odi

Working Paper

45

911635

MONETARY CONTROL IN GHANA: 1957-1988

Nii Kwaku Sowa

ODI Working Papers available at May 1991

13: Small Farmer Services in India: A Study of Two Blocks in Orissa State
John Howell, 1984, £5.00, ISBN 0 85003 090 0

15: Macroeconomic Stabilisation, Income Distribution and Poverty: a Preliminary Survey
Tony Addison and Lionel Demery, 1985, £6.00, ISBN 0 85003 094 3

16: Land Tenure Issues in Irrigation Planning Design and Management in Sub-Saharan Africa
Mary Tiffen, 1985, £3.00, ISBN 0 85003 096 X

17: Balance of Payments Adjustment and Developing Countries
Tony Killick, 1985, £3.00, ISBN 0 85003 097 8

18: The Third World's Import Needs and Potential: A European Perspective,
Igor Karmiloff, 1986, £6.00, ISBN 0 85003 101 X

20: Colombia, 1970-85. Management and Consequences of Two Large External Shocks
Juan Jose Echavarria, 1987, £5.00, ISBN 0 85003 109 5

21: Trade and Financing Strategies: A Case Study of Malaysia
Mohamed Arif, 1987, £5.00, ISBN 0 85003 108 7

22: Trade and Financing Strategies for Thailand in the 1980s.
Supote Chunanuntathum, 1987, £5.00, ISBN 0 85003 110 9

24: Industrialisation in Sub-Saharan Africa: Country case study: Cameroon
Igor Karmiloff, 1988, £3.00, ISBN 0 85003 112 5

25: Industrialisation in Sub-Saharan Africa: Country case study: Zimbabwe
Roger Riddell, 1988, £3.00, ISBN 0 85003 113 3

26: Industrialisation in Sub-Saharan Africa: Country case study: Zambia
Igor Karmiloff, 1988, £3.00, ISBN 0 85003 114 1

27: European Community Trade Barriers to Tropical Agricultural Products
Michael Davenport, 24, 1988, £4.00, ISBN 0 85003 117 6

28: Trade and Financing Strategies for the New NICS: the Peru Case Study
Jurgen Schuldt L., 1988, £3.00, ISBN 0 85003 118 4

29: The Control of Money Supply in Developing Countries: China, 1949-1988
Anita Santorum, 1989, £3.00, ISBN 0 85003 122 2

30: Monetary Policy Effectiveness in Côte d'Ivoire
Christopher E. Lane, 1990, £3.00, ISBN 0 85003 125 7

31: Economic Development and the Adaptive Economy
Tony Killick, 1990, £3.50, ISBN 0 85003 126 5

32: Principles of policy for the Adaptive Economy
Tony Killick, 1990, £3.50, ISBN 0 85003 127 3

33: Exchange Rates and Structural Adjustment
Tony Killick, 1990, £3.50, ISBN 0 85003 128 1

34: Markets and Governments in Agricultural and Industrial Adjustment
Tony Killick, 1990, £3.50, ISBN 0 85003 129 X

35: Financial Sector Policies in the Adaptive Economy
Tony Killick, 1990, £3.50, ISBN 0 85003 131 1

36: Problems and limitations of adjustment policies
Tony Killick, 1990, £3.50, ISBN 0 85003 132 X

37: Judging Success: Evaluating NGO Income-Generating Projects
Roger Riddell, 1990, £3.50, ISBN 0 85003 133 8

38: ACP Export Diversification: Non-Traditional Exports from Zimbabwe
Roger Riddell, 1990, £3.50, ISBN 0 85003 134 6

39: Monetary Policy in Kenya, 1967-88
Tony Killick and F. M. Mwega, 1990, £3.50, ISBN 0 85003 135 4

40: ACP Export Diversification: Jamaica, Kenya and Ethiopia
Christopher Stevens, 1990, £3.50, ISBN 0 85003 136 2

41: ACP Export Diversification: The Case of Mauritius
Matthew McQueen, 1990, £3.50, ISBN 0 85003 137 0

42: An Econometric Study of Selected Monetary Policy Issues in Kenya
F. M. Mwega, 1990, £3.50, ISBN 0 85003 142 7

43: Differences in Economic Performance between Franc Zone and other sub-Saharan African Countries
Christopher E. Lane and Sheila Page, 1991. £3.50, ISBN 0 85003 148 6

44: Monetary Policy Effectiveness in Indonesia, 1974-1900
Christopher E. Lane, David C. Cole and Betty F. Slade, 1991, £3.50, ISBN 0 85003 150 8

00002834

Overseas Development Institute

MONETARY CONTROL IN GHANA:
1957 - 1988

Nil Kwaku Sowa

May 199

Preface and Acknowledgements

CONTENTS

List of Tables

List of Figures

1.   INTRODUCTION

Ghana, formerly the Gold Coast, is a small country in West Africa with a land area of about 238,537 sq. km. and a population of about 14 million in 1988.   Agriculture contributes over 50% of GDP and employs about 60% of the labour force.   The export of processed and semi-processed cocoa contributes about 70% to the country's foreign exchange earnings and is the most important economic activity.   Other exports include gold (about 20% of exports) and also timber, bauxite and manganese.

In 1957 Ghana became the first sub-Saharan African country to gain independence.   It was hailed as the 'black star' of Africa with a hopeful economic future to be based upon development of its natural and human resource endowments.   However, after over thirty years of independence Ghana has retrogressed from being classified in international circles as a middle-income nation to a low-income nation, with constant price *per capita* GDP in 1988 well below that in 1960.

Among Ghana's woes have been high rates of inflation, a grossly over-valued exchange rate, persistent balance of payments deficits and declining *per capita* income.   Some of these problems were brought about by external factors such as instability of the world price of cocoa; and also internal factors such as political instability and general economic mismanagement.

Large budgetary deficits are usually the attributed cause of the internal problems since heavy government borrowing from the banking sector has expanded the money stock and been inflationary.   Consequently, since the 1970s, the country's money supply has been increasing at a rate of over 40% *p.a.* and the monetary policies pursued up to 1983 were unable to check this trend.   Since 1983, when the Economic Recovery Programme (ERP) was instituted with IMF financing, fiscal discipline has been restored; yet the country's money supply kept increasing at high rates and inflation remained above 20%. The increases in the money supply were no longer due to deficit financing, since the country has registered budget surpluses since 1985, but rather to the inflow of funds from foreign multilateral and bilateral donor agencies and governments.   This paper contrasts the effects of these two monetary regimes on Ghana's economy.

From 1960, when the Bank of Ghana gained full central banking status, the Ghanaian authorities have had the chance to pursue an independent monetary policy.   However, the effectiveness of central bank control of the money supply has been curtailed by factors such as undue interference by governments in the operations of the Bank of Ghana and a low degree of financial intermediation in the country.   This study examines some of the constraints militating against the effective implementation of monetary policies in Ghana.

Section 2 examines the state of the economy in the post-colonial period.   Section 3 describes the history and structure of the financial market in Ghana focusing upon the process of monetisation, the formal and informal sectors and the role of cocoa production and financing in the financial system.   Section 4 presents a model of the money market which discusses the determinants of money stock in Ghana, relates the money stock to

macroeconomic aggregates and presents regression results of the model.   Section 5 discusses monetary policies in Ghana and their effectiveness.   It also highlights some of the difficulties which prevent effective implementation of monetary policies in Ghana. The lessons from the past and the recommendations for future implementation of monetary policies in Ghana are handled in the concluding section.

2. THE STATE OF THE ECONOMY

2.1 Economic Decline, 1960-83

At independence, Ghana was a world leader in the production of cocoa and *per capita* income was at about the same level as that of Mexico or South Korea. The rate of inflation was a mere 1% (this was not surprising as explained later by the kind of monetary policy pursued). However, positive real economic growth was not sustained for long; it was negative between 1964 and 1966 and also from 1975 to the beginning of the Economic Recovery Programme (ERP) in 1983.

Table 1 presents a summary of the decline in the Ghanaian economy during 1960-83 and its partial recovery since. The volume of output and investment declined while population growth accelerated. Exports dropped both in volume and in value. For example, cocoa exports in the 1970s and 1980s were below the levels of the late 1950s. As the foreign exchange constraint became more severe imports contracted further. There was shortage of both intermediate imports and consumables.

Table 1:	Basic Indicators of Real Economic Performance (average annual growth rates)		
	1960-70	*1970-83*	*1983-88*
GDP	2.2	-0.8	5.7
Population	2.3	2.4	3.6
Exports	0.1	-4.4	4.7
Imports	-1.5	-7.2	18.5
Gross Domestic Investment	-3.1	-5.9	13.6
Terms of Trade	n/a	-1.3	-2.8
Total agriculture (volume)	2.6	-0.5	3.4
Food production (*per capita*)	0.3	-4.5	5.6

Sources: 1960-70: The World Bank, Towards Sustained Development in Sub-Saharan Africa, (Statistical Annex), Washington, 1984.
1970-83 and 1983-1988: World Bank, (1990).

During periods of economic decline (1970-1983) agricultural production and services fared relatively better than industry in general and manufacturing in particular (Table 2). Severe foreign exchange shortages meant that Ghana could not import the necessary spare-parts and raw materials to maintain industrial plant and equipment and industrial capacity utilisation dropped to below 25%. Since the ERP there has been a modest

recovery in output from the industrial sector. The gains in the tertiary sector were mainly expansions in the share of government services due to the political ideology and legacy of the Nkrumah government. With Socialism as its main political goal, Nkrumah increased state participation in almost every sphere of the economy through large state-owned holding companies.

Table 2: Structure of Production and Consumption in Ghana			
	1970	1983	1988
Per cent of GDP at factor cost:			
Agriculture	55.6	57.2	51.3
Industry	14.3	8.4	10.8
of which: Manufacturing	9.6	5.1	7.3
Services	30.1	34.4	37.9
Per cent of domestic absorption			
Private consumption	82.2	82.4	82.7
General government consumption	8.4	13.0	10.8
Gross Domestic Investment	9.4	4.6	6.5
Source: World Bank (1990).			

By the early eighties the situation worsened with inflation running at over 100%, the balance of payments in a very unfavourable situation, cocoa and other exports at their lowest production levels, and both unemployment and underemployment rife. By 1983, the country was a classic example of one faced with stagflation. There were shortages of almost all items: food, raw materials and even water.

The Ghanaian economy has a heavy reliance on the primary sector both in terms of domestic revenue and also foreign exchange. Production of agricultural goods has consistently accounted for over half of Ghanaian GDP (Table 2).

Cocoa dominated exports, but it was not growing in volume and there were no clear policies to develop agriculture to feed the newly established industries. Most of the industries relied on imported raw materials; hence the attempt to make the country self-reliant through import-substitution actually increased the level of foreign exchange dependence. Agriculture and cocoa were relatively unproductive in the sense that they were the largest employers of labour and yet they contributed proportionately less to GDP. Cocoa for example employed 17% of the labour force to produce only 8% of

GDP in 1968 (Steel, 1973). The neglect of the cocoa sector, combined with a poorly conceived programme of import-substituting industrialisation, contributed immensely to the drop in Ghana's economy. Subsequent governments after Nkrumah (1957-1966) and the National Liberation Council, NLC (1966-1969), did little to change the structure of the economy reflecting the economic stagnation that faced the Ghanaian economy.

2.2   Causes of Economic Decline

The causes of the decline in Ghana's economy can be attributed to both internal and external factors. The external factors include unfavourable long run terms of trade and adverse weather conditions (especially the drought of the late 1970s and early 1980s). The instability of commodity prices on the international market thus exposed the economy to an unreliable and fragile source of earnings. For instance, throughout the early sixties as the Nkrumah government was financing import substituting industrialisation and the provision of social and economic infrastructure, the international price of cocoa remained weak. Ghana, like other oil importing developing countries, also suffered from the oil crises and the global economic slump of the 1970s. The country's economic plight was however drawn to the attention of the international community when in 1983 in the midst of drought and bushfires, nearly a million Ghanaians were repatriated from Nigeria.

In the face of a trend decline in the terms of trade (1.3% *p.a.* 1970-1983) and higher inflation than trading partners, the country maintained a rigid fixed exchange rate regime and refused to devalue. As the foreign exchange constraint became more severe the government resorted to regulated pricing. Almost every commodity item in Ghana had a controlled price. This introduced distortions into the economy which threw everything out of gear and it also brought in its wake corruption at unprecedented levels which reached its height during the Acheampong era (1972-78). Perhaps the chief internal causes of the economy's decline are gross economic mismanagement, corruption and political instability. Policies formulated were mere paperwork and were never properly implemented. In some cases, good policies drawn-up and commenced could not be brought to fruition due to change of governments (mostly through the barrel of the gun). For example, since independence Ghana has drawn up at least four development plans, none of which has ever been fully implemented.

The decline in the economy imposed a strong financial burden on successive governments. The NLC government which took over from Nkrumah in a military coup in 1966. Government spending in the NLC period was almost a fifth of GDP as it was during the Nkrumah era. The Busia government (1969-72) tried to reverse the deficit financing it had inherited from the NLC and Nkrumah regimes. One such attempt involved the cutting down of government expenditure on social services such as education and health. This move met with stiff opposition by both student groups and other opposition movements. Another attempt by Busia to adjust relative prices, by devaluing the currency, cost him his government. When Colonel Acheampong took over from Busia in a military coup in 1972, he reversed most of the economic policies which Busia had initiated. He revalued the currency and repudiated most of Ghana's external debts. Acheampong increased government spending and between 1972 and 1978, when he was

overthrown, registered the highest budget deficits Ghana has ever witnessed. Monetary and fiscal policies were either out of tune with the realities of the situation or were not properly implemented. As inflation and monetary growth accelerated in the mid 1970s real government revenues fell sharply and the budget deficit widened from 4% in 1974 to 8% in 1975 and 11% in 1976 (Appendix 2).

During the period 1979-1983, and three different governments, (the first reign of Jerry Rawlings, the civilian government of the Third Republic led by President Limann and the second Rawlings government), there was a slowdown in government spending and deficits dropped to an average of about 5% of GDP. After the introduction of the ERP in 1983, the government of the Provisional National Defence Council (PNDC) restrained government spending, and for the first time in Ghana's post-Independence history, the government started registering budget surpluses in 1987 (Appendix 2).

Persistent budget deficits over the years had forced successive governments to borrow from the central bank to finance the deficit. Borrowing from the central bank became especially excessive during the Acheampong era. After the repudiation of Ghana's external loans in February 1972, the government could not borrow from external sources to finance the mounting deficits, and had to rely on the Bank of Ghana as the financial system was not developed enough to allow the government to borrow directly from the Ghanaian private sector. High government borrowing 'crowded out' the share of credit to the private sector and thus further depressed the chances for growth of that sector.

Until 1983, Government borrowing from the banking system grew more rapidly than that of the private sector. By the beginning of the 1980s commercial banks' credit to the private sector was about a third of their total credit. In 1982, only 28% of commercial bank credit went to the private sector. This trend was reversed under the Economic Recovery Programme which prevented an absolute 'crowd-out' of the private sector and raised its credit share to 74% during 1987. Credit to government was spent on the large and inefficient state sector which had developed. Thus, while private entrepreneurs were denied credit for investment, credit to government was also not invested efficiently. The country's gross domestic investment declined from a level of about 24% of GDP in 1960 to about 1% in 1982.

2.3   The Economic Recovery Programme

In April 1983, the PNDC Government accepted an IMF economic adjustment package. Its major objectives were: to restore production incentives for food, industrial raw materials and export commodities; to increase the availability of essential consumer goods; to increase the overall availability of foreign exchange in the country; to lower the rate of inflation; to rehabilitate the physical infrastructure and to undertake studies to restructure economic institutions.[1]

---

1.   Republic of Ghana, Economic Recovery Programme, 1984-1986, Vol. 1, pp. 15-16.

The major reforms relevant to the financial system were a comprehensive system of credit ceilings for commercial banks to restrain monetary growth and radical changes in the operation of the foreign exchange market.

Monetary policy was conducted in the framework of an annual monetary plan which set targets for credit expansion for every commercial bank. In September 1987 a liberalised system to determine borrowing and lending rates was introduced by the Central Bank for all commercial and secondary banks which replaced the previous administrative fixing of rates by the Bank of Ghana.

There was a series of devaluations of the exchange rate until September 1986 when the government introduced a dual exchange rate system. Transactions at Window I related to official transactions and were pegged at an exchange rate of 90 cedis to the dollar (compared to 2.75 in 1983). All other transactions passed through Window II, at rates which were determined by marginal bids at weekly auctions. Since February 1987, the two windows have been merged and the rate is determined at the auction.[2] The first rate determined at the auction in September 1986 was ¢120 to the dollar and by December 1989 the rate had depreciated to ¢300.

In 1988, the country moved towards a freely floating system of exchange rate determination with the introduction of private forex bureaux which determine their own sale and purchase prices and effectively eliminated the black market for foreign exchange.

Other major reforms in the ERP process were: removal of price controls on most commodities; through a divestiture programme, the government is selling off most state-owned enterprises; reductions in government expenditures and increases in revenue, leading to a cut in budget deficits. For three consecutive years beginning 1986, the budget has been in surplus. A new Investment Code has provided a package of incentives to attract foreign capital.

In section 5, we examine the specific monetary policies introduced under the ERP.

In summary, both internal and external factors contributed to a substantial decline in the Ghanaian economy until 1983. The internal factors included:

(a)   The maintenance of a fixed and highly overvalued exchange rate that discouraged exports and produced huge profits for traders of imported goods.

(b)   Large government deficits which resulted in inflationary pressures and distorted the real exchange rate.

---

[2]   The Bank of Ghana decides the allocation of foreign exchange to the auction and can effectively determine the exchange rate subject to reserve availability by varying the availability of foreign exchange.

(c)   The imposition of price controls at the manufacturing stage which discouraged production while giving excessive profits to the unregulated small-scale trading sector.

(d)   Misallocation and use of import licences which created further inefficiencies and denied critical inputs and equipment to high priority areas.

The external factors included:

(a)   Adverse weather in 1978-79 and 1982-83 which seriously reduced agricultural output.

(b)   Sharp increases in petroleum prices in 1979, followed by a world recession.

(c)   A trend deterioration in the terms of trade.

(d)   The expulsion of over one million Ghanaians from Nigeria in 1983.

3.   THE STRUCTURE AND OPERATIONS OF THE FINANCIAL SYSTEM

3.1   The Process of Monetisation

Ashanti gold weights and other units of account were popular in the Gold Coast as far back as the 15th century.   Other media of exchange which have been used at one time or another include cowries, cattle, copper rods and gold dust.   Owing to the large subsistence sector, the barter system persisted in Ghana for a long time and in some parts of Ghana cattle are still used for the payment of dowries.

The foundations for the financial system in Ghana were laid in the latter years of the 19th century as British silver coins started circulating in the region.   With the economy partially monetised, a Government Savings Bank was set up in 1888, and in 1896 the first commercial bank was established in Accra which still operates in Ghana under the name of Standard Chartered Bank (Ghana) Limited.

A West African Currency Board was established in 1912 to issue and redeem the West African currency which was then circulating in The Gambia, Nigeria and Sierra Leone as well as the Gold Coast.   The Board however could not pursue independent monetary policies in the colonies as monetary expansions and contractions were tied to the balance of payments and the exchange rate was pegged at par to sterling.   As local currency was backed 100% by foreign assets the money supply expanded with a balance of payments surplus and contracted with a deficit.   The Board was permitted to invest its funds in British Government or Dominion Government securities only and was barred from investing in the issues of the colonial governments.   Thus funds which could have been invested in the colonies were diverted into British investments.   On the other hand, the restrictions upon monetary expansion did serve to contain inflation to the prevailing UK rate.

When Ghana disengaged from the West African Currency Board in 1957, the issue and redemption of the currency became the duty of the Bank of Ghana, although the currency units were not changed until 1965.

During the post-independence period the economic decline in the mid-1960s and 1975-1983 was associated with a falling real value of the cedi.   This encouraged movement of financial holdings into physical goods and foreign currency, and correspondingly holdings of financial assets relative to GDP fell (see Figure 1).   Furthermore there was an evident financial shallowing, shown by relatively higher proportions of financial assets held as cash or demand deposits between 1973 and 1983 (see Figure 2).

Specific government policies tended to weaken people's confidence in the banking system.   For instance, in 1978 the government decided to mop up excess liquidity by demonetising the cedi.   Currency outside the banking system was changed at a 30% discount for the new currency, i.e. holders of cash were given only 70% of the face value of their currency holdings.   In 1982, the government of the PNDC decided to vet all bank balances exceeding ¢50,000.   Individuals without legal justification of the source

Figure 1:   Ghana: Indicators of Financial Depth
                                1960-1988
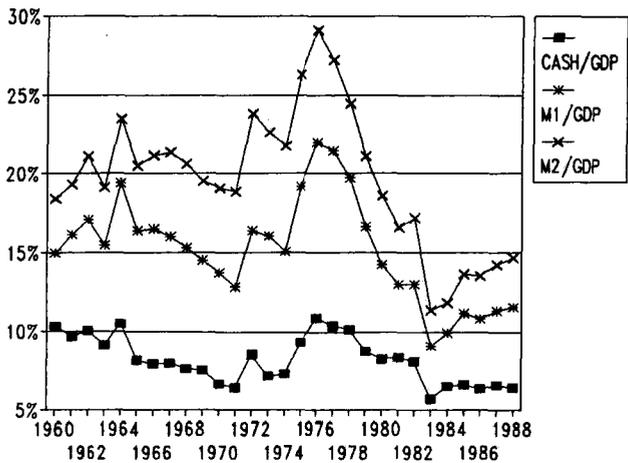
Source: World Bank, 1990.

Figure 2:   Ghana: Cash Holdings/Broad Money
                                1960-1988

Source: World Bank, 1990.

of their balances forfeited their monies. This particularly affected small-scale businessmen who generally did not keep accounts of their operations. 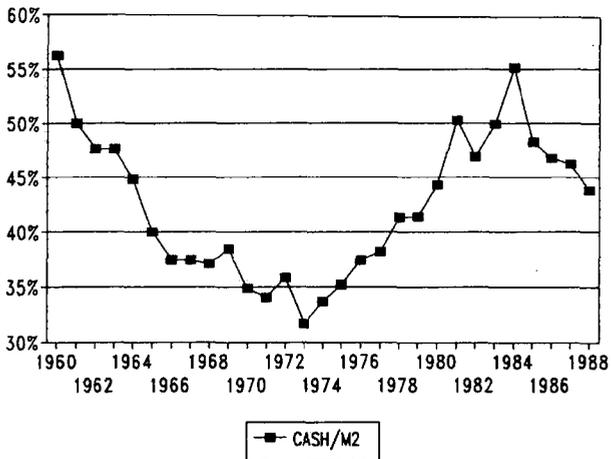Again in 1982 the PNDC withdrew from circulation 50-cedi notes issued by the Limann Administration in 1981. It was four years later before the 50-cedi notes were refunded to their owners during which time inflation substantially eroded their real value. These policies contributed a great deal to the loss of public confidence in the banking system which is also reflected in the high currency to broad money ratios. The recovery during the ERP phase (post-1983) has so far brought only a relatively modest increase in the ratios of financial holdings to GDP, particularly in comparison to previous declines. This post-independence process of demonetisation and shallowing has limited the scope for the financial system to intermediate between savers and borrowers, and to allocate financial assets efficiently.

3.2   The Formal Financial Sector

The formal financial sector has largely developed in the post independence period and consists of (1989): the central bank, (the Bank of Ghana), six commercial banks, three development banks, a savings bank, a merchant bank, about 120 rural banks, a discount house, a building society, insurance companies and a Trust Holding Company which also acts as a stock market.[3]   The Government of Ghana is the major shareholder in most of these financial institutions, which we briefly consider in the following paragraphs.

❑   The Bank of Ghana

The Bank of Ghana was established on the eve of independence as a central bank under the Bank of Ghana Ordinance (1957).   The Bank issues and redeems currency, and determines the external value of the currency (Exchange Control Act 1961).   As the Bank developed, the Bank of Ghana Act (1963) spelled out the Bank's developmental goals:

> . . . to propose to the Government measures which are likely to have
> a favourable effect on the balance of payments, movements of prices,
> the state of public finance and the general development of the national
> economy and monetary stability.

As regulator of the country's foreign exchange the Bank has, since September 1986, been supervising bidding for foreign exchange at the weekly foreign exchange auctions.   As the supervisor of all banking operations in the country, the Bank requests for regular returns on the operations of the commercial and development banks in order to monitor the monetary developments.

The Bank of Ghana, through the Bankers' Clearing House, offers clearing facilities to the banks.   As part of a policy of decentralisation, the Bank opened regional clearing houses in some of the regional capitals.   By 1985 there was a

---

3.   Ghanaian Business Weekly (Banking and Finance Survey) November 1989.

total of six clearing houses in the country, although usage of cheques as a means of payment is still not widely accepted in Ghana (section 4).

As central bank, the Bank of Ghana operates under the directions of the Minister responsible for Finance and Economic Planning. This subordination of the Bank to the Ministry makes it difficult for the former to follow independent policies which will counteract fiscal policies of the latter.

□ The commercial banks

Until 1953, Standard Chartered and Barclays Bank operated as the only commercial banks in the Gold Coast. They directed credit to expatriate firms rather than to indigenous ones, principally because of requirements for collateral. This duopoly was broken by the establishment of the Bank of the Gold Coast as the first indigenous commercial bank (now Ghana Commercial Bank). These three banks are generally referred to as the primary banks and hold about 60% of total deposits of the banking sector (see Appendix 1). The Government is a majority shareholder in the local banks and maintains minority shares in the three foreign owned banks.

The commercial banks provide intermediary services such as keeping cash deposits and giving short-term advances for commerce and other businesses requiring short-term credit. They also deal in securities and other bills of exchange. About 50% of the deposit liabilities of the primary banks are in the form of demand deposits and the greater part of them are private sector deposits.

The number of bank branches, an imperfect indicator of changes in levels of intermediation, rose from 90 in 1958 to 320 by 1985. Despite this growth in the number of banks and branches, most rural areas in Ghana remained without any formal financial intermediary. The spread of bank branches was concentrated in the regional capitals of Greater Accra, Ashanti, Western and Eastern Regions. Greater Accra alone accommodates about a quarter of bank branches. As the banks developed so did inter-bank activities centred upon cheque clearing facilities in the Bankers' Clearing House. Inter-bank activities have also been enhanced by the establishment in 1987 of a Consolidated Discount House, a kind of mini-stock exchange, which trades in securities (a new stock exchange was opened in 1990).

□ Development banks

There are three development banks in Ghana. The National Investment Bank (NIB) started operations in 1964 with the main object of assisting Ghanaian entrepreneurs in the establishment and expansion of their enterprises. The Agricultural Development Bank (ADB), originally a division of the Bank of Ghana, was established in 1965 with the aim of reaching small farmers. The ADB, however, followed the practices of commercial banks in granting loans mostly to large scale farmers. The Bank for Housing and Construction, the third development bank is, like ADB and NIB, owned by the government and parastatal

organisations.   It was established in 1972 to cater for the building and construction industry.   By the nature of their portfolios, these three banks advance long term loans.

The Act establishing the NIB empowered it to advance credit without insisting on collateral, unlike the commercial banks. In common with the other development banks, and also some commercial banks, the NIB has accumulated a sizeable portfolio of non-performing assets.   Without regular provision being made for bad debts, non-performing assets have become a major weakness in the banking system and encourage banks to keep their performing assets in relatively low risk government securities to balance the risk structure of their portfolio.

The depreciation of the cedi during the ERP has also led the banks and their customers into serious liquidity problems. This problem has become more acute in recent years with the continual depreciation of the cedi through the auction market.   The development banks also received loans from foreign agencies for administration to their customers. Most of these loans were administered when the cedi value has been pegged at a low rate to the dollar.   Recent devaluations have, however, increased the cedi liabilities of the banks' customers and have caused many of them to default.

❑   Rural banking

One major reason for setting up the Ghana Commercial Bank was for it to reach the country-side where the foreign-owned banks had been reluctant to go. Thus, the GCB opened up branches in several areas of the country. But, their activities did not meet the needs of the rural people, since they insisted on stringent collateral before lending.   This gap was partly filled by the Agricultural Development Bank and the Ghana Co-operative Bank. The Ghana Co-operative Bank is owned by two state financial institutions, some co-operative organisations and some individual Ghanaians.

Despite these initiatives and specialised institutions, commercial banks devote on average only 9% of credit to agriculture, taken up mostly by large scale farmers. This prompted the government to help establish rural banks in the country and it was hoped that an expansion of unit level banking facilities would reduce informal money-lending at usurious rates of interest.   The rural banks were established as small unit-banking operations, which are owned and managed by local communities.   The first rural bank was established in 1976 and 120 rural banks had been established throughout the country by 1989. The Bank of Ghana also owns shares in the rural banks and acts as their supervisor.   The prime aim was to mobilise savings and to help cottage industries.

In addition to the banks, there are other financial institutions such as insurance companies, a building society, a Social Security Trust, a National Trust Holding Company and a Discount House, which opened in 1987 as a precursor to a stock exchange since established.   However, trading in shares rarely occurred.   Occasionally, a few corporate

14

firms floated shares; but generally indigenous Ghanaian businesses are funded with accumulated family wealth or by borrowing from banks.

3.3 The Informal Sector

The informal sector comprises money lenders and several credit groups and thrift societies called *susu* collectors. Even though these groups are made up only of small holders, as a sector their operations have a significant impact on the functioning of the national economy.

◻ Money-lenders

The money-lenders are, generally, rich individuals who advance credit at rates well above commercial bank rates primarily in rural areas. There are no official records on the rates charged by these lenders but the rates are believed to be around 100% *p.a.*. These rates vary from one lender to another and are fixed rates unrelated to the term of the loan.

Farmers without access to bank credit approach the money-lenders during planting seasons. Businessmen also use the services of these lenders on occasion: they normally obtain credit to clear their goods from the ports and for other short term operations. In 1951, the government passed the Money-Lenders Ordinance which tried to regulate the activities of the money-lenders and to protect the borrower.

◻ *Susu* operators

The *susu* is a rotational savings system usually operated by small-scale businesses formed into types of co-operatives. Each member of the group regularly contributes a given amount into a common pool; and members then take turns in collecting the entire pool. In more sophisticated schemes, a special collector goes around with a note-book to collect various sums from different groups of traders and other small-scale business personnel each day. It becomes a type of compulsory saving which the individual may collect back at the end of a period. In the 1980s, some companies have turned the activities of the small-scale *susu* collectors into larger ventures. These companies advertise themselves in the public media as financial houses which receive and grant credit and in effect operate as unlicensed banks.[4] In May 1989, the Bank of Ghana called such companies to a meeting in an attempt to regularise their operations.

Although the success of the *susu* system depends largely on personal trust in the collectors' integrity, and despite the lack of interest paid on these savings, the *susu* is very popular among small-scale businesses, especially traders and fishmongers.

[4.] It is alleged that one company, after collecting large sums from unsuspecting traders, has folded-up and its directors are on the run.

Informal *susu* collectors have the advantage of being able to mobilise funds more easily than the formal sector by moving door-to-door. They also help cultivate regular saving habits in small-scale businesses and provide easy assess to credit for their clients, who are not bothered with bureaucratic procedures and the collateral requirements in the formal sector. Thus these informal financial groups fill an important gap left by the formal financial intermediaries. These institutions do not and cannot create 'paper-credit' but they do intermediate between groups of small savers and rather larger individual borrowers.

Within the informal sector there is also a group of food sellers or 'chop-bar' owners who offer credit facilities to workers for food and receive payment on pay-day. The special feature of this money lending group is the fact that their customers need not save with them. Credit is advanced on a good introduction and a guarantee or a collateral. 'Chop-bar' owners normally make themselves known to the accounts clerks in the various work places to improve the reliability of repayment. Another group of traders operate a hire-purchase system; these are mostly people having regular jobs with trading as a secondary job. They buy wares which they sell to their customers on credit with a premium which depends on the length of the payment period.

The informal financial market is composed almost entirely of small scale borrowers and lenders who are unable or unwilling to utilise the formal banking sector, where the banking procedures have followed those in higher income European countries. The aggregate effect of the informal market in Ghana is difficult to ascertain. One effect may be to reduce the level of idle cash balances held by individuals and consequently increase money velocity for a given money stock. The impact upon prices and output will then depend upon the extent of capacity utilisation, supply elasticity *etc.* Alternatively the existence of the informal sector may encourage additional financial saving and correspondingly increase investment expenditure and reduce consumption expenditure. For example, in the *susu* system the daily payments may represent small reductions in consumption and the lump sum 'credit' be directed towards investment activities. Clearly more research is required to investigate the economic impact of the informal sector.

3.4   Cocoa and the Financial System

Cocoa was introduced into Ghana from the middle of the 19th century and by 1911 Ghana's output of 41,000 tonnes made it the world's leading producer. Exports of cocoa increased gradually from then on, and peaked in 1964/65 with an output of 538,000 tonnes. The history of post independence production provides a representative picture of the state of the Ghanaian economy (Figure 3) with the most serious declines in production occurring in the mid-1960s (National Liberation Council) and the Acheampong era (1972-1978). Even though cocoa's share of GDP is only 8%, it earns about 60% of the nation's foreign exchange earnings, with about another 11% from processed cocoa exports. Cocoa also contributes about a quarter of the nation's tax revenue.

16

Figure 3:   Ghana: Cocoa Production
                              1957-1985

Source: Frimpong Ansah, 1989.
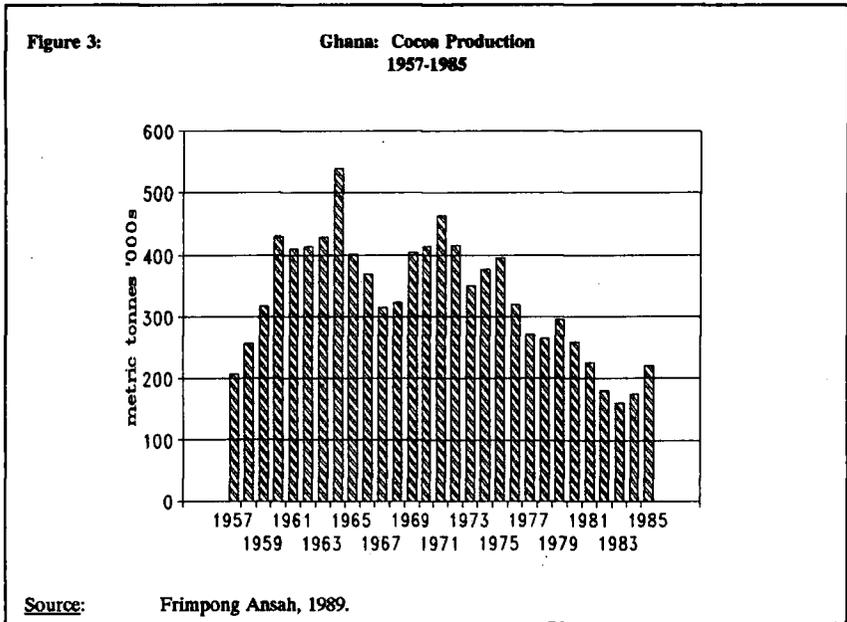
The Cocoa Marketing Board (CMB) was established in 1947 to co-ordinate the purchasing, marketing and export of cocoa.   With the establishment of the Bank of Ghana, the CMB started investing in Government of Ghana Bills.   The bill finance scheme for the marketing of cocoa crop was introduced with a view to achieving two things:

(a)   to exchange CMB surplus liquid assets for the Government's own holding of longer term sterling gilt-edged securities or as straight loan to Government;

(b)   to transfer the Board's financial transaction from London to Accra.[5]

Cocoa financing bills are still issued by the Bank of Ghana.   The Bank is informed by Cocoa Marketing Board the amount required for cocoa purchases and issues cocoa bills to that value which are then purchased by the commercial banks.   The Bank of Ghana takes up any unsold bills.   Like other bills and bonds, the cocoa bills are discounted mostly by the Bank of Ghana.

The cocoa marketing system has tended to change with the various political changes that Ghana has had over the years, reflecting the political and economic importance of cocoa

---

5.   Bank of Ghana, Report of the Board for the years 1960 and 1961.

in the Ghanaian economy. Between 1961 and 1966, the Nkrumah government established the United Ghana Farmers' Cooperatives Council to be the sole buying agent. But after the overthrow of Nkrumah in 1966, the government of the NLC replaced the Council with indigenous private buying agents. Between 1972 and 1976, the private buying agents were, in turn, replaced by two semi-governmental agencies - the Produce Buying Agency (PBA) and the Ghana Cooperative Marketing Association (GCMA). In 1976, the Produce Buying Company Limited, which is wholly owned and financed by the Ghana Cocoa Board (COCOBOD), became the sole licensed buying agent.

Until August 1979, the payments for cocoa purchases from farmers were made mostly by cash. At the tail-end of the marketing chain were the purchasing clerks who bought the cocoa direct from the farmers using cash. The cash was obtained either from the buying agents' own finances or bank loans. The system of cash purchases coupled with the buying agents system posed several problems for the cocoa industry. Some farmers took advances against future delivery of cocoa from one buying agent and sold the actual produce to another. Some farmers had to mortgage or sell their farms to pay off debts. The cash system of payment was also beset with other problems such as:

- long delays before payment;

- fraudulent practices, *e.g.* paying clerks investing cash meant for produce purchases in other ventures and paying farmers after the maturity of their investments;

- security problems of moving cash over long distances (Atiemo, 1989:p.34).

Partly in a bid to eliminate these problems and partly to inculcate the banking habit into the cocoa farming communities, a new system of payment known as the *'akuafo* cheque' system was introduced in 1979 on a small scale. This system involved the issue of payment vouchers to the farmers which they could then cash at commercial or rural banks. The *akuafo* cheque system was reorganised in 1983 and made the only system for the payment of cocoa farmers. The introduction of the *akuafo* cheques was certainly an improvement on the cash system, but it also faced some problems:

- inadequacy of banking outlets for the administration of the cheques;

- inadequate stocks of cash at some bank branches at certain peak demand periods;

- discontinuation of banking services by the farmers after the close of the cocoa season;

- fraudulent cheques.

Cocoa financing, because of the seasonality of the crop, influences the pattern of the banking sector liquidity over the course of the year, but the fluctuations are predictable

18

enough not to cause significant problems for monetary control and move cyclically with income.

Cocoa has two seasons: a Light Crop season (July-September) and a Main Crop season (October-December). Figure 4 shows seasonality in cocoa financing and currency holdings. Cocoa financing is usually at its peak during the third and fourth quarter of each year. It can be seen from the graph that the fluctuations in currency correlate fairly closely with those in cocoa financing. This seasonal influence of cocoa on the money stock should be taken into consideration by policy makers in the attempt to control the supply of money.

Figure 4:   **Seasonality in Money and Cocoa Financing**
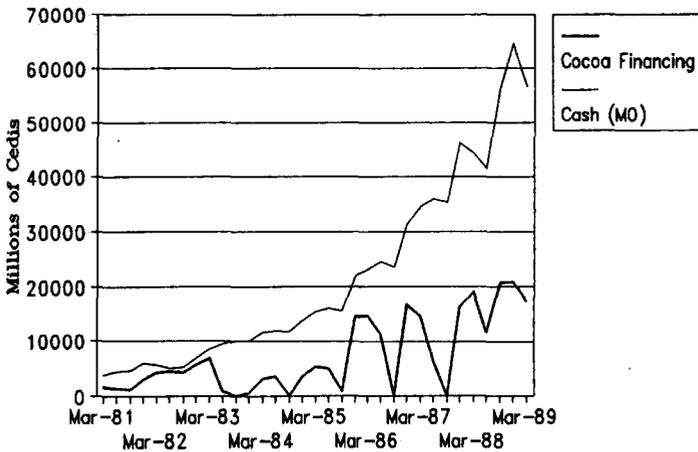
Source: Bank of Ghana.

4.   MODEL OF THE MONEY MARKET

This section discusses developments in the components of money supply and demand. It is followed by a multiplier model of the money stock determination, identification of the variables that are relevant for the control of the money stock and a discussion of the directional signs of the effect of changes in these variables on the money supply.   The model is made complete by the inclusion of a demand for money function, the stability of which is necessary for the effective use of monetary policy.

4.1   The Money Supply

The Bank of Ghana defines money supply as demand deposits at the banks (both primary and secondary) plus currency in the hands of the general public. This definition, M1, treats money as a medium of exchange.   However, the ease with which people can withdraw money from their saving accounts, without hindrance for transaction purposes means that broad money, M2, defined as M1 plus time and savings deposits may be more appropriate for policy purposes for Ghana. The importance of savings deposits for cash transactions in Ghana is a result of low confidence in personal cheques as a means of payment and a lack of proper identification procedures.   For example, data from the Bankers Clearing House shows that cheques cleared in Ghana averaged 4,750 per day in 1978 and 5,851 per day in 1985.   Even large commercial houses like the Ghana National Trading Company (GNTC), Union Trading Company (UTC) and Kingsway Stores rarely accept personal cheques.   This implies that it does not matter whether one's account is current or time; either way, one has to withdraw cash for transactions. Figure 2, for example, shows that the proportion of cash holdings rose during the period of economic uncertainty, 1975-1983, as inflation accelerated and the effective external value of the cedi declined sharply.

A broader measure of money as a means of payment would also include foreign exchange holdings.   When foreign exchange in formal markets became scarce and its rationing led to shortage of commodities on the local market, major foreign currencies became accepted, especially by traders and businessmen, as a means of exchange and as a superior store of value.   This was particularly so during the depressed conditions of the late 1970s and early 1980s.   These currencies were accepted as means of payment by traders for most consumer durables like cars, refrigerators and television sets. However, there is no accurate data on private foreign exchange holdings for a broader money measure to be calculated.

The money stock in Ghana is made up predominantly of currency held by the public outside the banking system.   Figure 2 shows the proportion of money stock held as currency.   The proportion decreased from a high of 54% in 1960 to a low of 34% in 1971, and then rose to 56% in 1984.   These trends reflect changes in the public's confidence in the banking system.   The ratio of M2 to GDP (Figure 1), which is a measure of the degree of monetisation in the country, increased until the late-1970s, until financial repression in the country, fuelled by negative interest rates, caused it to decline in the 1980s.

The decline may also be due to loss of confidence in the banking system as a whole. If the inverse of the M2:GDP ratio is interpreted as the velocity of money then we observe a situation in which the velocity of money increased rapidly during the high inflationary periods of the 1980s. Since 1978, even though nominal money stock has been increasing rapidly, real money supply has been declining. The fact that real balances declined in that period was indicative of the high inflation rates then prevailing. These high rates of inflation caused all rates of interest in the country to be negative and thus depressed savings. Correspondingly, the gross domestic saving:GDP ratio dropped from a high of 13.8% in 1970 to a low of 0.4% in 1983 (see Figure 5).

Figure 5:

Ghana: Savings Rates
Gross Domestic Saving/GNP
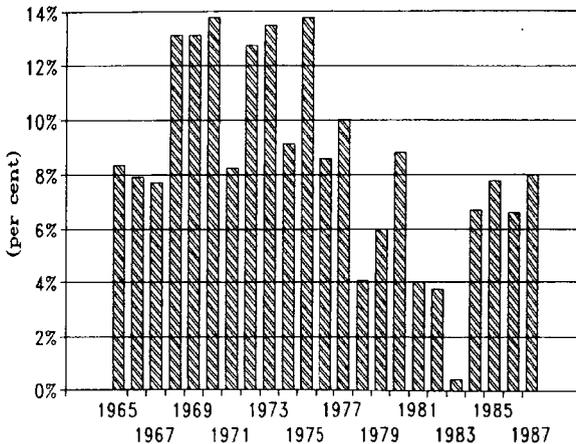
Source: IMF, International Financial Statistics.

□   Government finance and monetary policy

Large government deficits financed by borrowing from the banking system were the greatest source of changes in the supply of money as shown in the sources of changes in money supply in the lower half of Table 3. In some years, such as 1975, net credit to government accounted for almost the entire increase in domestic credit whilst changes to the non-financial private sector were small in comparison. Discrepancies between banking sector figures and those of government accounts prevent any meaningful discussion of the post 1983 impact of government operations upon monetary control. However Table 3 suggests that credit to central government continued to dominate credit expansion during the

Table 3:	Changes in Money Supply and Sources of Changes (¢ billion)									
	1965	1970	1975	1980	1983	1984	1985	1986	1987	1988
Money supply										
Currency plus demand deposits	0.00	0.02	0.31	1.41	5.52	10.13	11.46	16.85	29.01	37.86
Quasi-money	0.01	0.02	0.07	0.60	0.46	1.02	3.30	5.55	7.84	11.18
Restricted deposits and other items	0.01	0.05	0.08	-0.05	1.85	-6.96	-0.99	-3.86	-25.40	-80.66
Total money supply	0.02	0.09	0.46	1.96	7.83	4.19	13.77	18.54	11.45	-31.62
Sources of changes	**0.03**	**0.08**	**0.48**	**1.96**	**7.83**	**4.19**	**13.76**	**18.55**	**11.45**	**-31.62**
Net foreign assets	-0.05	0.06	0.13	-0.12	-5.77	-12.1	-15.34	-22.77	-74.79	-21.79
Domestic credit:	0.08	0.02	0.35	2.08	13.60	16.29	29.10	41.32	86.24	-9.83
(a) to Central Government (net)	0.06	-0.02	0.34	1.62	16.99	9.41	10.59	28.54	80.34	-8.69
(b) to non-fin. public and other fin. institutions	-0.03	0.05	-0.04	0.33	-4.67	3.75	13.82	4.89	0.92	-10.61
(c) to private sector	0.03	0.01	0.05	0.14	1.28	3.14	4.68	7.89	4.98	9.47

Note: Total changes in money supply may not be equal to total changes in sources, due to rounding.

1980s, although net government borrowing from the banking system fell sharply between 1983 and 1986, and in 1987 and 1988 there were net repayments.

☐   Money supply determination

The effectiveness of the monetary policy instruments of the Bank of Ghana can be analysed by the relation between the monetary base (liabilities of the central bank) and the money supply.   This relation is demonstrated in the money multiplier formulation which relates the monetary base to broad money:

(eq. 1) $M2 = 1/[(rr+er).(1-c) + c].MB$

Where:

MB	=	monetary base (banks reserves at central bank plus currency with the public
M2	=	broad money (cash plus sight and time deposits)
c	=	cash ratio (cash/M2)
rr	=	required reserve to deposits ratio
er	=	excess reserve ratio

To control the money supply (M2) effectively, the Bank of Ghana needs to control high-powered money (Mb); the rate of interest (Ir), which is assumed to influence excess reserve holding (er); the currency ratio (c); and the reserve ratio (rr). The interest rate here is the Central Bank's discount rate which is the opportunity cost for holding excess reserves.

A restrictive monetary policy will involve a decrease in the high-powered money, or an increase in the rate of interest, or in the currency ratio, or in the reserve ratio.

Equation (1) can be expressed in a general form as

        $M2 = f(Mb, Ir, c, rr)$

Such that, $f1 > 0$, $f2 < > 0$, $f3 < 0$, $f4 < 0$, where fi are the partial derivatives of M2 with respect to Mb, Ir, c, and rr respectively.

The sign of f2 depends on whether supply of credit or demand for it is taken as given, or how changes in the discount rate affect the holding of excess reserves. From the point of view of suppliers, taking demand as given, an increase in the rate of interest will induce them to give more credit and hence will increase the money supply.   If interest rates increase, the opportunity cost of excess reserves in the banks' portfolio increases and the banks will have an incentive to reduce Er.   Thus, for a given level of the other variables (Mb, Cr, and Rr), a higher interest rate increases the money supply.   However, if the supply of credit is taken as given, an increase in the rate of interest will discourage borrowers from getting more credit and thus have a restrictive effect on money supply. Thus,

rather than following a general notion that an increase in the rate of interest is restrictive, the sign of f2 is viewed as empirical and should be of interest to policy makers.

The currency ratio is based on a behaviourial assumption about the public and is therefore outside the control of the central bank. Nevertheless in situations where the currency ratio is stable, the action of the public becomes predictable and therefore the Central Bank can engage in 'defensive' actions to control the money supply. Figure 2 shows the variation of the currency ratio in Ghana and suggests that changes in the willingness of the public may be difficult to predict with any certainty. A high currency ratio implies that more people are willing to transact business using cash than using cheque deposits. Notice from equation (1) that an increase in currency ratio leads to a fall in the money supply. Intuitively, banks create credit from deposits; so as the public hold a greater proportion of money stock as currency, they hold less as deposits, and hence less credit is created. Thus the high currency ratio in Ghana acts as an automatic dampener in the money creation process.

The reserve ratio, based on the behaviour of the banks, is under the control of the monetary authorities (see section 5). An increase in the reserve ratio means banks will have lower excess reserves left for creation of new credit. There is an inverse relation between the supply of money and the reserve ratio if banks restrict credit to maintain a desired level of excess reserves. Changes in the reserve ratio will be ineffectual if banks merely substitute required reserves for excess reserves or *vice versa*.

High-powered money (monetary base) has the following counterparts:

High-powered Money   =   Securities   +   Advances   -
Government   Deposits   +
Foreign Assets + Other Assets

Securities are primary instruments while foreign assets and government deposits constitute auxiliary instruments. Both primary and auxiliary instruments come under the direct control of the Bank of Ghana. Advances are influenced by the central bank but are actually controlled by the commercial banks and other financial dealers. Other Assets are generally influenced by technical and other external factors beyond the control of the central bank. In theory, the central bank can control the monetary base by engaging in a defensive operations to neutralise the undesirable movement of a non-controllable item with counter action on its controllable assets. Note, however, that control of the monetary base is often made difficult by changes in the level of foreign assets emanating from external shocks or changes in domestic demand.

Specified as log-linear function, we have:

(eq. 2) $\log(M2) = a^0 + a^1\log(Mb) + a^2\log(Ir) + a^3\log(Cr) + a^4\log(Rr) + u^1$

Where u^1 is an error term assumed to be normally distributed.

□   Money supply results

The seemingly perfect fit for the money supply equation in Table 4 may be due
to high correlation between the monetary base and the money stock.   Both
variables are highly trended. A correlation coefficient of .99 was observed for the
two variables. .This is also confirmed by the high t-value for the estimate of the
parameter corresponding to the monetary base.   An attempt was made to
detrend the monetary base and re-estimate the equation.   The result, shown in
Appendix 7a, was not very good.   With the exception of the rate of interest no
other variable was statistically significant.

Table 4:	Money Supply Equation (2SLS Estimation)		
Dependent variable is Y1 = Log(M2)			
List of instruments: C, Log(Mb), IrEST, X13, X14			
29 observations used for estimation from 1960 to 1988			
Regressor	*Coefficient*	*Standard error*	*T-ratio·*
INTERCEPT	-.4215	.1260	-3.3444
Log(Mb)	.9297	.0533	17.4285
Log(Ir)	.3069	.2092	1.4668
Log(Cr)	-.5328	.0957	-5.5675
Log(Rr)	-.2503	.0295	-8.4834
R-Squared	.9995	F-statistic F(4, 24)	11847.2
R-Bar-Squared	.9994	S.E. of Regression	.0526
Residual Sum Squared	.0664	Mean of Dependent Variable	7.6450
S.D. of Dependent Variable	2.1642	DW-statistic	2.1112

From Table 4 it is observed that all the variables have the expected sign.   As
explained above, the sign on the interest rate variable can go either way.   As
expected because of the underdeveloped nature of the Ghanaian money market,
the rate of interest does not exert any significant influence on the money supply.
Notice, however, that the positive sign of the interest coefficient, indicates that an
increase in the rate of interest would be expansionary.

The money supply has a high and significant elasticity (0.9297) with respect to the
monetary base which suggests that changes in the monetary base are the most
important factor in determining money supply.   Correspondingly any weakness
in the ability of the Bank of Ghana to control the monetary base also reflects
significantly in the weakness in the control of the money supply as a whole.

From Appendix 7b we calculate that the long-run elasticity of the money supply with respect to the monetary base is 0.9450.[6]

Both the currency ratio and the reserve ratio exert significant influences on the supply of money. The currency ratio which, next to the monetary base, is the second most important argument explaining changes in the money supply, is outside the control of the Bank of Ghana. The reserve ratio could not serve effectively as a monetary tool since for most of the time the banks have excess reserves.

To sum up, the evidence suggests that the money supply is strongly linked to the high-powered money base. Other variables like reserve ratio of the banks and the currency ratio are significant but not effective instruments. Thus the ability of the Bank of Ghana to control the money supply lies principally in its ability to influence the monetary base.

4.2   Estimating the Demand for Money

Our previous discussions have suggested that there have been sizeable shifts in the demand for money: money holdings relative to income have changed markedly over time as confidence in the cedi has changed and the proportions of money held as cash, demand and time deposits has also changed substantially. In this section we analyse the quantitative importance of income, interest rates, expected inflation and the exchange rate on the demand for money.

The strongest motive influencing the demand for money in Ghana is the transactions motive. Cash is used for most transactions and this is dependent on the income of the individual. Income in this case can be defined as current income, permanent income or wealth. Following Adekunle (1968), the demand for money in Ghana is treated as dependent on the level of current income. The speculative demand for money is not very pronounced in Ghana since the money market is not well developed and few alternative financial assets exist which compete with money holdings, apart from government bonds and Treasury Bills, which are largely purchased by the financial institutions as investment for their idle funds. Consequently, one does not expect the rate of interest to have a significant effect on the demand for money and we test this hypothesis.

As a store of wealth, money competes with such items as houses, land, cattle and so on. It is assumed that the rate of inflation is the opportunity cost of most of these 'durable'

---

6.   Let a be the coefficient of the endogenous variable with respect to which the elasticity is sought, and b the coefficient of the lagged endogenous variable. The long-run elasticity is calculated as:

a/(1 - b)

Thus,	long-run money supply elasticity	=	0.8674/(1-0.0821)	=	0.9450
	long-run money demand elasticity	=	0.7259/(1-0.3728)	=	1.1574

items; and hence the rate of inflation is also included as an argument in the money demand function.

From the mid-1970s, a new element of speculation emerged on the Ghanaian scene. Shortages of foreign exchange and the prolonged over-valuation of the exchange rate caused people to hold or release cedi balances depending on the availability of foreign exchange and the exchange rate on the parallel market. If disaggregation of the demand for money function were possible, we would expect the exchange rate to affect especially the demand for money by businesses. The exchange rate is therefore included as a determinant of the demand for real balances in Ghana, although data constraints confined us to using the official exchange rate.

The demand for money in Ghana is therefore specified as

(eq. 3) $(M2/P)t = g(Yt, Irt, et, Pt, u^2t)$

Such that $g1 > 0, g2 < 0, g3 < 0, g4 < 0$; where gi is the partial derivative of real balances with respect to Y, Ir, e, and P respectively. Where:

   $(M2/P)t$ is demand for real balances in year t;
   Yt is real GDP in year t;
   Irt is the discount rate of the Bank of Ghana in year t (assumed as an index for interest rates);
   et is the exchange rate in year t;
   Pt is the rate of inflation in year t;
   u^2t is an error term assumed to be normally distributed with zero means and constant variance.

We estimate equation 3 in a log linear form with an adaptive expectations mechanism:

(eq. 4) $\log(M2/P)t = b^0 + b^1\log(Yt) + b^2\log(Irt) + b^3\log(M2/P)(t-1) + b^4\log(Pt) + b^5\log(et) + u^2t$

The full model of the money market of the Ghanaian economy is as specified in equations 1 and 4. Since this is a complete simultaneous system, with money stock and the rate of interest as endogenous variables, a method of two stage least squares (2SLS) was applied to data for the period 1960 to 1988.

□   Money demand results

The regression results of the specified money demand equation (eq. 4) did not present a good fit (Appendix 8a). Even though the adjusted R^2 is high, most of the estimates are individually not significant. It was found that using the price index in place of the rate of inflation, presents a better fit.[7]

---

[7].   Moreover, in 1967 Ghana registered a negative inflation rate; and that poses a problem for our functional form.

Since the exchange rate term in the several runs was not statistically significant and carried the wrong sign, it was dropped from the equation. This improves the significance of the other explanatory variables and the R^2 increases from 0.81 to 0.86. Because of the weak money market in Ghana the rate of interest does not exert a significant influence of the demand for money.

Using the improved regression in Table 5 one observes a scale factor of .7259 in the short-run, and from the information provided there a long-run demand elasticity of 1.157 can be calculated.[8] In a similar estimation of the demand for money in Ghana, Gockel (1983) found a scale factor of 1.553, apparently for the short-run. For a developing country with an underdeveloped financial system, a scale factor of more than unity is usually expected. On the other hand our results, surprisingly, indicate apparent economies of scale in the use of money in the short-run. The existence of long-run finite multipliers for the demand for money equation is an indication of its stability.[9] Thus it should be easier for the Bank of Ghana to specify its monetary targets and set rates of growth in the money supply to achieve these targets.

Table 5: **Money Demand Equation (2SLS Estimation)**

Dependent variable is Y2 = log(M2/CPI)
List of instruments: C, X21, IREST, X23, Y2(-1)
28 observations used for estimation from 1961 to 1988

Regressor	Coefficient	Standard error	T-ratio
INTERCEPT	-2.7934	1.1773	-2.3727
log(GPD/CPI)	.7259	.2174	3.3399
log(Ir)	.8381	.6420	1.3054
log(CPI)	-.9478	.2160	-4.3876
Y2(-1)	.3728	.1740	2.1429
R-Squared	.8794	F-statistic F(4, 23)	41.9376
R-Bar-Squared	.8585	S.E. of Regression	.1695
Residual Sum Squared	.6605	Mean of Dependent Variable	4.5793
S.D. of Dependent Variable	.4504	DW-statistic	2.1717
Joint test of zero restrictions on the coefficient of deleted variables:			
Wald Statistic		CHI-SQ(1) =	.9162

---

[8]   See footnote 6.

[9]   See Jan Kmenta, <u>Elements of Econometrics</u>, Second Edition, New York, Macmillan Publishing Company, 1986. pp 726.

5.   MONETARY POLICY IMPLEMENTATION, 1957-1988

The currency board system had the undoubted advantage, from the viewpoint of monetary control, of an automatic mechanism which contracted the money supply when the balance of payments was in deficit. As a result, inflation was low. From the money demand estimations in section 4, we interpret that low inflation was likely to increase real money demand as a store of value. However, critics believed that such a system reduced the economic sovereignty of Ghana and it was unsurprisingly abandoned (*de jure*) after independence although retained (*de facto*) for a number of years. The Bank of Ghana was given full powers for monetary control as specified under the Bank of Ghana Act (1963) and Section 22 of the Act provides that:

> *(I)f on any particular day the total amount of media of payment exceeds by 15% or more the total amount of media of payment in existence during the twelve months immediately preceding that day, the Board shall forthwith make a report to the Minister, specifying the causes which in their opinion have led to that situation and their proposals to the Minister as to the steps to be taken in view thereof.*

As shown in Appendix 3 the Bank of Ghana followed the letter of the act (on a December to December basis at least) during the first 12 years of operation of the Central Bank apart from in 1964.   A relaxation of monetary control (M2 up 40%) followed a change of political control in 1972 when a military coup brought General Acheampong to power.   The Bank of Ghana attributed this high monetary expansion 'mainly to net credit to the Government and public institutions, particularly the Ghana Cocoa Marketing Board and the Ghana Supply Commission'.[10]

The subsequent sustained rate of increase in monetary growth and at the same time increases in the rate of inflation (despite widespread price control) led most people to believe that Ghanaian inflation is a monetary phenomenon, and therefore a substantial effort was made at the beginning of the Economic Recovery Programme to implement policies which would help curb expansions in the money supply.   These included fiscal policies of curbing excessive government expenditure and monetary policies centred upon a credit squeeze.   To a certain extent the axe was directed at the wrong tree.   The 'squeeze' affected the private sector more than government and the public sector.   The following section considers in more detail the use of control mechanisms by the Bank of Ghana.

5.1   Credit Control

Money and credit control are the main functions of the Bank of Ghana.   Each year the Research Division of the Bank prepares a 'Monetary and Credit Plan' which describes the main trends in monetary and credit developments and includes the monetary and

---

[10].   Bank of Ghana, Annual Report of the Board for the Financial Year ended 30 June 1972.

credit control measures guiding the operations of the financial institutions' operations. Credit control as a monetary tool was first instituted in 1964, ostensibly to direct credit to the industrial and agricultural sectors of the economy. The tools used by the Bank of Ghana to control money supply are interest rates, reserve requirements, sectoral credit ceilings and mandatory lending ratios.

☐   Sectoral credit ceilings

The Bank of Ghana provides ceilings for all sectors of the economy in line with the country's stipulated development objectives. The 1964 regulation required that banking institutions should seek approval from the Bank of Ghana before granting loans exceeding £G5,000 to sectors other than agriculture and industry. These ceilings have been revised over the years, but credit to agriculture still has no limit. Currently, the ceilings are in the form of permissible percentage increases over each bank's outstanding credit to a respective sector at the end of the preceding period. This system, which has a developmental objective, is also intended as a credit rationing scheme to curb excessive expansion in the money supply. Unfortunately, these ceilings did not seem to channel credit to the intended sectors as commercial banks continued to lend predominantly to the commerce and trade sectors of the economy. Most banks were averse to the high risk agricultural sector. There was therefore no credit ceiling on lending to the agricultural sector until later years. In 1982, the Bank of Ghana made it mandatory that at least 20% of total bank credit should be to the agricultural sector. Industry also received only a small share of bank credit. In 1982 banks were allowed to expand credit to the manufacturing sector by 150%. Even though it is not the wish of government to encourage credit to commerce, by 1982 there were shortages of so many essential items on the market that the Bank encouraged lending to the import trade sector, by allowing banks to expand their credits to that sector by 600%. In 1985 credit ceilings for the priority sectors were increased by 300% for export trade, 200% import trade, 80% manufacturing and 70% agriculture.

One possible reason for the ineffectiveness of credit ceilings in moving funds to the priority sectors is that the limits were set without any other incentives attached. Interest rates for the priority sectors were generally lower than for non-priority sectors. Overall credit ceilings, however, seem to be a more effective monetary control tool than the reserve requirements. Most banks, for profitability, wish to lend to areas where they will have quick turnovers, like the trading sector. The Bank of Ghana has therefore found overall credit ceilings an effective tool. Indeed, in February 1989 six banks which were said to have exceeded their credit limits were penalised by the Bank of Ghana by being barred from sponsoring clients to the foreign exchange auction for two weeks.

In spite of their apparent effectiveness in the control of money supply, credit ceilings are likely to have lowered the efficiency of the banking sector as a whole. First, they limit competition between the banks, as the limits are set in general without attention being paid to the speciality of banks. Secondly, they are said to cause resource misallocation because they tend to accommodate old and

established borrowers at the expense of new and more dynamic ones. Thirdly, credit ceilings may interfere with the intermediation functions of the banks.

□   Reserve requirements

The Bank of Ghana is empowered to set various reserve and liquid asset requirements. Total liquid reserves of the banks were, for the financial year, divided into two ratios. A higher ratio was specified for the end year period because of the higher crop financing demand for credit. In 1977, the Bank issued new measures for monetary control aimed at mopping up excess liquidity in the economy. A new system of cash reserve ratios was introduced which made it mandatory for each commercial bank to maintain the average cash reserve ratio it had voluntarily maintained over the previous twelve months. but even this did not eliminate excess reserves. Defaulting banks were levied interest charges. When the government failed to achieve its aim through the reserve requirement, it demonetised the cedi in March 1978. The reserve requirements are not effective constraints to banks' lending since banks' aggregate reserve holdings are always above the required ratios.

□   Interest rates

Interest rates have not been an effective monetary policy tool in Ghana. This may be due to the undeveloped nature of the money market and the lack of a stock exchange in the country. The high rates of inflation rendered most real interest rates negative. By 1989, when nominal interest rates ranged between 20 and 35%, the rate of inflation was officially being quoted at 39%. Appendix 5 shows the trend of some rates of interest in Ghana. Rates of interest used to be specified by the Bank of Ghana but, as part of the process of liberalisation under the Economic Recovery Programme, rates of interest have since 1988 been liberalised to be determined on the free market by demand and supply, taking a cue from the rates determined at weekly auctions for government bonds and bills.

5.2   Management of Public Debt

One major factor contributing to the expansion of the money supply is the way in which government has been borrowing from the banking system. The public debt is financed either by the sale of treasury bills, stocks and bearer bonds, or by the government borrowing directly from the Central Bank 'Ways and Means Account' via the issue of Treasury Bills which are picked up by the Bank of Ghana or by issue of new notes.

In 1961, the Government introduced a Compulsory Saving Scheme under which National Development Bonds were sold to the public. This Scheme was abolished in 1964 and those who have contributed to it were allowed to redeem their bonds under the Compulsory Saving Act, 1964. Farmers were said to have donated their bonds to the government for the finance of development projects. Of the £G22.5 million total contribution made under the scheme, farmers contributed £G10 million.

Evidence on the growth of the money supply shows that there were higher growth rates during military regimes than during civilian regimes. This probably might be due to the fact that in a parliamentary regime the budget and its financing has to be reported to parliament. Thus, if it was seen that financing the deficit will entail going over the percentage increase in the money supply approved by parliament, government may be asked to exercise some restraint. Under a military regime there are no such checks and balances. Moreover, in a situation such as in Ghana where the central bank is more or less an appendage of government via the Ministry of Finance, it becomes very difficult to operate a restrictive monetary policy when the government is promoting an expansionary fiscal policy.

5.3   Monetary Policy under the ERP (1983-88)

At the inception of the Economic Recovery Programme in 1983, the country's financial system was almost collapsing under strong inflationary pressure, an overvalued exchange rate and low savings rates (less than 1% of GNP was saved in 1983). Among the prime objectives of the monetary policy adopted, therefore, was to curb the rate of inflation which was then running at 3-digit levels. This involved restricting the rate of growth of money supply. A severe credit squeeze was applied and interest rates were increased to encourage saving. The increase in the rates of interest, however, discouraged investment without increasing deposits (as seen, money demand did not respond to interest rates) owing to lack of confidence in the banking system. To encourage investment, liquidity reserve requirements were revised downwards 'to ease the liquidity position of the banks in order to increase loanable funds'.[11] This was a misdirected policy as the banks were hardly under liquidity pressure. In anticipation of increased demand for credit, especially by the import trade and manufacturing sectors, selective and mandatory credit controls were used to direct credit to the priority sectors. Whereas the policies mentioned above could not by themselves lower the supply of money (since much of the increases in money came from government and the above policies do not affect government very much), inflation in 1984, a year after the introduction of the ERP, dropped from 122% the previous year to 10%. This gave the erroneous impression that the policies had succeeded. However 1984 was a bumper harvest year and, in addition, Ghana had satisfied IMF conditionality under the ERP, external resources were flowing in and import pressures were eased. In other words, whereas the inflation in Ghana seemed to have been demand-caused it was tackled using supply means.

---

[11].   Bank of Ghana Annual Report, p.1.

6. CONCLUSION

The direction of monetary policy in Ghana has been almost completely overshadowed by the dominance of fiscal decisions in macroeconomic policy, although something of a reversal was experienced under the Economic Recovery Programme from 1983. Most policies tended to be *ad hoc* and directed only at solving particular problems. One does not see monetary policies being directed at championing the developmental efforts of the country. In trying to solve some of the problems, such as inflation caused by unrestrained deficit financing, policies adopted by the Bank of Ghana have had little impact.

This inability of the Bank of Ghana to exercise effective control over the money stock may be exacerbated by the existence of a large informal financial sector, and consequently the holding of a large amount of cash outside the control of the central bank. This is evidenced by the high currency to broad money ratio in the economy. However, this high currency ratio also provides an automatic dampener to expansions in the money supply. A thorough study is required of the informal financial sector in order to integrate it properly in the economy and also to harness it as avenue for the mobilisation of savings for development. An education of the public on banking habits and a programme to restore public confidence in the banking system will help a great deal in the restructuring of the banking system. The government has been the chief cause of credit and monetary expansion in the country. Credit granted to the Cocoa Marketing Board and other parastatal organisations had to be financed mostly by creating new paper money. Any credit squeeze which is directed at the private sector will only end up crippling production without yielding the desired slow down in monetary expansion. Education of the public on the advantages of holding other financial instruments like government bonds and bills may help ease inflationary pressures in case of deficit financing. The recent establishment of a stock exchange may help, but with the lack of education of the public, one doubts whether the full advantages of the market can be realised. The Discount House which was established could adequately perform the functions of the stock exchange. What is needed now is the education of the public on these new institutions which are alien to them.

The Bank of Ghana is too much under the yoke of Central Government. There are instances when one wonders who is in charge of monetary control.[12] The Bank should be decoupled from the Ministry of Finance and Economic Planning. This will help the two bodies pursue independent monetary and fiscal policies. Once named to the post, the Governor of the Bank should be assured of job security in order for him to pursue independent monetary policies without fear of recrimination from government.

---

[12] A Ghanaian Times editorial of 29 June 1989 made reference to a directive from the Ministry of Finance and Economic Planning to the Banks, instructing them to suspend the granting of loans temporarily from 1 March 1989.

BIBLIOGRAPHY

Adekunle, J.O. (1968); 'The Demand for Money: Evidence from Developed and Less Developed Countries', IMF Staff Papers, Vol.15(2), pp 220-266.

Atiemo, J.B.(1989); 'Cocobod's Operations: Operational Issues Relating to Purchasing, Haulage and Processing of Cocoa'. Paper read at National Seminar on the Cocoa Industry. Accra.

Frimpong-Ansah, J.H. (1971); 'The Ghanaian Banking System and The Challenges of our Time'. Bank of Ghana Quarterly Economic Bulletin, Vol. 11(1).

Frimpong-Ansah, J.H. (1989); 'An Economic Analysis of the Cocoa Industry'. Paper presented at University of Warwick Workshop, 5 February 1989.

Gockel, F.A. (1983); 'Monetary Control: Theory and Evidence The Case in Ghana'. Unpublished M.Sc. Thesis. Legon: University of Ghana.

de Graft-Johnson, J.C. (1967); 'Some Historical Observations on Money and the West African Currency Board', The Economic Bulletin of Ghana, Vol. XI(2).

Kmenta, Jan (1986); Elements of Econometrics (second edition). New York: Macmillan Publishing Company.

Steel, W.F. (1973); 'Social and Economic Statistics of Ghana'. Legon: University of Ghana (unpublished).

World Bank (1990); World Tables 1989/1990. Washington DC: World Bank.

34

APPENDICES

Appendix 1

Distribution of Bank Deposits and Branches, 1988

Banking	Deposits (¢ billion)	No. of branches	Development institution banking share (%)
(a) Commercial banks			
Ghana Commercial Bank	36	163	
Barclays Bank	12	37	
Standard Chartered Bank	12	24	
Bank for Housing and Construction	7	11	60
National Savings and Credit	3	19	
Bank of Credit and Commerce	2	1	
(b) Development banks			
Agricultural Development Bank	2	46	70
National Investment Bank	2	9	75
Social Security Bank	18	50	50
(c) Other			
Ghana Co-operative Bank	3	49	
Merchant Bank Ghana	3	2	

Note: Deposit shares based on end-1988 deposit levels, excluding Government and non-resident deposits.

Appendix 2

Indicators of Fiscal Performance, 1965-1988 (Ratios)

| Year | As ratios of GDP | | | Financing as ratio of deficit | | |
	Revenue	Expenditure	Deficit	Internal loans	From Bank of Ghana	External loans
1965	0.19	0.26	0.06	0.88	n.a.	0.03
1966	0.15	0.20	0.05	0.87	n.a.	0.34
1967	0.17	0.23	0.06	0.76	n.a.	0.19
1968	0.18	0.24	0.06	0.71	n.a.	0.27
1969	0.17	0.20	0.03	0.65	n.a.	0.41
1970	0.19	0.22	0.02	0.90	n.a.	0.96
1971	0.18	0.22	0.04	0.82	n.a.	0.27
1972	0.15	0.21	0.06	0.49	0.08	0.51
1973	0.11	0.17	0.05	0.90	0.83	0.10
1974	0.13	0.17	0.04	1.01	0.94	0.01
1975	0.15	0.23	0.08	1.00	1.51	0.00
1976	0.13	0.25	0.11	1.00	0.88	0.00
1977	0.10	0.20	0.09	0.99	1.36	0.01
1978	0.07	0.16	0.09	0.91	0.22	0.04
1979	0.10	0.17	0.07	1.00	0.21	-.-
1980	0.07	0.11	0.04	0.84	1.78	0.16
1981	0.05	0.11	0.06	0.92	0.38	0.08
1982	0.06	0.11	0.06	0.91	0.14	0.08
1983	0.06	0.08	0.03	0.78	0.09	0.20
1984	0.08	0.10	0.02	0.63	0.49	0.37
1985	0.12	0.14	0.02	0.53	0.27	0.46
1986	0.14	0.14	0.00	17.78	0.60	18.78
1987	0.15	0.14	0.01[+]	0.32	0.66	0.13
1988	0.15	0.14	0.01[+]	0.62	0.64	0.23

Note: [+] Budget surplus.

Source: Computed from IMF, International Financial Statistics, 1988 Yearbook, August
1989 issue from GSS's Quarterly Digest of Statistics, March 1989.

Appendix 3

Financial Indicators Current Prices
(millions of cedi)

	GDP	Currency	M1	M2	Change M2 %
1960	871	90	130	160	11.4
1961	932	90	150	180	8.8
1962	997	100	170	210	14.9
1963	1101	100	170	210	7.5
1964	1237	130	240	290	37.2
1965	1466	120	240	300	1.7
1966	1518	120	250	320	5.0
1967	1504	120	240	320	1.3
1968	1700	130	260	350	10.3
1969	1999	150	290	390	10.5
1970	2259	150	310	430	9.8
1971	2501	160	320	470	11.2
1972	2815	240	460	670	40.6
1973	3502	250	560	790	18.9
1974	4660	340	700	1010	26.6
1975	5283	490	1010	1390	38.0
1976	6526	710	1430	1900	37.2
1977	11163	1160	2390	3040	60.0
1978	20986	2120	4130	5130	68.6
1979	28222	2460	4680	5940	15.8
1980	42853	3520	6090	7950	33.7
1981	72626	6050	9410	12030	51.5
1982	86451	6960	11200	14830	23.3
1983	183638	10390	16720	20810	40.3
1984	270561	17630	26850	31960	53.6
1985	343048	22560	38310	46720	46.2
1986	511373	32350	55160	69120	47.9
1987	746000	48980	84170	105970	53.3
1988	1057867	67880	122030	155010	46.3

Note: Values at current prices.

Source: IMF, International Financial Statistics, various issues.

Appendix 4

National Accounts Data
(millions of cedi)

Year	GNP	Private cons.	Govt cons.	Net factor income	Gross dom. savings	Savings/ GNP (%)
1965	1447	1133	212	-19	121	8.4
1966	1504	1201	198	-14	119	7.9
1967	1479	1165	225	-25	114	7.7
1968	1650	1198	285	-50	217	13.2
1969	1941	1459	285	-58	255	13.1
1970	2211	1664	290	-48	305	13.8
1971	2449	1974	325	-52	202	8.2
1972	2775	2106	355	-40	354	12.8
1973	3472	2652	382	-30	468	13.5
1974	4613	3670	569	-47	421	9.1
1975	5241	3873	689	-42	721	13.8
1976	6478	5171	799	-48	556	8.6
1977	11123	8638	1409	-40	1116	10.0
1978	20938	17766	2371	-48	849	4.1
1979	28124	23649	2891	-98	1682	6.0
1980	42671	34232	4866	-182	3755	8.8
1981	72294	63333	6384	-332	2909	4.0
1982	86225	77619	5603	-226	3229	3.7
1983	182398	172140	10787	-1240	711	0.4
1984	266918	233023	19641	-3643	17897	6.7
1985	337280	284621	32241	-5768	26186	7.8
1986	498797	421849	56596	-12576	32928	6.6
1987	725451	608801	79332	-20549	57867	8.0

Note: Values at current prices.
Pre-1965 National Accounts data based on 1958 SNA.

Source: IMF, International Financial Statistics, various issues.

Appendix 5

Key Financial Rates and Ratios

Year end	Discount rate	Deposit rate	Lending rate	Inflation rate	Exchange rate($/¢)	Liquidity minimum	Ratio actual
1960	4.0	3.0	7.5	0.9	1.400	45	77.5
1961	4.5	3.5	7.0	6.2	1.400	54	47.3
1962	4.5	3.5	7.0	5.9	1.400	50	55.0
1963	.4.5	3.5	7.0	5.6	1.400	54	36.3
1964	4.5	3.5	7.0	15.8	1.400	54	70.0
1965	4.5	3.5	7.0	22.7	1.400	54	60.8
1966	7.0	3.5	9.0	14.8	1.400	54	78.7
1967	6.0	3.5	9.0	-9.7	0.980	54	66.5
1968	5.5	3.5	9.0	10.7	0.980	54	71.3
1969	5.5	3.5	9.0	6.5	0.980	35	60.9
1970	5.5	3.5	9.0	3.0	0.980	50	58.4
1971	8.0	7.5	9.0	8.0	0.550	40	50.9
1972	8.0	7.5	12.0	10.8	0.781	40	63.1
1973	6.0	5.0	10.0	17.1	0.870	40	60.5
1974	6.0	5.0	10.0	18.8	0.870	40	46.8
1975	8.0	7.5	12.5	29.8	0.870	40	57.0
1976	8.0	7.5	12.5	55.4	0.870	40	56.4
1977	8.0	7.5	12.5	116.5	0.870	67	62.4
1978	13.5	11.5	19.0	73.1	0.364	67	79.4
1979	13.5	11.5	19.0	54.5	0.364	67	89.1
1980	13.5	11.5	19.0	50.2	0.364	67	80.7
1981	19.5	11.5	19.0	116.5	0.364	60	80.0
1982	10.5	11.5	19.0	22.3	0.364	60	77.3
1983	14.5	11.5	19.0	122.8	0.033	45	79.1
1984	18.0	15.0	21.17	39.7	0.020	45	63.9
1985	18.5	15.75	21.17	10.3	0.017	40	65.4
1986	20.5	17.0	20.0	24.6	0.011	34	63.5
1987	23.5	17.58	25.5	39.8	0.006	29	40.8
1988	26.0	16.0	25.58	31.4	0.005	30	42.0

Source: Bank of Ghana, Annual Reports, various issues; Quarterly Digest of Statistics, June 1989, and International Financial Statistics, 1988 Yearbook.

Appendix 6

List of Variables and their Descriptions

GDP	:	Gross Domestic Product
M1	:	Money Supply
DT	:	Saving and Time Deposit
M2	:	Broad Money Supply
Cp	:	Currency with Public
Dd	:	Demand Deposits
CPI	:	Consumer Price Index
CDb	:	Reserves
Mb	:	Monetary Base
Cr	:	Currency Ratio
Rr	:	Reserve Ratio
Ir	:	Interest Rate
Er	:	Exchange Rate
Y1	:	log(M2)
X11	:	log(Mb)
X12	:	log(Ir)
X13	:	log(Cr)
X14	:	log(Rr)
Y2	:	log(M2/CPI)
X21	:	log(GDP)
X22	:	log(Ir)
X23	:	log(CPI)
X24	:	log(Er)
IREST	:	OLS estimation of Ir
ER1	:	1/er
ER2	:	er1/cpi
X241	:	log(er2)
X231	:	log(cpi/cpi(-1))
C	:	Intercept term
X242	:	log(er/cpi)

Appendix 7a

Money Supply Equation (2SLS Estimation)

Dependent variable is $Y1 = \text{Log}(M2)$
List of instruments: C, TRX11, IrEST, X13, X14
29 observations used for estimation from 1960 to 1988

Regressor	Coefficient	Standard error	T-ratio
INTERCEPT	-.3175	1.1452	-.2773
TRX11	.3354	.3246	1.0332
Log(Ir)	2.7376	1.1763	2.3274
Log(Cr)	1.1385	.8058	1.4129
Log(Rr)	-.4800	.3576	-1.3423
R-Squared	.9607	F-statistic F(4, 24)	146.6676
R-Bar-Squared	.9541	S.E. of Regression	.4634
Residual Sum Squared	5.1541	Mean of Dependent Variable	7.6450
S.D. of Dependent Variable	2.1642	DW-statistic	1.9873

Appendix 7b

Money Supply Equation (2SLS Estimation)

Dependent variable is $Y1 = \text{Log}(M2)$
List of instruments: INTERCEPT, X11, IREST, X13, X14
29 observations used for estimation from 1960 to 1988

Regressor	Coefficient	Standard error	T-ratio
INTERCEPT	-.3637	.1203	-3.0228
Log(Mb)	.8674	.0867	10.0099
Log(Ir)	.2360	.1694	1.3929
Log(Cr)	-.4943	.0938	-5.2699
Log(Rr)	-.2223	.0368	-6.0382
Log(M2(-1))	.0821	.0809	1.0143
R-Squared	.9997	F-statistic F(5, 22)	13115.0
R-Bar-Squared	.9996	S.E. of Regression	.0435
Residual Sum Squared	.0417	Mean of Dependent Variable	7.7368
S.D. of Dependent Variable	2.1457	DW-statistic	2.0386

Appendix 8a

Money Demand Equation (2SLS Estimation)

Dependent variable is Y2 = Log(M2/CPI)
List of instruments: C, X21, IREST, X23, X24, Y2(-1)
28 observations used for estimation from 1961 to 1988

Regressor	Coefficient	Standard error	T-ratio
INTERCEPT	-4.3956	2.1302	-2.0635
log(GDP/CPI)	1.0531	.4081	2.5802
log(Ir)	1.0215	.8015	1.2745
log(CPI)	-1.2474	.4161	-2.9982
log(Er)	.1027	.1073	.9572
Y2(-1)	.1966	.2908	.6760
R-Squared	.8475	F-statistic F(5, 22)	24.4493
R-Bar-Squared	.8128	S.E. of Regression	.1949
Residual Sum Squared	.8355	Mean of Dependent Variable	4.5793
S.D. of Dependent Variable	.4504	DW-statistic	1.8717

Appendix 8b

Money Demand Equation (2SLS Estimation)

Dependent variable is Y2 = Log(M2/CPI)
List of instruments: C, X21, IREST, X23, X241, Y2(-1)
28 observations used for estimation from 1961 to 1988

Regressor	Coefficient	Standard error	T-ratio
INTERCEPT	-4.3956	2.1302	-2.0635
log(GDP/CPI)	1.0531	.4081	2.5802
log(Ir)	1.0215	.8015	1.2745
log(CPI)	-1.3501	.5064	-2.6663
X241	-.1027	.1073	-.9572
Y2(-1)	.1966	.2908	.6760
R-Squared	.8475	F-statistic F(5,22)	24.4493
R-Bar-Squared	.8128	S.E. of Regression	.1949
Residual Sum Squared	.8355	Mean of Dependent Variable	4.5793
S.D. of Dependent Variable	.4504	DW-statistic	1.8717

Appendix 8c

Money Demand Equation (2SLS Estimation)

Dependent variable is Y2 = Log(M2/CPI)
List of instruments: C, X21, IREST, X23, X242, Y2(-1)
28 observations used for estimation from 1961 to 1988

Regressor	Coefficient	Standard error	T-ratio
INTERCEPT	-4.3956	2.1302	-2.0635
log(GDP/CPI)	1.0531	.4081	2.5802
log(Ir)	1.0215	.8015	1.2745
log(CPI)	-1.1447	.3359	-3.4077
X241	.1027	.1073	.9572
Y2(-1)	.1966	.2908	.6760
R-Squared	.8475	F-statistic F(5,22)	24.4493
R-Bar-Squared	.8128	S.E. of Regression	.1949
Residual Sum Squared	.8355	Mean of Dependent Variable	4.5793
S.D. of Dependent Variable	.4504	DW-statistic	1.8717