the weather condition, would result in various increases in the real aggregate supply.

6.2.5 Inflation and Wage Rate Models

An important aspect of any macroeconomic model is the determination of the level of inflation. The prevention of persistent inflation is one of the major aims of any macroeconomic stabilization policy. However, effective policies to control inflation require a knowledge of the underlying causal factors. A specification for inflation assists in this regard. Inflation is modeled to reflect the monetarist view that inflation is explained predominantly by excess liquidity, together with structural and institutional factors that influence inflation in developing countries like per capita food production, an external shock, and the nominal exchange rate.

Monetarists characterize inflation as a monetary phenomenom explained predominantly by excess liquidity in the system which leads to a faster increase in expenditures and a higher rate of inflation. This is explained below. From the quantity theory of money;

$$\begin{aligned} M^d V &= PY \\ M^d &= kPY \end{aligned}$$

M^d is the demand for cash balances.

V is the velocity of money.

k is the reciprocal of V.

P is the general price level.

Y is the real output level.

For equilibrium in the money market, supply of money equals demand for money, i. e. $M^d = M^s$. Using the equilibrium condition, and finding the first difference of the log-linear equilibrium condition, we have:

$$\triangle \log M^s = \triangle \log k + \triangle \log P + \triangle \log Y$$

Assuming that the velocity of money is constant, then "k" is also constant, hence, $\triangle \log k$ is zero. Therefore,

$$\triangle \log M^s = \triangle \log P + \triangle \log Y$$

Rearranging the above equation, we have

$$\triangle \log P = \triangle \log M^s - \triangle \log Y$$

The above equation shows that an increase in nominal money supply would increase the rate of inflation, and an increase in real output would decrease the rate of inflation. Futhermore, people's expectations about changes in the price level would have a positive correlation with the rate of inflation.

It should be noted that in many developing countries, domestic and external structural factors may be as important as monetary factors in explaining inflation. Examples of these are food production, world price of major commodoties such as oil, and the exchange rate. Unlike the monetarist inclination that price influences agricultural output, production and marketing bottlenecks make it difficult for agricultural producers to respond to price changes resulting in very inelastic food supply. Under such circumstances, food supply influences the price level rather than the reverse. A reduction in agricultural output would therefore cause an increase in food prices and the overall price level.

Since the introduction of the economic recovery program in Ghana, retail prices of petroleum products which are controlled by the authorities, have been raised sharply to reflect a full pass-through of the higher import costs. For example, in 1990 a cumulative total of 266 percent increase in petroleum price was implemented (Kapur et al. 1991). Increases in fuel prices impact on inflation through three main channels; through the direct impact of the weight of petroleum in the consumer price index, indirectly via prices of the broader spectrum of goods and services whose costs are influenced by fuel prices, especially transportation, and through inflationary expec-

tations. This clearly indicates that changes in the world price of oil and inflationary expectations would have positive correlations with changes in the general price level.

Exchange rate developments contribute to inflation directly through the impact on domestic cost of imported goods. Also, exchange rate developments influence inflation expectations because the exchange rate is one of the most readilly available indicators of price movements in the country. However, price movements are influenced more by the exchange rate on the parallel market relative to the official exchange rate. Hence a weighted average of the parallel and official rates is used in the analysis.

Regarding the impact of wage increases on price movements, it depends on the proportion of formal sector labour to the total labour force, and the bargaining strength of formal sector labour. In Ghana, a very small proportion of the total labour force is employed in the formal sector while a large share of the basket of goods used to compile the consumer price index consists of goods (eg. food items) that are produced by the informal sector. Hence developments in wages in the formal sector have only a limited effect on price movements. Furthermore, only wages in the formal sector are recorded.

The introduction of the minimum wage by the authorities to safeguard a minimum standard of living for the unskilled labour force in the formal sector is qualified by "the employer's ability to pay" clause, which makes wage increases in collective bargaining agreements rather modest. In general therefore, wages (including that for the public sector) do not exert much pressure on inflation in Ghana.

Based on these arguments, inflation is modeled along the lines of Kanpur et al. (1991), by incorporating both the structuralist and monetarist views. The rate of inflation is influenced by percentage changes in broad nominal money supply, real gross domestic product, per capita production of staple food crops, the world price of oil, the weighted average of the official and parallel exchange rates, and the expected

change in the general consumer price index.[18] The mathematical specification is given as follows:

$$\begin{aligned} \triangle \log GHCPI_t &= \phi_0 + \phi_1 \triangle \log PCSTAP_t + \phi_2 \triangle \log RGDP_t \\ &\quad + \phi_3 \triangle \log WPOIL_t + \phi_4 \triangle \log GWEXCR_t \\ &\quad + \phi_5 \triangle \log BMS_t + \phi_6 \triangle \log EGHCPI_t + U_{11} \end{aligned} \tag{6.58}$$

$\triangle \log GHCPI_t$ is the percentage change in Ghana's general consumer price index in period t.

$\triangle \log PCSTAP_t$ is the percentage change in the per capita production of staple food crops in period t.

$\triangle \log RGDP_t$ is the percentage change in real gross domestic product in period t.

$\triangle \log WPOIL_t$ is the percentage change in the world price of oil in period t.

$\triangle \log GWEXCR_t$ is the percentage change in the weighted average of the official and parallel exchange rates in period t.

$\triangle \log BMS_t$ is the percentage change in nominal broad money supply in period t.

$\triangle \log EGHCPI_t$ is the expected percentage change in the general consumer price index in period t.

[18]The expected change in the rate of inflation is based on the adaptive expectations process discussed under the sub-section on "Demand for Money".

U_{11} is the error term for the inflation function.

Since the inflation model is a blend of cost-push (structural) and demand-pull (monetary) factors, it becomes necessary to perform a non-nested test to confirm that the monetary factors are not a subset of the structural factors. A J-test is therefore performed (Maddala, 1992). Two hypotheses are established as follows:

$$\begin{aligned} H_0 : \triangle \log GHCPI_t &= r_0 + r_1 \triangle \log PCSTAP_t \\ &\quad + r_2 \triangle \log WPOIL_t + r_3 \triangle \log GWEXCR + u_0 \end{aligned}$$

$$\begin{aligned} H_1 : \triangle \log GHCPI_t &= s_0 + s_1 \triangle \log BMS_t \\ &\quad + s_2 \triangle \log RGDP_t + u_1 \end{aligned}$$

The hypothesis H_0 assumes that inflation is explained basically by structural factors, and hypothesis H_1 assumes that inflation is explained by monetary factors. The J-test involves testing the hypothesis H_0 against H_1. The regression equation given by H_1 is estimated and the predicted value used as an explanatory variable in estimating the model for hypothesis H_0. The coefficient for the predicted value is then tested for its significance. A significant coefficient means H_0 is not rejected by H_1, and hence both H_0 and H_1 are acceptable. Analogous steps are carried out to test H_1 against H_0.

Statistically significant t-values of 3.572 and 5.215 at the 5 percent level for the coefficients of the predicted rate of inflation in the first and second tests respectively,

indicate that both specifications are acceptable, and that it is appropriate to incorporate both structural and monetary factors in the inflation model.

All the coefficients of the explanatory variables are expected to be positive except that of the per capita production of staple food crops.

Real wage rate is essential for determining the level of employment, and consequently, the gross domestic output. To examine the impact of macroeconomic variables on real wages and vice-versa requires a wage rate specification.

The nominal wage specification is based on a simple Phillips curve framework where the nominal wage (NWAGE) is explained by the level of unemployed labour force (UNLABF), lagged general price level, and lagged nominal wage.

The level of unemployed labour force captures the impact of excess supply of labour on nominal wage. The lagged general price level captures the impact of expectations for wage adjustment on the basis of cost of living, and the lagged nominal wage captures the bench mark impact of nominal wage adjustments. Using a log linear form, the nominal wage specification is given as follows:

$$\begin{aligned} \log NWAGE_t &= \psi_0 + \psi_1 \log UNLABF_t + \psi_2 \log GHCPI_{t-1} \\ &\quad \psi_3 \log NWAGE_{t-1} + U_{12} \end{aligned} \tag{6.59}$$

$NWAGE_t$ is the nominal wage rate in cedis per day in period t.

$UNLABF_t$ is the unemployed labour force in millions of workers in period t.

$GHCPI_t$ is Ghana's general consumer price index in percent in period t.

$\psi_0 \ldots . \psi_3$ are the structural coefficients of the wage function.

U_{12} is the error term for the wage function.

The coefficients of the logs of lagged consumer price index and the lagged nominal wage rate are expected to be positive. Under a flexible labour market, one would expect the coefficient of the unemployed labour force to be negative, but in a highly imperfect labour market with a high percentage of unskilled labour force, this may not in fact be the case.

6.3 The Full Structural Model

Twelve behavioural equations and forty-seven definitional equations and/or identities make up the full structural model. The various specifications under the respective sectors or sub-sectors are given below.

6.3.1 The Expenditure Sector Model

$$\begin{aligned} RGDP_t &= RCPR_t + RIPR_t + RCAPEXP_t + RCUREXP_t \\ &\quad + RVALEXPC_t - RVALIMPC_t \end{aligned} \tag{6.1}$$

Real Private Consumption Expenditure Function

$$\begin{aligned} \log RCPR_t &= \alpha_0 + \alpha_1 \log RDINC_t + \alpha_2 \log RDINC_{t-1} \\ &\quad + \alpha_3 \log RLENDR_t + \alpha_4 \log RCPR_{t-1} + U_1 \end{aligned} \tag{6.2}$$

$$RDINC_t = [(NGDP_t - NTOTAXR_t)/(GHCPI_t \times 0.01)] \tag{6.3}$$

$$RCPR_t = [CPR_t/(GHCPI_t \times 0.01)] \tag{6.4}$$

$$RLENDR_t = (LENDR_t - RINF_t) \tag{6.5}$$

Real Private Investment Expenditure Function

$$\begin{aligned} RIPR_t &= \beta_1 \triangle RLENDR_t + \beta_2 \triangle RGDP_t \\ &\quad +\beta_3 \triangle RINTCRED_t + \beta_4 \triangle RVEXTDID_t \\ &\quad +\beta_5 \triangle REEXCH_t + \beta_6^* RIPR_{t-1} + U_2 \end{aligned} \tag{6.6}$$

$$RIPR_t = [IPR_t/(GHCPI_t \times 0.01)] \tag{6.7}$$

$$RINF_t = [(GHCPI_t - GHCPI_{t-1})/GHCPI_{t-1}] \times 100 \tag{6.8}$$

$$RGDP_t = [NGDP_t/(GDPD_t \times 0.01)] \tag{6.9}$$

$$RINTCRED_t = [INTCRED_t/(GHCPI_t \times 0.01)] \tag{6.10}$$

$$RVEXTDID_t = \frac{NVAFOREX_t}{(USCPI_t \times 0.01)} \tag{6.11}$$

$$RVEXTDID_t = NVALEXPD_t + NPRIVTRD_t + NGOVTRD_t + DIRINVD_t + OTHCAPD_t \quad (6.12)$$

$$REEXCH_t = \sum_{i=1}^{N} w_i(\frac{CPI_{it}}{GHCPI_t}) \times EXCR_{it} \quad (6.13)$$

The Fiscal Sector sub-Model

$$\log NTOTAXR_t = \delta_0 + \delta_1 \log COCEXR_t + \delta_2 \log OTEXPREV_t + \delta_3 \log NGDPLEX_t + \delta_4 \log IMPORTS_t + U_3 \quad (6.14)$$

$$NTOTREV_t = NTOTAXR_t + NONTR_t \quad (6.15)$$

$$\log NCUREXP_t = \gamma_0 + \gamma_1 \log NTOTREV_t + \gamma_2 \log PUBDEBT_t + \gamma_3 \log GHEXCR_t + \gamma_4 GOVDUMY + U_4 \quad (6.16)$$

$$\log NCAPEXP_t = \omega_0 + \omega_1 \log NTOTREV_t + \omega_2 \log GHEXCR_t + \omega_3 \log INTCRED_t + \omega_4 \log NEXGTDID_t + \omega_5 \log PUBLENDR_t + \omega_6 GOVDUMY + U_5 \quad (6.17)$$

$$NGTEXP_t = NCUREXP_t + NCAPEXP_t \quad (6.18)$$

$$NGOVDEF_t = NGTEXP_t - NTOTAXR_t \tag{6.19}$$

$$PUBDEBT_t = \sum_{i=1}^{t} NGOVDEF_i \tag{6.20}$$

$$GOVNFOP_t = NGTEXP_t - NTOTREV_t \tag{6.21}$$

$$\begin{aligned} NEXGTDID_t &= NGOVTRD_t + NVALEXPD_t \\ &\quad + DIRINVD_t + OTHCAPD_t \end{aligned} \tag{6.22}$$

Foreign Trade Sector Model

$$\begin{aligned} \log QEXP_t &= \pi_0 + \pi_1 \log RPEXPD_t + \pi_2 \log RPCOC_t \\ &\quad + \pi_3 \log RIGTP_t + \pi_4 \log RVALIMPD_t \\ &\quad + \pi_5 \log RGDPS_t + \pi_6 \log QEXP_{t-1} + U_6 \end{aligned} \tag{6.23}$$

$$RIGTP_t = \sum_{i=1}^{N} [\frac{VEXP_{it}}{TVEXP_t}][RGDP_{it}] \tag{6.24}$$

$$NVALEXPD_t = (QEXP_t \times NPEXPD_t) \tag{6.25}$$

$$NVALEXPC_t = (QEXP_t \times NPEXPC_t) \tag{6.26}$$

$$RVALEXPC_t = [(NVALEXPC_t)/(GHCPI_t \times 0.01)] \tag{6.27}$$

$$\begin{aligned}\log QIMP_t &= \theta_0 + \theta_1 \log RPIMPD_t + \theta_2 \log RGDP_t \\ &+\theta_3 \log REEXCH_t + \theta_4 \log RVEXTDID_{t-1} \\ &+\theta_5 \log QIMP_{t-1} + \theta_6 TTREND + U_7 \end{aligned} \tag{6.28}$$

$$NVALIMPD_t = (QIMP_t \times NPIMPD_t) \tag{6.29}$$

$$NVALIMPC_t = (QIMP_t \times NPIMPC_t) \tag{6.30}$$

$$RVALIMPC_t = [(NVALIMPC_t)/(GHCPI_t \times 0.01)] \tag{6.31}$$

6.3.2 Monetary Sector Model

Demand for Money Function

$$\begin{aligned} ERINF_t &= \rho[RINF_t + (1-\rho)RINF_{t-1} + (1-\rho)^2 RINF_{t-2} + (1-\rho)^3 RINF_{t-3} + \dots] \\ &= \rho \sum_{i=0}^{\infty} (1-\rho)^i RINF_{t-i} \end{aligned} \tag{6.32}$$

$$\begin{aligned}\log DRBMS_t &= \varphi_0 + \varphi_1 \log ERINF_t + \varphi_2 \log RGDP_t \\ &+\varphi_3 RGDP_{t-1} + \varphi_4 \log DRBMS_{t-1} + U_8 \end{aligned} \tag{6.33}$$

$$DRBMS_t = [BMS_t/(GHCPI_t \times 0.01)] \tag{6.34}$$

Supply of Money Function

$$BMS = [(1+CUDDRAT+TSDDRAT)/(CBRDDRAT+CUDDRAT)] \times HPMONST \quad (6.35)$$

$$MONMULT = [(1+CUDDRAT+TSDDRAT)/(CBRDDRAT+CUDDRAT)] \quad (6.36)$$

$$HPMONST_t = INTCRED_t + NINTRESC_t \quad (6.37)$$

$$\begin{aligned} \log INTCRED_t &= \tau_0 + \tau_1 \log NGDP_t + \tau_2 \log LENDR_t \\ &\quad +\tau_3 \log CBRESRA_t + \tau_4 \log ECINTRD_t \\ &\quad +\tau_5 \log GOVNFOP_t + U_9 \end{aligned} \quad (6.38)$$

Balance of Payments Identities

$$NVALEXPD_t = (NVMEXPD_t \times NVSEXPD_t) \quad (6.39)$$

$$NVALIMPD_t = (NVMIMPD_t \times NVSIMPD_t) \quad (6.40)$$

$$NMETRBAD_t = (NVMEXPD_t - NVMIMPD_t) \quad (6.41)$$

$$NTRABALD_t = (NVALEXPD_t - NVALIMPD_t) \quad (6.42)$$

$$CURACBAD_t = (NTRABALD_t + NPRIVTRD_t + NGOVTRD_t) \quad (6.43)$$

$$CAPACBAD_t = (DIRINVD_t + OTHCAPD_t) \quad (6.44)$$

$$OVERBALD_t = (CURACBAD_t + CAPACBAD_t + ERROMD_t) \quad (6.45)$$

$$NINTRESD_t = OVERBALD_t \quad (6.46)$$

$$ECINTRD_t = [NINTRESD_t - 1/3(NVALIMPD_t)] \quad (6.47)$$

$$NINTRESC_t = (NINTRESD_t \times GHEXCR_t) \quad (6.48)$$

6.3.3 Other Identities and Ratios

$$DEBTSRAT_t = (EXDEPAD_t/NVALEXPD_t) \quad (6.49)$$

$$EXDSGDPR_t = (EXDEPAD_t/NGDPD_t) \quad (6.50)$$

$$TEXDGDPR_t = (TOTEXDD_t/NGDPD_t) \quad (6.51)$$

$$EXDEPAD_t = (PPEXDTD_t + IPEXDTD_t) \quad (6.52)$$

$$NGDPD_t = (NGDP_t/GHEXCR_t) \quad (6.53)$$

$$RINTABSC_t = (RCPR_t + RIPR_t + RGTEXP_t) \quad (6.54)$$

$$RGDFXKF_t = [NGDFXKF_t/(GHCPI_t \times 0.01)] \quad (6.55)$$

$$NGDFXKF_t = (IPR_t + NCAPEXP_t) \quad (6.56)$$

6.3.4 Aggregate Supply Model

$$\begin{aligned} \log RGDPS_t = {} & \eta_0 + \eta_1 \log RGDFXKF_t + \eta_2 \log ELABF_t \\ & + \eta_3 \log RVCIMPD_t + \eta_4 WEADUMY_t \\ & + \eta_5 \log RGDPS_{t-1} + U_{10} \end{aligned} \quad (6.57)$$

6.3.5 Inflation and Wage Rate Model

$$\begin{aligned} \triangle \log GHCPI_t = {} & \phi_0 + \phi_1 \triangle \log PCSTAP_t + \phi_2 \triangle \log RGDP_t \\ & + \phi_3 \triangle \log WPOIL_t + \phi_4 \triangle \log GWEXCR_t \\ & + \phi_5 \triangle \log BMS_t + \phi_6 \triangle \log EGHCPI_t + U_{11} \end{aligned} \quad (6.58)$$

$$\log NWAGE_t = \psi_0 + \psi_1 \log UNLABF_t + \psi_2 \log GHCPI_{t-1} + \psi_3 \log NWAGE_{t-1} + U_{12} \quad (6.59)$$

6.4 Linkages in the Model

The three main sectors in the model i. e. the expenditure sector, the monetary sector, and the wage, price and production sector, are linked through several variables (Refer to Figure 6.1), allowing for the simulation of the model.

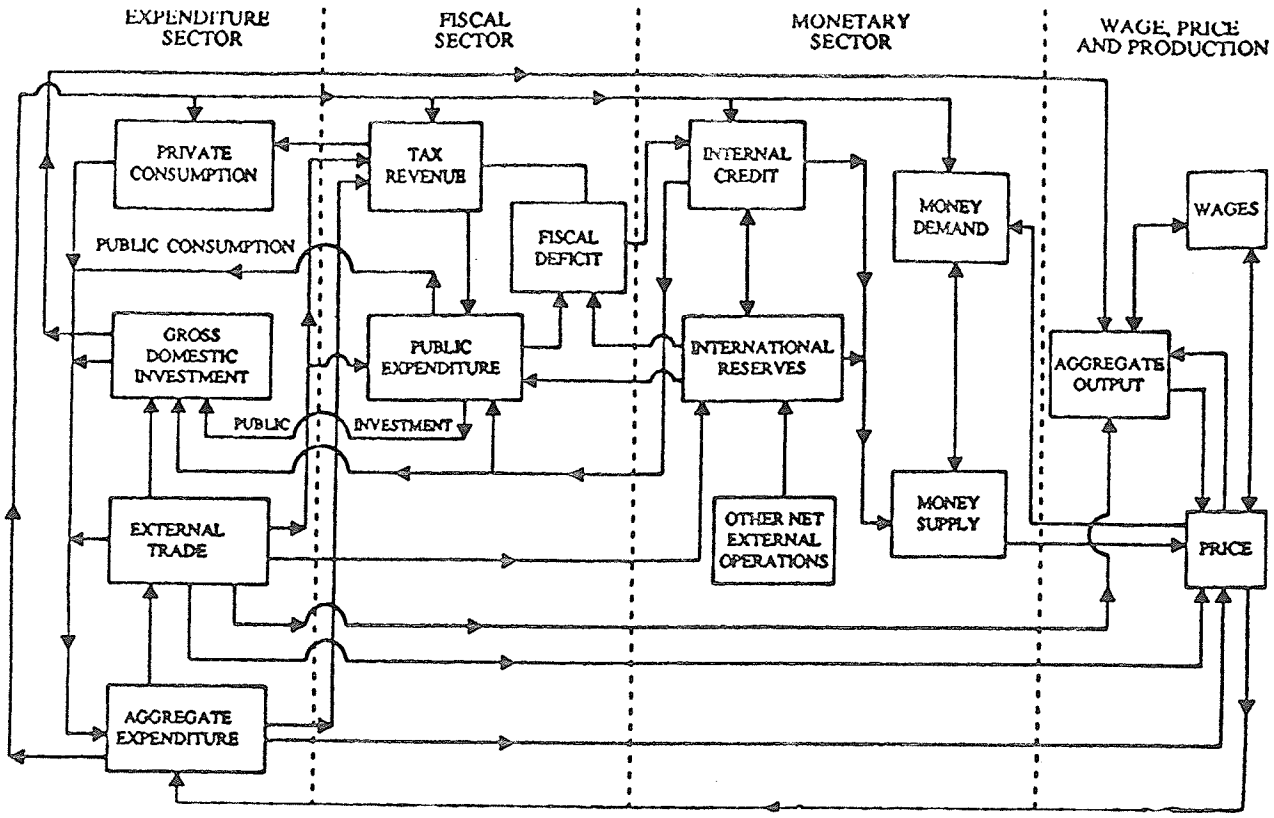
The expenditure sector is linked to the monetary sector through internal credit, private and public investment, and net international reserves. Net International reserves incorporate the trade balance.

The fiscal sub-sector is linked to the expenditure sector through taxes, private consumption, and public expenditure; and to the monetary sector through internal and external credit to finance the government's deficit and/or expenditure.

The wage, price, and production sector is linked to the monetary sector through money supply which includes internal credit and net international reserves. It is also linked to the expenditure sector through external trade and gross domestic investment. The influence of import prices and/or nominal exchange rate on the price level, links the wage, price and production sector to the expenditure sector.

The expenditure sector, the fiscal sub-sector, the monetary sector, and the wage, price, and production sector, are all linked through aggregate expenditure.

Figure 6.1: Condensed Flow Chart of the Model



6.5 Analytical Operation of Model

The behavioural equations specified for the various sectors and the sub-sector, together with the definitional equations and identities, determine simultaneously the structural equations for private consumption, private investment, public expenditure, imports, exports, tax revenue, fiscal deficit/surplus, stock of money supply, trade balance, current account balance, balance of payments, net international reserves, external debt payments, debt service ratio, aggregate supply, inflation, and wages.

The structural equations are then used to perform a within-sample simulation to evaluate the model's ability in tracing the historical data. Simulated experiments are also carried out by changing some key macroeconomic policy variables, based on IMF and World Bank recommendations. The key macroeconomic variables are fiscal deficit, foreign capital flow, internal credit, exchange rate, and terms of trade. The impact of the changes in the policy variables are evaluated by comparing the results of the outputs to the results of the base run.

6.6 The Sequential Working of the Model

Using the condensed flow chart of the model, the sequential working of the model is explained below. For the purpose of exposition, assume there is an increase in net capital inflow.[19] This would directly improve foreign exchange availability and the balance of payments. The improvement in foreign exchange would influence the

[19]A net capital inflow is used since the lack of foreign exchange is considered a major constraint in improving developing economies. Furthermore, one of the major differences between Ghana's structural adjustment programme and that of many other places is the massive inflow of foreign capital.

endogenous variables in varying degrees.[20]

It must be mentioned that in the analysis that follows, a Granger causality test is performed to determine the direction of causality. To evaluate whether the variable X causes Y, two regression equations, restricted and unrestricted regression equations, are estimated as given by the following expressions:

$$(i)Y = \sum_{i=1}^{m} a_i Y_{t-i} + \sum_{i=1}^{m} b_i X_{t-1} + e_1$$

$$(ii)Y = \sum_{i=1}^{m} a_i Y_{t-1} + e_2$$

Equation (i) is the unrestricted regression equation and equation (ii) the restricted regression equation. The error sum of squares of the two regression equations are used to perform an F-test.[21] If the calculated F-statistic is greater than the tabulated F-statistic at the corresponding degrees of freedom for the numerator and the

[20]Since the signs and significance of the coefficients are unknown at this stage, the exact effects cannot be determined at this stage. The analysis is therefore based on the expected signs of the coefficients.

[21]The calculated F-statistic is determined as follows:

$$F_{q,N-k} = \frac{(ESS_R - ESS_{UR})/q}{ESS_{UR}/(N-k)}$$

where q = number of restrictions; N = sample size; k = number of parameter estimates in unrestricted regression; ESS_R = error sum of squares of restricted regression; ESS_{UR} = error sum of squares of unrestricted regression.

denominator, then the coefficients of the lagged variables of X are significant and hence reject the null hypothesis that X does not cause Y. The test is repeated for the null hypothesis that Y does not cause X by switching dependent and independent variables in the above equations.

The tests revealed simultaneous causality between consumption and income, exports and imports, private investment and income, exports and income, government expenditure and income, with the calculated F-statistics in both causalities greater than the tabulated F-statistic of 3.06. Uni-directional causality were also revealed for some endogenous variables. For example aggregate supply causing exports, internal credit causing investment, money supply causing prices, prices causing nominal wage and international reserves causing money supply. The various directions of causality used in the analysis below are based on these tests

The increase in net capital inflow would tend to increase the level of imports, including capital and intermediate goods (via the import equation 6.28); and increase the level of private investment, and public capital investment (via equations 6.6 and 6.17 respectively).

The increase in the level of imports is likely to increase aggregate supply (via equation 6.57) and exports (via equation 6.23). The increase in output would also increase the level of exports (via equation 6.23). The increase in investment together with the increase in exports would tend to increase nominal income, (via the nominal form of the aggregate expenditure identity equation 6.1), if net exports is positive. The increase in nominal income is likely to increase consumption (via equation 6.2), and increase tax revenue (via equation 6.14).

The increase in tax revenue is likely to increase government current and capital expenditure (via equations 6.16 and 6.17 respectively), and in turn increase the nominal income (via equation 6.1). The impact on tax revenue and the government

expenditure would directly influence the fiscal deficit and the government's net fiscal operations (via equations 6.15, 6.18, 6.19, and 6.21).

At the same time, if the increase in net capital inflow is not sterilized, or used entirely for imports, the nominal international reserves of the banking system would increase, which would increase the domestic currency equivalent of the net international reserves (via equation 6.48). The increase in the net capital inflow would tend to increase the expected change in the international reserves in dollars (via equation 6.47), which would in turn increase internal credit (via equation 6.38). The increase in the domestic currency equivalent of the net international reserves, together with the increase in internal credit, would increase the high-powered monetary stock (via equation 6.37), and eventually increase the money supply (via equation 6.35).

The increase in internal credit would increase private and capital investment (via equations 6.6 and 6.17 respectively), while the increase in money supply is likely to raise prices (via equation 6.58). The increase in the price level is also likely to influence nominal wage (via equation 6.59).

Hence an increase in capital inflow would simultaneously affect the balance of payments, the government net fiscal operations, as well as some other important macroeconomic indicators.

Chapter 7

Structural Estimates and Analysis of Model

7.1 Introduction

The principal objective of this chapter is to analyse the empirical results of the model outlined in the previous chapter. The chapter is divided into two main sections. The first section looks at the econometric procedures and techniques used in estimating the model while the second section presents and discusses the econometric results of the individual behavioural equations of the model.

7.2 Estimation Procedures

The principal source of data for the estimation is that published by the Ghana Statistical Services for the period 1970 - 1990. This is supplemented by data published in the International Financial Statistics and World tables. With the combination of the various specifications into an economy-wide model, the interdependence in the

model becomes simultaneous. In a simultaneous system, the application of ordinary least squares does not yield consistent estimates. It becomes necessary, therefore, to use a simultaneous estimation procedure. Two problems are usually encountered in the application of simultaneous methods of estimation to an economy-wide model. First is the problem of some element of non-linearity in the model, and second the small sample size problem (Goldfeld and Quandt, 1972). The model is confronted with both problems. It becomes imperative therefore to discuss the handling of the problems in the estimation technique.

First, regarding non-linearity, the log-linear specifications in the model are non-linear in variables but linear in parameters. Under such circumstances, a simultaneous estimation technique using a two stage least squares (2SLS) method yields consistent but not necessarily efficient estimates if the behavioural equations are identified. In this respect, all the behavioural equations in the model are identified. Moreover, the large number of predetermined variables (including both independent and lagged variables), virtually guarantees that the order condition for identification would be met.

Whereas a large number of predetermined variables facilitate the identification of a simultaneous system of equations, a problem arises if the number of predetermined variables is more than the number of observations. This is the problem of undersized sample (Theil, 1971). Under this, there would be an insufficient degrees of freedom and the first stage in the 2SLS procedure would break down. The problem is circumvented by the use of principal components, first proposed by Kloek and Mennes (1960). In the principal components technique, the original set of predetermined variables are transformed into a new set of variables which are linear combinations of the original variables, and in addition are orthogonal (i.e. uncorrelated) to each other. The principal components are then used as instruments (i. e. the factor scores) in the first stage of the 2SLS procedure. An additional advantage in the use

of the principal components is that since they are orthogonal, it avoids the problem of multicollinearity. Kloek and Mennes (1960), Amemiya (1966), and Klein (1969), all demonstrated that 2SLS estimates based on principal components are consistent. Brundy and Jorgenson (1972) confirmed this, and Klein (1974) observed that a 2SLS based on four principal components gave the best results in the Klein-Goldberger model of the United States.

To confirm the need for a simultaneous approach to the estimation, a Hausman test for simultaneity is performed on each of the selected behavioural equations by including a principal component (instrument) as a regressor in each of the equations, and testing for the significance of the coefficient of the principal component using a t-test. A significant coefficient is a rejection of the null hypothesis of no simultaneity. Table 7.1 gives the estimated t-values for the coefficients of the instruments in the various behavioural equations and the level of significance.[22]

The estimated t-values reject the hypothesis of no simultaneity in the various behavioural equations at the 5 and 10 percent levels of significance, and reaffirm the appropriate use of the simultaneous estimation approach. Hence, a 2SLS procedure is used in estimating the model with 6 principal components used as instruments in the first stage of the 2SLS procedure. The 6 principal components cumulatively account for 97 percent of the variation in the predetermined variables.

Another major problem with time series data is autocorrelation. Autocorrelation renders the estimates inefficient but does not make them biased or inconsistent if the model is correctly specified. Most problems of autocorrelation are caused by misspecification. The problem is addressed by selecting the best specifications from alternatives based on some model selection criteria and the Ramsey's regression error

[22]One asterisk (*) indicates 5 percent level of significance; two asterisks (**) indicate 10 percent level of significance.

Table 7.1: t-Values of Coefficients of Instruments and Significance

Behavioural Equation	t-ratio of IV and Significance
Consumption	5.23*
Investment	2.14*
Tax Revenue	5.21*
Gov't Current Expenditure	3.05*
Gov't Capital Expenditure	4.63*
Exports	2.01*
Imports	2.56*
Demand for Money	1.81**
Internal Credit	1.71**
Aggregate Supply	2.12*
Infaltion	3.25*
Wages	1.72*

specification test (RESET) procedure.[23]

As discussed in the previous chapter, the selected specifications do not show any evidence of auto-correlation as indicated by the Durbin-Watson or the Durbin "h" statistic, and the Ramsey's RESET procedure does not indicate any misspecification at the 5 percent level.

In summary, after avoiding auto-correlation in the various behavioural equations through correct specifications, a two-stage least squares (2SLS) estimation procedure with principal components as instruments in the first stage, is used to estimate the structural parameters of the model. Furthermore, enough lag variables give better dynamic properties for the model.

[23]The model selection criteria and the RESET procedure are discussed in Chapter 6.

7.3 Estimates of Behavioural Equations

The structural estimates of the behavioural equations, the expected signs, the t-values of the parameters, the level of significance of the parameters, and other statistical information are presented in Tables 7.2. to 7.7.[24]

On the whole, the results indicate that the goodness of fit of the various behavioural equations in the model is quite satisfactory. The various values for the coefficient of determination (R^2) are quite high, ranging from 0.8168 for exports to 0.9967 for government current expenditure. The adjusted R-squared values are also quite high ranging from 0.7152 for exports to 0.9958 for current government expenditure. All the F-statistics are significant at the 5 percent level. Neither the Durbin-Watson statistics nor the Durbin-h statistics indicate any apparent problem of serial correlation.[25] A detailed analysis of the individual behavioural equations is given below. The estimated equations cover the period from 1970 to 1990.

[24]One asterisk (*) indicates 5 percent level of significance; two asterisks (**) indicate 10 percent level of significance.

[25]In an autoregressive model, (i. e. a model that includes one or more lagged dependent variable as explanatory variables), the calculated Durbin-Watson statistic is biased toward 2 (Nerlove and Wallis, 1966). Under a such conditon, the Durbin's h-statistic is used to test for first-order autocorrelation. The Durbin's h-statistic is calculated as follows:

$$Dh = (1 - \frac{1}{2}DW)\sqrt{\frac{N}{1 - N[var(b_i)]}}$$

where $var(b_i)$ is the OLS estimate of the variance of the lagged dependent variable, and N is the sample size. The Dh statistic tests the null hypothesis of no positive or negative first-order autocorrelation. The null hypothesis is accepted if the Dh lies between -1.96 and 1.96.

Table 7.2: Principal Components Instrumental Variables, Two-Stage Least Squares Estimate of Structural Parameters: Private Consumption and Investment

Private Consumption

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$\log RCPR_t$	Constant		+0.901	+2.256*
	$\log RDINC_t$	+	+0.950	+10.792*
	$\log RDINC_{t-1}$	−	−0.130	−0.449
	$\log RLENDR_t$	−	+0.002	+0.191
	$\log RCPR_{t-1}$	+	+0.173	+1.751**
$R^2 = 0.9832$	$Adj.R^2 = 0.9785$	$F = 205.319$	$Dh = 0.980$	

Private Investment

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$RIPR_t$	Constant		+917.484	+0.873
	$\triangle RLENDR_t$	−	−3.333	−0.382
	$\triangle RGDP_t$	+	+0.165	+1.725**
	$\triangle RINTCRD_t$	+	+0.148	+0.646
	$\triangle RVEXTDID_t$	+	+2.998	+1.976*
	$\triangle REEXCH_t$	+	+140.988	+1.762**
	$RIPR_{t-1}$	+	+0.810	+4.441*
$R^2 = 0.8981$	$Adj.R^2 = 0.7971$	F =17.906	$Dh = 1.10$	

Table 7.3: Principal Components Instrumental Variables, Two-Stage Least Squares Estimate of Structural Parameters: Tax Revenue and Gov't.Current Expenditure

Tax Revenue

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$\log NTOTAXR_t$	Constant		-0.391	-1.209
	$\log COCEXR_t$	$+$	$+1.062$	$+1.998$*
	$\log OTEXPREV_t$	$+$	$+0.495$	$+0.767$
	$\log NGDPLEX_t$	$+$	$+0.296$	$+4.016$*
	$\log IMPORTS_t$	$+$	$+0.100$	$+1.214$
$R^2 = 0.9946$	$Adj.R^2 = 0.9930$	$F = 641.504$	$DW = 1.906$	

Gov't. Current Expenditure

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$\log NCUREXP_t$	Constant		-0.282	-0.404
	$\log NTOTREV_t$	$+$	$+0.717$	$+5.785$*
	$\log PUBDEBT_t$	$+$	$+0.333$	$+4.723$*
	$\log GHEXCR_t$	$-$	-0.037	-0.404
	$GOVDUMY$	$+$	$+0.149$	$+1.354$
$R^2 = 0.9967$	$Adj.R^2 = 0.9958$	$F = 1064.589$	$DW = 2.21$	

Table 7.4: Principal Components Instrumental Variables, Two-Stage Least Squares Estimate of Structural Parameters: Government Capital Expenditure and Exports

Gov't. Capital Expenditure

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$\log NCAPEXP_t$	Constant		+0.966	+0.534
	$\log NTOTREV_t$	+	+0.733	+2.675*
	$\log GHEXCR_t$	+	+0.274	+1.749**
	$\log INTCRED_t$	+	−0.298	−1.143
	$\log NEXGTDID_t$	+	+0.625	+2.517*
	$\log PUBLENDR_t$	−	−0.683	−1.013
	$GOVDUMY$	+	+0.110	+1.003
$R^2 = 0.9793$	$Adj.R^2 = 0.9689$	$F = 94.403$	$DW = 1.9625$	

Exports

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$\log QEXP_t$	Constant		−4.748	−1.054
	$\log RPEXPD_t$	+	+0.048	+0.618
	$\log RPCOC_t$	+	+0.342	+1.727**
	$\log RIGTP_t$	+	+0.059	+0.232
	$\log RVAIMPD_t$	+	+0.050	+1.742**
	$\log RGDPS_t$	+	+0.477	+1.724**
	$\log QEXP_{t-1}$	+	+0.518	+3.047*
$R^2 = 0.8168$	$Adj.R^2 = 0.7152$	$F = 12.841$	$Dh = -1.04$	

Table 7.5: Principal Components Instrumental Variables, Two-Stage Least Squares Estimate of Structural Parameters: Imports and Demand for Money

Imports

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$\log QIMP_t$	Constant		-19.17	-1.946**
	$\log RPIMPD_t$	$-$	-0.303	-0.856
	$\log REEXCH_t$	$-$	-0.032	-1.95**
	$\log RGDP_t$	$+$	$+2.316$	$+2.345$ *
	$\log RVEXTDID_{t-1}$	$+$	$+0.690$	$+1.992$*
	$\log QIMP_{t-1}$	$+/-$	-0.056	-0.200
	$TTREND$	$+/-$	-0.088	-2.509*
$R^2 = 0.9467$	$Adj.R^2 = 0.920$	$F = 35.520$	$Dh = -1.13$	

Demand for Money

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$\log DRBMS_t$	Constant		$+9.258$	$+2.459$*
	$\log ERINF_t$	$-$	-0.288	-7.164*
	$\log RGDP_t$	$+$	$+0.446$	$+2.309$*
	$\log RGDP_{t-1}$	$-$	-1.160	-1.026
	$\log DRBMS_{t-1}$	$+$	$+0.939$	$+17.417$*
$R^2 = 0.9632$	$Adj.R^2 = 0.9527$	$F = 91.663$	$Dh = 0.069$	

Table 7.6: Principal Components Instrumental Variables, Two-Stage Least Squares Estimate of Structural Parameters: Internal Credit and Aggregate Supply

Internal Credit

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$\log INTCRED_t$	Constant		-0.059	-0.158
	$\log NGDP_t$	$+$	$+0.760$	$+16.529$*
	$\log LENDR_t$	$-$	$+0.292$	$+1.888$**
	$\log CBRESRA_t$	$-$	$+0.093$	$+0.704$
	$\log ECINTRD_t$	$+$	$+0.118$	$+1.802$**
	$\log GOVNFOP_t$	$+$	$+0.177$	$+0.663$
$R^2 = 0.9952$	$Adj.R^2 = 0.9933$	$F = 535.71$	$DW = 1.82$	

Aggregate Supply

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$\log RGDPS_t$	Constant		$+1.643$	$+1.008$
	$\log RGDFXKF_t$	$+$	$+0.076$	$+1.719$**
	$\log ELABF_t$	$+$	$+0.610$	$+3.334$*
	$\log RVCIMPD_t$	$+$	$+0.301$	$+6.452$*
	$WEADUMY$	$+$	$+0.1638$	$+2.694$*
	$\log RGDPS_{t-1}$	$+$	$+0.05$	$+0.351$
$R^2 = 0.8751$	$Adj.R^2 = 0.8270$	$F = 18.211$	$Dh = 1.43$	

Table 7.7: Principal Components Instrumental Variables, Two-Stage Least Squares Estimate of Structural Parameters: Inflation and Nominal Wage Rate

Inflation

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$\triangle \log GHCPI_t$	Constant		+0.026	+0.376
	$\triangle \log PCSTAP_t$	−	−0.249	−2.256*
	$\triangle \log RGDP_t$	+	+0.073	+1.728**
	$\triangle \log WPOIL_t$	+	+0.716	+2.302*
	$\triangle \log GWEXCR_t$	+	+0.101	+1.989*
	$\triangle \log BMS_t$	+	+0.184	+1.003
	$\triangle \log EGHCPI_t$	+	+0.247	+1.731**
$R^2 = 0.8683$	$Adj.R^2 = 0.8024$	$F = 13.182$	$DW = 1.89$	

Nominal Wage Rate

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$\log NWAGE_t$	Constant		+2.414	+0.832
	$\log UNLABF_t$	−	−0.493	−0.898
	$\log GHCPI_t$	+	+0.384	+2.363*
	$\log NWAGE_{t-1}$	+	+0.645	+4.670*
$R^2 = 0.9872$	$Adj.R^2 = 0.9846$	$F = 385.4$	$Dh = 0.29$	

7.3.1 Private Consumption

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$\log RCPR_t$	Constant		+0.901	+2.256*
	$\log RDINC_t$	+	+0.950	+10.792*
	$\log RDINC_{t-1}$	−	−0.130	−0.449
	$\log RLENDR_t$	−	+0.002	+0.191
	$\log RCPR_{t-1}$	+	+0.173	+1.751**
$R^2 = 0.9832$	$Adj.R^2 = 0.9785$	$F = 205.319$	$Dh = 0.980$	

All the estimated coefficients of private consumption have the expected signs except for the lending rate. However, only the coefficient for the disposable income and the constant are significant at the 5 percent level. Lagged consumption is significant at the 10 percent level.[26] Other insignificant variables are needed to avoid autocorrelation and to pass the RESET tests.

The regression equation indicates that disposable income is the main factor that influences private consumption behaviour in Ghana. The estimated coefficient of 0.95 for the log of disposable income implies that a 1 percent increase in disposable income increases private consumption by 0.95 percent. This value falls in the high range of estimates reported by Haque and Montiel (1989).

The insignificant coefficient for lagged disposable income shows that lagged disposable income does not have much influence on current consumption.

The coefficient 0.002 for the log of the lending rate together with its statistical insignificance, suggests that the lending rate does not have any influence on private consumption in Ghana. Most studies of consumption functions in LDCs draw

[26]One asterisk (*) indicates 5 percent level of significance; two asterisks (**) indicate 10 percent level of significance.

the same conclusions on the relationship between the lending rate and consumption (See Haque and Montiel, 1989). The unexpected sign of the real lending rate is not surprising since for most of the period covered by the study, real lending rate was negative. Furthermore, it is insignificant and best treated as zero. The use of tight monetary policy to influence the lending rate as a means of controlling consumption and consequently inflation, would therefore not be an effective policy in Ghana.

The coefficient 0.173 for lagged private consumption implies an adjustment coefficient of 0.827 (i. e. $1 - 0.173$), and an adjustment period of about 1.2 years for actual private consumption to adjust to a desired level.

7.3.2 Private Investment

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$RIPR_t$	Constant		+917.484	+0.873
	$\triangle RLENDR_t$	−	−3.333	−0.382
	$\triangle RGDP_t$	+	+0.165	+1.725**
	$\triangle RINTCRD_t$	+	+0.148	+0.646
	$\triangle RVEXTDID_t$	+	+2.998	+1.976*
	$\triangle REEXCH_t$	+	+140.988	+1.762**
	$RIPR_{t-1}$	+	+0.810	+4.441*
$R^2 = 0.8981$	$Adj.R^2 = 0.7971$	F =17.906	$Dh = 1.10$	

All estimated coefficients of private investment have the expected signs. Rates of changes in real gross domestic product, real internal credit, real value of available foreign exchange, real effective exchange rate, and lagged real private investment, are all positively related to real private investment, while the rate of change in real lending rate is negatively related to private investment.

The coefficients for the real value of available foreign exchange and the lagged

real private investment are significant at 5 percent and the coefficients of the rates of changes in real gross domestic product and real effective exchange rate are significant at 10 percent level.[27] These indicate that the major factors influencing private investment in Ghana are real output, available foreign exchange, the real effective exchange rate and lagged private investment.

Changes in real lending rate and real internal credit do not significantly influence private investment in Ghana. This is not unexpected considering the weak financial system in Ghana which is typical of most LDCs. It also shows the tendency of Ghanaian investors to rely on own sources of finance rather than on credit, a behaviour which is deeply rooted in the societal norms and values, and the culture of the people.

The estimated coefficients indicate that unit separate increases in changes in real gross domestic product, available foreign exchange and real effective exchange rate, would lead to 0.165, 2.998, and 140.988 unit increases in the real private investment, respectively.

The following deductions are made from the positive and significant coefficients of the rates of changes in real gross domestic product, available foreign exchange, and real effective exchange rate. First, the flexible accelerator investment theory holds true for Ghana. Second, investment in Ghana relies on imported capital and intermediate goods. Third, depreciation of the domestic currency stimulates investment. Currency depreciation impacts positively on private investment presumably by raising returns to export and import substitution activities, in which most commercial investments are concentrated.

The coefficient 0.81 for lagged investment (which is almost identical to the 0.809 estimate of Haque et al. , 1990) implies an adjustment coefficient of 0.19 (i. e. 1 – 0.81), and a fairly protracted period of adjustment of about 5 years 3 months

[27]One asterisk (*) indicates 5 percent level of significance; two asterisks (**) indicate 10 percent level of significance.

(i. e. 1/0.19), for actual private investment to adjust to a desired level. Using these estimates, the long run output, available foreign exchange, and real effective exchange rate elasticities are 0.868, 15.778, and 742 respectively. This shows that private investment in Ghana is foreign exchange and real exchange rate elastic in the long run.

7.3.3 Nominal Tax Revenue

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$\log NTOTAXR_t$	Constant		-0.391	-1.209
	$\log COCEXR_t$	$+$	$+1.062$	$+1.998$*
	$\log OTEXPREV_t$	$+$	$+0.495$	$+0.767$
	$\log NGDPLEX_t$	$+$	$+0.296$	$+4.016$*
	$\log IMPORTS_t$	$+$	$+0.100$	$+1.214$
$R^2 = 0.9946$	$Adj.R^2 = 0.9930$	$F = 641.504$	$DW = 1.906$	

The estimated coefficients for the nominal tax revenue are all of the expected signs. Cocoa exports, other exports, gross domestic product less exports, and imports all exert a positive influence on tax revenue. However only the coefficients for cocoa exports and nominal gross domestic product less exports are significant at the 5 percent level.[28] Other exports and imports do not influence tax revenue significantly.

The estimated coefficients indicate that the cocoa export elasticity of tax revenue is 1.062, and the gross domestic product less exports elasticity of tax revenue is 0.296. This implies that one percent separate increases in cocoa export revenue and gross domestic product less exports would lead to 1.062 and 0.296 percent increases in the

[28]One asterisk (*) indicates 5 percent level of significance; two asterisks indicate 10 percent level of significance.

nominal tax revenue, respectively. This suggests that the tax system is cocoa elastic but not particularly elastic to non-cocoa domestic income.

7.3.4 Government Current Expenditure

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$\log NCUREXP_t$	Constant		-0.282	-0.404
	$\log NTOTREV_t$	$+$	$+0.717$	$+5.785$*
	$\log PUBDEBT_t$	$+$	$+0.333$	$+4.723$*
	$\log GHEXCR_t$	$-$	-0.037	-0.404
	$GOVDUMY$	$+$	$+0.149$	$+1.354$
$R^2 = 0.9967$	$Adj.R^2 = 0.9958$	$F = 1064.589$	$DW = 2.21$	

All the estimated coefficients for the government nominal current expenditure bear the expected signs. Nominal total revenue and the level of public debt have positive influences on nominal current government expenditure, and the exchange rate a negative influence. However, only the coefficients for total revenue and public debt are significant at the 5 percent level.[29] The presence of military governments, as indicated by the government dummy variable, increases the level of current government expenditure, but not significantly.

The coefficients 0.717 and 0.333 for the logs of nominal total revenue and the public debt, respectively, indicate that a 1 percent increase in total revenue and public debt lead to a 0.717 and 0.333 percent increases in current expenditure, respectively.

[29]One asterisk (*) indicates 5 percent level of significance; two asterisks (**) indicate 10 percent level of significance.

7.3.5 Government Capital Expenditure

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$\log NCAPEXP_t$	Constant		+0.966	+0.534
	$\log NTOTREV_t$	+	+0.733	+2.675*
	$\log GHEXCR_t$	+	+0.274	+1.749**
	$\log INTCRED_t$	+	−0.298	−1.143
	$\log NEXGTDID_t$	+	+0.625	+2.517*
	$\log PUBLENDR_t$	−	−0.683	−1.013
	$GOVDUMY$	+	+0.110	+1.003
$R^2 = 0.9793$	$Adj.R^2 = 0.9689$	$F = 94.403$	$DW = 1.9625$	

Regarding government nominal capital expenditure, nominal total revenue, Ghana's exchange rate, and the available foreign exchange to the government, (as indicated by the value of exports, government transfers, and direct investment), are all positively related to the government capital expenditure as expected. Public lending rate and internal credit are negatively related to government capital expenditure. The negative influence of public lending rate is expected, but not the negative influence of internal credit. However, both are insignificant and best treated as zero.

The coefficients for the logs of nominal total revenue and available foreign exchange are significant at the 5 percent level and that for the log of the exchange rate significant at 10 percent level.[30] The negative and insignificant influence of internal credit may be explained by the enormous capital investment during the ERP which was financed mainly by foreign capital, and during which time credit in the domestic economy, and especially to the government, was very much restricted. The presence of a military government exerts a positive but insignificant influence on government

[30]One asterisk (*) indicates 5 percent level of significance; two asterisks (**) indicate 10 percent level of significance.

capital expenditure. The positive influence is mainly due to the heavy capital investment of the PNDC government during the ERP, and also because of the decline in government capital expenditure during the excess liquidity period of the 1970s to the early 1980s.

The coefficients 0.733, 0.274, and 0.625 for total revenue, the exchange rate, and the available foreign exchange respectively, indicate that 1 percent separate increases in total revenue, the exchange rate, and available of foreign exchange to the government, result in 0.733, 0.274, and 0.625 percent increases in government capital expenditure, respectively.

The structural estimates of the two government expenditures show that current expenditure is very much a function of total revenue while capital expenditure relies heavily on foreign capital. They also show that public debt has an influence on government current expenditure, and that exchange rate depreciation influences government capital expenditure significantly but not current expenditure. This is explained, perhaps, by the fact that the availability of foreign financing was itself a function of exchange rate liberalization in the 1980s.

7.3.6 Exports

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$\log QEXP_t$	Constant		-4.748	-1.054
	$\log RPEXPD_t$	$+$	$+0.048$	$+0.618$
	$\log RPCOC_t$	$+$	$+0.342$	$+1.727^{**}$
	$\log RIGTP_t$	$+$	$+0.059$	$+0.232$
	$\log RVAIMPD_t$	$+$	$+0.050$	$+1.742^{**}$
	$\log RGDPS_t$	$+$	$+0.477$	$+1.724^{**}$
	$\log QEXP_{t-1}$	$+$	$+0.518$	$+3.047^{*}$
$R^2 = 0.8168$	$Adj.R^2 = 0.7152$	$F = 12.841$	$Dh = -1.04$	

All the estimated coefficients for export supply bear the expected signs. World price of exports, domestic producer price of cocoa, the income of Ghana's trading partners, the value of imports, the economy's capacity to produce exports (proxied by the rate of change in the real gross domestic product), and lagged exports, are all positively related to the supply of exports.

Regarding the significance of the coefficients, the coefficient for lagged exports is significant at the 5 percent level, while the coefficients for the domestic producer price of cocoa, the value of imports, and the economic capacity of the country are all significant at the 10 percent level.[31] This implies that the domestic cocoa price, real value of imports, and the domestic capacity, are the main factors that influence export supply in Ghana.

The real world market price of exports and the income of Ghana's trading partners, though being positively related to export supply, do not have a significant influence. This is basically due to the fallacy of composition which reduces the fairly elastic

[31]One asterisk (*) indicates 5 percent level of significance; two asterisks (**) indicate 10 percent level of significance.

demand curve (small country assumption) for Ghana's exports and hence reduces the impact of increased prices on export supply. The significance of the value of imports points to the dependence of the export sector on imported intermediate and capital goods while the significance of the economic capacity illustrates the importance of improving the productive capacity of the economy to stimulate exports. All these observations seem to support the structuralists view of export supply for LDCs.

The significant and positive relationship between domestic cocoa price and exports is not surprising. For the greater portion of the period under investigation, there was little domestic incentive to expand production of cocoa because the domestic producer price was about one-third of the world price. At the same time, there was a relatively much higher price in Côte d'Ivoire so there was a huge incentive for smuggling of cocoa to this neighbouring country. With the "devaluation induced" increases in domestic producer price of cocoa, much of the cocoa output went through the official channel and helped increase export supply considerably.

The coefficients 0.342, 0.050, and 0.477 for the logs of domestic cocoa price, value of imports and economic capacity, respectively, indicate that 1 percent individual increases in the domestic cocoa price, value of imports, and economic capacity, would result in 0.342, 0.050, and 0.477 percent increases in the supply of exports, respectively, in the short run. These point to a short run inelastic response of export supply to the explanatory variables.

Furthermore, the estimates imply long run domestic cocoa price, value of imports, and economic capacity elasticities of export supply of 0.71, 0.10, and 0.99 respectively. This shows that apart from the economic capacity which is unitary elastic in the long run, all the significant variables are still inelastic in the long run.

7.3.7 Imports

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$\log QIMP_t$	Constant		-19.17	-1.946**
	$\log RPIMPD_t$	$-$	-0.303	-0.856
	$\log REEXCH_t$	$-$	-0.032	-1.95**
	$\log RGDP_t$	$+$	$+2.316$	$+2.345$ *
	$\log RVEXTDID_{t-1}$	$+$	$+0.690$	$+1.992$*
	$\log QIMP_{t-1}$	$+/-$	-0.056	-0.200
	$TTREND$	$+/-$	-0.088	-2.509*
$R^2 = 0.9467$	$Adj.R^2 = 0.920$	$F = 35.520$	$Dh = -1.13$	

In the import demand equation, all the estimated coefficents bear the expected signs. Rates of change in import price and real effective exchange rate influence quantity of imports negatively, while rates of change in domestic economy and available foreign exchange in the previous period influence quantity of imports positively.

Regarding significance, the coefficients for the rates of change in gross domestic product, and available foreign exchange are significant at the 5 percent level, while that for the real effective exchange rate is significant at the 10 percent level.[32] Hence, rates of change in real gross domestic product, real effective exchagne rate, and available foreign exchange significantly influence rate of change in quantity of imports. The real price of imports and lagged quantity of imports do not significantly influence the rate of change in imports.

The insignificant negative relationship between import price and quantity of imports is explained by the high import dependence of the Ghanaian economy, making imports more of necessities for the economy, and hence not significantly influenced

[32]One asterisk (*) indicates 5 percent level of significance; two asterisks (**) indicate 10 percent level of significance.

by the rate of change in prices.

The estimated coefficients -0.032, 2.316, and 0.69 for the logs of real effective exchange rate, real gross domestic product, and available foreign exchange in previous period, respectively, indicate that 1 percent separate increases in the rates of change of real effective exchange rate, real gross domestic product, and available foreign exchange, would lead to 0.032 percent decrease, 2.316 percent increase, and 0.69 percent increase, in the rate of change in imports, respectively, in the short run. The results show that quantity of imports is economic growth elastic and again portray the import dependence of the Ghanaian economy.

With the highly inelastic exchange rate elasticity of quantity of imports demanded (i. e. -0.032), and the insignificant relationship between import price and quantity of imports, the responsiveness of quantity of imports to changes in import price and real effective exchange rate is very very small. However, the value of imports, especially the domestic value, is influenced immensely by these variables.

The negative coefficient for the lagged imports indicates a normal stock built up from previous imports, which tends to diminish the demand for imports in current period. Even though the coefficient is not significant, it is a true manifestation of a typical behaviour of Ghanaian importers, where imports are normally kept at the ports for a considerable length of time pending customs clearance.

The negative and significant coefficient of the time trend shows that growth in quantity of imports has been declining with time. This again is true of the Ghanaian economy for the greater part of the period covered in the study (See Chapters 1, 4, and 5.)

7.3.8 Demand for Money

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$\log DRBMS_t$	Constant		+9.258	+2.459*
	$\log ERINF_t$	−	−0.288	−7.164*
	$\log RGDP_t$	+	+0.446	+2.309*
	$\log RGDP_{t-1}$	−	−1.160	−1.026
	$\log DRBMS_{t-1}$	+	+0.939	+17.417*
$R^2 = 0.9632$	$Adj.R^2 = 0.9527$	$F = 91.663$	$Dh = 0.069$	

Regarding the demand for money equation, first, all the estimated coefficients bear the expected signs. Second, all the coefficients are significant at the 5 percent level except for that of the lagged real gross domestic product which is not significant.[33] Demand for money is negatively related to the expected rate of inflation, and lagged real gross domestic product, but positively related to the real gross domestic product and lagged demand for real cash balances.

The coefficients −0.288 and 0.446 for the logs of the expected rate of inflation, and real gross domestic product, indicate that 1 percent separate increases in the expected rate of inflation and real gross domestic product would decrease demand for real cash balances by 0.288 percent, and increase it by 0.446 percent, respectively, in the short run.

The coefficient 0.939 for the lagged demand for real cash balances suggests an adjustment coefficient of 0.061 (i. e. 1 − 0.939). The long run expected inflation and income elasticities of demand for real cash balances are −4.72 (i. e. −0.288/0.061), and 7.31 (i. e. 0.446/0.061). This shows that demand for real cash balances is expected inflation and income inelastic in the short run but expected inflation and income

[33]One asterisk (*) indicates 5 percent level of significance; two asterisks (**) indicate 10 percent level of significance.

elastic in the long run. With a very weak financial market, and negative real interest on the limited financial assets, the tendency is for Ghanaians to hold a greater portion of their financial assets as cash, rather than investing in other financial assets. Hence the high long run elasticity is not surprising.

7.3.9 Internal Credit

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$\log INTCRED_t$	Constant		-0.059	-0.158
	$\log NGDP_t$	$+$	$+0.760$	$+16.529$*
	$\log LENDR_t$	$-$	$+0.292$	$+1.888$**
	$\log CBRESRA_t$	$-$	$+0.093$	$+0.704$
	$\log ECINTRD_t$	$+$	$+0.118$	$+1.802$**
	$\log GOVNFOP_t$	$+$	$+0.177$	$+0.663$
$R^2 = 0.9952$	$Adj.R^2 = 0.9933$	$F = 535.71$	$DW = 1.82$	

With respect to the internal credit equation, all the coefficients are of the expected signs, except for the nominal lending rate and the commercial bank reserve ratio. As expected, nominal gross domestic product, expected change in international reserves, and government net fiscal operation are all positively related to internal credit. Unexpectedly, however, the nominal lending rate and the commercial bank reserve ratio are positively related to internal credit. However, only the nominal lending rate is significant at the 10 percent level.

The positive relationship between nominal lending rate and internal credit may be explained by the fact that under a high rate of inflation, where real interest rate is negative, borrowers gain at the expense of creditors, and thus interest rate is not a deterrent to credit. This is a common occurrence in Ghana (Refer to earlier Tables on Selected Economic Indicators), and hence the positive relationship. The positive

coefficient of the commercial bank reserve ratio implies an excess liquidity in the banking system as a result of the imposition of credit ceilings.

Regarding the significance of the estimated coefficients, the coefficient for the nominal gross domestic product is significant at the 5 percent level while nominal lending rate and the expected change in international reserves are significant at the 10 percent level.[34] The commercial bank reserve ratio and government net fiscal operation are not significant in influencing internal credit. Even though government net fiscal operation has a positive influence on internal credit, it is not significant, testifying to the relatively tight fiscal situation in Ghana since the early 1980s. The insignificant commercial bank reserve ratio again points to excess liquidity in the banking system.

The significant coefficients 0.760, 0.292 and 0.118 for the logs of nominal gross domestic product, nominal lending rate, and the expected change in international reserves, indicate that 1 percent separate increases in nominal gross domestic product, nominal lending rate, and the expected change in international reserves, would result in 0.76, 0.292, and 0.118 percent increases in the internal credit, respectively. Economic growth is the most significant variable that explains internal credit, and is the relatively most elastic of all the variables.

[34]One asterisk (*) indicates 5 percent level of significance; two asterisks (**) indicate 10 percent level of significance.

7.3.10 Aggregate Supply

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$\log RGDPS_t$	Constant		+1.643	+1.008
	$\log RGDFXKF_t$	+	+0.076	+1.719**
	$\log ELABF_t$	+	+0.610	+3.334*
	$\log RVCIMPD_t$	+	+0.301	+6.452*
	$WEADUMY$	+	+0.1638	+2.694*
	$\log RGDPS_{t-1}$	+	+0.05	+0.351
$R^2 = 0.8751$	$Adj.R^2 = 0.8270$	$F = 18.211$	$Dh = 1.43$	

In the aggregate supply equation, all the estimated coefficients are of the expected signs. Real gross domestic fixed capital formation, employed labour force, the value of capital and intermediate imports, weather condition, and lagged aggregate supply are all positively related to current aggregate supply.

Regarding the significance of the coefficients, the coefficients for the rates of change in the employed labour force, the value of capital and intermediate imports, and the weather condition, are all significant at the 5 percent level, and the rate of change in gross domestic fixed capital formation significant at the 10 percent level.[35] The rate of change in the lagged aggregate supply is not significant.

The estimated coefficients 0.076, 0.610, and 0.301 for the rates of change in gross domestic fixed capital formation, employed labour force, and the value of capital and intermediate imports indicate that 1 percent separate increases in fixed capital formation, employed labour force, and the value of capital and intermediate imports, would result in short run increases of 0.076 percent, 0.610 percent, and 0.301 percent in the aggregate supply, respectively. These indicate inelastic output response to changes

[35]One asterisk (*) indicates 5 percent level of significance; two asterisks (**) indicate 10 percent level of significance.

in these variables. The coefficient of 0.05 for the lagged aggregate supply indicates an adjustment coefficient of 0.95, $(1 - 0.05)$. With the adjustment coefficient close to unity, the long run elasticities do not vary much from the short run elasticities, and are all less than unity. The long run elasticities are 0.08 for fixed capital formation, 0.642 for employed labour force, and 0.317 for the value of capital and intermediate imports.

The results seem to support the observation that output in many developing economies is highly dependent on imports. Second, that employed labour force and good weather improve output significantly. These observations are not surprising given the nature of the output mix, i. e. agricultural and mining products. The signs of the coefficients of the gross domestic fixed capital formation and the value of capital and intermdiate imports, suggest that foreign and domestic factors of production are complements rather than substitutes.

7.3.11 Inflation

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$\triangle \log GHCPI_t$	Constant		+0.026	+0.376
	$\triangle \log PCSTAP_t$	−	−0.249	−2.256*
	$\triangle \log RGDP_t$	+	+0.073	+1.728**
	$\triangle \log WPOIL_t$	+	+0.716	+2.302*
	$\triangle \log GWEXCR_t$	+	+0.101	+1.989*
	$\triangle \log BMS_t$	+	+0.184	+1.003
	$\triangle \log EGHCPI_t$	+	+0.247	+1.731**
$R^2 = 0.8683$	$Adj.R^2 = 0.8024$	$F = 13.182$	$DW = 1.89$	

In the inflation equation, all the coefficients are of the expected signs. Rates of growth in real gross domestic product, world price of oil, the weighted average of

Ghana's exchange rate, broad money supply, and the expected consumer price index, are all positively related to the rate of change in the consumer price index. The rate of change in the per capita output of staple crops, is negatively related to the rate of change in the consumer price index.

The coefficients for the growth rate of per capita staple food production, world price of oil, and the weighted average of the exchange rate are all significant at the 5 percent level. The rate of growth in real gross domestic product and the expected consumer price index are significant at the 10 percent level.[36] The coefficient for broad money supply is not significant.

The estimated coefficients suggests that 1 percent separate increases in the growth rates of real gross domestic product, world price of oil, the weighted average of the exchange rate, and the expected consumer price index, would lead to 0.073 percent, 0.716 percent, 0.101, and 0.247 percent increases in the inflation rate, respectively. Also, a 1 percent increase in the rate of growth in the per capita output of staple food, would lead to a 0.249 percent decrease in the inflation rate.

The results underscore the fact that large swings in the inflation rate in Ghana are influenced by supply shocks like food production, as well as domestic and external cost-push factors, like world price of oil and the exchange rate. It also shows that expectations influence price movements considerably. The results, however, do not provide strong support for the monetarist thesis of monetary expansion exerting a strong influence on inflation. This observation supports the very low estimate (i. e. 0.18) and insignificant coefficient for the influence of money growth on inflation for a cross-section of African countries, including Ghana, in London's study (London, 1989). Amoako - Adu (1991) also gave evidence to support low estimates for the coefficient of monetary expansion in inflation equations for Ghana.

[36]One asterisk (*) indicates 5 percent level of significance; two asterisks (**) indicate 10 percent level of significance.

7.3.12 Wage Rate

Dep. Var.	Indep. Var.	Expect. Sign	Est. Coeff.	t-Value
$\log NWAGE_t$	Constant		+2.414	+0.832
	$\log UNLABF_t$	−	−0.493	−0.898
	$\log GHCPI_t$	+	+0.384	+2.363*
	$\log NWAGE_{t-1}$	+	+0.645	+4.670*
$R^2 = 0.9872$	$Adj.R^2 = 0.9846$	$F = 385.4$	$Dh = 0.29$	

All the signs for the coefficients in the wage equation are expected. Lagged consumer price index and lagged nominal wage rate are all positively related to current nominal wage rate, while unemployed labour force is negatively related to the nominal wage rate.

In terms of the significance, the coefficients for the lagged consumer price index and the lagged nominal wage rate are significant at the 5 percent level.[37] The coefficient for the unemployed labour force is not significant.

The estimated coefficients indicate that 1 percent separate increases in the rates of growth of lagged consumer price index and lagged nominal wage, would cause 0.384 percent, and 0.645 percent increases in the rate of growth of the current wage rate, respectively. The results imply that percentage changes in nominal wage rate do not make up for percentage changes in the general consumer price index, hence eroding the purchasing power of earners.

[37]One asterisk (*) indicates 5 percent level of significance; two asterisks (**) indicate 10 percent level of significance.

7.3.13 Summary of Results

The results portray some of the characteristics of a typical less developed country and give much support to the structuralist view of LDC economies. First, they show that most Ghanaians are income constrained, that the marginal propensity to consume in Ghana is high and that consumption in Ghana is not greatly influenced by the real lending rate. Second, that imports and foreign exchange are major constraints to investment in Ghana. Third, that Ghana relies heavily on cocoa export duty and income tax as the main source of tax revenue. Fourth, that government current expenditure in Ghana is very much a function of total revenue while capital expenditure relies heavily on foreign capital and responds to a devaluation of the domestic currency. Fifth, that even though export supply has positive relationships with the price of exports and the income of Ghana's trading partners, and even though Ghana can be considered a small country in terms of cocoa production, it is not significantly influenced by them. That export supply is both price and income inelastic. However, export supply is influenced by the domestic producer price of exports. The consequence is that an increased supply of exports tends to result in lower world prices of exports because a number of cocoa producers throughout the world are expanding output simultaneously. This is the fallacy of composition, i. e. an approach which might work for one country might not necessarily work when a number of countries adopt similar approaches. The dependence of the export sector on imports is also observed.

On the import side, again the results support the structuralists view that imports in LDCs are basically necessities, and are not influenced to a great extent by import dollar prices. However they are influenced by the real effective exchange rate, available foreign exchange and the output of the economy. Sixth, like many LDCs, the financial system is quite underdeveloped in Ghana, and this renders monetary policy relatively

ineffective. Seventh, output is influenced to a very great extent by the value of capital and intermediate imports, gross domestic fixed capital formation, labour and other supply shocks like bad weather. The relationship between imports, investment and output shows that foreign and domestic factors of production do not substitute for one another but complement each other. Eight, inflation in Ghana is determined mainly by domestic and external structural factors like per capita food production, world price of oil, and the exchange rate; and demand pull factors like gross domestic product. Broad money supply does not, however, have a significant influence on inflation. Lastly, that the wage rate is determined mainly by lagged wage rate and the level of inflation. However, changes in the wage rate lag behind the rate of inflation in that only about 38 percent of the inflation rate is covered by the wage rate.

Chapter 8

Simulation Results and Analysis

8.1 Introduction

The purpose of this chapter is to use the estimates of the individual behavioural equations determined in chapter 7 to examine the statistical and economic properties of the entire model. The first part of the chapter looks at the model's ability in tracking the historical behaviour of the endogenous variables. The second part evaluates the impacts of changes in policy variables on key macroeconomic variables in the model.

8.2 Theoretical Review of Simulation Models

The statistical properties of the simultaneously determined individual behavioural equations show that most of the explanatory variables significantly influence the dependent variables. However, these properties do not give any indication of the ability of the model in tracking the historical behaviour of endogenous variables. Even if all the individual equations in a model fit the data well, and the structural coefficients are statistically significant, a simulation of the model might not track the data

series closely. It is also true that some might track the original data series closely, others might not. It therefore becomes important to examine how well the system of equations tracks the historical behaviour of the endogenous variables and reflects economic reality.

In order to examine this property, the model is put through a simulation, which is the most commonly used procedure for model validation. The simulation procedure basically consists of two steps. In the first step, the full set of equations including the identities are solved simultaneously to determine the structural coefficients of the behavioural equations. In the second step, the structural coefficients determined in the first step are used to estimate the endogenous variables and the values compared to the corresponding historical values over the simulation period.

The simulation process is explained mathematically below. The simultaneous equation system can be written in matrix form as follows (Theil, 1971):

$$AY_t = B^*X_t + U_t$$

Y_t is a matrix of the endogenous variables.

X_t is a matrix of predetermined variables.

U_t is a matrix of residuals.

Partitioning the predetermined variables into lagged dependent variables, and other predetermined variables, the above expression is written as follows:

$$AY_t = BX_t + CY_{t-1} + U_t$$

Solving the simultaneous equation system above for the endogenous variables, we have the following:

$$Y_t = A^{-1}BX_t + A^{-1}CY_{t-1} + A^{-1}U_t$$

or,

$$Y_t = \Pi_1 X_t + \Pi_2 Y_{t-1} + V_t$$

The last expression is the reduced form of the structural model. The reduced form expresses the solution of each endogenous variable in terms of the predetermined variable and the residuals at any given point in time.

Two types of simulation may be performed:

- Ex post or Historical Simulation.
- Forecasting.

In the ex post or historical simulation, the simulation is within the period for which the sample is collected. The simulation begins in the first year and runs forward. Historical values for the first year are supplied as initial values for both the endogenous and exogenous variables. After the first year, the values of the endogenous variables are determined by the simulation solution.

A comparison of the simulated values to the corresponding observed values for all the endogenous variables is viewed as a test of the model's 'Goodness of Fit', and the

validation of the model. Furthermore, the comparison can isolate problem areas of the model for an improvement in the model's specification.

Ex post or historical simulation is used for policy analysis either by changing the value of the coefficients or the values of exogenous variables and examining the economic impact of the change.

In forecasting, the simulation is beyond the estimation period. Before the forecast, predictions and assumptions would have to be made about the future to generate alternative solutions. The major problem with this is that one must have time series data for all exogenous variables for the entire forecast period.

8.3 Model Simulation

In this study, using the parameter estimates of the structural equations, two sets of ex post simulations are performed with the complete model (including the identities). In the first set, ex post simulation is carried out with the original (observed) data set without any changes. In the second set, various simulation experiments are carried out by changing the macroeconomic and trade variables in the model in an attempt to evaluate the impact of alternative economic policies.

8.3.1 First Simulation Results

Graphical comparisons of the observed and simulated values of endogenous variables over time, and three quantitative measures, the root mean square error (RMSE), the root mean square percent error (RMSPE), and the Theil index (U), are used to evaluate the 'Goodness of Fit' of the model. The results of the first simulation are presented below.

Graphical Illustrations of First Simulation Results

The graphical results of the simulation process are shown in Figures 8.1 to 8.20.[38] The graphs illustrate the comparison of the observed values (in bold lines), to the simulated values (in broken lines), for some of the endogenous variables. The graphs show that the model is able to track the historical movements of the endogenous variables quite well over the sample period. Also, the turning points are pretty well identified.

Quantitative Measures of Goodness of Fit of First Simulation Results

Apart from the graphical evaluation of the goodness of fit, there are quantitative statistical indicators that measure how closely simulated variables track their corresponding observed values. Three quantitative indicators are commonly used in such analysis. These are root mean square error (RMSE), root mean square percent error (RMSPE), and Theil inequality coefficient (U). The three statistical indicators are mathematically defined as follows (Pindyck and Rubinfield, 1991):

$$RMSE = \sqrt{\frac{1}{T}\sum_{t=1}^{T}(Y_t^s - Y_t^a)^2}$$

$$RMSPE = \sqrt{\frac{1}{T}\sum_{t=1}^{T}(\frac{Y_t^s - Y_t^a}{Y_t^a})^2}$$

[38]Only some selected graphs are presented for illustration.

$$U = \frac{\sqrt{\frac{1}{T}\sum_{t=1}^{T}(Y_t^s - Y_t^a)^2}}{\sqrt{\frac{1}{T}\sum_{t=1}^{T}(Y_t^s)^2} + \sqrt{\frac{1}{T}\sum_{t=1}^{T}(Y_t^a)^2}}$$

Y_t^s is the simulated (predicted) value of the variable Y.

Y_t^a is the observed (actual) value of the variable Y.

T is the number of periods in the simulation.

The root mean square error statistically measures the deviation of the estimated variable from the actual time path. A desirable indication is to have a root mean square error close to zero. The major problem with the root mean square error statistic is that the magnitude of the error depends on the units of the variable, and second, it can only be evaluated by comparing it to the size of the actual variable. Hence the use of the root mean square percent error statistic. A desirable statistic is to have a root mean square percent error close to zero. The Theil inequality coefficient is a modified statistic of the root mean square error where the root mean square error statistic is constrained between '0' and '1' because of the denominator. A desirable statistic is to have the Theil inequality coefficient close to zero.

Table 8.1 gives the root mean square errors, the root mean square percent errors, and the Theil inequality coefficients, for the endogenous variables and some selected macroeconomic variables. The measures do support the observation that the model tracks the historical series quite closely. The root mean square errors for the endogenous variables determined in the log form are all very small, ranging from 0.0285 to 0.247. The root mean square errors for the endogenous variables estimated in actual values are high, ranging from 17.4187 to 1243.3, because of the units of measurements.

Figure 8.1: Simulated Versus Observed Values: Log of Real Private Consumption, Real Private Investment, Log of Nominal Tax Revenue, Log of Gov't Current Expenditure

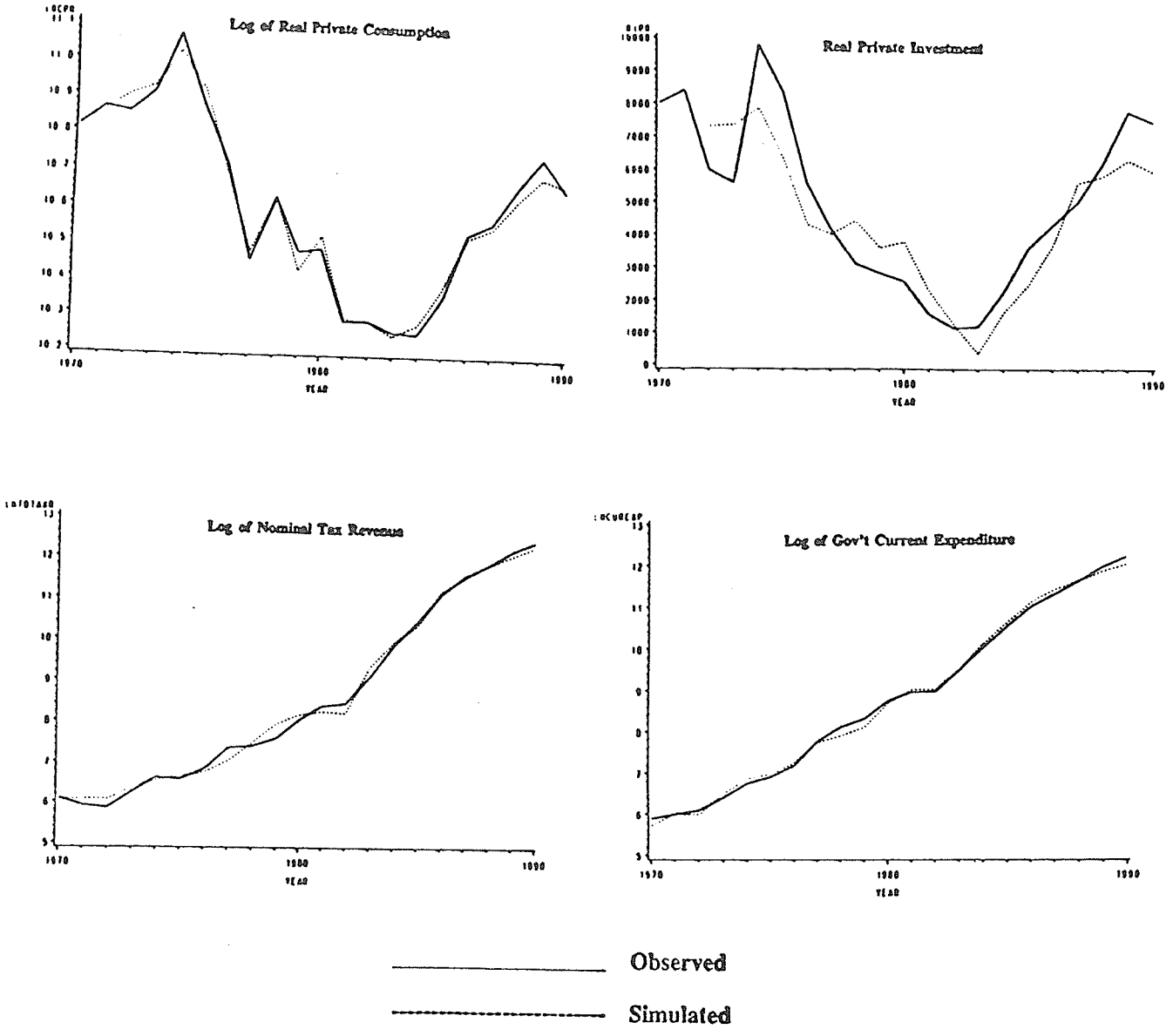


Table 8.1: Quantitative Measures of Goodness of Fit

Variable	RMSE	RMSPE	U
$\log RCPR$	0.0285	0.29	0.0012
$RIPR$	1169.5	30.45	0.0035
$\log NTOTAXR$	0.196	2.44	0.11116
$\log NCUREXP$	0.076	1.11	0.004
$\log NCAPEXP$	0.247	3.85	0.0165
$\log QEXP$	0.100	1.39	0.007
$\log QIMP$	0.162	2.39	0.0122
$\log DRBMS$	0.119	1.30	0.0067
$\log INTCRED$	0.162	2.14	0.00858
$\log RGDPS$	0.102	0.94	0.0046
$\triangle \log GHCPI$	0.085	11.2	0.1098
$\log NWAGE$	0.171	3.75	0.028
$RGDP$	2167.83	3.8	0.0152
$RGDFXKF$	1243.3	20.7	0.07698
$RINF$	17.4187	9.8	0.0676

The root mean square percent error and the Theil inequality coefficients give a better indication of the 'Goodness of Fit'. The values for RMSPE range from 0.29 percent for the log of real private consumption to 30.45 percent for real private investment. Values for the Theil inequality coefficient range from 0.0012 for the log of private consumption to 0.1098 for the change in the log of the general consumer price index. The relatively low Theil inequality coefficient for private private investment gives some credibility to the private investment estimation relative to its RMSPE. These measures again point to the model's ability to track the historical values of the endogenous variables.

Figure 8.2: Simulated Versus Observed Values: Log of Gov't Capital Expenditure, Log of Quantity of Exports, Log of Quantity of Imports, Log of Demand for Money

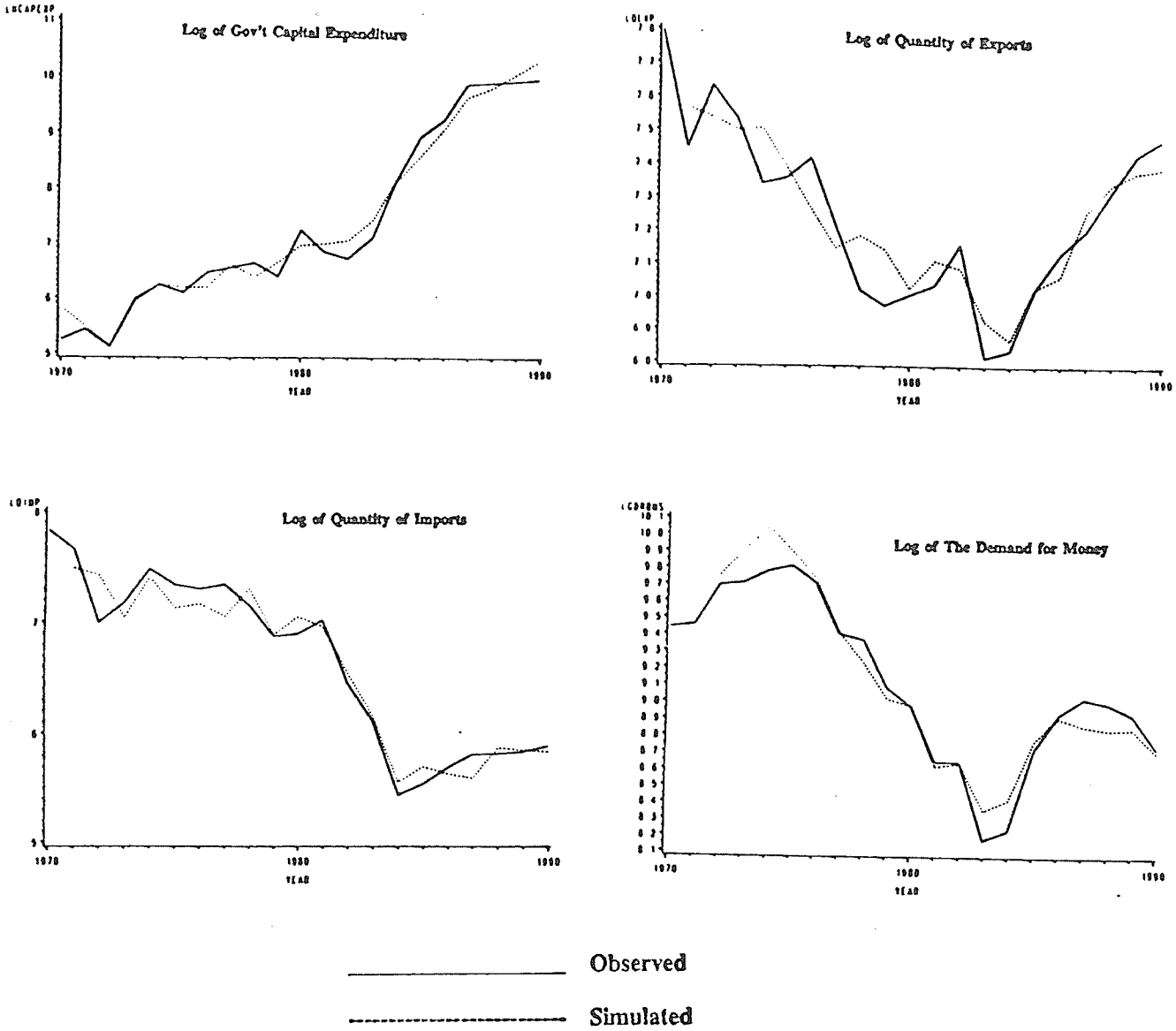


Figure 8.3: Simulated Versus Observed Values: Log of Internal Credit, Log of Real Aggregate Supply, Change in the Log of General Consumer Price Index, Log of Nominal Wage Rate

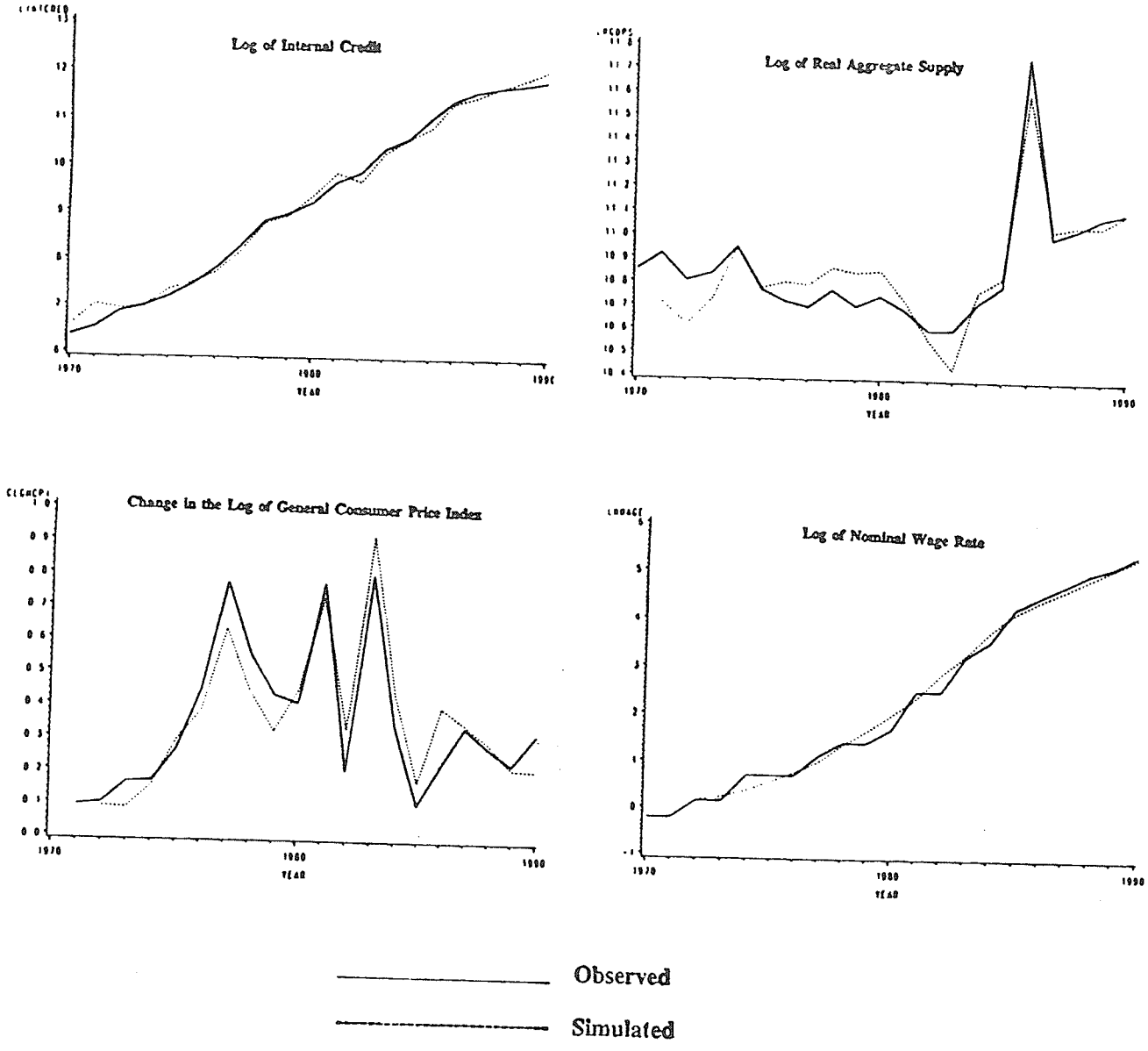


Figure 8.4: Simulated Versus Observed Values: Real Gross Domestic Product, Real Gross Domestic Fixed Capital Formation, Rate of Inflation, Aggregate Supply

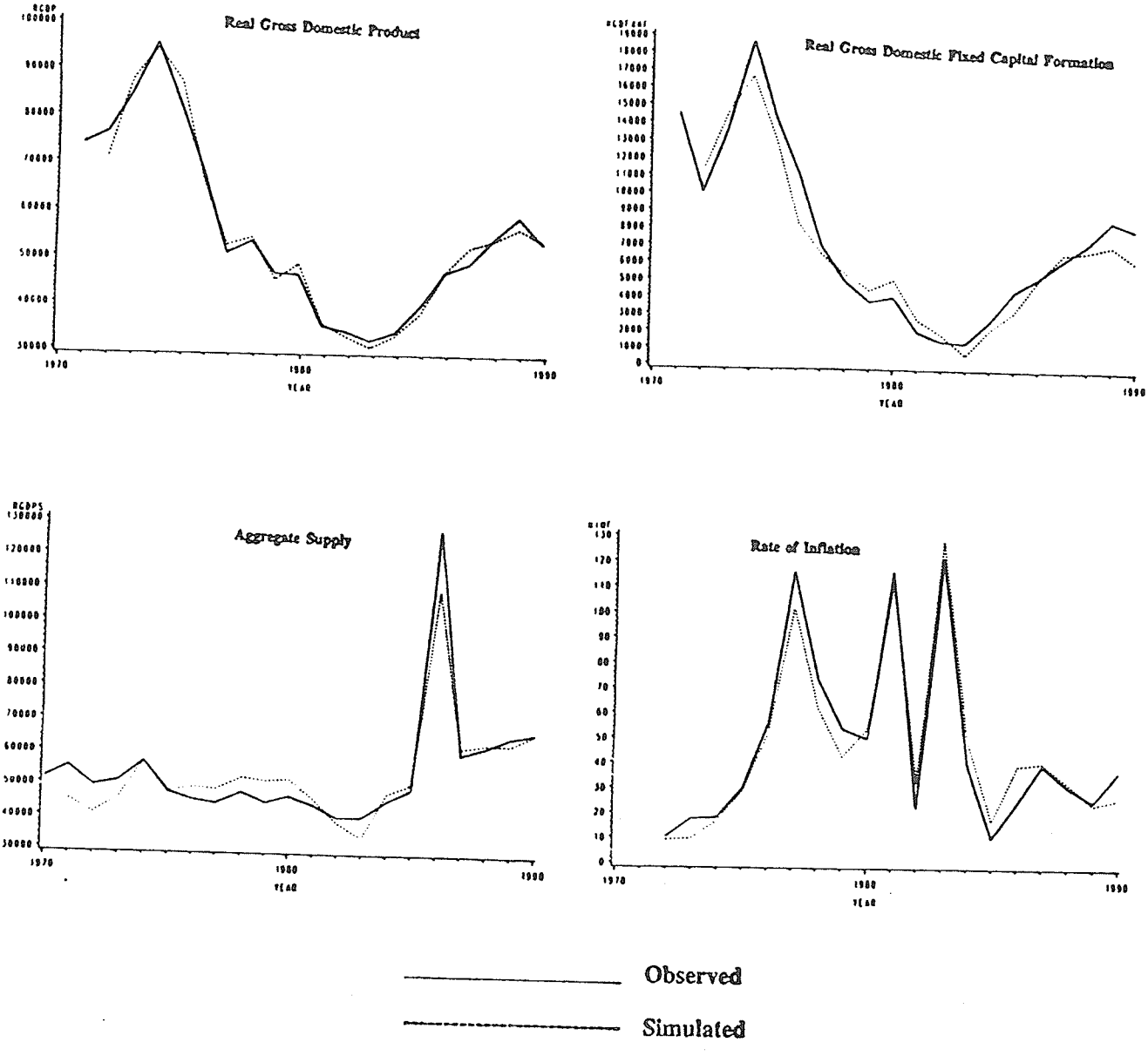
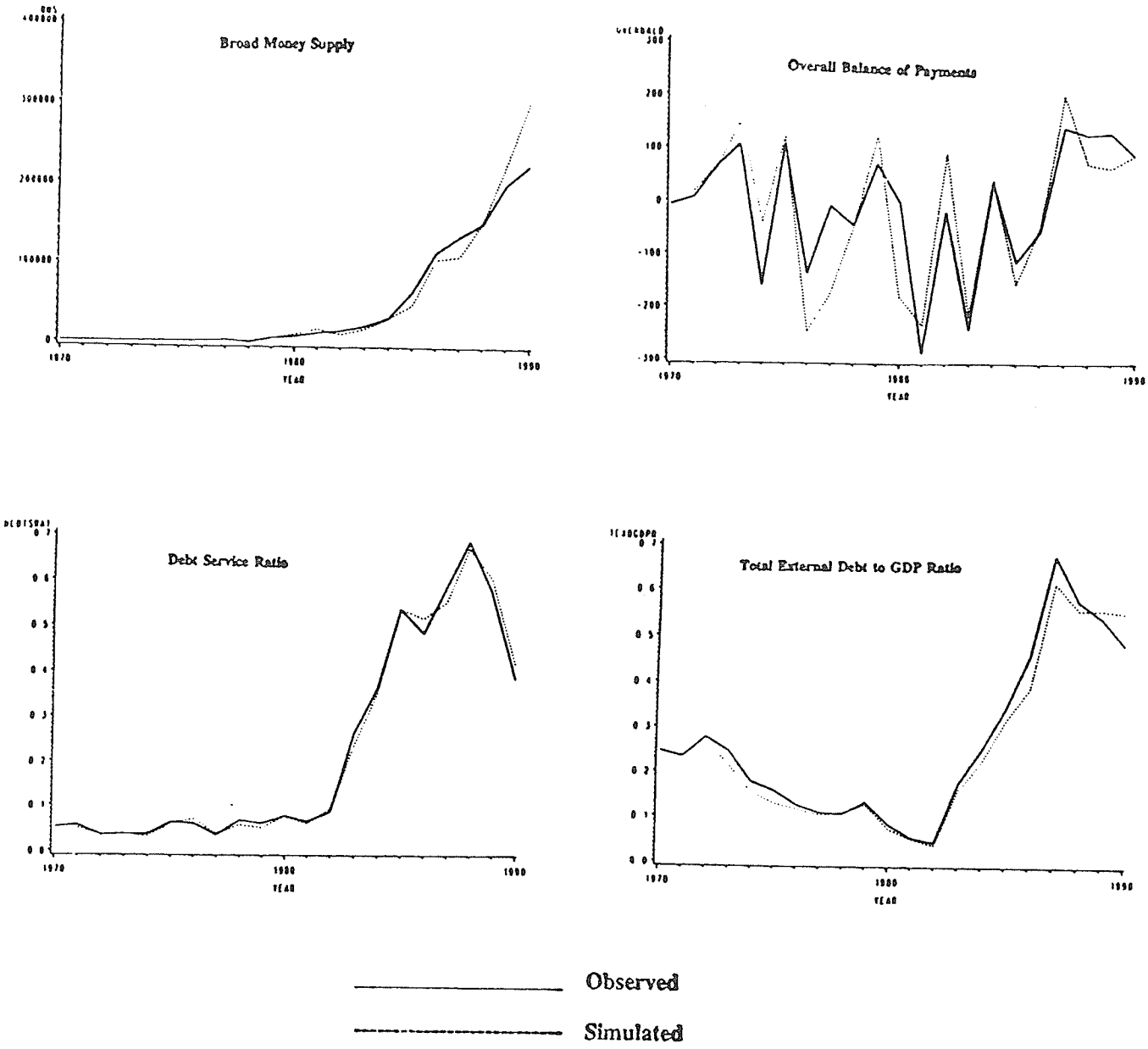


Figure 8.5: Simulated Versus Observed Values: Broad Money Supply, Overall Balance of Payments, Debt-Service Ratio, Total External Debt to GDP Ratio



One advantage of the Theil's inequality coefficient is that the simulation error can be decomposed into its characteristic sources of error. The characteristic sources are the bias proportion, the variance proportion, and the covariance proportion. The mathematical specifications of the various proportions are given as follows (Pindyck and Rubinfield, 1991):

$$U^m = \frac{(\overline{Y}^s - \overline{Y}^a)^2}{\frac{1}{T}\sum_{t=1}^{T}(Y_t^s - Y_t^a)^2}$$

$$U^s = \frac{(\sigma_s - \sigma_a)^2}{\frac{1}{T}\sum_{t=1}^{T}(Y_t^s - Y_t^a)^2}$$

$$U^c = \frac{2(1-\rho)\sigma_s\sigma_a}{\frac{1}{T}\sum_{t=1}^{T}(Y_t^s - Y_t^2)^2}$$

$$\rho = \frac{1}{\sigma_s\sigma_a T}\sum_{t=1}^{T}(Y_t^s - \overline{Y}^s)(Y_t^a - \overline{Y}^a)$$

U^m is the bias proportion.

U^s is the variance proportion.

U^c is the covariance proportion.

The sum of the various proportions is equal to 1.

The bias proportion measures the extent to which the average values of the simulation and the actual values deviate from each other, and it is an indication of the systematic error in the model. A desirable value of the bias proportion must be close to zero. A large value, i.e. over 0.2, indicates the presence of a systematic bias.

The variance proportion is an indication of the model's ability to replicate the degree of variability in the variable. If the variance proportion is large, it means one of the series, i.e. either the simulated or the actual series, shows some fluctuations while the other does not.

The covariance proportion measures the unsystematic error. It represents the remaining error after the two previous errors have been accounted for. For an ideal situation, both the bias and variance proportions must be close to zero, and the covariance proportion close to one. The values for the various proportional errors are given in Table 8.2

From Table 8.2, the decomposition of the simulation error into the various sources does not indicate any serious systematic bias of variance bias within the model, which again validates the model's ability to track the historical values of endogenous variables.

8.3.2 Second Simulation

The second simulation involves changes in key macroeconomic variables and evaluating the impacts of alternative policies. The policy simulation scenarios are:

- Scenario I. A 10 percent decrease in planned fiscal deficit throughout the simulation period.
- Scenario II. A 10 percent increase in the level of capital inflow throughout the simulation period.

Table 8.2: Proportional Breakdown of Simulation Error

Variable	U^m	U^s	U^c
$\log RCPR$	0.025	0.019	0.9564
$RIPR$	0.092	0.11	0.813
$\log NTOTAXR$	0.000218	0.00166	0.99616
$\log NCUREXP$	0.0186	0.0338	0.9476
$\log NCAPEXP$	0.0225	0.061	0.9165
$\log QEXP$	0.0016	0.113	0.8854
$\log QIMP$	0.169	0.1287	0.7023
$\log DRBMS$	0.017	0.108	0.8750
$\log INTCRED$	0.042	0.102	0.8560
$\log RGDPS$	0.0.0095	0.0054	0.9851
$\triangle \log GHCPI$	0.023	0.020	0.9578
$\log NWAGE$	0.026	0.0041	0.9699
$RGDP$	0.180	0.0342	0.7858
$RGDFXKF$	0.03670	0.022	0.9413
$RINF$	0.008650	0.069	0.92235

- Scenario III. A 10 percent reduction in internal credit.
- Scenario IV. A 20 percent devaluation of domestic currency.
- Scenario V. A 10 percent external terms of trade deterioration.
- Scenario VI. All of scenarios I - V working simultaneously.

The first policy simulation is regarded as an expenditure reducing policy or a tight fiscal policy, which is in line with the typical austerity measures proposed by the IMF. The second policy is regarded as adjustment assistance and/or a debt relief policy resulting in an increase in capital inflow. This is in light of the critique that debt servicing, capital flight, and lack of foreign investment, are major constraints in developing economies. The third and fourth scenarios represent a tight monetary policy, and an exchange rate policy respectively. Again this is in line with an IMF recommendation for developing countries undergoing stabilization and/or structural adjustment. The fifth scenario represents a common problem with external trade in the LDCs. The sixth scenario represents a policy mix situation where there is capital inflow alongside tight fiscal and monetary policies, and a devaluation.

Even though various endogenous variables are affected by the policy changes, only the results of the impact on consumption, investment, exports, imports, international reserves, real output, and rate of inflation are presented. The results which measure the mean percentage deviation of the simulated values from the base run values, are presented in Table 8.3.

The first scenario of a 10 percent decrease in planned fiscal deficit leads to a 2.6 percent decline in consumption, 3.2 percent decline in gross domestic fixed capital formation, 2.3 percent reduction in exports, 2.9 percent reduction in imports, 1.1 percent reduction in real income, 1.24 percent reduction in real output, and 2.7 percent reduction in the rate of inflation. The level of international reserves increases

Table 8.3: Results of Policy Simulation Experiments

Endogenous Variable	Policy Simulation Scenario					
	I	II	III	IV	V	VI
Consumption	−2.60	+4.30	−0.30	−0.59	−0.17	+0.65
Investment	−3.20	+5.97	−1.20	+0.25	−0.68	+1.09
Exports	−2.30	+6.99	−1.30	+2.88	−2.36	+4.09
Imports	−2.90	+5.57	−1.5	−0.245	−0.71	+0.23
Int. Reserves	+0.56	+1.53	+0.23	+0.44	−1.22	+1.68
Real Income	−1.10	+4.01	−0.40	−0.08	−2.36	+0.07
Output	−1.24	+4.50	−0.50	−0.09	−2.59	+0.90
Inflation	−2.70	+3.50	+0.80	+17.10	+1.60	+19.1

by 0.56 percent primarily because of the greater reduction in imports relative to the exports. Inflation decreases by a small amount mainly because of the reduction in aggregate demand. This suggests that there is an unfavourable trade off between improving the fiscal balance and the level of economic activity.

Under the second scenario of a 10 percent increase in capital flows, consumption increases by 4.3 percent, gross domestic fixed capital formation increases by 5.97 percent, exports increase by 6.99 percent, imports increase by 5.57 percent, international reserves increaase by 1.53 percent, real income increases by 4.01 percent, output increases by 4.5 percent, and inflation increases by 3.5 percent.

The increase in inflation is primarily because of the increase in aggregate expenditure. This validates the argument that an increase in capital inflow is very crucial for most developing countries in terms of economic activity but the price to pay is higher rates of inflation. This also gives credibility to the observation that huge capital inflows are responsible for the stability in the Ghanaian economy during the ERP. However, there was always an upward pressure on inflation.

Under the third scenario, a 10 percent reduction in internal credit, and hence money supply, leads to a 0.3 percent decline in consumption, 1.2 percent decline in gross domestic fixed capital formation, 1.3 percent decline in exports, 1.5 percent decline in imports, 0.4 percent decline in real income, and a 0.5 percent decline in output. The level of international reserves increases by 0.23 percent primarily because of the greater reduction in imports relative to exports, and inflation increases moderately by 0.8 percent because output is falling. The decline in consumption is basically because of the decrease in income. This suggests that whereas a tight monetary policy leads to a reduction in output, it is unable to control inflation, and results in a stagflationary effect.

The fourth scenario of a 20 percent devaluation of domestic currency results in a 0.59 percent decline in consumption, 0.245 percent decline in imports, 0.08 percent reduction in real income, 0.09 percent decline in output, 0.25 percent increase in gross domestic fixed capital formation, 2.88 percent increase in exports, 0.44 percent increase in international reserves, and 17.1 percent increase in inflation. The increase in gross domestic fixed capital formation points to the tendency of Ghanaian investors to rely on external funding for investment, as a result of which devaluation increases the domestic value of foreign investment. Despite the increase in gross domestic fixed capital formation, and net exports, real income decreases because of the predominance of the negative impact on consumption and the increase in the rate of inflation.

Under the fifth scenario, a 10 percent external terms of trade deterioration results in a 0.17 percent decrease in consumption, 0.68 percent reduction in investment, 2.36 percent reduction in exports, 0.71 percent reduction in imports, 1.22 percent reduction in international reserves, 2.4 percent reduction in real income, 2.59 percent reduction in output, and 1.6 percent increase in the rate of inflation. The reduction in consumption and investment is basically because of the low income and output, and the constraint on imports. The increase in the rate of inflation is mainly due to

impact of lower imports and lower output.

Under the sixth scenario, the combination of all the various policy changes results in a 0.65 percent increase in consumption, 1.09 percent increase in gross domestic fixed capital formation, 4.09 percent increase in exports, 0.23 percent increase in imports, 1.68 percent increase in international reserves, 0.07 percent in real income, 0.9 percent increase in output, and 19.1 percent increase in inflation. The results indicate the dominance of the increase in capital inflow over the rest of the policy changes since the direction of the changes are identical to those under the second scenario. However, in the case of inflation, the impact of devaluation dominates. The results seem to suggest that massive capital inflow is the major reason for the stability and growth in Ghana during the ERP. Consistently, a relatively lower foreign capital inflow and the impact of terms of trade deterioration account for the problems in the ERP during the later part of the 1980s and the early 1990s. An increase in the cost of living is the trade off for the policy mix.

Chapter 9

Summary, Conclusion and Recommendations

Following a period of relative stability after independence in 1957, the Ghanaian economy saw a steady deterioration in the early 1970s and bottomed out with an economic crisis in the early 1980s. The severity of the economic crisis coupled with the lack of resources for any economic program forced the Government of the Provisional National Defence Council (PNDC), to launch an Economic Recovery Program (ERP), with financial support from the International Monetary Fund (IMF), the International Bank for Reconstruction and Development (IBRD) (World Bank), and other International Financial Institutions (IFIs). The ERP basically followed the orthodox stabilization and structural adjustment program recommended by the two sister financial institutions, the Fund and the Bank.

Even though there continue to be some areas of concern with the Ghana program, unlike many other African countries where the track record of the orthodox program has fallen far short of expectations, as the survey of program performance in Chapter2 suggests, Ghana's program has held together and has produced some remarkable

results. As a result, Ghana's model is being proclaimed as "the model" for sub-Saharan African countries facing similar economic problems. Towards the late 1980s and the early 1990s, Ghana's program started showing some structural adjustment fatigue.

On the basis of this, the major purposes of the study have been to develop an analytical framework to evaluate the impact of changes on key macroeconomic variables on the Ghanaian economy, and to use the framework to investigate the reasons for the initial success and the later problems of the Ghana program. The results of the investigation are to provide some policy recommendations for other developing countries and the financial institutions in their quest for economic growth and stability.

The study developed and estimated a simultaneous macroeconometric simulation model that attempted to capture the salient structural characteristics of the Ghanaian economy, and used it to examine the role of demand, supply, fiscal, monetary, foreign exchange, and trade shocks in explaining essential macroeconomic indicators in the Ghanaian economy.

The results of the model indicated that the Ghanaian economy has characteristics that are typical of less developed countries, and they seem to support the structuralists views of LDC economies. The results confirmed the high import dependence of the Ghanaian economy; the importance of foreign exchange to the economy; that the public sector has a role to play in promoting economic growth; that the Ghanaian export sector is highly vulnerable to the fallacy of composition; that the financial system in Ghana is relatively underdeveloped and renders monetary policies ineffective; that high inflation rates are mainly due to structural more than monetary factors; that output in Ghana is very much dependent on foreign exchange, imports and some exogenous variables like weather; and that changes in the nominal wage rate lag behind the rate of inflation.

The validation of the simulation model using graphical illustrations and quantitative measures seemed to give credibility to the model's ability in tracking down the historical movements of the endogenous variables.

The simulation experiments clearly indicated the dominance of increased capital inflows over the rest of policy changes, and the import dependence of the Ghanaian economy. It also indicated that tight monetary and fiscal restraints could result in a stagflationary effect. This shows that the positive impact of the massive foreign capital inflows during the early stages of the ERP negated the recessionary impact of fiscal restraint and tight monetary policies, and resulted in the high economic growth in the initial stages. Upward pressure on inflation persisted mainly because of dominance of structural factors on inflation. Towards the late 1980s and early 1990s, however, reduced foreign capital inflow, and declining export prices, impacted on the economy and resulted in the problems with the ERP.

What the analysis demonstrates, therefore, is that certain structural characteristics of the economy are crucial to understanding both the success of the ERP and its limitations. In particular, reliance on foreign capital continues to dominate the policy environment and the potential for growth. The food sector, touched upon only peripherally in the ERP, plays a crucial role in price stability and, therefore, in the stability of the nominal exchange rate.

In conclusion, the Ghana's case study indicates that solving the economic problems of LDCs requires more than tight monetary policy and fiscal restraint. External financial assistance is crucial for most LDCs to correct their structural deficiencies and be able to alleviate their economic crisis, and to adjust to external shocks. Since the IMF and the World Bank have increasingly become the main sources of external finance for LDCs, and since other sources of funds are conditional upon their approval, the policies of these institutions should emphasize long-term financing, concessional loans, and removing the supply bottlenecks and structural rigidities in the LDCs.

There has been some movement in this direction since the mid-1980's and this is to be welcomed, but much more is needed if IMF/IBRD programs are to yield maximum benefits to the LDC's and if reforms are to be sustainable over the long term.

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