

MONETARY AND EXCHANGE RATE POLICIES IN GHANA, 1957-1982

BY

CLEMENT BENTIL AYISA

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To Ebo and Yaw, for whom I continue.

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CHAPTER ONE

INTRODUCTION

1.1 OBJECTIVE

The economy of Ghana has been plagued with a high rate of inflation and balance of payment disequilibrium for a very long time. The causes have been attributed by the monetarists to allowing aggregate demand to run ahead of supply, through excessive monetary expansion, via government budget deficit financing; demand therefore has to be restrained by appropriate and targeted monetary growth (Ahmad, 1970). Structuralists attribute the problems to rigidities in the pattern of production and demand (Killick, 1978); supply bottlenecks and other structural rigidities must be removed so that output can be raised to reduce the excess demand; resources should also be redirected to the external sector to improve the balance of payment. Both Schools accept the important role played by monetary and exchange rate policies.

The role of monetary policy and exchange rate policy in reducing internal and external imbalance has long been recognised. The evidence for this awareness,

in the case of Ghana, is the plethora of policy instruments which have been used at one time or another since the problems of high inflation and balance of payment deficit appeared in the early 1960s. However, relatively little is known about the quantitative characteristics of the interrelationships among monetary and exchange policies and output, inflation, balance of payment and government budget.

The objective of the thesis is to specify and estimate a model that will simultaneously capture the relationships among monetary growth, fiscal budget, balance of payment, output and prices. The macro-econometric model which is estimated is used to examine the possible effects of monetary and exchange rate policies on the important variables in the economy. It also provides an indication of the dynamics of the economic system and the response of the variables to policy changes.

After a careful appraisal of exchange rate policy in the period 1957-1982, an alternative exchange rate policy is proposed and hypothetical exchange rates derived from the proposal. Then, a set of simulation experiments is conducted using the estimated model and the hypothesised exchange rates in order to predict the effects of the exchange rate policy change on internal and external balance.

To achieve the objective, this introduction and review of the literature on monetary and exchange rate policies is followed by Chapter Two which gives a survey of the performance of the economy over the period 1957

to 1982, stressing the important structural changes and the factors which make active exchange rate policies imperative. Chapters Three and Four give the historical evolution of monetary and exchange rate policies in Ghana, together with critical analysis of the various policy instruments employed. In Chapter Five an eclectic macroeconometric model is presented which aims at portraying the various interrelationships in the important economic variables of money supply, exchange rate, output, balance of payment and government budget deficit. The chapter also includes a simulation exercise to give policy insight. In Chapter 6 we test the hypothesised exchange rate and the simulated income and money supply to find out whether these conform to the predictions of the monetary approach to exchange rates.

The emphasis on monetary and exchange rate policies in the thesis does not in any way suggest that other factors are ignored or even played down. Indeed it is recognised that in the long run, the most important factors affecting economic growth in Ghana might be sensible internal policies - especially with regard to pricing and the role of the public sector, political stability, and structural readjustment, especially as the latter affects food production and relative prices. The role of monetary and exchange rate policies is seen as the means for correcting the existing distortions which affect the relative rewards for production, as against speculation and import trade activities, factors which in the long run have much effect on internal and external balance - for a small open economy such as

Ghana - and on economic growth. A second consideration is that structural rigidities expose Ghana to inflationary tendencies which call for greater control over money supply and greater need to change the par value of the exchange rate at relatively frequent intervals to prevent the currency being overvalued for long periods.

Thirdly, proper use of monetary and exchange rate policies could provide the tools for expenditure-switching and expenditure-reducing policies that are needed to correct the fundamental and persistent disequilibrium in the external balance. Governments in Ghana have relied more on various direct control methods, which have been neither consistent nor useful, and at worst have exacerbated the distortions in the economy.

On the other hand, monetary and exchange rate policies should be compatible with the macroeconomic objectives of the country. Government policies should not accentuate the distortions. Therefore, there should be rational criteria by which the authorities can determine the appropriateness of any policy action, based on the short-term as well as long-term objectives of economic policy as a whole at any given time and the current state of the economy and its relationships to the outside world.

The choice of the period of study was made in order to capture fully the various phases of monetary and exchange rate policies. 1957 was the year of independence. More important, it represents the middle

of the period of relatively liberal foreign trade regime. Ghana was then a member of the sterling area and used the currency issued by the West African Currency Board for Ghana, Nigeria, Sierra Leone and the Gambia. Even though balance of payment deficit began to appear immediately after independence, the accumulation of large reserves in the immediate preceding years enabled imports to be sustained. More important, in March 1957, five days before independence, the Bank of Ghana was established to perform central bank functions. The early years of the bank's existence was spent in making a transition - including the issue of the country's own currency - from the currency board system to the pursuit of an active monetary policy, starting from about 1960.

Even though 1982 saw some success in the attempt to control the growth of money supply, reducing it to 19 per cent increase from about 50 per cent in the preceding years, there was no evidence that there was a decisive change in the course of economic policy.¹ By taking the study to 1982 we are able to formulate a long-run dynamic model that will take into account the long-run time path of the variables.

Economic literature does not lack studies on the effect of monetary and exchange rate policies, jointly or separately, on the behaviour of important economic

¹ In 1983, exchange rate policy was altered. There was increased willingness to devalue at frequent intervals, which, in a little over two years altered the exchange rate from £2.75=\$1 to £60=\$1.

variables in developing countries. What follows is a review of some of the important contributions.

1.2 SURVEY OF THE LITERATURE

The collapse of the Bretton Woods system and the consequent evolution of the international monetary system into the regime of flexible exchange rates has opened the flood-gates for a renewed study of the role of exchange rates. The literature on both economic theory and empirical analysis of exchange rates has been vast. G.K. Helleiner (1974) noted that the international changes 'provide a convenient excuse to pursue a policy which could not be politically sustained on its own merits but which is seen by the government as desirable.'

Interest in the effects of exchange rates on the balance of payment, however, goes as far as the post war years when the 'elasticities approach' came in vogue. The approach emphasised that devaluation (and for that matter revaluation) affected the relative prices of traded and non-traded goods, thus switching demand and output between the two sectors. The realisation that devaluation also affected aggregate income and expenditure led to the development of the 'absorption approach'. The absorption approach asserts that devaluation reduces the absorptive capacity of the country, reducing aggregate demand to ensure equality of aggregate demand and aggregate supply. Later, attempts were, made to synthesise the two approaches (Tsiang, 1961).

In the 1970s however, support grew for the hypothesis that the balance of payment is essentially a monetary phenomenon. A number of articles were written on the subject, some of which were collected in IMF (1977) and Frenkel and Johnson (Eds.) (1976, 1978). The approach was developed in the atmosphere of renewed interest in monetary problems. But it was also a response to the practical need to answer monetary policy questions, especially after the oil price shocks of the first half of the 1970s, and its accompanying balance of payment deficits and inflation for most non-oil developing countries. In addition, there was the generalised floating among the developed countries in 1973 which ended the Bretton Woods exchange arrangements which had existed since 1947 (when the IMF began operations). Increasingly, the need to control domestic credit as a major instrument of demand management and balance of payment control evolved, and with it the integration of monetary and exchange rate policies as important instruments of economic control.

The effects of monetary policy in a small open economy are complex and uncertain. Moreover, in open economies, governments are faced with the additional task of stabilising the balance of payments. Thus, there is always the need to study the effects of monetary and exchange rate policies together and to ensure their proper coordination. One such study has been done by Galbis (1975). While claiming that the model can be adapted to the operations of the external sector under both fixed and flexible exchange rate systems and with

or without capital controls, and he indeed examines the implications of the model under different scenarios, the model is specifically developed for the economy of Canada, which is a developed economy. Prices and inflation do not play important role in the model.

Much work has been done on exchange rate policies in developing countries. Khan (1974), in a study of 15 developing countries including Ghana, shows that price elasticities of imports and exports tend to be much larger than perhaps would be generally expected, and also similar in a number of cases. The elasticities for Ghana were estimated at -0.438 for exports and -1.057 for imports. Income elasticities are on the low side for both imports and exports (0.238 and 0.384 respectively for Ghana) and also are fairly similar for a number of countries. It therefore appears that prices do play an important role in the determination of imports and exports. Also, the fairly high estimated elasticities for most of the 15 countries, including Ghana, suggests that the Marshall-Lerner condition for successful devaluation would be easily satisfied. This, perhaps establishes the need for a more active exchange rate policy in Ghana.

Romeo M. Bautista (1980) makes similar observations. He notes that many less developed countries are characterised by a fundamental disequilibrium in their foreign trade and payments, a condition inherited from the pre-1971 system of fixed exchange rates. While in the past currency devaluation was a politically hazardous policy measure (the 1971

devaluation in Ghana was immediately followed by a military coup with the devaluation as one of the reasons) (see also World Bank, 1984), the present regime of generalised floating among the major currencies makes it almost necessary for the government in a developing country to actively manage the exchange rate, providing also an opportunity to revamp their trade and payments system and improve the efficiency of resource allocation. He however, notes that real exchange rate is determined by exchange rate policy as well as rate of domestic inflation; therefore, government policy should give some attention to the proper coordination of exchange rate management with domestic policies (monetary, fiscal, wages and prices) affecting the general price level. His work, therefore, underlines the need for active exchange rate policy as well as sensible monetary policy that will ensure that domestic rate of inflation is not much higher than the foreign rate.

Kemal Dervis et al. (1981) also demonstrate that adjusting by rationing is much more costly in terms of GDP loss than adjusting by devaluation because of the distortions rationing causes. Moreover, in general, export oriented consumer goods industries benefit from devaluation, while domestic capital and intermediate goods industries benefit from fix-price rationing. In Ghana few industries would be described as capital or intermediate goods industries.

Bhagwat and Onitsuka (1974) examined the export-import responses to devaluation in 46 non-industrial countries in the 1960s, including Ghana.

The devaluations were divided into three groups:

1. Independent and discrete devaluation. (this included Ghana's devaluation of 1967).
2. Devalued because of devaluation in Britain.
3. Devalued because of devaluation in France.

The last two, unlike the first, devalued not so much to correct an existing fundamental disequilibrium as to avoid unfavourable repercussions on external commercial and financial relationships. This difference led to the differences in trade response to devaluation, especially response to exports. The following is the summary of findings:

1. In many cases, especially for group 1, the effective devaluation in terms of the impact on domestic currency prices of traded goods was substantially less than the magnitude of the nominal devaluation, because formal devaluation was generally preceded by ad hoc measures to encourage exports and restrain imports, and devaluations were usually accompanied by either elimination or reduction in these ad hoc measures. To some extent, this was the case in Ghana.
2. The effective devaluation was smaller in groups 2 and 3 because there was a simultaneous and equivalent devaluation by their important trading partners.
3. In most of group 1 export growth had slowed down in the immediate pre-devaluation period because the increasing overvaluation was not adequately offset by ad hoc export supports. Again, this point applies to Ghana.
4. In almost all group 1 cases, post devaluation export performance was better than pre-devaluation period,

especially if supported by financial policies which transfer resources to the export sector.

5. Export volume of major primary commodities did not increase much because (a) prices were often set by government and were not changed post-devaluation, and (b) the supply of certain primary commodities (eg. cocoa in the case of Ghana) may involve time lags. This could mean that supply response to devaluation should not be expected to be high in the short run. In the long run, however, supply of the exportable primary commodities is likely to increase, provided the government is willing to encourage shift of resources into the production of the exportables.

6. Pre-devaluation overvaluation of currency did not result in acceleration of imports because of cost and administrative restrictions. In Ghana, exchange and import controls were initiated as early as 1962.

7. In most cases imports continued to grow after devaluation, in some cases accelerating, because the effects of export-led higher level of domestic economic activity and import liberalisation measures were stronger than the price effect of devaluation in the opposite direction. Also, increased demand was possible because of increased flow of foreign capital and greater foreign exchange availability.

The increased imports after devaluation should not be a problem if the devaluation also results in increased export earnings.

In a similar work, Donovan (1981) asserts that depreciation of currency is intended as a direct and

powerful method of reducing real domestic expenditure and relative prices so as to divert economic resources toward the external sector, thereby improving the balance of payments, and laying the ground for sustained economic growth. His emphasis is therefore on the expenditure-switching effects of devaluation. But he notes that the behavioural responses to relative price changes may be slow and uncertain in many countries. In addition, the potential disruptive effects of abrupt changes in relative prices may be significant; in particular, the once-and-for-all rise in the cost of living resulting from a depreciation, and the subsequent implications for the distribution of income, may have serious social and political repercussions. To counter this negative effect of once-and-for-all devaluation, this thesis takes the view that it is better for the country to have regular and smaller changes in exchange rates, and avoid having overvalued currency for very long periods.

Looking at real growth in exports, imports and GDP and rate of domestic inflation, Donovan (ibid) gives the following responses to exchange rate action:

1. Expenditure reduction, via the real cash balance effect, will lead to a decline in domestic expenditure, including imports, through reduction in ratio of the stock of money to the domestic currency value of goods. This should reflect favourably on the balance of payment.

2. Expenditure switching: Due to shift in relative prices, domestic demand is shifted away from traded

toward non-traded goods. There is also increased supply incentives for domestic producers of import substitutes and exports. This has favourable effect on the external balance.

3. Exports: On the average, exchange rate devaluations were associated with a significantly improved export performance, especially for those with import liberalisation programmes, especially as input shortages from the prior restrictiveness of the import system had probably exercised a major restraining effect on exports (eg. Burma, Bangladesh, Pakistan, Sudan). The improvement was also over a longer period, post devaluation.

4. Imports: Significant reduction in imports for import-restraint programmes were noticed (eg. Bolivia, Ecuador, Israel, Jamaica, South Africa and Yugoslavia). For liberalisation programmes, both real imports and exports rose sharply, but the trend in relative growth rates of imports and exports did not worsen significantly, notwithstanding the liberalisation.

5. Inflation: Though inflation was not reduced on average, a deterioration of individual country positions vis-a-vis the world average (for non-oil LDCs) was prevented, despite the significant inflationary bias on consumer prices caused by the depreciation itself.

6. Real GDP: Economic growth in the import-restraint programmes declined, perhaps because of the strong dose of contractionary demand policies; for the rest, economic growth rose markedly.

7. Another possible influence of devaluation is the

'announcement effect' which causes increased confidence in the currency and subsequently increases capital flow.

The foregoing demonstrate the power of active exchange rate action to correct both internal and external imbalances. But it also demonstrate the need to combine exchange rate policy with supporting measures; hence the need for an active monetary policy. And if we accept that there is a link between the exchange rate and the supply of money, then the need for coordination of exchange rate and monetary policy become imperative.

On the nature of exchange rate policy, the literature is not silent on the degree of exchange rate flexibility that a country should adopt. There is general consensus that free floating is not feasible for most developing countries (Williamson, 1982). However, the question of what to peg to is not easily resolved (ibid.). On the other hand, there is increasing recognition of need for greater flexibility on the part of less developed countries. Heller (1978) and Holden et al. (1979) identify the relevant characteristics for a country to decide on the degree of exchange rate flexibility as: size of the country (measured by the GDP), degree of openness and international financial integration, degree of capital mobility, geographic and product concentration of its trade and the degree of divergence in the inflation rate from world average. But as noted by Argy (1982), one could also argue, contrary to the hypothesis that open economies should have less flexible exchange rates, that the more open an economy the greater is its exposure and greater the case for

flexible rates which would reduce its exposure. Also, it could be argued that less diversified economies ought to have flexible rates in order to stabilise their trade and domestic output. The discriminant analysis made by Heller (1978), however, could be interpreted as indication of whether a country ought to have a more or less flexible rate, given its unique combination of characteristics. In this sense it is interesting to note that Ghana's score of -1.6 (third on the scale of those classified as peggers) perhaps indicate a need for greater flexibility. Moreover, if the data used had been that of 1976 when inflation divergence for Ghana had been over 45%, instead of the 1975 data, Ghana could have been classified as a floater.

In the literature on the degree of flexibility of exchange rates for developing countries, much emphasis has been placed on the inadequacy of the domestic financial markets and the lack of their integration with the world markets (Whickam, 1985; Black, 1976; Branson and Katseli-Papaefstratiou, 1981). The argument places much importance on the role of capital flows in the stability of the exchange rates. The exchange rate, in this scheme, is like the price of any other asset, the level of which is determined by the relative demands for and supply of domestic and foreign financial assets. The argument goes on further, that since many developing countries do not have capital markets which are integrated with the outside world, so that domestic financial assets and foreign financial assets are not substitutes for each other, the choice for many

developing countries is to determine what to peg to, how to adjust the peg, and how often. This is the line taken by the thesis in respect of Ghana's exchange rate policy, and each of these issues will be discussed in greater detail later in Chapter Four.

The question of which currency to peg to (assuming it is accepted that pegging is the optimal policy) is answered by recourse to the theory of optimum currency area. When a developing country (or for that matter any other country) pegs its currency to the currency of another country, there is a creation of a currency area. The theory of optimum currency area seeks to unravel the main factors that determine whether it is desirable for a country to join a currency area (Heller, 1978; Bird, 1979). These factors may include the degree of openness of the economy, the rate of economic growth, the rate of inflation, and the degree of diversification in trade (Kenen, 1969; Ishiyama, 1975).

Some work has been done to integrate studies on monetary policy and exchange rate policies. Hodrick's (1978) thesis is that in the long run the rate of change of the exchange rate will be the rate of growth of per capita nominal money balances in the domestic country minus the rate of growth of per capita money balances in the foreign country. But his study relates to advanced economies of United States, United Kingdom and Germany with considerable capital flow. However, it is an interesting proposition which needs inquiry as to its applicability to Ghana in the quest for controllable variables. These will then receive the attention of the

authorities responsible for the formulation of exchange rate policies. The work of Vicente Galbis (1975) is more relevant. Among the many conclusions, Galbis notes that a fixed exchange rate system will bring about recurrent crises of the exchange rate and the balance of payments - particularly when the monetary authorities attempt to affect income and employment by monetary policy. This assertion raises serious doubt about the appropriateness of the exchange rate policy Ghana followed between 1957 and 1982 in which the exchange rate was essentially fixed to the dollar, with reluctance to make changes in the parity even when change was obviously warranted.

The argument put forward by Hodrick (1978), like others who had tried to underscore the importance of monetary considerations in exchange rate policies (Johnson, 1972; Connolly and Taylor, 1976), was considered within the framework of the monetary approach to the balance of payment. This line of analysis suggests that the causes of balance of payment surpluses or deficits are the inequality between the demand for and supply of domestic money stock, relative to the foreign monetary stock. An increase in the domestic money supply via increased domestic money creation, by either central or commercial banks, leads to excess supply of money which is in turn reflected in the balance of payment deficits. The effect of a devaluation (or a change in the exchange rate) is to raise (change) domestic prices and the corresponding demand for money. So long as the increased money demand is not matched by more domestic credit creation, devaluation is bound to

improve the balance of payment (Cooper, 1971).

These studies on the effects of exchange rate adjustments assume that there is an appropriate, even unique, exchange rate which is desirable for a country to maintain. That is to say it is possible to keep the balance of payment in equilibrium if the 'right' exchange rate is maintained. The question that has to be answered then is what determines the exchange rate.

There are two broad institutional arrangements for determining the exchange rates: the flexible exchange rate system and the fixed exchange rate system. Under both arrangements, the exchange rate is determined by the interaction of the forces of demand and supply of foreign exchange, at least in the long run. Under the flexible system, the exchange rate is determined by the free working of the forces of demand and supply. But under the fixed system the exchange rate is made to remain fixed and effort is put into ensuring that supply is brought into equality with demand, possibly through other government policies. In either system, it is imperative to discover what lies behind the supply and demand in order to determine the effects of policy changes in the exchange rate and the balance of payment.

Under the old gold standard, the strong link between the exchange rate and the money supply meant that exchange rate was determined by the supply of and demand for money. Changes in money supply triggered off Hume's price-specie-flow mechanism. An increase in money supply, for example, increased the cost structure and prices in the country, relative to those in other

countries. The country's demand for imports increased while demand for its exports fell, it was argued. This resulted in a reduction in the quantity of the country's currency, as specie flowed out of the country, and eventually restored balance of payment equilibrium when money supply had been reduced to the appropriate level. Monetary policy was thus the main instrument of balance of payments adjustment.

The link between the exchange rate and the money supply has remained, with varying emphasis, in all theories of exchange rate determination after the end of the gold standard. Four of these theories are examined below.

(a) The post-Keynesian theory

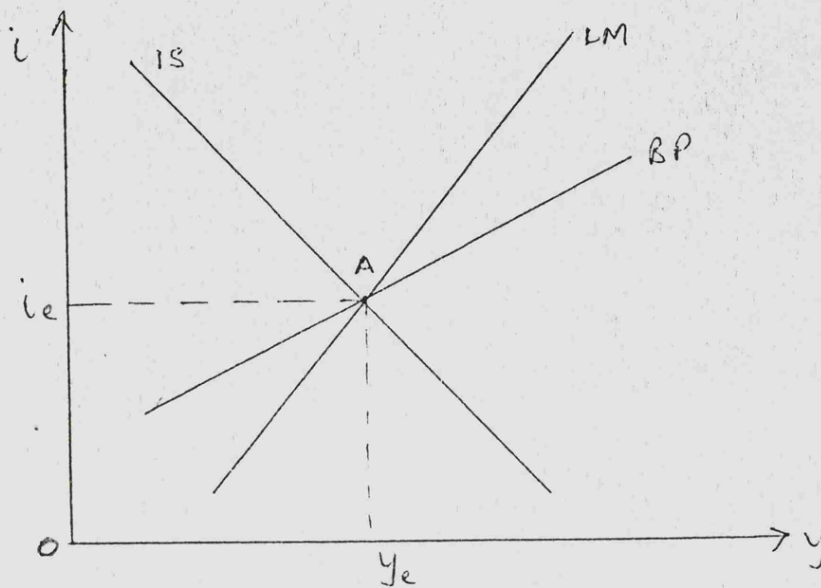
This theory of exchange rate determination is an extension of the standard Keynesian model to an open economy. The theory was initially developed by Fleming (1962) and Mundell (1963) (see Pierce and Tysome, 1985; Dornbusch and Fischer, 1984).

The Fleming-Mundell model, as it is often called, recognises the interdependence of the money market, the goods market and the balance of payment. No one of these three can maintain a position of equilibrium unless it is simultaneously a position of equilibrium for the other two. Such a simultaneous equilibrium for all three is marked A in Figure 1.1.

In Figure 1.1, LM represents the money market equilibrium schedule. Each point on the LM curve is a combination of interest rates and levels of income such

Figure 1.1

Equilibrium with LM, IS, and BP



that the demand for real balances is equal to the supply. The money market is therefore in equilibrium only on the LM curve. The positive slope of the LM curve shows that an increase in the interest rate is accompanied by an increase in the level of income for the money market to be in equilibrium. This is because an increase in interest rates reduces the demand for real balances; to maintain the demand for real balances equal to the fixed supply, the level of income has to rise. In an open economy with international capital movement, the money supply is influenced by inflow or outflow of capital in response to foreign exchange movements.

The IS curve is the goods market equilibrium schedule and shows combinations of interest rates and output such that planned spending equals income. At each

point on the curve planned investment equals savings. The negative slope reflects increase in aggregate demand associated with a reduction in the interest rate. Lower interest rate increases investment spending, thereby increasing aggregate demand and thus the equilibrium level of income. Points above and to the right of the IS curve represent conditions of excess supply of goods.

In an open economy with international trade, there is also a balance of payment equilibrium schedule (BP in Fig. 1.1). The schedule represents combinations of income and interest rates that keep the balance of payment in equilibrium. Assuming that the balance of payment is initially in equilibrium, and assume that there is an increase in the level of income, resulting in a rise in imports. This will result in balance of payment deficit. To restore equilibrium to the balance of payment, interest rate will have to rise to induce net capital inflow. Thus, increases in income must be accompanied by higher levels of interest rates for the balance of payment to remain in equilibrium. This gives the BP curve a positive slope. All points to the south-east and right of BP are points of balance of payment deficit. It is when all the curves, IS, LM and BP, intersect that there is simultaneous equilibrium in the goods market, the money market and the balance of payments.

The exchange rate is determined within this standard macroeconomic model. The exchange rate influences the price competitiveness of exports and import substitutes. Now, assume that we start from a

position of equilibrium in the goods market, the money market and the balance of payment (i.e. point A in Fig. 1.1). If there is an increase in money supply interest rates will have to fall. Aggregate demand then increases to raise the level of income. This will be accompanied by increase in net imports leading to balance of payment deficit. To restore equilibrium in the balance of payment the exchange rate will have to depreciate in order to increase exports. The actual mechanism for restoring equilibrium in the balance of payment and in the other markets is different under fixed and floating exchange rate systems. Under a floating exchange rate system the exchange rate acts as the equilibrating mechanism to keep the demand for and supply of the country's currency in balance. Under fixed exchange rate system, however, the authorities will have to buy or sell currency (according to whether there is a deficit or surplus) in order to maintain the parity of the currency. Therefore, balance of payment deficit, for example, will have to be met by a selling of foreign reserves, thus reducing the money supply, foreign reserves being a component of the money supply. The reduction in money supply restores equilibrium to the money market, the goods market and the balance of payment.

The working of the system under the fixed and floating exchange rate systems are illustrated as below:

(i). In Figure 1.2 the initial position of general equilibrium is A with interest rate of i_e and income of y_e . An expansion of the money supply will shift the LM

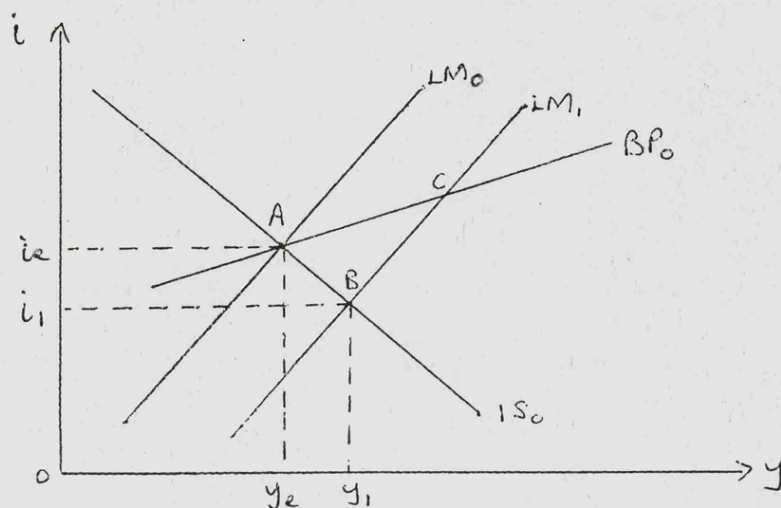
curve from LM_0 to LM_1 . This results in equilibrium in the goods and money markets at B with lower interest rate i_1 and higher income, y_1 . However, the balance of payment is in disequilibrium because higher imports and lower interest rates mean increase in outflow of capital. The outflow of capital will cause a fall in the money supply and the movement of the LM curve towards the left till it reaches its original position LM_0 , where the balance of payment (as well as the money and goods markets) will be in equilibrium and the contraction of money supply will cease. Interest rates and income will be back at their original positions. Therefore, the monetary expansion fails to have any permanent affect on either interest rates or income.

The authorities may continue to expand the money supply by domestic credit creation, thus preventing the LM curve from returning to LM_0 . Such an action, however, cannot be continued indefinitely because the capital outflow will eventually exhaust the country's foreign exchange reserves. If the authorities institute exchange controls to restrict the outflow of capital, balance of payment deficit will become chronic and the country will increasingly be unable to defend the fixed parity.

(ii). Point A in Fig. 1.3 again represents equilibrium in the goods market, the money market and the balance of payment, with income and interest rates of y_0 and i_0 respectively. Again, an increase in money supply shifts the LM curve to LM_1 , intersecting IS curve at point B. The balance of payment is now in disequilibrium. But because the exchange rate is flexible, it will move

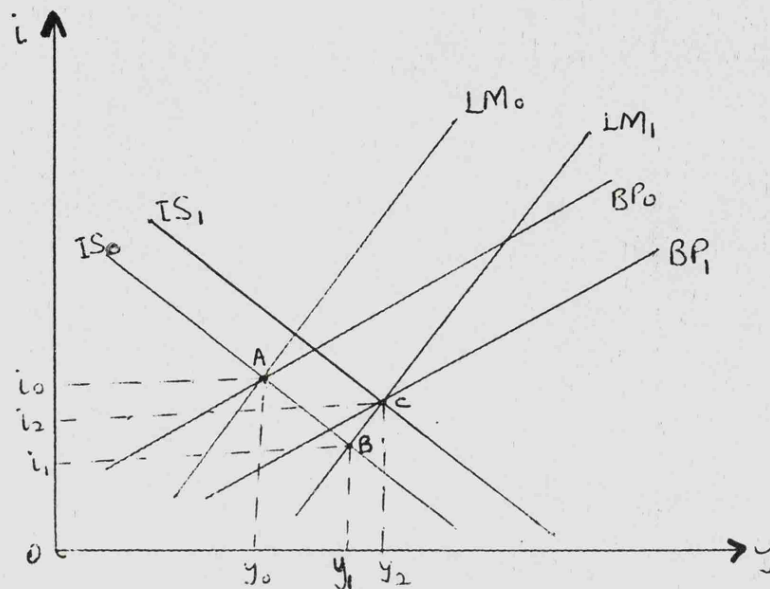
Figure 1.2

Expansion of money supply under fixed exchange rates



(depreciate) to keep the balance of payment in equilibrium without any net movement of money. The LM curve, therefore, need not move back to LM_0 . But at B, interest rate is lower and income higher than at the initial point A. The lower interest rate will induce net outflow of capital while imports will increase as a result of the higher incomes. The exchange rate will depreciate to increase the price of imports and lower the price of exports. The BP curve will then shift to BP_1 as exports rise and imports fall. This will also shift the IS curve to IS_1 because of the increase in aggregate demand. When all shifts have been accomplished, a new equilibrium is established at C, where interest rates and levels of income are higher than initially. But the external value of the currency (exchange rate) is lower than before.

Figure 1.3
Expansion of Money Supply under Floating Exchange Rates



Several criticisms have been made against this post-Keynesian model of exchange rate determination (see Pierce and Tysome, 1985, p.229). Firstly, it is alleged that the model ignores the fact that differences in international interest rates is sometimes due to exchange rate expectations, rather than differences in credit creation. Secondly there is no recognition of the fact that currency depreciation may mean higher domestic prices and thereby a fall in the real value of money supply which would then force the LM curve in Fig. 1.3 to return to LM_0 . Thirdly, it fails to take into account the lags in the response of output and trade flows. It assumes that each and every country has the capacity to expand output in response to increase in money supply. Fourthly, it assumes that output responds to interest rate changes. In many developing countries the real interest rates are negative and do not induce the same

response in aggregate output and aggregate demand. Lastly, the role given to capital flows in the model may be appropriate only for short-run analysis. In the long-run capital flows may cease once stocks have been optimally allocated. In developing countries, capital flows may not perform the same role assigned to it because of the absence of suitable interest-yielding local assets which would induce capital inflow when required. The absence of capital and money markets also reduce the movement of capital, even if there are no exchange controls.

(b). The monetary approach to exchange rate dermination

The approach has certain elements and assumptions (see Frenkel, 1978; Pierce and Tysome, 1985). The first is that the balance of payment is a monetary phenomenon. There is a direct relationship between the domestic money supply and the balance of payments of an open economy. A balance of payment deficit, for example, will contract the monetary base and money supply. Attempts by the authorities to sterilise the changes in money supply is not feasible in a world of integrated financial markets and high volume of mobile international capital ready to take advantage of interest-rate differential across international boundaries.

Secondly, the approach assumes that the demand for money is a stock demand, not a flow demand, and is a stable function of a small number of variables. This stability ensures that excess money supply, for example, is not absorbed in idle cash balances like in the

Keynesian scheme, but reflected in the balance of payment. The demand for money model is usually set out as a function of the price level (P), the level of income (y) and the rate of interest (i), i.e.

$$M = L(P, y, i) \quad \dots\dots(1)$$

or in real terms,

$$M/P = L(y, i) \quad \dots\dots(2)$$

There is similar demand for money function for the foreign country,

$$M^*/P^* = L(y^*, i^*) \quad \dots\dots(3)$$

where * indicates the foreign country variable.

The approach thirdly assumes international commodity arbitrage, so that purchasing-power-parity (PPP) prevails among all national currencies. The PPP is represented as

$$P = EP^* \quad \dots\dots(4)$$

where E is the exchange rate. Equation 4 can be re-written as

$$E = P/P^* \quad \dots\dots(5)$$

Substituting in (5) equations (2) and (3) gives

$$E = \frac{M L(y^*, i^*)}{M^* L(y, i)} \quad \dots\dots(6)$$

Equation (6) makes the exchange rate the relative price of the two national monies and is determined by the supply of and demand for those monies (Hodrick, 1978 p.97; Bilson, 1978, p.75). This is the basic proposition of the monetary approach.

The fourth assumption is that national income is given, at its full or natural level, so that increase in money supply per se cannot increase the national income.

Finally, the monetary approach assumes that interest rates are fixed by foreign rates and exchange rates expectations. Any difference between the domestic and the foreign interest rates is equal to the expected change in exchange rates. This is the interest parity condition which is shown as

$$i - i^* = (E^e - E^s) / E^s \quad \dots\dots(7)$$

where $(i - i^*)$ is the interest differential, E^e is the expected future rate of exchange and E^s is the current spot rate. $(E^e - E^s) / E^s$ is then the expected depreciation of the domestic currency. If domestic interest rates increase by a certain percentage (from a condition of initial equilibrium) then the currency is expected to depreciate by a proportionate percentage.

With these elements of the monetary approach spelt out it is easy to trace the effect on the balance of payment and exchange rate of a change in money supply.

Under a fixed exchange rate, the monetary approach provides a theory of balance of payments determination. Assume that as domestic credit expansion results in excess money supply, individuals seek to adjust their portfolio by increasing the demand for foreign goods and assets. This has the tendency to depress the exchange rates. The authorities, wishing to maintain the fixed exchange rate will have to sell foreign exchange. This contracts the monetary base and money supply till eventually equilibrium is restored in the money market.

Under a floating exchange rate, the monetary approach becomes a theory of exchange rate determination. The exchange rate is determined by the

stock equilibrium conditions in the money market. An excess of money supply again puts the exchange rate under downward pressure, but in the absence of official intervention, the exchange rate depreciates. Domestic prices will have to rise in line with PPP, leaving the real money supply unchanged. (Note that price elasticity of money demand is assumed to be unity).

The approach considers devaluation to correct balance of payment disequilibrium as effective only through its effect on the demand for and supply of money and work only if they reduce the real value of nominal money balances through an increase in domestic price level.

Like other economic models, the monetary approach has had a number of criticisms levelled against it. One criticism is the assumption of stable demand for money function. It is argued that the demand for money may not be stable in all countries, and that not all the determinants of the function are appropriate in every country. For example, demand for money may not respond to interest rates in many developing countries. Here, the interest rates are institutionally fixed, real rates of interest are largely negative or rural money markets play significant role. In many developing countries, because demand for money has a strong liquid asset motive, the opportunity costs of holding money as approximated by movements in the price level are more important (see Adekunle, 1980).

The link between the balance of payment and money supply in the monetary approach has been questioned on

many grounds. First, it is argued that in the real world, especially in developing countries, the assumption of free trade and perfect capital mobility is not valid. Movement of capital in or out of the country may be restricted by government policy. Moreover, capital may not flow into a country in response to interest rate differentials. Capital mobility may be influenced by other factors including expectations which may in turn be affected by political and social considerations. At any rate, interest rates may be institutionally determined which makes the assumption of international interest arbitrage not valid.

Secondly, the increase in the domestic money supply may not be completely reflected in a balance of payment deficit because of various lags in adjustment - even in the absence of government restrictions on international transactions (Aghevli and Khan, 1977). In such a situation, the increase in money supply may result in rise in domestic prices and interest rates above their respective world levels before complete adjustment takes place.

Thirdly, the approach is considered to be paying inadequate attention to the possibility of sterilisation of external flows either through open-market operations (at least in the short-run) or through the government budget surplus or deficit. The inflow of money from a balance of payments surplus, for example, need not affect the money market equilibrium if accompanied by government budget surplus (Currie, 1976).

Finally, it has been argued that while it is valid

to emphasise domestic credit restraint to cure balance of payment problems the same result can be achieved by expenditure switching policies that work through real flows and the government budget.

In spite of these criticisms, the monetary approach has impressive ability to explain the behaviour of the balance of payments. It focuses the attention of policy makers on the need to coordinate monetary and exchange rate policies which is the concern of this thesis.

(c). The Portfolio Balance Approach

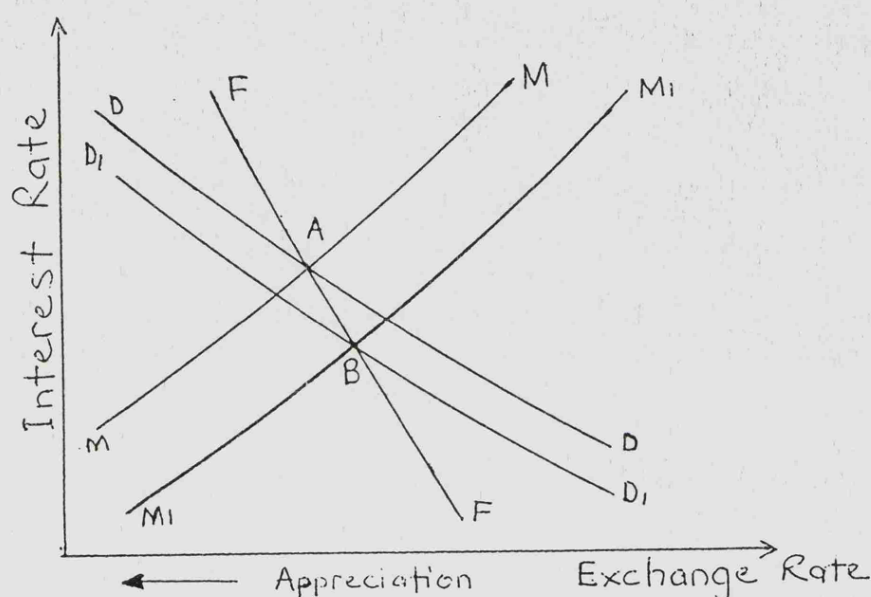
This approach emphasises the need for equilibrium in a whole spectrum of assets which comprise an individual's wealth portfolio. Money itself is one of the assets, and the exchange rate, as the price that equilibrates the demand for and supply of money, is one of the prices that have to relate to each other to ensure portfolio equilibrium. The market for each asset is viewed as an efficient speculative market. The foreign exchange market is dominated in the short-run by speculation and international capital movements rather than payments related to merchandise trade (Kouri, 1980). The portfolio balance approach is therefore an extension of the monetary approach by contending that exchange rate movements are not the consequences solely of changes in money supply and demand. The exchange rate does influence the domestic currency value of foreign assets and thereby the value of the total wealth portfolio. Exchange rate changes can be caused by changes in the demand for and supply of foreign assets

and domestic non-money assets.

The figure below illustrates the determination of the exchange rate in the portfolio balance approach (see Pierce and Tysome, 1985, p.232).

Figure 1.4

The portfolio balance approach to exchange rate determination



In Figure 1.4 the MM curve is the locus of points representing equilibrium in the money market at various combinations of interest rate and exchange rate. A rise in interest rate leads to a fall in money demand and a disequilibrium in the money market. For money demand to rise there must be a depreciation of the exchange rate in order to increase in the domestic currency price of foreign assets and hence wealth. The increase in wealth raises the demand for money and keeps the money market in equilibrium.

The curves DD and FF show different combinations of interest rate and exchange rate that keep, respectively,

the domestic asset market and the foreign asset market in equilibrium. Higher interest rates increase the demand for the asset, so an appreciation of the currency is required to restore equilibrium. The appreciation causes a fall in the value of wealth and hence the demand for the asset.

Now, from a position of general equilibrium at A, suppose there is an expansion of the money supply so that MM curve shifts to M_1M_1 as the money market equilibrium now requires a depreciation of the currency and/or a lower rate of interest. This will result in a fall in demand for the domestic asset and shift the DD curve to D_1D_1 as equilibrium in the domestic asset market now requires a lower interest rate at each level of exchange rate. The fall in domestic interest rates will increase the demand for the foreign asset, thus depreciating the exchange rate. Since there are only fixed stock of foreign assets held by domestic residents the depreciation is a slide along the FF curve to the new equilibrium point at B where once again there is balance of portfolios.

As an extension of the monetary approach, the portfolio balance approach has suffered from some of the criticism of the former. In particular, there is the neglect of real and structural causes of balance of payment disequilibrium. Surely, the role of other non-money assets - both foreign and domestic - must be played down in many developing countries, and interest rates may not play the same role assigned to it in the absence of international interest rate parity.

(d). Rational expectations hypothesis of exchange rate determination

This is also known under the names of the 'market efficiency' or 'speculative efficiency' hypothesis of the exchange rate to show that it is a combination of all three hypotheses. The hypothesis often assumes rational expectations. Under floating exchange rates, with frequent daily movements of exchange rates, one would expect to find evidence of rational expectations. Rational expectation assumes that people know and act immediately on the systematic components of their economic environment so that they need not make systematic mistakes.

If the foreign exchange market is efficient, in the sense that all available information is used rationally by risk-neutral agents in determining the spot and forward exchange rates, then there will be no expected rate of return to speculation. And the forward rate becomes an unbiased prediction of the future spot rate (Baille et al., 1983).

The origin of the hypothesis is the need to explain the large fluctuations (see Frekel and Mussa, 1980) that floating exchange rates have displayed in the aftermath of the generalised floating of 1973, and the poor performance of forward rates as predictors of future spot rates (Edwards, 1983). In order to assess the desirability of government intervention in floating exchange rates or even decision to peg the exchange rate, it is important to analyse the extent and causes

of the volatility of exchange rates under a floating system and the degree of efficiency of foreign exchange markets (ibid.)

The hypothesis is that forward prices in an efficient market (including that of the foreign exchange) are the best unbiased forecast of future spot prices. Any observed difference is due to transaction costs, information costs and risk aversion (Bilson, 1981). In its basic form, market efficiency can be represented by equation (8) as:

$$S_{t+1} = E_t S_{t+1} + \epsilon_{t+1} \quad \text{.....(8)}$$

where E_t is the expectation at time t , S is the spot rate and ϵ_{t+1} is a serially independent forecast error with mean zero and uncorrelated with any known variable (see Attfield et al., 1985). The speculative efficiency hypothesis makes the forward rate equal to the expected future spot rate (Bilson, 1981),

$$F_t = E_t S_{t+1} \quad \text{.....(9)}$$

where F_t is the forward rate at time t for transactions due in time $t+1$. The equation ensures identical transaction costs in forward and spot markets and also risk neutrality.

When equations (8) and (9) are combined, the result is equation (10):

$$S_{t+1} = F_t + \epsilon_{t+1} \quad \text{.....(10)}$$

Various forms of this equation, or rather $S_{t+1} = a + bF_t + u_{t+1}$, have been tested by many economists

(Edwards, 1983; Baille et al., 1983; Frenkel, 1980; Hakkio, 1981). The results of the tests have not always been encouraging. In general, the speculative hypothesis is rejected as the tests become more powerful (Attfield et al., 1985, p.175).

In developing countries the absence of forward markets and arbitragers mean this model can hardly be applicable, especially also, as in the case of Ghana, the exchange rate system is fixed.

All the theories of exchange rate determination surveyed here show the link between monetary policy and exchange rate policy. Unfortunately, the assumption of perfect capital mobility and interest rate arbitrage with efficient money and capital markets or asset markets do not fit the reality in Ghana.

This thesis seeks to investigate the potential of monetary and exchange rate policies in Ghana and establish how the two can complement each other to ensure stability.

The approach taken in the thesis is not much different from 'the monetary approach to the balance of payment', in the overt acknowledgement of the need for greater attention to, and coordination of, monetary policy, in the formulation and execution of exchange rate policies. The departure is the long-term view taken by the thesis. Traditionally, the issue addressed by the 'monetary approach to the balance of payment' is the short-term effect of changes in money supply on the balance of payment and exchange rate, and on the other side of the same coin, the effects of one-time exchange

rate action on the demand for money and the balance of payment. Our objective is to establish the relationship between the growth in money supply and demand for money, and the exchange rate and balance of payment in the long run.

The 'monetary approach' has much to teach policy makers, in relation to the conduct of monetary and exchange rate policies with regard to the relevant internal and external factors to watch, especially when the country pegs its exchange rate. This thesis tries to unravel some of these factors. Another objective is to study how the coordination of monetary and exchange rate policies within the framework of the 'monetary approach' can affect and be affected by other macroeconomic objectives such as output growth, price stability and government finance balance. From the long-term perspective, the effects of exchange rates and monetary growth on the macroeconomic policy targets are viewed as having had time to work themselves out. The effects in the long-run are not confined to traded goods; non-traded goods, through relative price changes and movement of resources, are able to respond to exchange rates in the long run.

To gain an understanding of the kind of economic environment in which the study is being done, the next chapter provides a summary of the important developments in the economy of Ghana between 1957 and 1982.

CHAPTER TWO

DEVELOPMENTS IN THE ECONOMY OF GHANA, 1957-1982

A study of the economy of Ghana between 1957 and 1982 inevitably becomes involved in stabilisation issues. The data available clearly shows the extent to which the economy has increasingly moved towards imbalance between supply and demand in almost every market, resulting in severe inflationary pressures, worsening balance of payment, increasing foreign debt, unemployment and breakdown of infrastructure and services.

A comparison of the state of the economy in 1982 with what existed in the early years following political independence in 1957 give a sad story of an economy which, though a post-colonial one with all its ramifications, has, over a quarter of a century, moved from a promising economy to a hopeless state. Statistics available from the World Development Report (World Bank) 1982 give some quantitative indications of the extent of the economy's decay. Gross domestic product increased at 2.1% between 1960 and 1970 and -0.1% between 1970 and 1980, when annual growth rate of population was about 3%, so that per capita income decreased at the rate of 1.0% per annum between 1960 and 1980 and 3.1% between 1970 and 1980 (World Bank, 1984). Food production per capita in 1978-80 was 82% that of 1969-71. Both agricultural and industrial production

grew at -1.2% per annum between 1970 and 1980 while manufacturing grew at -2.9% per annum. It is not surprising, therefore, that the Gross Domestic Investment grew at -3.2% per annum from 1960 to 1970 and -6.2% between 1970 and 1980, so that Gross Domestic Investment and Gross Domestic saving were both 5% of GDP in 1980 as against 24% and 17% respectively in 1960. This result is as expected in the face of falling per capita GDP (which would affect savings more than consumption) and increased underutilisation of capacity due to foreign exchange constraint on the importation of raw materials and other producer goods.

Increased external imbalance was a reflection of the decline of export of goods and non-factor services from 28% of GDP in 1960 to 12% in 1980. Exports on the average grew at the rate of -8.4% annually between 1970 and 1980; the corresponding figure for imports during the period was -3.3%.

While government budget deficit and the money supply increased, inflation accelerated from 7.6% in the 1960s to 34.8% in the 1970s. In 1977 and 1981 the rate of inflation reached over hundred per cent.

In the first half of the 1960s, cocoa output averaged 425,000 tons per annum (and as high as 557,000 tons in 1964/65 season) (Killick, 1978, p.109). In the early 1980s, output declined to less than 200,000 tons. It is possible that a large fraction of the decline in the official figures is accounted for by increased smuggling, mainly to Togo and the Ivory Coast. ECOWAS sources estimate that smuggling accounted for about N10 million

(\$1=N0.7092) of total trade between Ghana and Togo in 1982, while official trade estimate was only N2.5 million (West Africa, 18 April 1983, p. 959).

In the face of falling volume of exports and rising oil prices, it is not surprising that there was acute shortage of foreign exchange, which became scape goat for government incompetence and mismanagement. Imported inputs became scarce and led to very low capacity utilisation, invariably estimated at less than 30%, and created supply inelasticities which increased pressure on prices.¹

The government's answer to the foreign exchange scarcity and rising inflation was to institute measures to control prices and the use of foreign exchange, as well as fixing the producer prices of agricultural products. The producer prices have always been fixed not to ensure steady output of the crop and stable income for the farmer. but to maximise government revenue. The result has been substitution of food production for export crop production as well as neglect of existing cash crop farms. But more important, both crop and food production fell because most cocoa farms start as food farms and so disincentive to produce cocoa also affects food output. This partly explains the fall in food output and the fact that the price index for local food is always higher than the overall retail price index (Killick, 1978).

¹Most industries were import substituting and had been built to utilise imported raw materials. Import content of industries is estimated at 70%.

The widening of the exchange-control net and the maintenance of over-valued currency for most of the period under review resulted in the growth of a large premium on foreign exchange for those who could get access to foreign exchange. Coupled with commodity price control, exchange control led to the development of black markets in the foreign exchange and the internal commodity markets. The black market price of a unit of foreign exchange came to nearly fifty times the official rate in 1982. Commodity prices saw similar increases on the black market. The retail price index does not fully capture the level of prices, certainly not in the black market which became the main source of acquiring manufactured goods (West Africa, 4 October 1982, p.2571).

The decline in investment and the lack of financial incentives in the agricultural sector explain the rising unemployment. Unemployment figures in Ghana are unreliable, but Lisk (1976) estimates an increase of over 8% in 1975, from 4% in 1970 and 3.5% in 1964. Of course, the figures represents only registered unemployed relative to wage labour force and exclude persons seeking work for the first time. The registered unemployed refers to only those on the current registers of the Public Employment Centres. Then those registered remain on the live register for a month after which he is withdrawn unless registration is renewed the following month. Moreover, registration is voluntary and has no pecuniary advantage. Worse still, the Public Employment Centres are located only in the few urban areas.

While the picture about income distribution and its

trend was not clear in the 1960s, it was obvious that the high inflation rates of the second half of the 1970s resulted in increased inequality in favour of the business community. Importers enjoyed the premium on the foreign exchange received; manufactures of import substitutes and traders had the economic rent that resulted from the scarcity of goods and the consequent high prices which official price control was ineffective in stalling. Exporters of goods engaged in smuggling and under-invoicing. The losers were the export producers who had to sell to government marketing agencies (mainly Cocoa Marketing Board), and salary earners working for the government and government agencies where wages were under the control of the Prices and Income Board. These had price and wages increases far below the rate of inflation. The foregoing is not to suggest that in the years immediately following independence the country was prosperous or developed. Indeed it was a purely neo-colonial economy, very rural and with a very low per capita income. Agriculture accounted for about 60% of the GDP and employment. The ratio of foreign trade to GDP was about 30% and most capital and consumer goods had to be imported. While the pattern of consumption was described as advanced, and there was widespread production for the market and use of money, the economy remained largely dualistic. The rural agricultural economy depended on traditional labour intensive techniques of production, with a large subsistence sector, despite the increasing importance of cocoa production. Co-existing was a growing, modern manufacturing, mining, construction and commercial

sector which used capital-intensive methods and was, not only highly monetised, but also integrated into the international economy. Urbanization was growing but about 70% of the population were rural.

The ratio of literacy was very low in 1960; so was the level of life-expectancy. The educational system, though expanding, was still inadequate, and skilled labour was a serious constraint on the development of the economy. Labour productivity was also low.

The high rate of growth of the population - around 2.5% - was recognised as a limitation on the growth of per capita income.

Even so, the consensus is that at independence Ghana stood a better chance at developing than most other post-colonial countries. Political, social and economic factors, together, favoured a good performance of the economy.

Cocoa, which around 1960 accounted for over 60% of the foreign exchange earned and provided a large number of people with commercial activity, was introduced in the last decade of the 19th century, but its cultivation quickly spread throughout the forest regions as farmers showed ability to respond to new economic opportunities. With the increase in cocoa production and monetization came great social and economic infrastructural development, starting from the 1920s.

The rapid expansion of the agricultural sector in the 1950s - certainly in cocoa production but also in food-growing - and the high investment and increased supply of human resources through an expanded educational

programme contributed to the high growth rate of the GDP, estimated at the compound rate of 4.8% per annum between 1955 and 1962.

Gross domestic fixed capital formation for the years between 1955 and 1962 was between 15% and 21% of GDP. This showed that the economy was growth-oriented. At the time of independence capital-output ratio was about 2.3 and growing, while the savings ratio averaged about 18%.

Finally, it must be noted that the high prices cocoa commanded in the 1950s on the international market led to accumulation of foreign reserves estimated at over \$400 million, representing about 129% of imports and 174% of gross capital formation, in 1960.

In terms of GDP per capita, savings ratio, gross fixed capital formation, level and quality of human resources and educational system, social and economic infrastructure, natural resources, the strength of the external reserves, and political and administrative machinery, therefore, Ghana's position among other developing countries was very favourable. The signs were everywhere that modernisation was underway, and the prospects for the future were good. But independence also brought with it self-government and the responsibility to initiate and implement policies which will promote further the process of nation-building and economic development. However, after 25 years of independence the economy was in tatters everywhere and in all sectors. There was urgent need to reappraise government economic objectives and policies (World Bank, 1984 p.XV-XV11).

Table 2.1 gives some important economic indicators, contrasting the earlier years of 1957-62 with economic conditions in the early 1980s.

TABLE 2.1

ECONOMIC INDICATORS, 1957-82

Growth Rates (% per annum)	Year	Figure	Year	Figure
GDP Growth Rate	1960-70	2.1	1970-80	0.2
GDP Growth Rate	1958/59-			
	1964/65	2.5	1979-82	-6.1
Per Capita Income	1958/59-			
	1964/65	0.2	1970-80	-3.1
Agricultural Output			1970-80	-1.2
Industrial Output			1970-80	-1.2
Export Volume	1958-62	2.2	1970-80	-8.4
Cocoa Export Volume	1960-70	-3.6	1970-80	-6.2

Other Indicators

Domestic Savings as %				
of GDP	1958-59	18	1970-80	9.5
Gross Domestic Investment				
as % of GDP	1958-59	16	1970-80	-5.0
Appreciation of Real				
Effective Exchange Rate(%)	1957-66	62.6	1973-81	816.0
Real Rate of Interest (%)	1958-59	-0.1	1970-80	-30.0
Average Inflation Rate				

(% per annum)	1958-62	5.2	1970-80	34.8
Real Wage Growth Rate				
(% per annum)	1960-64	-1.8	1970-80	-13.4
Exports-GDP Ratio (%)	1958	28.2	1981	3.6
Imports-GDP Ratio (%)	1958	24.4	1981	3.6
Government Revenue as %				
of Current Expenditure			1982	65.4
Government Revenue as %				
of Total Expenditure	1957	135.5	1982	59.3
Government Budget Deficit/				
Surplus (as % of GDP)	1957	4.6	1981/82	-6.3
Tax-GDP Ratio (%)			1981/82	6.3

Sources: World Bank (1984); Killick (1978); IFS Yearbook 1983.

The table gives a clear picture of the degree of deterioration in all sectors of the economy, as a result of the pursuit of inappropriate policies by the government.

The next two chapters look at the monetary and exchange rate policies of the governments of Ghana between 1957 and 1982 and how they have contributed to the economic collapse. The description of the economy, given in this chapter, also enables us to build a macroeconometric model in Chapter Five for subsequent simulation of an alternative exchange rate policy.

CHAPTER THREE

MONETARY POLICY IN GHANA, 1957-1982

3.1 THE ROLE OF MONETARY POLICY:

This chapter reviews the monetary policy of Ghana between 1957 and 1982 and tries to provide estimates of the supply and demand for money functions, the latter as an appendix.

The importance of money and monetary policy in controlling an economy and its development has always been an issue of serious contention, which in recent years has achieved more political and philosophical connotations. The debate over the desirability, efficacy and mechanism of monetary policy itself has passed through many phases. Friedman's (1968) contribution has become a classic. He noted that monetary policy cannot peg the real quantities of interest rate, unemployment, level of real national income, real quantity of money, growth of real national income or the rate of growth of the real quantity of money, but does have important effects on these real magnitudes. Monetary policy can prevent money itself from being a major source of economic disturbance; monetary policy can provide a stable background for the economy - by providing confidence for producers and consumers, employers and employees that average prices will be stable; and monetary policy can contribute to offsetting

major disturbances in the economic system arising from other sources - for example, slower monetary growth can offset inflationary tendencies that arise from budget deficit. Monetary policy has important role to play in price stabilization though some have questioned its ability to control real variables.

For developing countries, it has often been argued that the lack of institutional features such as well-developed money and capital markets, and lack of banking habits and diversified financial institutions and instruments preclude any meaningful and effective use of monetary policy (Khatkhate, 1972; Ghatak, 1976). The high degree of openness in respect of freedom of movement of goods and capital, and fixed exchange rate arrangement are also regarded as limitation to the scope of independent monetary policies (Aghevli, 1976). In summary, monetary policy, it is argued, is ineffective in controlling aggregate demand, uncertain in its impact, blunt in its selective application to influence the pattern of production, investment and consumption, and irrelevant to many of the problems related to internal and external disequilibrium.

However, Eshag (1971) argues that in the LDCs where modern business sector is smaller, investment opportunities are greater, the liquidity position of business is weaker and there is more reliance on external funds to finance business outlay, these countries should be more responsive to monetary measures. Also, higher rate of inflation in LDCs means less incentive to hold assets in liquid form, and the motive for relying on external

borrowing is stronger which should make monetary policy more efficient.

McKinnon (1973) and Shaw (1973) argue that the fragmentation of capital and financial markets in the developing countries is the most important factor leading to retardation of growth and development. The major aim of monetary policy, therefore, should be to promote the development of capital and financial markets rather than to focus on short term stabilization. (See also Ayre, 1981).

It can also be argued that an LDC cannot ignore the short-term stabilization role of monetary policy, both for maintaining international balance of payment equilibrium (especially where a fixed exchange rate is maintained) and also for demand management, especially when for structural reasons the economy is prone to inflation and external shocks.

The economic history of Ghana between 1957 and 1982 point to the necessity for a meaningful and effective use of monetary policy in achieving this dual role of monetary policy - achieving short-term stability and promoting long-term growth.

3.2 THE DEVELOPMENT OF THE MONETARY SYSTEM

(A) The Pre-1957 Period:

Prior to the establishment of the Bank of Ghana in 1957, monetary and financial institutions and monetary policy was not different from those of other colonies. The modern system of money and finance can be traced to 1912. Though by then there was in circulation sterling and two

commercial banks operated branches in the country, it was in 1912 that the need was felt to create a separate colonial currency and establish a new and independent institution to exercise some semblance of monetary authority functions. The West African Currency Board (WACB) was founded in 1912 because the circulation of sterling had so expanded that it led to problems of the control over the supply and repatriation of currency, the equitable distribution of seignorage and the maintenance of adequate reserves for currencies circulating in the British colonies in West Africa.

The functions of the WACB was to act as large scale money changer, issuing a colonial currency, called the West African pound, for Nigeria, Sierra Leone, the Gambia and Ghana, and converting the colonial currency into sterling and vice versa according to demand. It also managed the reserves of gold and securities, and invested and distributed profits arising out of its operations to the colonies.

The operations of WACB were very simple indeed. The money issued and its exchange rate were closely related to those of Britain. In fact, the exchange rate was unity. But the WACB had some amount of independence, by having its own reserves. However, there was no independent monetary policy, nor was there in existence any instrument of monetary control. The system was designed to regulate itself. Though the WACB was the supplier of currency in circulation it had no control over the volume which was, in practice, tied to the balance of payment. This was deemed to be the greatest short-coming of the system. Though in

principle the commercial banks could influence the supply of money through their lending operations, commercial bank lending went almost solely to finance international trade, and therefore depended on the level of external trade. As a result, the currency in circulation and the sterling reserve cover had to be earned by the colony, mainly through the sale of exports. Thus, the money supply expanded at a time of boom and contracted during a slump, probably exacerbating the swings.

The maintenance of hundred per cent sterling cover for the local currency led to the automatic settlement of balance of payment deficits by withdrawal of money from local circulation which lowered incomes in the colony, reducing imports to equal exports once more, though at a lower equilibrium level. Money was therefore mainly a medium of external exchange. The system became a sterling exchange standard, not unlike the gold standard. The exchange rate was, however, effective in achieving external balance.

The system, no doubt, had certain advantages. It prevented the colony from accumulating deficits, and because the colonial administration also maintained a balanced budget, it eliminated inflation and the danger of balance of payment crisis. Currencies circulating in the colony enjoyed international reputation and convertibility, and a degree of stability. Finally, profits from seignorage and invested currency reserves gave the colony additional revenue which had not been possible previously.

The obvious limitation was that growth in the

internal exchange economy tended to be inhibited by monetary tightness, especially during periods of export deficit. The system and its concomitant monetary policy, together with passive banking and fiscal policies and institutional and economic conditions in the colony, combined to produce certain features that were not desirable.

The WACB and the commercial banks invested their reserves and money in the metropolis, UK, resulting in a situation in which an underdeveloped country loaned money to the advanced colonial power, not necessarily because the colony was capital surplus. Bank lending policy generally followed the trade cycle by expanding credit during a boom and reducing it at a time of slump, thus accentuating the trade cycles. Furthermore, the WACB increased and decreased the circulation of local currency according to whether there was a trade surplus or deficit. These tended to magnify trade and business fluctuations. In addition, bank loans were confined mainly to the large expatriate firms, mainly engaged in external trade, thus reinforcing their dominant position in commerce. The banks were, therefore, accepting deposits from nationals of the colony and lending them to expatriates (Hopkins, 1975).

Concern over these issues had grown to the extent that the government commissioned a study of banking conditions in the country. The resulting Trevor Report on Banking Conditions in the Gold Coast (1951) affirmed the existence of some of these limitations. But it was not felt to be necessary to establish a fully fledged central bank. Instead, the Bank of the Gold Coast, later called

the Ghana Commercial Bank, was established in 1953 to operate as a commercial bank.

(b) 1957-1963, Early Post Independence:

A few days before independence, that is on 1st March 1957, the Bank of Ghana was established by an ordinance. As it should be expected, the period 1957 to 1963 could be aptly described as a transitional period. The bank was only a step further than the WACB. But it was expected to control all commercial banks and evolve a monetary policy; that was why it was not merged with the Ghana Commercial Bank.

Other functions of the bank were to encourage and assist in the formation of financial institutions, to grant loans and give flexibility to the credit system and to insulate the economy from the money supply fluctuations which arose from balance of payment problems. In effect the Bank of Ghana was expected to move the country from the WACB system to an independent monetary system.

One of the first significant acts of the Bank of Ghana was the replacement, in the second half of 1958, of the WACB's currency by a national currency, the Ghana pound. The Ghana pound had parity value (of unity) with the WACB pound, and therefore the pound sterling. The Bank of Ghana Ordinance, 1957, constrained fiduciary issue to £G12 million.

Money supply was increased in response to a growing need. The bank's assets increased from £G45 million in 1957 to over £G86 million in 1963.

During the period 1957 to 1963, the Bank concerned itself mainly with issuing and administering the new

currency, the administration of the Government's account and those of the commercial banks and other depositors, the administration of the public debt and cautiously establishing the framework for an active monetary policy. After 1961, it administered the exchange control regulations and the compulsory savings scheme. It also started to operate ways and means advances to the government, which by 1962 had become 16.5% of total internal component of money supply.

It is interesting to note that although the 1957 Bank of Ghana Ordinance authorized the creation of fiduciary issue of up to £G12 million, the Bank continued to back its currency liabilities by 100% sterling, till 1961 when it created fiduciary issues by using Ghana Government Treasury Bills and Ghana Government stocks.

(c) The Bank of Ghana Act, 1963:

The Act of 1963 consolidated the 1957 Ordinance and the 1961 Act, and by it the Bank passed from the transition to a fully fledged central bank, performing all the traditional central banking operations, and perhaps more. The main objectives of the Bank, as set out in the Act were:

1. To issue and redeem bank notes and coins;
2. To administer, regulate and direct the currency system;
3. To regulate and direct the credit and banking system in accordance with the economic policy of the government and the provisions of the Act;
4. To promote by monetary measures the stabilization of the value of the currency within and outside Ghana;
5. To propose to the Government measures which are likely

to have a favourable effect on the balance of payment, movement of prices, the state of public finances and the general development of the national economy and monetary stability;

6. To do all such things as are incidental or conducive to the efficient performance of its functions.

As provided in the Act, the Bank was to function as the sole issuer of notes and coins, the banker of the government and the commercial banks and their lender of last resort (through discounting of bills). It was also given responsibility for monetary policy, in its own right or as an adviser to the government. As a result of the Act, the Bank had power to initiate and execute an effective monetary policy.

The 1963 Act removed the separation between the Issue and the Banking departments, which had existed from the 1957 Ordinance. Secondly, the types of assets that could be used as currency cover was extended, so that, in addition to sterling, government treasury bills and securities, commercial bills of exchange, and certain categories of securities other than government securities could be used as currency cover for new issues of local currency. This was, perhaps, necessary because of the diminishing foreign exchange reserves and also because there was need to create an independent monetary system. But, needless to say, irresponsible use of this power in later years led to excessive monetary growth far in excess of the limits which the Act had provided for as safeguard. Article 37 empowered the Bank to make temporary advances to the government to finance budget deficit. The amount to

be lent under this provision was not to exceed 10% of the year's budget revenue or 15% at the request of the President; in any case the advance should be paid within three months of the end of the related financial year; and no further advances should be made until all outstanding advances had been repaid.

The rationale for this provision was to give the government smooth operation in the event of lack of synchronisation between government expenditure and government revenue. But there were sufficient safeguards to prevent regular use of the central bank to finance large government deficits. The refusal of successive the governments to cooperate with the Bank of Ghana, especially in the 1970s, to adhere to this provision led to large increases in domestic credit and consequent high rates of inflation. Increasingly, a very large proportion of the currency became fiduciary issue, and with little foreign exchange reserve, the currency became inconvertible.

There was provision for a fiduciary issue of up to 40% of the currency in circulation, which could be raised to a maximum of 60% by the Minister of Finance through legislative instrument. This provision was abused in 1965 when fiduciary issued reached over 70%. In 1967 it became necessary to enact a law, ex post, to raise the maximum fiduciary issue to 75% with effect from 1st July 1965.

Finally, provision was made for arresting measures to be initiated whenever money supply increased more than 15% in any given 12 months. In 1964, and throughout the period after 1971, this limitation was not observed. Indeed, the

financing of budget deficits by the Bank of Ghana (see Table 3.8), which for most years in the 1970s averaged over 50% of the deficit, compromised the Bank's powers under the 1963 Act to control credit creation.

The 1963 Act and the functioning of the Bank of Ghana, thereafter, had wide implications for monetary and credit policy, as discussed later.

(d) 1963-1966:

The new system of financing cocoa purchasing introduced in 1963 (discussed below) had important ramifications for financial and monetary policy during this period. The period also saw the establishment of National Investment Bank and Agricultural Development Bank. The Bank of Ghana was actively involved in their establishment. Indeed, the Agricultural Development Bank used to be the Agricultural Credit Department of the Bank of Ghana. The significance was that the Bank of Ghana assumed some development banking functions, actively providing finance and technical assistance for the national economic development effort. It directly and indirectly invested long-term capital in certain agricultural and industrial projects. However, the bank's failure to satisfactorily perform the stabilization role seriously dissipated its efforts to promote economic development and growth.

(e) 1966-1971:

The change in the political regime in 1966 provided the Bank with governmental backing for greater control of monetary expansion. But as noted below (p.66) it was not all of a success story. It has been observed that 'there

was effectively no monetary control in 1971' (Killick, 1978, p.309) as there was a break-down in bank discipline and the commercial banks exceeded allowed credit expansion by a multiple of between two and three i.e. from £15 million to £34 million.

In December 1969, the new civilian government introduced the Credit Guarantee Scheme. The scheme was intended to facilitate the flow of credit to agriculture, industry and small-scale Ghanaian enterprises, and in particular, to help finance the government's Business Promotion Exercise. By the end of 1970 the Bank of Ghana was providing a 66.6% guarantee cover for bank loans to small businesses, a 75% joint Government-Bank of Ghana cover for bank advances to facilitate Ghanaian purchase of alien trading assets, and a 100% guarantee cover for certain credit schemes in connection with agricultural and industrial development (Furness, 1975).

Another important development of the period was the enacting of the Banking Act of 1970. The Act re-enacted many of the provisions of the 1963 Act, reinforcing the authority of the Bank to determine liquidity requirements, and control bank lending, and regulate the opening and closing of bank branches and bank amalgamation. The supervisory authority of the Bank of Ghana over all banking matters was strengthened, with added power to ensure the efficient and safe running of banks and to licence banks. To make these provisions effective, all banks (including existing ones) were required to be incorporated in Ghana. There were prescribed minimum paid-up capital requirements and a statutory bank reserve

fund.

(f) 1972-1982:

The period was significant for the Bank of Ghana in two respects. First, exchange control laws were extended and strengthened. It became, increasingly, the function of the Bank of Ghana, together with the Ministry of Trade, to operate and regulate the plethora of exchange control regulations that were introduced, e.g. import licencing, collection and disbursement of all foreign exchange, the authorization of issue of letters of credit. In short, the Bank of Ghana became the sole administrator of the country's external accounts.

Secondly, the Bank of Ghana financed and directed the establishment of more financial intermediaries. The Bank for Housing and Construction and the Social Security Bank were set up in 1972 and 1976 respectively. Also established were a number of Rural Banks in the late 1970's and early 1980s (beginning from 1976). This, together with the establishment in 1982 of the Akuafo Cheque System, by which farmers of major agricultural cash crops are paid in cheque, will no doubt have profound impact on the effectiveness, or otherwise, of future monetary policy in Ghana. The immediate effect has been to bring a large number of people into the 'banking economy' and to propagate the banking habit among the population. Whether it will add to or simply serve as substitute for the activities of the commercial banks is yet to be seen.

3.3 MONETARY POLICY: 1957-1982

(a) 1957-1963

The institutional, legal and political environment in which the Bank of Ghana operated between 1957 and 1982 determined the nature and effectiveness of monetary policy. As noted (p. 53), the period 1957 to 1963 is best described as a transitional period. Before 1960, the sterling exchange standard operated. There was no government debt instrument (i.e. treasury bills, etc.) and no fiduciary issue of currency. The currency continued to be backed 100 % by sterling, and its volume therefore depended on the country's ability to earn sterling from foreign trade, i.e. the balance of payment of the country determined the money supply.

This regime was to be terminated, albeit gradually, between 1960 and 1963. In 1960, the Government of Ghana issued Treasury Bills which could be discounted at the Bank of Ghana. These Treasury Bills were acquired by the commercial banks. In April 1961 fiduciary currency were issued which, by the end of 1962, grew to about a fifth of the Bank of Ghana's currency liabilities. The 1963 Bank of Ghana Act permitted a maximum of 60% fiduciary issue.

The result of these developments was the phenomenal increase in the money supply that was experienced in the early 1960s, as is shown in Table 3.2. From the end of 1956 to the end of 1959, money supply, M1, increased by 5%, while the subsequent increase to the end of 1963 was 52%.

The acquisition of government treasury bills gave the commercial banks an attractive risk-free domestic earning asset; it also enabled them to expand their domestic credit since these bills could be rediscounted at the Bank

of Ghana. But there was other reasons for the large increase in the money supply.

1. Government budget deficit began to increase (Table 3.1) and this was increasingly financed by borrowing from the banking sector (Table 3.7). Net claims of the banking system on the Government increased from -£122 million in 1957 and -£90.3 million in 1960 to £38.4 million, £39.9 million and £52.8 million at the end of 1961, 1962 and 1963 respectively. The size of the budget deficit for the period is shown in Table 3.1.

TABLE 3.1

Government Budget Balance, 1957-63 (millions)

Financial Year	Balance
1957-58	-£7.0
1958-59	-£22.6
1959-60	-£35.6
1960-61	-£60.4
1961-62	-£82.0
1962-63	-£68.8

Source: Killick (1966) p.417.

Note: Pound values have been converted to cedis: £1=¢2.

2. There was limited evidence that demand for bank loans was increasing, and that more Ghanaians were able to provide the securities and guarantors required by the

banks. This was particularly so with Ghana Commercial Bank lending which went mainly to Ghanaians (Killick, 1978, pp.328-9).

3. Exchange control regulations which were introduced in 1961 required the commercial banks not to hold more than £1 million each as external assets. The banks, therefore, had to repatriate the excess external assets which they had to lend locally. The effect was that foreign assets of commercial banks decreased from £37.4 million in 1960 to £1.2 million in 1962, rising slowly to £1.8 million in 1963. Their lending to the private sector increased from £39.7 million in 1960 to £54.2 million in 1961, to £61.0 million in 1962 and to £83.4 million in 1963. The corresponding commercial bank lending to government for the four years were respectively £9.8 million, £54.4 million, £38.7 million and £47.6 million respectively (all figures are end-of-year values).

4. Exchange control regulations restricted the remittances of incomes by non-Ghanaians, forcing expatriates to hold more local currency than would be the case.

5. Exchange controls probably also induced foreign firms operating locally to obtain credit locally.

(b) 1964-1971

The year 1964 saw a particularly sharp rise in the money supply, both M1 and M2. A number of factors explain this:

1. The tightening of the exchange control regime and the introduction of import licencing in December 1963 had their full effects on the money supply in 1964. The banks had to increase their local lending activities, by making

use of the repatriated foreign reserves.

2. The Bank of Ghana Act, 1963, had redefined currency cover to include government treasury bills and securities and other commercial bills of exchange. It also raised the ceiling of fiduciary issue of currency from £24 million (£12 million) to 60% of total currency. The Bank of Ghana was thus in a position to influence, to a large extent, the supply of money, but it also increased the possibility of large increases in the money supply.

3. 1964 was the effective year of the beginning of the implementation of the Seven-Year Development Plan. In line with the philosophy of the time, many public enterprises were set up under the plan. These started to command a large portion of bank lending, especially from the Bank of Ghana, whose lending to public enterprises increased from £29 million at the end of 1963 to £66.4 million at the end of 1964 and stayed around that level for the rest of the 1960s.

4. The introduction in October 1963 of the Inland Cocoa Bill scheme by which cocoa marketing was to be financed added a further impetus to monetary increase. Before then, the Cocoa Marketing Board had to convert foreign securities into local currency to finance cocoa purchases. These foreign securities were used by the Bank of Ghana as currency cover for issue of local currency. But under the new scheme the Cocoa Marketing Board was authorised to draw three-months internal bills on its subsidiary, the Cocoa Marketing Company. These bills were initially to be discounted by the commercial banks, but the banks could rediscount them with the Bank of Ghana. The new scheme

implied advance financing of cocoa purchasing by the banking system. A large portion of the cocoa bills were eventually held by the Bank of Ghana - about 85% at the end of 1963 and 90% at the end of 1964 (Bank of Ghana (a), 1964 and 1965). These bills could be used by the Bank of Ghana as backing for the creation of fiduciary issue, while those held by the commercial banks increased the scope for credit creation on a multiple basis.

5. Allied to the foregoing was the bumper harvest of cocoa in 1964 (the largest harvest ever) which occurred at a time of falling world price for cocoa. Because, at the same time, domestic producer price was fixed, the Cocoa Marketing Board found it increasingly difficult to repay the funds borrowed from the banking system by means of the bills.

6. To make things worse, Ghana, together with other members of the Cocoa Producers' Alliance withdrew sales from the world market in October 1964. The Cocoa Marketing Board had to rely on the banks to finance cocoa purchasing. There was need to borrow funds in order to hold the large cocoa stocks.

These factors accounted for the 39.5% annual increase in money supply in 1964 (IMF (c), 1983, Ghana, line 34). And although the end of year figure for 1965 was slightly lower than that of 1964, the monthly average showed increases of 22.6% and 23.0% respectively in 1964 and 1965 (Ahmad, 1970, p.137). Domestic credit increased by 66% in 1964 and 27% in 1965 (end-of year figures) (IMF (c), 1983, Ghana, line 32). What emerges is that in 1964 the in-built mechanism for controlling monetary and credit increases

were dismantled and the country was exposed to large increases in money supply, unless a direct and effective monetary policy could be executed.

These developments were viewed seriously by the Bank of Ghana. The Bank of Ghana Act, 1963, had provided it with the power to control the monetary system - and to prescribe minimum reserve ratios that the banks must hold against various types of deposits, to undertake open market operations and to impose ceiling on specified types of credit. Already, the issue of government treasury bills had made open market operations possible. In March 1964 the Bank of Ghana sought to enforce minimum assets ratio as follows:

(i)	Cash balances with banks in Ghana and current account deposits with Bank of Ghana	8%
(ii)	Liquid assets, March to August	40%
(iii)	Liquid assets, September to February	46%
(iv)	Special deposits with Bank of Ghana	5%
(v)	Ghana Government stocks	18%

The higher liquid assets ratio between September and February was justified by the fact that it coincided with the major cocoa harvest season. Since liquid assets included Treasury Bills and approved industrial and agricultural loans, the regulations in effect limited other loans to 29% of total assets or 23% between September and February.

By 1964, the financial structure and the existence of a large number of instruments of monetary policy had made it possible for the Bank of Ghana to assume full central

banking functions; indeed, these functions were necessary in view of the large increases in money supply and domestic credit, and its accompanying high rate of inflation, that were taking place.

But the monetary policy of the time was inefficient because it lacked full government cooperation and commitment. Government budget deficit which was financed by borrowing from the banks was not consistent with effective control of monetary growth. In addition, the government failed to support the monetary policy with appropriate fiscal and exchange rate policies to control demand. Table 3.2, however, shows a much smaller increases for the period 1966 to 1971 because of government interest in helping to control money supply increases.

TABLE 3.2

Annual Increases in Money Supply (in percentages)

1957	0.8	1962	7.2	1967	1.8
1958	-0.6	1963	12.7	1968	5.5
1959	4.4	1964	22.5	1969	5.6
1960	12.6	1965	23.2	1970	15.5
1961	16.8	1966	-1.8	1971	0.7

Sources: Killick, 1966, Table 13.9; Killick, 1978, Table 4C.

Note: Figures are increases in average of end-of-month figures for the year, as percentage of the previous year's average.

The smaller increases in money supply were achieved not because the Bank of Ghana became more effective in controlling the activities of the banks. In 1966, the Bank of Ghana wanted commercial bank loans and advances to be cut by £14 million but it went up by £4 million. In 1969, commercial bank lending to non-public sector went up by over £25 million instead of the £10 million requested by

the Bank of Ghana. Similarly, there was increase of commercial bank lending to the non-government sector to the tune of £34 million in 1971 instead of the targeted maximum of about £15 million.

In 1969 the liquidity requirement regulations of 1964 were replaced by simpler and new regulations. The minimum cash ratio was raised to 15% and, in addition, banks were required to hold Ghana government stocks and treasury bills equal to at least 20% of their deposit liabilities, making a total liquidity ratio of 35%. Early in 1970 the cash ratio was further raised to 30% (raising the total liquidity ratio to 50%) in order to neutralise the effect of substantial repayment of government debt. But due to increasing demand for credit, banks were not able to meet the new requirement. In 1971 the cash ratio was reduced to 20%.

That the rate of growth of money supply was lower between 1966 and 1971 was due largely to reduced government borrowing from the banking system and smaller government budget deficit.

(c) 1972-1982

Before the end of 1971, the Bank of Ghana responded to the increasing bank credit to the private sector, by issuing directives and requiring large mandatory liquidity ratios. It also introduced interest rate reforms by raising rediscount rate and rate on savings deposits from 5.5% and 3.5% to 8.0% and 7.5 % respectively.

These measures did not have their intended effects. From 1972 to 1982 monetary policy went out of the window, not by lack of action, but by the ineffectiveness of the

actions taken. Money supply increased by about 40% per annum on the average. In spite of the high rate of inflation of about 17%, the rate of interest on savings deposits was lowered in 1973 to 5.5%. Thus, the real rate of interest was negative as it has been for most of the post-independence period. By 1975 large balance of payment deficit (fuelled by the oil crisis), large increases in money supply, the presence of large excess liquidity in the economy and a high rate of inflation had necessitated a fresh look at monetary policy. The government introduced a package of monetary measures. Interest rates were again raised to 7.5% but not sufficient to ensure a positive rate of interest. The main monetary control measures were through quantitative credit limits. The credit ceiling resulted in the banks holding large excess liquid assets. In 1976 and 1977, for example, the minimum cash ratios held by the commercial banks were respectively 46.4% and 43.1%, compared with the legally required minimum of 20%. The banks, therefore, became reluctant to accept interest-bearing deposits from the public.

By 1977, structural imbalances and high rates of inflation, together with large monetary expansion and excess liquidity, had become so serious that in August a new set of monetary control measures were issued - mainly to control the monetary expansion and reduce the excess liquidity. These measures were therefore designed to freeze the banks' excess liquidity and control their lending capacity. Commercial banks were obliged to maintain the average cash reserve ratio they had voluntarily maintained over the previous twelve months.

Since the average cash reserve ratio for the previous twelve months was about 43%, the effective minimum cash reserve ratio increased from 20% to 42.8%. At the same time the maximum other liquid reserve ratio was increased from 20% to 25% in order to enable the banks to acquire more government securities, which were reserve assets. To enforce these measures, interest rates were to be levied on defaulting banks.

In 1978, the rate of interest was further increased - the discount rate from 8.0% to 13.5% rate and the savings deposit rates from 7.5% to 8.5% (the rate of inflation was 50%). Table 3.3 shows the structure of interest rates from 1975 to 1980. In addition, new quantitative credit regulations were issued to control bank credit, especially to 'non-priority' sectors.

TABLE 3.3

End of period	Interest Rates (Percentages)									
	Bank of Ghana				Commercial Banks				First Ghana Building Society	
	Stocks	Treasury Bills	Other Loans	Rediscount Rate	Deposit Rates			Savings Deposits	Bills Discounts and purchased	Lending Rates Loans and Overdrafts Secured by
					3 Months	6 Months	Over 12 Months			
1975										
June	3½ - 8	5½	7	6	5½	5½	5½	5	6½ - 10	9 - 10
December	5 - 8	7½	9	6	7½	7½	8	7½	7½ - 8½	10½
1976										
December	5 - 8	7½	9	6	7½	7½	8	7½	8½	10½ - 12½
1977										
December	5 - 8	7½	9	8	7½	7½	8	7½	8½	10½
1978										
March	5 - 8	7½	9	8	7½	7½	8	7½	8½	10½
June	5 - 8	7½	9	8	7½	7½	8	7½	8½	10½
September	5 - 13½	12	14½	13½	12½	12½	13	12	14 - 14½	16½
December	5 - 13½	12	14½	13½	12½	12½	13	12	14 - 14½	16½
1979										
March	5 - 13½	12	14½	13½	12½	12½	13	12	14 - 14½	16½
December	5 - 13½	12	14½	13½	12½	12½	13	12	14 - 14½	16½
1980										
March	5 - 13½	12	14½	13½	12½	12½	13	12	14 - 14½	16½

* Ghana Saving Bank rates are the same as those of Commercial Banks from July 1975.

Source: C.B.S., News letter No. 15/80, 16th April 1980.

These measures and others subsequently introduced, especially in 1980 and 1982, failed to control the rate of increase in money supply. If anything, the quantitative credit ceilings and low and negative real rate of interest on bank loans permitted by law led to increased excess bank liquidity. As a result, the banks continued to discourage savings deposits by not paying interest on deposits above ₵10000 and refusing to accept new time and savings deposit accounts. Moreover, the bank excess liquidity weakened the ability of the Bank of Ghana to control the commercial banks.

For one thing, no limits were imposed on commercial banks' lending to the export sector till 1978, and limits on lending to agriculture and certain other priority sectors were very liberal. These sectors also enjoyed preferential lending rates of interest, thus causing large increases in bank loans to these sectors.

Bank credit to the non-priority sectors also increased, exceeding the required limits, because funds to priority sectors are fungible and there is no way of separating the two sectors; furthermore, the high rate of inflation induced much bank borrowing from the non-priority sectors to supplement working capital and to finance speculative trading.

The raising of maximum 'other liquid assets' from 20% to 25%, though intended to reduce the banks' excess liquidity, served to increase bank lending to the government.

By and large, it could be said that monetary policy in the period 1972 to 1981, though active was dictated by,

and served the needs of, central government budget deficit. Table 3.7 shows that government budget deficit progressively reached high levels, and financed by borrowing from the banking system, especially from the Bank of Ghana.

The stringent control of the reserve base of the commercial banks was not effective in reducing the rapid growth in money supply when government borrowing from the banks were not curbed. Under the regime of the high rate of inflation for the period, government revenue failed to increase, due to inelastic tax system and falling per capita real income and fixed exchange rate policy. Expenditure, however, increased because of increasing cost of government-purchased goods and increases in producer price of cocoa and other agricultural products and wages and salaries of government employees, even if the increases did not keep pace with the rate of inflation. For most years, the projected deficits were outrun by larger realised deficits.

Another factor which partially explains the increases in the supply of money was the establishment of more secondary banks during the period. The Bank of Ghana was unable to control the lending of these banks since some of the banking regulations did not apply to the secondary banks even though the latter increasingly took on normal commercial bank operations. For example, Table 3.4 shows that in 1976, 1977 and 1978, these banks exceeded the maximum other liquid reserve ratios by very large margins.

TABLE 3.4

Reserve Ratios of Secondary Banks, 1976-1978

Year	Cash Ratio		Other Liquid Reserve Ratio	
	Minimum	Actual	Maximum	Actual
1976	20.0	22.6	20.0	34.0
1977	20.0	21.2	20.0	33.0
1978	20.0	28.0	25.0	33.0

Source: Bank of Ghana, Quarterly Economic Bulletin, Vol.19, No. 14, October-December 1979.

Note: Figures are in percentages.

3.4 INSTRUMENTS OF MONETARY CONTROL

The foregoing indicates that most traditional instruments of monetary control have been in use in Ghana over the period of this thesis. This section seeks to make further observations about them, not their historical development, but their mode of operation and their relative effectiveness.

1. Central Bank Credit to Commercial Banks and the Rediscount Rate:

Central bank accommodating credit to commercial banks in Ghana has not been very important. Therefore, the effect of varying the rediscount has been neutral. First, the rediscount rate has been changed very infrequently. Secondly, the rates have not been penal rates and are therefore set just above the Treasury Bill discount rate

(1/8% between 1960 and 1963). Finally, the banks have rarely been short of funds to warrant going to the Bank of Ghana for accommodation. As seen earlier, the banks held so much excess liquidity from the middle of the 1970s that they refused to accept new interest bearing deposits from customers. Rediscount rates have therefore, been varied only to align it with changes in other interest rates, and not as instrument of monetary control.

2. Open Market Operations:

This has been regarded as very flexible tool of monetary control, very effective and immediate in its impact on the money supply. The commencement of the issue of Ghana treasury Bills in the early 1960s provided the opportunity to use open market operations in Ghana. But the securities market has been very thin in Ghana. Further, the use of open market operations requires dependence on the market system, while governments in Ghana have preferred to by-pass the market, in favour of direct controls to regulate the economy. In addition, negative real rates of interest over the years have made government securities unattractive, and the market for them has not been able to develop.

3. Reserve Requirements:

The enforcement of cash and liquidity reserves requirements aim at influencing the basis of the commercial banks' lending. The instrument itself is very inflexible and its impact all-at-once and once-and-for-all, except the central bank is willing to

spread the period of adjustment.

In Ghana, variable reserve requirement prescription has been a major instrument by which the Bank of Ghana has sought to control money supply and liquidity. Since 1964, the Bank of Ghana has enforced reserve ratios with varying degrees of success. Initially, there were times when the banks did not meet the minimum cash ratio. But in the last ten years of this study, the banks have had no difficulty in meeting the requirements, and the Bank of Ghana was seen to be raising the limits to points near to the banks' own observed ratios. Thus, the prescribed reserve requirements merely responded to the realised ratios, rather than dictating what the ratios were to be.

Moreover, the system of prescribing maximum other liquid assets (including government securities) ratio worked, even if inadvertently, to crowd out credit to the private sector in favour of the government sector. Thus, in 1981, real bank lending to the public sector was half that in 1972, while real lending to the private sector for the same period was less than 9%. It therefore raises suspicion that monetary policy, and the use of the reserve requirement, worked to provide funds to finance the yawning government budget deficit. It has also served to encourage the development of financial repression.

4. Interest Rates:

Interest rate changes can be effective because they by-pass the chain of responses that the other instruments must work through, that is, if the financial system is responsive to interest rates. There is little empirical

evidence as to the nature of interest elasticities in the economy of Ghana. A priori, it could be observed that over the years interest rates have often been left unchanged for long periods, while the rate of inflation accelerated. The few changes that took place were not primarily as means of credit control or demand management, but a secondary measure taken with other monetary measures, as in 1971, 1975 and 1978. As a result of the rigid interest rate policy, real interest rates were recorded positive for only 5 out of the 26 years of the study period. The effect of the policy on financial savings is evident from Table 3.5.

The interesting phenomenon is the reduction of the interest rate in 1973. Again in 1982 the discount rate was reduced from 19.5% to 10.5% and other regulated rates were correspondingly reduced. at a time when the rate of inflation for the previous year was 116% and the trend was continuing upwards.

As noted by Chandavarkar (1971): 'Insofar as there is a critical range within which interest rates could be said to be effective in evoking larger financial savings, there is a strong case for a flexible policy aimed at a realistic level of rates high enough to stimulate saving without constricting the rate of development (through high financial cost to industry)'. From a study of some Asian countries, he concludes that the critical range should be positive real rate. He notes further that '...[the Taiwan] experience aptly exemplifies the role of high but flexible and realistic interest rate policies as a necessary, even if not sufficient, condition of effective economic

stabilization programs' (p.87). The Korean interest rate reform of the 1960s was also an important part of the overall stabilization program. In Malaysia and Singapore, interest rates were stable, low and 'conventional' but this was made possible by remarkable price stability which ensured positive real rates of interest (ibid.).

The objectives of interest rate policies in Ghana have been to increase the level of investment and improve the allocation of investment among sectors, and to keep financial costs down so as to avoid possible inflationary effects of interest rates liberalization. These objectives, gleaned from official publications, cannot be achieved by the kind of interest rates policies adopted, even if the objectives are by themselves laudable. The severely negative real rates of interest were not likely to increase investment because, as seen in Table 3.5, sufficient savings might not be generated.

TABLE 3.5

INTEREST RATES AND FINANCIAL SAVINGS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
YEAR	DR	RI	RRI	DM2	RDM2	DQM	RDQM
-----	-----	-----	-----	-----	-----	-----	-----
1957	4.0	3.0	2.0	-9.4	-9.8	2.1	2.2
1958	4.0	3.0	3.0	9.3	9.7	4.7	4.9
1959	4.0	2.5	-0.4	16.6	16.8	3.9	3.9
1960	4.0	3.0	2.1	23.4	23.4	3.2	3.2
1961	4.5	3.5	-2.6	14.1	13.3	1.6	1.5
1962	4.5	3.5	-5.7	26.4	22.8	8.0	6.9
1963	4.5	3.5	-0.5	14.6	12.1	6.8	5.6
1964	4.5	3.5	-9.2	79.8	58.8	11.6	8.5
1965	4.5	3.5	-22.9	5.7	3.3	6.3	3.7
1966	7.0	3.5	-9.5	14.8	7.6	7.1	3.7
1967	6.0	3.5	11.2	3.9	2.2	11.0	6.1
1968	5.5	3.5	-4.6	32.6	16.8	15.0	7.8
1969	5.5	3.5	-3.7	36.7	17.7	5.7	2.7
1970	5.5	3.5	0.6	38.6	18.1	22.3	10.4
1971	8.0	7.5	-2.1	47.6	20.3	32.4	13.8
1972	8.0	7.5	-2.6	193.0	74.9	51.5	20.0
1973	6.0	5.5	-12.2	125.9	41.5	24.7	8.1
1974	6.0	5.5	-12.6	211.5	59.1	77.9	21.8
1975	8.0	7.5	-22.4	381.0	81.9	69.8	15.0
1976	8.0	7.5	-48.6	516.7	71.2	96.5	13.3
1977	8.0	7.5	-108.9	1141.0	72.6	177.2	11.3
1978	13.5	12.0	-68.1	2087.2	76.7	353.8	13.0
1979	13.5	12.0	-49.4	811.1	19.3	257.3	6.1
1980	13.5	12.0	-45.1	2006.6	31.8	601.3	9.5
1981	19.5	18.0	-98.5	4080.0	29.9	751.9	5.5
1982	10.5	8.5	-13.8	2810	16.8	1020	6.1

NOTES: (1) Discount Rate in %.

(2) Rate of interest on savings deposits in %.

(3) Real savings deposit rate i.e. (2) minus the rate of inflation.

(4) Change in M2, in millions of cedis.

(5) Real change in M2, i.e. (4) deflated by the consumer price index, base=1960.

(6) Change in Quasi-money, in millions of cedis.

(7) Real change in quasi-money, i.e. (6) deflated by the consumer price index, base=1960.

Source: IMF International Financial Statistics Yearbook 1983.

Even if savings were sufficient other factors, such as the ability to provide the required collateral and the general business atmosphere which affect returns on investment may be more important factors affecting borrowing and lending decisions. And because of the fungibility of money, it is not possible to monitor borrowers to ensure that loans are always used for the original purposes. Thus, the policy of preferential rates of interest for favoured sectors was not very sound. Moreover, financial costs, as a ratio of total cost of industry was low enough to make increased interest rate charges which would be realistically positive not a great burden. The major problem of industry in Ghana in the 1970s was lack of raw material inputs which resulted in very low capacity utilization. At any rate, a realistic interest rate might help to remove excess demand for investment and the use of capital intensive methods of production instead of the locally more abundant factor, labour. It will also lead to rational allocation of investment funds, and make the rate of interest a realistic social rate of discount for investment allocation purposes. Furthermore, a higher rate of

interest would be an advantage in drawing financial savings from the unorganised sector where, in spite of an early legislated maximum of 15%, the rate is known to be between 50 and 200 per cent per annum.

The real 'hidden' objective of interest rate policy might, perhaps, be as a means of keeping down the servicing charges on government debt, since government was the major customer of the banks.

The conclusions that can be made from a study of interest rate policy in Ghana over the period are that less emphasis was placed on interest rates because of the imperfections of the money and capital markets and because of the misconceived objective of keeping the cost of borrowing down; and that officially determined priorities in the allocation of capital funds led to preferential lending rates for sectors, favouring mainly agriculture and exports.

5. Margin Requirements:

The margin requirement is intended to make borrowers finance part of their credit needs themselves, and so it increases the effective cost of credit. In this way, it might discourage some borrowers.

This instrument was first used in Ghana in 1964, when importers were required to deposit 15% of the value of letters of credit for imports with commercial banks. The system was variously modified at very short intervals till it was abolished in July 1967 after the first devaluation (Leith, 1973, p.17). It was introduced again in 1973. In 1978 banks were asked not to provide loans to

meet the cost of the mandatory cash margins. Margins were also prescribed, in that year, for home ownership loans, and all cash margins were to be deposited with the Bank of Ghana.

The instrument has been used in Ghana mainly as a means of controlling imports, for balance of payment reasons, rather than as credit control instrument. But even as a balance of payment instrument its effectiveness is doubtful, as it adds only about 0.3% to 0.45% to the cost of imports, assuming the importer borrows the amount to be deposited at interest rates between 8% and 12% per annum.

6. Quantitative Credit Ceiling:

There are two aspects to this instrument. The first relates to direct ceilings on aggregate credit the banks are allowed to make. The bank of Ghana has often asked the commercial banks to maintain the same credit increase as the previous twelve months, or has prescribed a certain percentage increase in credit on the previous year's level. For example, in the Measures for Monetary Control issued by the Bank of Ghana in September 1978, bank credit to non-priority sectors (i.e. commerce and services, import trade and miscellaneous activities) were to be maintained, over the next twelve months, at the same level as that of the end of the previous June. Credit to construction could be increased up to 15%. The percentage increases allowed for the priority sectors were (Bank of Ghana (b), July-September 1978, Vol.18, No.3):

Agriculture and Export Trade

100%

Manufacturing, Transport,	
Communication and Storage	50%
Mining and Quarrying	30%
Electricity, Gas and Water	25%

The second aspect of quantitative credit control relates to selective credit controls which aims at directing credit into certain favoured sectors. Often, credit ceilings are differentiated when higher increases in credit are allowed on favoured sectors. For example, in 1964, banks were required to get the approval of the Bank of Ghana for loans over £10000 for purposes other than agriculture and industry. (See also the 1978 regulations above).

The instrument has been further strengthened by

(a) The Bank of Ghana's guarantee for certain approved agricultural and industrial loans.

(b) Preferential, lower lending rates of interest for priority sectors.

(c) The establishment of specialised financial institutions for agriculture (Agricultural Development Bank), industry (the National Investment Bank), housing and construction (Bank for Housing and Construction) and for co-operatives.

Quantitative credit ceilings have been the major instrument of credit control in Ghana. This is in line with the general philosophy of direct government control over distribution, prices and almost everything, but its direct effect also makes it easier and more efficient to implement, given the imperfection of the capital and money markets in the economy. But the instrument cannot escape

the possibility of causing misallocation of credit and distortion and repression of the financial system. Indeed, it is responsible for the excess liquidity carried by the banks and their subsequent refusal to accept interest yielding deposits from customers, as well as limiting the amount of deposits on which interest rates are paid.

As an instrument of directing credit to preferred sectors, it is bound to be ineffective because many multi-industry firms can always switch funds internally from one sector to another. This, perhaps, explains why the Bank of Ghana has often expressed concern over the ineffectiveness of the instrument (e.g. see Bank of Ghana (a), 1965, 1978).

3.5 MONETARY POLICY: A CONFLICT OF OBJECTIVES

It has been argued that the most important function of the central bank in a less developed country is to encourage the growth and development of financial institutions and to spread the banking habit (Furness, 1975). It has been shown that throughout the period of this study, the Bank of Ghana actively encouraged the establishment of many financial intermediaries and also was active in spreading the banking habit. The evidence, however, seems to suggest a conflict between the achievement of economic development in general and the development of financial intermediation in particular (or at least the active use of financial intermediaries to promote economic development), and the objectives of monetary policy - in particular, the control of the growth of money supply.

As an economy grows and is transformed, one would expect increasing monetization and commercialisation of economic activities and with it the increasing use of the services of financial intermediaries. Even though the number of commercial banks remained three, the number of commercial banks increased from about 80 in 1957 to 177 in 1978. Also significant was the establishment of specialised financial institutions by the share capital and technical assistance of the government and the Bank of Ghana. These formations included the National Investment Bank (which had existed earlier as a department of the Bank of Ghana) in 1965, The First Ghana Building Society in 1956, the Merchant Bank and the Cooperative Bank (both with chequered history) the Bank for Housing and Construction in 1972, the Social Security Bank in 1976 and a series of Rural Banks from 1976. Also established in the 1970s was the Premier Bank, now Bank of Credit and Commerce. It could be noticed that, in addition to the National Savings Banks (formerly the Post Office Savings Bank), a financial intermediary was established to deal with banking and credit needs of every major sector of the economy. In addition, attempt was made to boost the use of bank services by introducing, in 1982, a scheme whereby farmers' produce sold to marketing boards would be paid for by cheque.

However, it is clear that the increase in the number of bank branches was not necessarily a direct indication of the monetization of the economy (Chandavarkar, 1977, surveys the monetization issues) or the increasing use of bank services. (Notice the problems of defining

'monetization'). Table 3.6 gives some indicators of the degree of monetization. Income velocity is defined as national income divided by the money supply.

TABLE 3.6

SOME INDICATORS OF MONETIZATION IN GHANA

Year	No. of Bank Branches	Average Deposit per Branch (¢million)	Income Velocity of Money (M1)
1955	43	94	6.57
1963	149	76	6.99
1978	177	16	5.09
1982			7.66

Sources: 1. Birmingham et al. 1966 p. 279, Table 13.2.
2. Bank of Ghana, Quarterly Economic Bulletin,
Jan.-March 1979, Vol. 19 No.1 Statement 2.
3. IMF (c), IFS Yearbook 1983.

In 1955 when the number of bank branches was 43, the average deposit per branch was ¢94 million. In 1963 the average deposit was ¢76 million for 149 branches. At the end of 1978 the number of branches had increased to 177 but the average deposit per branch was only ¢16 million (see Table 3.6). This partly gives credence to the observation that the high rate of inflation, especially in the 1970s, resulted in a shift from financial to real assets (Ghana Commercial Bank, 1976). Also significant was

the fact that when more financial institutions were being established and the banking habit encouraged, the excess liquidity of the commercial banks and the credit control activities of the central bank resulted in the commercial banks limiting the interest earning deposits of customers, and discouraging the opening of new accounts.

In addition, at a time that the central bank was desperate to control the credit and reserves of the commercial banks, more secondary banks were being established. Though reserve requirements and credit ceilings were eventually prescribed for the secondary banks as well, the fact that new institutions were being set up meant that domestic credit and money supply was bound to increase more than the Bank of Ghana intended. For example, credit from the secondary banks increased from £233 million in June 1976 to £430 million in June 1978 (Bank of Ghana (a), 1978).

Furthermore, the largest source of domestic credit expansion in the 1970s was the government borrowing from the banks, especially from the Bank of Ghana (Table 3.7). It meant, therefore, that the efforts of the Bank of Ghana to control domestic credit expansion by monetary policy were sterilised by the actions of the government. As a result, even though the Bank of Ghana changed the minimum 'other liquid assets' ratio to maximum ratio (these assets were mainly government liabilities to the commercial banks) and the commercial banks by-and-large conformed (though the secondary banks did not), the government liability to the banks continued to increase and most of them were held by the Bank of Ghana.

Finally, the conflict of objectives was also seen in the interest rate policies. It has been noted that despite the increases that were effected in the 1970s, the real rate of interest remained negative. This was in spite of the declared objective of mobilizing domestic savings through, for example, the establishment of Rural Banks.

In the light of these conflicting objectives and the use of the various monetary policy instruments, discussed earlier, by the monetary authorities to achieve stability and growth, we explore further in the next two sections the important determinants of money supply in Ghana.

3.6 THE SUPPLY OF MONEY IN GHANA

Following the multiplier approach to the money supply process (see Appendix to Chapter Three), money supply becomes the product of the money multiplier and reserve money. If M_s = Money Supply, k = money multiplier and R_m = reserve money, then $M_s = kR_m$. The importance of reserve money in the growth of money supply is clear from Table 3.7.

TABLE 3.7

MONEY SUPPLY (£ million)

Year	Money Supply (M1)	Money Multiplier (k)	Reserve Money (RM)	Net Foreign Assets	Net Claims on Gov'tment	Net Other Assets
1957	96.6	1.34	72.1	195.3	-122.1	-1.2
1958	101.2	1.37	73.9	200.9	-125.9	-1.1
1959	113.9	1.30	87.7	217.2	-127.6	-2.0
1960	134.1	1.32	101.5	198.5	-93.7	-3.3
1961	146.6	1.48	99.3	116.5	-12.4	-4.8
1962	165.0	1.41	117.1	114.2	13.0	-10.1
1963	172.8	1.53	112.8	82.8	20.9	9.1
1964	241.0	1.46	164.8	60.5	51.0	53.3
1965	240.4	1.60	150.7	13.8	111.5	25.4
1966	248.1	1.59	156.1	-1.3	121.9	35.5
1967	241.0	1.50	160.6	-34.8	182.5	13.2
1968	258.6	1.54	168.2	-50.6	239.7	-20.9
1969	289.6	1.44	200.7	-52.9	233.4	20.1
1970	305.9	1.33	230.6	-2.2	192.3	40.4
1971	321.1	1.35	237.9	-6.5	321.1	-76.7
1972	462.6	1.31	352.1	138.1	291.9	-77.9
1973	563.8	1.29	437.2	220.7	308.6	-92.1
1974	697.4	1.17	594.0	36.6	533.8	23.6
1975	1008.6	1.15	878.8	150.8	823.5	-95.6
1976	1428.8	1.14	1249.0	40.8	1402.0	-193.8
1977	2392.6	1.19	2015.4	69.0	2440.6	-494.2
1978	4126.0	1.11	3719.6	303.5	4154.9	-738.7
1979	4679.8	1.06	4396.2	340.9	4195.9	-140.5
1980	6085.1	1.06	5742.0	243.5	5447.1	51.3
1981	9413.2	1.05	8923.9	-91.3	8959.2	56.0
1982	11203	1.10	10211	141	8296	1775

SOURCE: IMF, International Financial Statistics, Yearbook 1983.

Alternatively, money supply (M) can be defined as

non-banks' holdings of currency (CU) plus all deposits (D), ie. $M \equiv CU + D$. Monetary base (MB) is defined as the currency holdings outside banks (CU) plus reserves of banks (RE), ie. $MB \equiv CU + RE$. Given the public has a desired ratio of currency to deposits, c , ($CU = cD$), and the banks keep a certain fraction, r , of deposits as reserves ($RE = rD$) we have the following relations:

$$\begin{aligned} MB &= CU + RE \\ &= cD + rD \\ &= (c+r)D \end{aligned} \quad \dots\dots (1)$$

$$\text{Since } M = CU + D = cD + D = (c+1)D \quad \dots\dots (2)$$

Dividing (2) by (1) yields the expression

$$\begin{aligned} M/MB &= (1+c)/(c+r) \\ M &= \frac{(1+c)}{(c+r)} MB \end{aligned}$$

Since RE, the reserves of the banks is a component of monetary base the money supply function in chapter five includes this variable.

Using annual data, the following is the report of OLS estimation of the money supply process between 1957 and 1982.

$$M1 = 62.61 + 1.07RE \quad \dots\dots(3)$$

(3.44) (184.79)

$$\bar{R}^2 = .999 \quad F_{(1,24)} = 34148 \quad DW = 1.53$$

$$M2 = 83.10 + 1.39RE \quad \dots\dots(4)$$

(2.13) (112.09)

$$\bar{R}^2 = .998 \quad F_{(1,24)} = 12564 \quad DW = 1.79$$

Equation (3) shows that money supply, M1, is proportional to the reserve money. This makes the reserve money an important policy target.

As shown later in this chapter, a large proportion of the increases in domestic credit is explained by increases in government budget deficit. These results are also evident from Table 3.7.

Table 3.7 shows that reserve money has been the main determinant of growth in money supply, and that Foreign Assets was the main determinant of reserve money till 1964. From 1965, the importance of net claims on government increased substantially. In the 1970s net claims on government was the overwhelming determinant of reserve money and therefore, money supply. In fact, from 1965, net claims on government accounted for over 70% of the reserve money, and exceeded 100% for 8 of the years. Another important feature of the money supply was the increase in Bank of Ghana's claim on public enterprises which was insignificant till 1963 and then increased from £29 million to nearly £5000 million at the end of 1982. Equally significant was the growth in other liabilities of the Bank of Ghana, arising out of increased import deposits.

From 1957 till the middle of the 1960s, the money multiplier increased, due to positive growth rate of per capita income, and increasing commercialization of economic activities. From then on there was a steady decline as per capita income declined. The notable slight increases recorded in 1977 and 1982 were due to the high rate of inflation (over 116%) in 1977 which made it necessary for the public to increase their cash holdings; and in 1982, the withdrawal of £50 bank notes from circulation (without compensation) might have induced

increased cash-holding as holders of the withdrawn notes tried to maintain their cash holding by converting bank deposits into cash. What is remarkable is the apparent stability of the money multiplier over the years.

3.7 MONEY SUPPLY AND GOVERNMENT BUDGET DEFICIT

It has been shown that central bank claims on government has been the most important source of increase in money supply. Table 3.8 indicates that the growth in central bank claims on government has been due to the large government budget deficits which have been financed by the Bank of Ghana.

TABLE 3.8

MONEY SUPPLY, BUDGET DEFICIT AND ITS FINANCING (₵MILLION)

Year	(1) Money Supply (M1)	(2) Gov'tment Budget Deficit	(3) Net Commercial Banks Claims on Government	(4) Net Central Bank Claims on Government
1957	96.6	-34.1	0.1	-122.1
1958	101.2	-18.8	-2.7	-125.9
1959	113.9	-22.3	-3.0	-127.6
1960	134.1	17.1	3.4	-93.7
1961	146.6	70.6	50.8	-12.4
1962	165.0	155.3	25.9	13.0
1963	172.8	144.5	31.9	20.9
1964	241.0	120.6	70.6	51.0
1965	240.4	94.1	66.5	111.5
1966	248.1	76.6	82.8	121.9
1967	241.0	66.8	83.3	182.5
1968	258.6	102.3	75.6	239.7

1969	289.6	63.3	80.0	233.4
1970	305.9	30.6	98.9	192.3
1971	321.1	73.1	-31.7	321.1
1972	462.6	124.7	66.5	291.9
1973	563.8	112.0	67.6	308.6
1974	697.4	190.5	50.1	533.8
1975	1008.6	338.1	100.9	823.5
1976	1428.8	539.2	368.0	1402.0
1977	2392.6	870.6	339.1	2440.6
1978	4126.0	1478.5	368.1	4154.9
1979	4679.8	1906.5	706.9	4195.9
1980	6085.1	1645.4	1071.3	5447.1
1981	9413.2	4440.2	1689.7	8959.2
1982	11203	3904.5	2761	8296

Sources: IFS, Yearbook 1983; Government Finance Statistics, Yearbook 1984.

A number of interesting facts come out of the table. First is the growing size of the deficit, which has increased since 1959. There is also significant correlation between the growth of the budget deficit and the growth of money supply, and between these two and the government borrowing from the banking system.

The complete view of these various interrelationships can only be appreciated through a simultaneous macroeconomic model, which is presented in Chapter 4. Here, we present a Sims-Granger type of causality test between money supply and government budget deficit.

The data is annual and the method of estimation OLS. We regressed money supply on its own 3 lags and 3 lags of budget deficit, and in another equation on its own lags only. The following results were obtained (t-statistics in

parentheses):

$$(1) \quad M = -1.37 + 0.80M_1 - 1.15M_2 + 2.35M_3 + 0.79B_1 + 2.63B_2 - 3.82B_3$$

$$(-1.70) \quad (2.64) \quad (-2.07) \quad (3.30) \quad (1.05) \quad (2.56) \quad (-2.68)$$

$$\bar{R}^2 = .995 \quad F_{(6,17)} = 755.12 \quad ESS = 146.654$$

$$(2) \quad M = -0.53 + 0.65M_1 + 0.13M_2 + 1.14M_3$$

$$(-0.57) \quad (3.08) \quad (0.36) \quad (3.31)$$

$$\bar{R}^2 = .991 \quad F_{(3,20)} = 837.94 \quad ESS = 307.034$$

where,

M = Money supply,

B = Budget deficit,

M₁ = M_{t-1} etc.,

ESS = Error sum of squares.

An F test was made, using the error sum of squares (ESS) of equation (1) and equation (2) which has the coefficients of budget deficit restricted to zero. The test statistic is:

$$F_{(q, N-k)} = \frac{(ESS_R - ESS_{UR})/q}{ESS_{UR}/(N-k)}$$

where,

ESS_R = Error sum of squares of the restricted model

ie. equation (2),

ESS_{UR} = Error sum of squares of the unrestricted

model ie. equation (1),

q = number of restrictions,

N = number of observations,

k = number of explanatory variables, including the constant, in the unrestricted model.

The numerator is the increase in the sum of squared errors divided by the number of parameter restrictions,

and the denominator is the error sum of squares in the original unrestricted model divided by its degrees of freedom.

The result of the test was:

$$F_{(3,17)} = \frac{(307.034 - 146.654)/3}{146.654/17} = 6.197$$

The F-statistic is significant at 1% level. Therefore, the null hypothesis that the coefficients of the budget deficit are jointly equal to zero is rejected. We conclude therefore that growth of budget deficit in fact "causes" increases in money supply.

The problems associated with the interpretation of causality tests must be borne in mind. They include the neglect of other information such as other causes of the variable of interest, the fact that the asymptotic distributions of the various statistics which are used for the test may not be accurate enough in small sample time series, and the fact that the evidence of clear association between variables cannot necessarily confirm causation, especially when there is feedback. In addition, it must be noted that economic causality can be derived only from theory; there is therefore reservations about the statistical use of the term causality.

Table 3.7 also shows that as the budget deficit increased, the proportion financed from external borrowing decreased. This trend was reversed between 1966 and 1972. After that year the trend resumed and the budget gap was closed mainly from internal borrowing, the large proportion of which was by central bank loans.

In the 1970s the Bank of Ghana became uneasy about the large budget deficit and its own lending to the government, and the consequences of these on the effectiveness of monetary policy. It observed in 1978 that '...despite the more stringent control of the reserve base of the commercial banks, the rapid growth in money supply continued, mainly through inflationary financing of the widening budget deficit of the government. The failure of monetary policy to reduce the excess liquidity in the economy was due to the fact that government spending during the year progressively got to a level which could not be matched by government revenue (Bank of Ghana (a), 1978 p.11).

The implication of the foregoing is that monetary policy was effectively hamstrung by the fiscal actions of the government. But there was one other policy instrument which could be used, if not on its own merit, then as a compliment to monetary and fiscal policies. The proposal here is that through an effective exchange rate policy the government can regain control over the effective use of monetary policy.

APPENDIX TO CHAPTER THREE

THE DEMAND FOR MONEY IN GHANA

In addition to the money supply function, the money demand function can provide us with an important picture of the monetary sector and certain monetary elasticities in Ghana.

The monetary approach to the balance of payment assumes that the money supply and money demand functions are stable. For monetary policy to have a predictable effect on prices, output and balance of payment, the demand for money must be a stable function of a few variables.

The collection of theories and evidence about the demand for money by Laidler (1977) indicates the nature of the disagreement over what variables go into the argument for the demand for money. For developing countries, the problem is made worse by the difficulty of getting data for analysis comparable to the studies that have been done for developed countries.

One issue of controversy is what constitutes the quantity of money - ie. the definition of money. The literature abounds in discussions about the choice between M1 (defined as currency plus demand deposits)

and other definitions which include financial assets of various liquidity eg. savings and time deposits, deposits with other non-bank financial institutions. It has been suggested that 'if the criteria for defining money is its capacity to be used in transaction, currency and current accounts only should be called money' (Short, 1980). Unfortunately, this approach does not provide a clear-cut solution. The problem has been the possibility that other assets are close substitutes for current account and are very liquid. In Ghana, savings deposits with commercial banks can be withdrawn on demand. Moreover, the other financial institutions operate some amount of current accounts for customers, making it difficult to leave deposits of these institutions out of the definition of money. Furthermore, the settlement of debts by cheques is very limited so that the distinction between current accounts and savings account is virtually immaterial.

One approach to the solution of the problem of definition has been centred on empirical investigation on such issues as which definition gives a stable function, and the substitutability among money and near-money assets. Work done has tried to determine the degree of correlation between income and various definitions of money (Friedman and Meiselman, 1963), the elasticity of substitution between money and near money (Chetty, 1969), and the cross-elasticity of money and near-money with respect to rate of return on competitive assets to determine the degree of moneyiness. All these results have yielded inconclusive results (Laidler,

1977).

Conlisk (1970) tried to resolve the problem of definition by correlating various financial assets with inflation, and concludes on the evidence that 'savings and time deposits are better left out of the definition of money than included equally with currency and demand deposits'. Using similar variables and data, but cutting off the first five years of Conlisk's data and including data for five subsequent years, Villanueva and Arya (1972) make the opposite conclusion.

On the specification of the demand function itself, the tradition has been to include a scale variable and one or more variables to represent the opportunity cost of holding money. Once again, evidence as to what is the correct scale variable or opportunity cost is inconclusive. The studies show a preference for permanent income for the scale variable, as against current income (Laidler, 1977), but do not resolve the choice between real gross domestic product and domestic expenditures or terms-of-trade adjusted real income. There is the further issue of taking into account output in the monetised sector only, since it is the only sector that involves the use of money (Coats and Khatkhate, 1980).

The choice of the relevant opportunity cost variable also involves a determination of whether the rate of inflation or the rate of interest is the opportunity cost of holding money. A more pertinent issue is the choice of the appropriate asset whose interest rate should be used (given also that interest

rates have a term structure), and the appropriate price index. There is a further difficulty of converting the relevant variables into the expected variable in models with expectation (ibid., Akinnifesi and Philips, 1978).

The following table reports our results of OLS estimation of the demand for money in Ghana, 1957-82:

TABLE A3.1

OLS ESTIMATES OF DEMAND FOR MONEY IN GHANA, 1957-82

	\bar{R}^2	<u>D.W.</u>	<u>h</u>
1a. $M1 = 9.557 + .160Y - 8.227R1$ (.29) (5.01) (-5.05)	.541	1.361	
b. $M2 = -56.930 + .278Y - 12.326R1$ (-1.34) (6.66) (-5.80)	.654	1.521	
2a. $M1 = 32.372 + .070Y - 5.398R1 + .467M1_{t-1}$ (1.20) (1.96) (-3.54) (3.67)	.702		0.179
b. $M2 = 6.860 + .118Y - 7.613R1 + .508M2_{t-1}$ (.19) (2.33) (-3.80) (4.07)	.794		0.175
3a. $M1 = 35.910 + .096Y - .398P$ (.79) (2.389) (-1.68)	.139	0.434	
b. $M2 = -27.342 + .192Y - .730P$ (-.45) (3.55) (-2.28)	.305	0.441	
4a. $M1 = 40.653 + .012Y - .407P + .698M1_{t-1}$ (1.39) (.39) (-2.68) (5.84)	.647		1.570
b. $M2 = 25.336 + .032Y - .660P + .760M2_{t-1}$ (.74) (.87) (-3.78) (7.44)	.793		1.269

The values in parenthesis are the t-ratios.

M1 is the money stock, defined as currency plus demand deposits. M2 is M1 plus savings and time deposits. Each variable has been deflated by the general price level so that they represent real stock of money.

Y is the gross domestic product deflated by the general price index. P is the rate of inflation and R1 is the nominal bank discount rate which, as shown by Tables 3.3 and 3.5, moves with rate of interest on savings deposits. In the absence of any data on long run rate of interest, we have had to use the discount rate as the relevant cost of holding money. The data used was obtained from the IMF International Financial Statistics. The data was annual from 1957 to 1982, (26 observations).

The (a.) equations are for M1 and the (b.) equations for M2. The statistics \bar{R}^2 , D.W. or h, the t-ratios and the estimated coefficients show, almost without exception, that the M2 equations are better.

Equation 3, compared to equation 1, shows that rate of interest is a better determinant of the demand for money than inflation. However, if equation 4 and 2 are compared inflation becomes as good a cost of holding money as the rate of interest. These two equations have been estimated on the assumption of partial adjustment of the real stock of money. The stock adjustment model assumes that the desired level of money is dependent upon the current level of income and the cost of holding money, ie.

$$M_t^* = a + bY_t + cK_t + e_t \quad \dots (a)$$

In any period the quantity of money demanded may not adjust completely to obtain the desired level. The hypothesis is that people make partial adjustment of their current money holdings by a proportion of the difference between the desired money stock and their

holdings at the end of the last period, the rate of response being a function of the adjustment coefficient λ :

$$M_t - M_{t-1} = \lambda(M_t^* - M_{t-1}) \quad \dots (b)$$

where in equations (a) and (b),

M_t^* is the desired level of real money stock,

Y_t is real income,

K_t is the cost of holding money, either P or R1

and λ is the adjustment coefficient, $0 < \lambda < 1$.

Equations (a) and (b) give

$$M_t = a\lambda + b\lambda Y_t + c\lambda K_t + (1-\lambda)M_{t-1} + u_t \quad \dots (c)$$

where $u_t = \lambda e_t$,

$$E(u_t) = 0$$

$$E(u_t u_j) = 0, \quad t \neq j$$

$$= \sigma_u^2, \quad t = j$$

Equation (c) has been estimated in equations 2 and 4 of Table A3.1. These equations in the table demonstrate the validity of the stock adjustment model for the demand of money in Ghana. Equation 2 shows the coefficient of adjustment to be 0.533 for M1 and 0.492 for M2. The corresponding values in equation 4 are 0.302 and 0.240 respectively. These show that demand for money adjusts to rate of interest more quickly than to the rate of inflation. This is to be expected, since the monetary aggregates used include real transactions balances which would have to be maintained at a certain level even in the face of the very high rates of

inflation experienced in the country.

The income elasticity of demand for money, as calculated from Equation 2, is 0.594 for M1 and 0.767 for M2. Both values show that demand for money was inelastic with respect to income. The high rates of inflation in the 1970s obviously discouraged the holding of money and encouraged the holding assets in non-monetary forms. This can be regarded as a set-back for the country if we accept the hypothesis of McKinnon (1973) and Shaw (1973) that inflation causes financial repression and has adverse effects on the economic development of a country (see Ayre, 1981). The resulting financial repression reduces the volume of real bank deposits and investment from personal (financial) savings, produces shallow financing and the diversion of investment from more indivisible items of capital equipment to smaller investments with lower returns or to investments with lower social productivity, and probably encourages people to revert to subsistence production. There is some evidence that these effects were observable in Ghana during the period after 1976 (see World Bank, 1984, pp. 1-5 and pp. 24-25.).

The interest elasticity is estimated at 0.578 for M1 and 0.624 for M2. These are also inelastic. This is not surprising since interest rates were altered less frequently and real rates for most of the time were negative (see Table 3.5). Both income and interest elasticities are higher for M2 than M1.

The Durbin-Watson statistic for Equation 1 is low and indicate the possible presence of positive serial

correlation in Equation 3. Since \bar{R}^2 for these equations are also very low and not significant very little value is attached to these Equations, except to compare them to Equations 2 and 4 to show the superiority of the stock adjustment model.

Because of the presence of the lagged dependent variable as explanatory variable in Equations 2 and 4, the D.W. statistics were converted into the Durbin h statistics:

$$h = (1 - \frac{DW}{2}) \sqrt{\frac{T}{1 - T(V)}}$$

where, DW is the Durbin-Watson statistic, T is the number of observations and v is the variance of the coefficient of the lagged dependent variable, calculated by squaring its standard error. The reported h in the table enable us to reject, at the 5% level of significance, the hypothesis of the presence of autocorrelation in Equations 2 and 4.

Specification test for the appropriateness of a log-linear function, like the Godfrey-Wickens (1981) test, was not done because of the small size of the sample.¹

To summarise, the following observations could be made about the demand for money in Ghana:

¹My thanks to Prof. Godfrey of University of York for drawing my attention, in a private communication, to the poor performance of their test in small samples.

1. Generally, M2 is a better aggregate than M1.
2. Income elasticity of demand is low.
3. Interest elasticity is low. This could reduce the potential of the use of monetary policy for stabilisation.
4. Interest rate is a better proxy for the cost of holding money than inflation.
5. The stock adjustment model explains the demand for money in Ghana, and the coefficient of adjustment is relatively high, between 0.3 and 0.5.

CHAPTER FOUR

EXCHANGE RATE POLICY IN GHANA, 1957-82

4.1. INTRODUCTION

The monetary approach to the balance of payments shows how exchange rate policy can be used to effect external balance, via its effects on the money balances held in the economy. The basic hypothesis is that a change in the exchange rate (e.g., a devaluation) will increase the demand for money. A devaluation will result in a rise in the prices of traded goods, denoted in domestic currency, raising the level of the total price level. The real value of cash balances declines, inducing exchange of goods for money. There will then be excess supply of goods which causes improvement in the balance of payment. Put in this way, there is much similarity between this and the absorption approach to devaluation and the real balance effect (also known as the assets market approach) of monetary theory. The decline in real cash balances, which follows devaluation, reduces domestic absorption relative to real output. Unless the monetary authorities increase the rate of supply of domestic credit, the accumulation of cash balances produces the balance of payment surplus that continues until actual cash balances held are equal to the desired balances.

There is however a second line of argument with

respect to the effect of an exchange rate change. The rise in the price of traded goods of a small country results in a fall in the price of non-traded goods, relative to traded goods. The effect is a possible restructuring of the economy. While the basic monetary approach argues that whatever relative price changes that follow exchange rate change is short-lived, Johnson (1976) shows that an exchange rate change can be made to have long-run effects and alter the structure of the economy over time in a LDC.

The inter-relationship between exchange rate policy and monetary policy therefore assumes a particular importance. One way of looking at the problem is to consider a balance of payment deficit as the result of the money stock being too large, relative to the nominal demand for that stock. Devaluation can raise the nominal demand, while monetary policy can reduce the money supply. Another view of the issue is that a country maintaining a fixed exchange rate, and which does not desire to have balance of payment disequilibrium or excess reserve loss (or inflow of capital from abroad) must not allow the domestic credit to expand above what is necessary to meet the increase in the demand for money through the growth rate of incomes. Exchange rate can therefore be used to achieve several related objectives.

4.2. OBJECTIVES OF EXCHANGE RATE POLICY

The following objectives of exchange rate policy can be identified:

1. As the price of foreign exchange, the exchange rate

can be adjusted to clear the foreign exchange market. In other words it could be a policy tool to achieve external balance and prevent the loss of reserves.

2. The exchange rate can be used to foster industrialisation. By raising the price of imports relative to home products it could serve as an inducement for industrialisation, possibly of the import-substitution type. This in line with the traditional infant-industry argument of protection.

3. The exchange rate could also be used to improve the terms of trade. A big country or a country with monopoly power over exports and monopsony power over imports might be in a position to alter the terms of trade by exchange rate action which raises the relative price of imports.

4. A country which derives a large amount of taxes from international trade, like many African countries, might want to increase government revenue by depreciating the exchange rate (i.e. the domestic currency value of a unit of foreign currency). If the taxes on international trade are mainly *ad valorem*, a depreciation of the exchange rate would increase the domestic currency value of exports and imports, and therefore the tax yield on them.

5. Exchange rate policy could be used to change the cost-price and relative price structure of the economy. This would be done in order to induce long-run shift of resources from some sectors to others to achieve a more efficient allocation of resources or achieve a more efficient economic structure.

6. As argued by the monetary approach to balance of payment, exchange rate could be an instrument of monetary

adjustment to achieve equilibrium between the stock of money and the desire to hold. The increased demand for money is due to the reaction of economic units to the rise in the domestic price level that results from a devaluation.

8. Exchange rate action can also be a proxy for, or supplement to, fiscal action, to tax (subsidise) the private sector and to subsidise (tax) asset accumulation in the public sector. This is particularly important when exchange rate changes affect the yield from taxes on international trade and the value of domestic cash holdings.

9. Exchange rate policy may be used to impose once-and-for-all tax on wealth of some producers, and subsidise others.

The history of exchange rate policies in Ghana shows how some of these objectives have been sought through the use of exchange rate policy.

4.3. THE HISTORY OF EXCHANGE RATES IN GHANA, 1957-1982

At the time of independence in 1957, Ghana used a common currency with other British West African colonies, namely Nigeria, Sierra Leone and the Gambia. The currency, issued by the West African Currency Board, was exchanged at par value with the pound sterling. There was little restriction on the transfer of currency into or out of the country. The currency was fully convertible, at the rate of £1=\$2.80.

The replacement of the West African Currency Board's pound by the Ghana pound in 1958 did not involve a change

in the exchange rate. The par value between the new Ghana pound and sterling was maintained.

In July 1965 the Ghana pound was replaced by the cedi (¢) which was a decimal currency. This, too, did not involve a devaluation, but since the pound was exchanged for £2.40 (i.e. 1 penny for 1 pesewa, 100 pesewas = £1) the official exchange rate became £1=\$1.17. In the February of 1967 the cedi was replaced by the New Cedi which had a higher value of 1.2 times. The exchange rate was thus realigned to N£1=\$1.40. In July of the same year the first official devaluation was effected, depreciating the exchange rate to N£1=\$0.98.

The official par value with the sterling was maintained throughout the period before 1967, and quotations with other currencies depended on London quotations. However, with the introduction of exchange control regulations in 1961, a black market rate of exchange emerged in early 1962, the rate becoming increasingly diverged from the official rate throughout the rest of the period under study.

Following the international exchange rate 'crisis' in the middle of 1971, the cedi was floated from 15th August till 4th November 1971 when the rate of £1=\$0.98 was restored. However, after the Smithsonian realignment of December, the Cedi was devalued on December 27th, establishing a new rate of £1=\$0.55. The various different rates which had been introduced in the year for remittances, tourism and transfer of profits, together with the export bonus were abolished. On February 7th, however, the Cedi was revalued and a new rate of £1=\$0.78

was established. A year later, on 13th of February 1973, following the devaluation of the dollar in terms of gold, the Bank of Ghana began to deal at an official rate of $\text{¢}1 = \$0.87$.

This new rate was maintained till 1978 inspite of very high rates of inflation, reaching over 100% in some years. There was increasing use of exchange control to manage the balance of payment. The result was a widening divergence of the black market exchange rate from the official rate (Table 4.3). In June 1978 it became necessary to adopt a more flexible exchange rate to secure a realistic rate that will reflect the underlying economic, financial and balance of payment situation. The exchange rate subsequently depreciated to $\text{¢}1 = \$0.36$, resulting in a cumulative depreciation of 58.2% since June 20th. This rate was maintained up to the end of 1982.¹ These historical developments have been summarised in Table 4.1 below:

¹In fact officially till October 1983.

TABLE 4.1
EXCHANGE RATE CHANGES IN GHANA, 1957-82

<u>DATE</u>	<u>RATE (£ per \$)</u>	<u>REMARKS</u>
1957	.714	Equivalent exchange rate between the dollar and the Ghana pound.
1967	1.02	Devaluation of the Cedi on July 8.
1971	1.82	Devaluation of the Cedi on December 27.
1972	1.28	Revaluation on February 7.
1973	1.15	Gold value maintained, but revalued against the dollar following the dollar's devaluation.
1978	2.75	Depreciated after 3 months of floating.

4.4. THE OPERATION OF EXCHANGE RATE POLICY IN GHANA

The previous section gives the landmarks of the changes in the official exchange rate over the period under study. But, as this section will show, there were, in and around these landmarks, a multiplicity of fiscal and legislative actions which made the effective rate of exchange different from what has been outlined above. These actions had aimed at achieving some of the objectives of exchange rate policy listed above, and in particular, to achieve external balance. For this reason, the number of instruments and the degree to which they were used to restrict external transactions depended not only on the philosophy and political colour of the various governments Ghana has had but also on the degree of balance of payment disequilibrium.

From 1957 to 1961 the Bank of Ghana dealt in sterling at rates within .5% on either side of the parity, with a statutory limit of .75%. The rates for other currencies was based on the current London market rates plus an exchange charge of .5% and brokerage fee of 1/8%.

Ghana was then a scheduled territory under the British Exchange Control Act of 1947. The exchange control regulations were similar to those of the other sterling area countries. Trade with other countries was made subject to licencing and payment restrictions designed to ensure favourable overall balance of payment for the area. As such, imports from (and exports to) within the sterling area were permitted under an Open General Licence (OGL), while all other imports, except wheat flour from the U.S. and Canada were subject to specific licencing. Proceeds from exports to non-sterling area countries had to be collected in hard currency and surrendered within six months of shipment. There were similar surrender and licencing requirements on invisible receipts from, and payments to, non-sterling area. Capital movements to and from outside the area were also regulated (IMF (a), 1961).

In 1957 there was a large current account deficit in the balance of payment, as had been in 1956. But the country had a reasonably large foreign exchange reserves - more than enough to cover a whole year's imports. Even so, the Economic Survey for 1957 warned of the possibility of continuing balance of payment deficits.

In 1958 a sizable surplus was recorded, due mainly

to a fall in imports which resulted in a rather large surplus on the trade account. However, the deficit re-emerged in 1959 and accelerated in 1960. By the middle of 1961 the large current account deficit had resulted in a reserve loss of over £69 million in six months from £296 million at the end of 1960 (Bank of Ghana (a), 1962, p17). What made the situation serious was the fact that traditionally the first six months of the year recorded payments surplus. In fact, the total loss of reserves for 1961 was £150 million.

At first, the government declined to use quantitative import controls on the grounds of the cost in terms of administration and also the possible emergence of 'corrupt practices' (Parliamentary Debates, 1961). Instead, a wide range of tariff and fiscal measures were introduced in the government budget statement of July 1961, aimed at reducing the balance of payment deficit. These measures included increased tariffs on a large number of goods and a new purchase tax of up to 66% on consumer durable goods which were largely imported. Along with these measures, exchange control was extended to cover transactions with all countries, including countries in the sterling area. Under the new system, foreign exchange cover was provided by the authorised banks but exporters to all countries were now to collect and surrender proceeds within six months. The country's foreign exchange balances were centralised at the Bank of Ghana. Proceeds from invisibles were to be surrendered, while invisible payments had to be approved in each case; most were limited and standardised.

In spite of these measures, however, the balance of payment situation continued to worsen during the second half of 1961 and there was a large reserve loss for the year. In December the government made a turn-round of policy and instituted import licencing to restrict imports and also as a protection for local production. All existing open general licences were revoked, making all exports and imports subject to specific licence.

There were obvious problems with the administration of the licencing system which resulted in shortages in 1962. Gradually, the administration of the system was streamlined and about seven open general licences were issued to cover various imports, mainly essential goods. Early in 1963 seven open general licences were issued but various consumer non-durables were no longer included.² An eighth open general licence covered border trade with West African countries. Exchange control was tightened in 1963 by reduction in the amount of foreign exchange allowed for annual travel.³ On capital transactions, the new Capital Investment Act, 1963, came into force on April 19. Under the Act, a Capital Investment Board was established to regulate foreign investment and profit repatriation. Later in the year, importers were required to register with the Ministry of Trade.

²These included corned beef, rice, wheat flour, milk, cream, sugar, cattle, sheep and goats.

³They were halved from £100 to £50 for persons aged twelve years and above, and from £70 to £35 for children under twelve years.

The difficulties of the licencing system continued in spite of these measures. This is illustrated by the fact that between December 27, 1963 and February 24, 1964, the open general licence was revoked, revised, established and added to no less than six times.

The balance of payment deficit increased in 1963, and a large reserve loss was recorded. Getting to the end of the year, regulations were issued which limited such invisible items as commission payments, freight charges, insurance on imports, bank charges and interest and rebates on acceptance bills (CBS: Commercial and Industrial Bulletin, 20 Dec. 1963). Then in April 1964, as part of the banking and credit regulations issued, attempt was made to restrict credit facilities for imports. In addition, a 15% prior deposit on the import of consumer goods were required. Other measures introduced in 1964 included restrictions on the remittances abroad of income by foreign residents, review of the register of importers to reduce the number, and a new provision that insurance for imports must be covered in Ghana.

New fiscal measures were introduced for the year 1965 in January.⁴ The purchase tax on imported manufactured goods was abolished except on motor cars, the tax on which was increased. In its place a new sales tax of 10% was levied on many imports, soon to be raised to 11.5%. Import duties on a wide range of manufactured

⁴The fiscal year had been changed so that it now coincided with the calendar year.

goods were increased. In addition, attempt was made to reduce the deficit on invisibles by the imposition of a foreign travel tax of 10% on the price of round trip ticket levied on residents leaving the country temporarily by aircraft or ship. Furthermore, the government tried to centralise the import trade in the hands of the state by the establishment of state corporations to import meat products, machinery and textiles. Corporations responsible for the last two were later merged in the Ghana People's Trading Corporation (later Ghana National Trading Corporation) which was set up to import and distribute consumer goods.⁵ To increase the export of manufactured goods, an incentive scheme was devised to increase the provision of import licences for manufacturers exporting goods. A ban was also placed on the importation of certain import substitutes manufactured locally, including textiles and footwear.

These measures failed to prevent a big increase in the volume of imports in 1965 (due to, among other reasons, the run down of stock in 1964; another reason is the OAU summit in Accra in 1965; Killick, 1978 p.106). The result was a large trade deficit which, added to the traditionally large deficit on the invisible account, resulted in a big loss of reserve and accumulation of

⁵The GNTC was set up with 43 branches throughout the country. It was later expanded by the purchase of the A.G. Leventis chain of stores and eventually given monopoly to import essential goods. The monopoly was ended in February 1966 (see Fitch and Oppenheimer, 1966).

medium term debt. The government called in the IMF and the World Bank which recommended a reduction in overall government expenditure to restore balance between government revenue and expenditure and a devaluation of the exchange rate. There was also to be a temporary halt in the launching of new projects financed by supplier's credits, a more liberal attitude toward foreign investment and a review of the existing trade pacts with Eastern Countries (CBS, 1965). These recommendations were, however, not agreeable to the government.

The deterioration of the country's external payments position was such that by early 1966 the country's external reserves had fallen to £3.5 million, equivalent to only two weeks of imports - from £149 million in 1960. Moreover, external debt was valued at over £805 million out of which £85.3 million (equivalent to £35 million) represented current payment arrears (Republic of Ghana, 1969; Esseks, 1975). The external imbalance reflected itself in internal problems of low capacity utilisation, shortages, rising prices and unemployment (Leith, 1973). There is no doubt the economic situation contributed towards the change in government that took place in February 1966, or at least the general welcome given to the new government. At the time of the coup d'état exchange rate policy could be summarised as follows:

A large part of the import trade was in the hands of the state-owned Ghana National Trading Corporation or similar state trading agencies. A few other goods were imported by private firms and individuals who were registered. Apart from certain prohibited imports and

four inconsequential open general licences, all other goods were imported under individual specific licence which were issued within the imports plan. There were also "special unnumbered licence" which allowed imports where 'satisfactory' evidence could be shown to the effect that it would not involve the transfer of the country's foreign exchange. Each specific licence attracted a fee of 1% on the value of the goods specified. Most items were exported by state Marketing Boards. Other exports could be made under specific licences obtained prior to shipment. The proceeds from such exports had to be collected within 60 days of shipment and the foreign exchange surrendered. There were deposit requirement for letters of credit on all imports, including industrial raw materials (5%) and capital goods (1%). Foreign Exchange allocations for invisibles like foreign travel were reduced to £50 a year (IMF, 1966).

The new government spent 1966 consolidating its position and trying to launch a programme of stabilisation to achieve external and internal balance. On the external front, the government proclaimed its objective of working to get rid of restrictions and controls on foreign trade and payment (NLC, 1967). In March 1966, the government abolished the cash margin requirement on import letters of credit for pharmaceuticals, raw materials, capital goods, essential foodstuffs and spare parts. Early in 1967 it restricted the issue of "special unnumbered licence" (SUL) to non-commercial imports, but added two other open general licences which removed the controls on the importation of

pharmaceuticals, fertilizers and other chemicals, tools, coke and pig iron. At the same time, the importation of certain goods which were mainly produced in Ghana and certain luxuries were prohibited. These included cocoa, lard, palm and coconut oil, travel goods, certain textiles, phonographic records, poultry, fish and various foodstuffs, alcoholic beverages and cigarettes, petroleum products, footwear, fruits and certain building materials. The number of open general licences was extended as the liberalisation process went on. In 1967, there were eight open general licences, and in 1968 there were ten. The goods involved were mainly basic and essential consumer goods, and agricultural and manufacturing producer goods. Registered importers could import these from any country.

The most important foreign exchange policy element of the period immediately after 1966 was the devaluation of the cedi on July 8, 1967, which reduced the external value of the currency from £1.00=US\$1.40 to £1.00=US\$0.98. Following the devaluation, a series of measures were taken which influenced the effective exchange rate. The list of commodities on the open general licence was extended and the 15% advance deposit requirement withdrawn. The export duty on diamonds was abolished while that on timber was reduced. Allocations for invisibles were increased in order to maintain their pre-devaluation value in foreign currency. The withholding tax on profits repatriated abroad was reduced from 20% to 12.5% and subsequently to 7.5% in 1968, and a policy to gradually liberalise remittances of profit and

dividend announced.

In 1968, the practice of preparing a foreign exchange budget was resumed. The practice had been started in 1965 but was not seriously implemented and the 1966 budget was abandoned after the change in government (Killick, 1978, pp. 265-286). Now in 1968 an economic sub-committee was made responsible for drawing up the foreign exchange budget. Two budgets were prepared: the minimum import programme which represents the country's import needs, and a reduced 'operational' import programme which was based on the known quantity of available foreign exchange. It was the latter which set the ceiling of the over-all import plan for the year and which could be extended only if additional foreign exchange became available, for example, through foreign aid. As foreign aid was received, import licence was issued for the gap between the minimum programme and the reduced programme.

In 1968 and 1969 the open general licence was further extended to include more basic consumer and producer goods. Early in 1969 the 1% licence fee levied on the cost and freight (insurance on imports had to be covered in Ghana) value of imports was instituted to dampen the demand for foreign exchange. In the middle of 1969, rice, sugar and jute were exempted from the 180-day suppliers credit requirement. Liberalisation was taken further by the abolition of the need to complete OGL commitment forms for imports on the OGL list. Henceforth, importers were only to inform the Bank of Ghana at least two weeks before payment was due. In addition, import

duties on automobiles and trucks were reduced from 250% to 100%.

To ensure that the external accounts would be in balance after the foregoing liberalisation measures, the list of restricted commodities was extended (also as part of the import substitution policy) and certain other goods were not to be imported without the permission of the controller of imports and exports. These goods were mainly textiles and luxuries. Also, an Export Promotion Council was established and company tax reduction of up to a maximum of 50% were proposed for export-oriented industries.

In 1970, liberalisation was carried further by placing more commodities (mainly foodstuffs and consumer products) on the open general licence. There was a marked shift from quantitative import restrictions regime to the use of import taxation to control imports. First, a five per cent ad valorem surcharge was placed on a number of imports. This was soon replaced by a new surcharge which was graded from 5% to 150%. In addition, some items were exempted from the surcharge but were subject to a development levy of one pesewa (1p.) per pound weight, which was equivalent to about 10% ad valorem on rice and about 18% on sugar. Moreover, the concessionary customs duty of 5% or 10% granted to approved manufactures for import of basic manufacturing inputs was abolished. Exemption from customs duties was granted only for the import of agricultural machinery and inputs and pharmaceutical inputs.

The effect of the liberalisation was large increase

in imports from £354 million in 1969 to £419 million in 1970 and to £443 million in 1971 in spite of the new import surcharges (ibid. p.307).

By the middle of 1971, the external payments account had given cause for concern and the government responded with various fiscal measures. Certain custom duties were increased and government departments and statutory corporations made subject to the payment of import duties and surcharges and other indirect taxes. Import duties on a number of items were changed from specific to ad valorem, and sales tax increased on petroleum products. The temporary import surcharge was re-organised and extended to certain food items (e.g. milk and tinned meat and fish). A new system of foreign exchange taxes were introduced to restrict invisible expenditure.⁶ In addition, more items were placed on the list of banned imports. To increase foreign exchange earnings, a new

⁶These taxes were:

- 1.Dividends, profits and royalties - 25%
2. Airline and shipping remittances - 10%
3. Insurance premiums - 10%
4. Personal remittances - 10%
5. Student remittances - 10%
6. Transfers to Ghana's missions abroad - 10%
7. Business travel and private travel - 25%
8. Commissions - 25%
9. Interest payments - 25%
- 10.Head office expenses - 25%
- 11.All others (excluding merchandise imports) - 25%

scheme of 25% export bonus, paid to exporters of non-traditional goods, was established, and in addition, tourists visiting Ghana were made entitled to a bonus of 25% when changing foreign currency or travellers cheques for cedis. These measures altered the effective rate of exchange.

But by the end of 1971 the growing imports had resulted in increased trade deficit and a dangerously low foreign exchange reserves of only \$40 million at the end of the third quarter of 1971, with large accumulated unpaid import bills (Leith, 1973). The government finally decided on devaluation. On December 28, the par value was changed from 0.870897 gram of fine gold to 0.450182 gram per cedi. The cedi's new effective parity relationship with the US dollar became £1=\$0.55 from £1=\$0.98 which had been established in the previous August. Furthermore, a wider band of up to 2.25% was established. Following the devaluation, the temporary import surcharges, the foreign exchange tax on invisibles, the export and tourist bonus schemes were all abolished.

The year 1972 started with uncertainty hanging over the country as to what the effects of the large devaluation and the accompanying liberalisation measures were going to be. But just about two weeks after these measures were introduced there was a change of government. The new government started to institute policies to reverse almost all the liberalisation measures. Regulations made in January and February re-introduced import licencing and banned the import of certain goods. The government also announced a

retrenchment programme for imports, while the 180-day import credit requirement, under which importers could only pay for imports after 180 days, was abolished. An import programme was introduced. The programme for 1972 set a limit of £235 million, reducing by half the 1970 level of the import of most end-use categories. A similar programme for 1973 was published in October 1972 with minor shifts between the restricted list, banned list and special licence list.

Significantly, the official foreign exchange value of the currency was raised to £1=\$0.78, with a new sterling rate of £1=£3.34. More significant, perhaps, was the fact that there was no return to the value before December 27, 1971 which had been £1=\$0.98. It showed that the new government accepted that the old parity over-valued the currency. Before any formal analysis is made, it should be noted here that at the time of the February 1972 revaluation the black market rate of exchange was £1=\$0.46, which upon the revaluation increased to £1=\$0.68 (Pick's Currency Yearbook, 1976). That there was no apparent justification for preferring the higher foreign exchange value of £1=\$0.78 to £1=\$0.55 could be deduced from the fact that the total fall in reserves for 1972 was \$74.8 compared with the fall of \$14.8 in 1971, despite the exchange control regulations of 1972. This perhaps indicates that the new exchange rate could not have achieved a desirable external balance.

The only other explanation for the choice of the new exchange rate was the distrust of the effectiveness of exchange rate action and a preference by the new

government for the use of administrative and other direct control methods to regulate external trade, and indeed other internal economic variables. For example, an Essential Commodities Committee, later renamed Logistics Committee, was established to be solely responsible for the import of certain basic commodities. The export of cocoa, diamonds and manganese were centralised and made the monopoly of government organisations. Export shipment of non-ferro base metals were placed under the supervision of the General Superintendence Company Limited, while all imports became subject to pre-shipment inspection. The export bonus scheme was re-introduced, giving exporters of non-traditional products 20% bonus on the gross value of their exports. As added incentive to exporters, they were made eligible for concessionary interest rates. With regard to invisibles, the basic travel allowance was abolished, and charter flights suspended. To control imports further, an import licence fee of 7.5% was imposed and the customs tariff restructured.

On June 23, 1972 Ghana ceased to be a Scheduled Territory under the U.K. Exchange Control Act of 1947 and the Bank of Ghana suspended the official buying and selling rates for sterling. Following the floating of the sterling on July 1, it was decided to maintain the dollar rate of £1=\$0.78 and sterling quotations were determined daily. When in February 1973 the US dollar was devalued, Ghana decided to maintain the value of its currency in terms of gold, effectively revaluing the cedi in terms of the dollar from £1=\$0.78 to £1=\$0.87.

The administrative and legal control over external trade continued in 1974 with a few changes, some of substance but others only procedural. The latter include new import and export regulations and the withdrawal of exemptions given to government departments and statutory corporations from import and other duties. The special unnumbered licences for imports were abolished, the open general licence system was formally abrogated and the list of restricted and banned items were merged into one list of restricted items for which licences would not normally be issued. There were also increases in the export and import taxes and the levy on import licences. In addition, the Bank of Ghana released foreign exchange for the payment of certain import arrears and agreement was signed with creditor countries to reschedule medium term loans.

Before the end of 1974, however, it had become necessary to introduce certain unusual measures to reduce imports further. In September the government announced a 50% reduction in the face value of issued import licences for which letters of credit had not been opened, and in December all import licences were cancelled, including those issued for 1975. Customs controls over imports and exports by overland routes were tightened. Additional monetary measures were introduced to control the level of imports. These were restrictions on the level of bank lending to the import trade and mandatory cash margins against imports of up to 100% in most cases.

Early in 1975 a new import programme was introduced for that year. It aimed at achieving large reductions in

imports from the 1974 level. The importation of certain commodities, mainly textiles and raw cotton, were banned. The cash margin deposit requirement for imports of chemicals, pharmaceuticals, petroleum and industrial raw materials were reduced by 25 percentage points across the board. Later in the year the requirement was reduced from 100 to 65 per cent for all other imports. But the range of import licence fee was increased from 5-50 per cent to 5-150 per cent. In addition bank lending to the import trade was again restricted in the middle of the year and the commonwealth tariff preferences terminated.

Minor policy changes took place in 1976 and 1977. The regulatory regime continued in 1976 with the prohibition of chilled and frozen fish and a new import licence tax of 10%. In early 1977 a foreign exchange tax of 10% was put on allocations for travel and the tax on purchase of airline tickets raised from 10 to 15 per cent. The former was raised from the 10% to 30% in the mid-year budget statement. Also increased was the export bonus, from 20% to 30%, except cocoa exports. As a further incentive for industry, the mandatory cash margin against imports of machinery and equipment for the timber industry was lowered from 50% to 20%.

It was clear in the middle of 1978 that the currency was highly overvalued and could not ensure a balanced external accounts. However, in view of the political costs of an outright devaluation, and the government's preference for direct control, devaluation was not to be contemplated. The government instead chose to continue using other indirect methods of controlling the demand

for foreign exchange. A 30% surcharge on exchange allocation for foreign travel was introduced. In addition, mandatory cash margin deposits against import letters of credit was required of all importers, as a monetary policy as well as an exchange rate policy instrument. The margins were 25% for industrial raw materials, chemicals, spare parts, lubricants, drugs, medical supplies and building materials; 50% for machinery and equipment including transport equipment other than automobiles. Other imported goods, regarded as less essential, including private passenger automobiles attracted margins of 65%. Only fertilizer and crude oil were exempted from the cash margin requirement.

By June 20, 1978, the severity of the imbalance had made it necessary to depreciate the exchange rate to a more realistic external parity. The government announced that it was adopting a flexible rate of exchange to enable it adjust the exchange rate to reflect the underlying economic, financial and balance of payment situation. Immediately, the exchange rate depreciated from 1.15 to 1.35 cedis to a dollar at the end of June, and to $\text{C}1.46 = \$1$ at the end of July. It soon became clear that this did not represent a turn-round of government thinking and policy to rely on 'market forces' to determine the price of foreign exchange or to adopt a new regime of liberal trade policies which would enable the government to avoid the dangers inherent in maintaining overvalued exchange rates for a long time. For, on August 28, the flexible exchange rate regime was abandoned, after the exchange rate had fallen to $\text{C}1 = \$0.3636$.

Following the depreciation, the export bonus of 30% and 20% was unified and reduced to 10%. The failure to abolish the bonus completely shows that inspite of the depreciation the government was, even in the immediate aftermath, sceptical that the new exchange rate was appropriate to correct the distortions in relative price of exportables viz-a-viz non-tradeables, given the high rate of inflation at the time. In fact there was still in existence a wide gap between the official exchange rate and the black market exchange rate of about $\text{₺}1 = \$0.10$.

By early 1979, it was clear that the depreciation that occurred in 1978 was not sufficient to enable the country to overcome the serious imbalance - both internal and external - that had built up. The government decided to reduce the amount of currency in circulation and also to, supposedly, cut off illegal holdings of bank notes abroad. In an unusual move the government replaced all bank notes in a very short time at the ratio of 30 per cent new notes for old notes up to $\text{₺}5000$ holdings and 50 per cent for larger holdings. The exercise was aimed at controlling the very high rates of inflation, which had been 116% in 1977 and 73% in 1978. It was also aimed at reducing the current account deficit which in 1978 had been \$46.1, from a surplus of \$17.1 million in 1977 (World Bank, 1984, Table 2). The government was able to reduce the rate of growth of money supply from 72.5% and 68.6% for M1 and M2 respectively in 1978 to 13.4% for M1 and 15.8% for M2 in 1979.¹ The rate of inflation declined

¹See page 99 for definition of M1 and M2.

from 73% in 1978 to 54.4% in 1979. A current account surplus of \$121.8 million was also recorded in the balance of payment account (ibid.). However, the underlying causes of the external imbalance had not disappeared and, with the restrictive regime still in operation, it was clear that the exchange rate was not anywhere near an equilibrium level. The current account balance for 1980 was a surplus of only \$16.3 million, to be replaced in 1981 by a deficit of \$162.7 million (ibid.). At the end of 1979 and throughout most of the first half of 1980, the black market rate was about 18 to 20 cedis to one US dollar compared with average black market rate of 9.55 cedis to one dollar during the first quarter of 1979 when the currency exchange exercise was undertaken (Pick's Currency Yearbook, 1983).² In the middle of 1980, therefore, the government had to increase the tax on airline travel and allocation of foreign exchange from 50% to 75% to forestall the apparent movement towards a balance of payment deficit. This measure was followed in December of 1980 by imposition of sales tax of 20% on import of final goods and the introduction of a new import licence tax of 10%.

These measures failed to relieve the pressure on the balance of payment in 1981. There was pressing need to increase exports. As has been the case for most of the 1970's, the boost for exports was not to be achieved by the use of a realistic exchange rate to alter the terms of trade in favour of exports, but through an increase in

² Compare with official exchange rate of 0.3636=US\$1.00.

the export bonus from 10% to 20% in June 1981. The foreign exchange tax was subsequently increased from 75% to 80%.

Thus, was the nature and ramifications of the exchange rate policy by the end of 1982.³ To summarise, we recall that at the time of independence in 1957 up to about 1961, there was relatively no balance of payment problem and the exchange rate was on parity with the British sterling and fully convertible. The convertibility was supported by relatively large reserves, but by 1961 the reserves were used up. As was to be repeated in the 1970's, the government's immediate response was to use fiscal and tariff measures to control imports. As the balance of payment problem worsened, the government resorted to quantitative restrictions on imports and foreign exchange transactions in an increasing severity. Meanwhile, the rate of inflation was accelerating, resulting in a severely overvalued exchange rate and the emergence of black market exchange rates. The new government that took over in early 1966 saw the need to gradually remove the trade restrictions which had been woven around the country. In the middle of 1967 the exchange rate was devalued and a commitment made to

³ In August 1983, a new military government came into agreement with the IMF/World Bank on a stabilisation programme which included exchange rate action to alter in a systematic manner the official rate of exchange. By the end of 1984 the official exchange rate had been depreciated from £2.75=US\$1.00 to £50=US\$1.00.

liberalise trade. The successor government in 1969 and 1970 was equally committed to trade liberalisation, and was willing to gradually remove the restrictions by placing more and more commodities on the open general licence. When the balance of payment situation worsened in 1971, the government in the middle of the year temporarily increased the tariffs on imports but was willing, at the end of the year, to adjust the exchange rate to realistic levels of £1=US\$0.55.

The devaluation of December 1971 was not allowed to operate for long, for, within two weeks there was a change of government which in February 1972 revalued the currency, even if not to the pre-devaluation level. From then till the end of 1982, there was very high rate of inflation. The inflation rate accelerated from over 10% in 1972 to over 50% in all of the second half of the 1970's, and indeed reached over 100% in two of the years. Consequently, the cedi became highly overvalued and the divergence between the official exchange rate and the black market rate widened. There was increasing use of high rates of tariffs and other taxes to discourage imports and to close the increasing government budget deficit; all imports were made subject to import licencing, and quantitative restrictions were used to regulate imports, with complete ban on some imports e.g. textiles. There were also attempts to erect state monopolies to control imports and their internal distribution. The scarcity premium on foreign exchange encouraged smuggling, and with decline in exports the gap in the balance of payment widened, resulting in need to

restrict imports further.

Because of the difficulties of achieving an external balance by quantitative restrictions in the presence of a highly overvalued currency, resort was made to the use of monetary policy to supplement the exchange rate and fiscal actions. The monetary actions were in the form of cash margin against imports, restrictions on letters of credit and ceilings on credit for imports, as well as even direct discounting of currency note holdings in 1979.

At the cost of repetition we note that these measures failed to achieve equilibrium between the external payments and receipts. This failure is not surprising in view of the large gap that existed between the official exchange rate and what informed observers could regard as the equilibrium exchange rate. The next section seeks to investigate the nature and extent of this gap.

4.5. DETERMINING THE EXCHANGE RATE

4.5A The Exchange Rate Standard:

For over a decade now, floating of exchange rate has been adopted by major industrialised countries. Floating of exchange rate is now regarded as a permanent expedient as more countries float their currency. In addition to floating, there has been a number of other policy options available now with regard to the standard to which to peg, assuming pegging is the right policy.

The options available are:

1. Continuing to peg to a single currency, with or without frequent changes in the parity.
2. Pegging to a basket of currencies (e.g. trade weighted) or less commonly to the SDR.
3. Crawling peg in which the government declares its willingness to frequently adjust the exchange rate according to some accepted indicators.
4. Managed or dirty floating in which there is active government intervention to direct the movement of the exchange rates as desired by the current policy objectives and the behaviour of other macroeconomic variables.
5. Free or clean floating which is a policy of nonintervention in the foreign exchange market.
6. A combination of some of the above.⁴ The choice of any of these options and its success in helping to achieve an equilibrium exchange rate and maintain an external balance will depend on the rate of inflation in the country, the rate of change in the money supply, the net capital inflow, the costs of the various policies and the characteristics of each country. The costs include resource costs, institutional costs, instability costs and political costs (Black, 1976a). In addition to the costs, the institutional and economic characteristics of

⁴For example, Fleming's dual exchange markets with floating rate for capital account transactions (Fleming, 1974). Also, see another suggestion by Ansu for Ghana (Ansu, 1984).

each country have been advanced as determining the appropriateness of the selection of each standard. These characteristics can be summed up as the size of the country (in terms of the GNP), the degree of openness, the degree of international financial integration, the degree of divergence in the inflation rate from world average and the pattern of trade and the geographic concentration of trade (Heller, 1978; Holden et al., 1979).

What follows is a review of the merits and demerits of each standard in relation to Ghana and with reference to the costs and the country characteristics. The discussion is made with the hope that it would provide a basis for the choice of appropriate standard that would make the determination of equilibrium exchange rate easier and less costly.

1. Floating

With the adoption of floating exchange rates by the leading industrial countries since March 1973, The possibility and desirability of developing countries following this example has been examined. Indeed, some developing countries, including a few in Africa, have opted to float their currencies viz-a-viz the currencies of the rest of the world.⁵ The issue is no less relevant to Ghana. As has been noted already (p.110) the country declared in June 1978 that it was adopting a flexible exchange rate policy. Subsequently the exchange rate was

⁵IMF (a), 1983, lists Uganda, Sierra Leone and Nigeria as countries with declared managed floating policies.

allowed to float and thereby depreciate. However, this experiment was short-lived as it was practically abandoned after only two months, and though the country's exchange rate system continued to be described as flexible (IMF (a), 1979 to 1982), the exchange rate was effectively pegged to the US dollar at $\text{¢}1 = \$0.3636$ till 1983.

The advantages of floating the exchange rate include the feasibility of a more continuous adjustment in the exchange rate which will reduce the political perplexities of devaluations, a reduction of the distortions that arise from overvalued exchange rate, freedom to pursue internal policy objectives without much anxiety about external balance, and a reduction in the need to hold large reserves. Ghana, in 1978, experimented with floating in order to enjoy these advantages, and also to avoid the political costs of a devaluation. That the experiment was curtailed was due to the real difficulties that a small, open and developing country faces in adopting a floating exchange rate.

It is not difficult to marshal reasons to explain the inability of the government to follow through the introduction of the floating regime. The operation of the floating exchange rate system among developed countries clearly show the need for a well developed domestic securities market, with adequate substitutability between domestic and foreign securities. It is only then that the foreign exchange ^{rate} can be determined by the free movement of capital across boundaries in response to differences in interest rates and exchange rate expectations.

Unfortunately, such a market does not exist in Ghana. Over two decades of currency inconvertibility and exchange control has effectively isolated the domestic 'rudimentary' securities market from the world's securities markets. In addition, there is no forward market for foreign exchange, which reduces capital mobility and thereby the stability of the balance of payment that is made possible by capital flows (Black, 1976a, pp. 18-19). The functioning of exchange markets is facilitated by a two-way capital mobility which the governments in Ghana were not prepared to countenance. In the absence of a well developed financial market and forward market there is always the possibility of overshooting, and instability.

The costs of floating is in the institutional arrangements that are required to ensure its effective operation. In addition, it requires a commitment to renounce direct government control over foreign exchange, and indeed over other economic variables. In Ghana, however, foreign exchange is considered so important as to require a direct allocative mechanism, as distinct from an amorphous and unpredictable price mechanism implicit in the adoption of a floating regime. Foreign exchange is seen as a powerful instrument for allocation of resources to transform the economic structure. Control of foreign exchange is also consistent with the tendency for the governments in Ghana to control all economic activities. Thus, floating of the exchange rate would be only a second best solution in the midst of governmental control on other prices, including interest rates.

Incidentally, pegging interest rate at unrealistically low levels has been one of the reasons for the absence of financial markets which are linked with world markets.

For Ghana, then, there are powerful arguments against the adoption of a freely floating, or even managed floating, exchange rate. On the other hand, it can be argued that the absence of foreign exchange market is the result of deliberate government policy in concentrating all foreign exchange holdings in the hands of the central bank. For example, the ratio of commercial bank holdings of foreign currency assets to central bank holdings has declined from 13% in 1957 to 5% in 1970 and to 1.7% in 1982. It could therefore be argued that given a reversal of policy and governmental encouragement, a good securities and foreign exchange market could develop to facilitate the operation of a floating exchange rate, provided the right domestic economic environment is created and other controls are removed to allow the free functioning of all markets.

2. Single Currency Peg

The need for a more flexible exchange rate system becomes very compelling in the present international economic environment in which there is a general floating of exchange rates among the developed and most important trading nations. A developing country that pegs its currency to one major currency effectively floats against all other currencies. Thus, unless trade with the country whose currency the LDC's currency is pegged to is very large, there is bound to be considerable cost due to the fluctuating terms of trade with all other countries. This

point is illustrated by Leslie Lipschitz (1979). On the simplified assumption that a developing country, i, imports only from Japan, j, and exports only to the United States, us, then, the terms of trade in domestic currency terms may be represented by:

$$t = \frac{P_x^{us} E_{us}}{P_m^j E_{us} / E^*} = \frac{P_x^{us} E^*}{P_m^j}$$

where P_x^{us} = price of exports in US dollars

P_m^j = price of imports in Japanese yen

E_{us} = domestic currency price of US dollar

E^* = Japanese yen price of US dollar

The equation in the final form does not include E_{us} ; that is to say, the terms of trade does not depend on domestic currency price of US dollar, i.e. the rate of exchange of the developing country. Rather, a change in the rate of exchange between the yen and the dollar, E^* , changes the terms of trade.

TABLE 4.2

VALUE OF IMPORTS BY COUNTRY OF ORIGIN, 1975-79
(as per cent of total imports)

COUNTRY	1975	1976	1977	1978	1979
U. K.	14.75	16.55	13.75	18.69	20.20
U. S.	16.19	15.68	13.40	10.66	10.70
GERMANY	11.43	14.52	12.60	12.76	13.29
NIGERIA	6.77	9.68	10.24	10.26	12.88
JAPAN	6.52	5.21	4.41	5.02	4.88

Source: U.N. Yearbook of International Trade Statistics,

Volume 1, Trade by Country, 1982.

Table 4.2 shows the percentage share of imports of Ghana from the five major trading partners. The table reveals that there is not overwhelming dependence on imports from any one country during the seventies. It is also significant that the share of the U.S., whose currency the cedi has been pegged to since 1972, has been generally less than 15%. In the absence of a dominant trading partner whose currency can be used for intervention and/or as a single currency peg without much cost, unlike many of the French-speaking African countries (see Black, 1976, p.36), the policy of maintaining an essentially dollar peg for most of the period under review seems to be a sub-optimal policy.

There is fairly general consensus that under a fixed parity, a country must be willing to change the exchange rate more frequently to establish a realistic parity unless it is willing to follow domestic policies that are in agreement with policies adopted in the country whose currency one has pegged one's own currency. Failure to do this invariably results in balance of payment difficulties that leads to the establishment and/or continuation of a regime of quantitative restrictions. Such a restricted trade regime normally begins with ad hoc effective tariffs on different activities which results in a set of multiple import exchange rates and net export exchange rates which are below the effective import exchange rates. These export exchange rates

discriminate against exports and also compounds and reinforces the distortions that would arise from a multiplicity of import exchange rates. The gap in the trade balance widens and to increase exports in an inefficient domestic product and factor markets, export subsidies are resorted to. This often leads to multiple exchange rates on exports too, since these export subsidies discriminate among different types of exports. The sum effect of the subsidies and tariffs is de facto devaluation on current visible transactions which is then gradually extended to cover invisibles. Eventually, there is a large formal devaluation - done reluctantly - to rationalise the situation. The crisis atmosphere in which the devaluation takes place as well as the large size of the devaluation results in severe dislocations for the economy.

This clearly has been the situation in Ghana since 1961, as has been shown in the section on the operation of exchange rate policy in Ghana. Single currency peg, then, cannot avoid devaluation. It can rather lead to resource misallocation as well as a large variance in the domestic price of tradeable goods. As it often leads to exchange controls, the institutional arrangements of operating the system could be very high. It could also lead to the development of parallel foreign exchange markets. In addition, pegging requires relatively large holdings of reserves to be used for intervention. In the absence of large reserves to maintain the fixed rate of exchange, recourse will have to be taken to the use of exchange controls. Thus, while the major advantage of

single currency pegging is the stability of the exchange rate itself, the disadvantages are likely to be overpowering.

3. The Crawling Peg

To counter the drawbacks of a single currency peg, it has been suggested that a superior policy is a crawling peg. The advantage is to maintain the stability of the exchange rate while enjoying the financial services of the intervention currency. On the other hand it avoids currency over-valuation and the dislocational effects of large devaluations.

The crawling peg has a nominal rate fixed by the exchange rate authorities. The peg is adjusted in small steps towards the equilibrium. Probably, crawling peg policy requires similar discipline in domestic monetary policy as a single peg system. The reason is that if adjustment becomes invariably one way, it might stimulate speculation and thereby cause instability. Unless stability is achieved, speculation could be a characteristic of the crawling peg.

The crawling peg has been used mainly by the South American countries like Chile, Peru, Colombia and Brazil. The system has potential for avoiding cumulative disequilibria and therefore, balance of payment crises. However, there are major difficulties in the implementation of a crawling peg. These include the determination of the relevant real equilibrium exchange rate, which will serve as the target, and even the target variable, i.e. whether capital flows, reserves, or current account balance. There is another problem with

the determination of the optimal path for implementation of the crawling peg policy, knowing that some of the changes in the exchange rate or the underlying factors may be transitory. Furthermore, crawling peg, like a single peg, cannot escape the effects of exchange rate changes among other currencies in a world of floating exchange rates.

4. The Basket Peg

The last drawback in particular accounts for the tendency among developing countries to peg their currencies to a collection or basket of currencies. The principle is to determine an effective exchange rate that is defined in terms of weighted average of the exchange rates of the country's trading partners. The effective exchange rate may take into account not only the trade but also the payment structure, thus accounting for the effect of most exchange rate changes on the country's balance of payment. The weight used in the calculation may be export-weighted, import-weighted or based on bilateral trade i.e. accounting for both exports and imports. Alternatively, there are suggestions for weighting each currency according to the proportion of trade denominated in the currency or weighting each currency according to the proportion of trade for which prices are fixed in that currency (Lipschitz, 1979). To take into consideration price elasticities of supply and demand, the multilateral exchange rate model (MERM) is proposed (Artus et al., 1973). Related proposals seek to achieve a satisfactory cyclically adjusted long-run basic balance (Artus, 1979; Belanger, 1976).

Whatever the method used in arriving at the weights, adopting a basket peg may reduce the variance of the exchange rate and therefore minimise the instability in the prices of traded goods that could be transmitted from changes in exchange rates among the trading partners whose currencies are mutually floating against each other. On the one hand it retains the advantages of pegging, but on the other, therefore, also has the major disadvantage of single pegging, that is, the danger of the exchange rate being maintained for long at disequilibrium level. This danger can be minimised if a new weight or a newly determined exchange rate is adopted at a fairly frequent intervals.

5. The S.D.R. Peg

The costs involved in the construction of a basket at frequent intervals and communicating them to foreign exchange dealers has lead many developing countries to peg to the Special Drawing Right.

Many Asian and Middle East countries have operated SDR peg for some time. Increasingly, many African countries are adopting SDR peg too. It is recognised that an SDR peg will not be the optimum policy if the weights in the SDR does not closely reflect the trade weights of the particular country. However, it is very convenient to use an internationally recognised numeraire that also reflects the general pattern of international trade and capital flows, and more important, reflect world pattern of demand for primary commodities. It also maintains the flexibility of a float and requires less reserves. It is definitely a commendable exchange rate policy to

consider, unless the country has a predominant trading partner. As Ghana has no such a trading partner it could seriously consider this option.

4.5B The Equilibrium Exchange Rate

Assuming that it is viable for governments to intervene to either determine the exchange rate or influence the movement of the exchange rate towards some target, the government will have to first decide what target or level of exchange rate is desirable. This is irrespective of any of the exchange rate systems the country adopts, except a freely floating policy. This section discusses and compares some of the more traditional methods of determining equilibrium exchange rates.

1. Purchasing Power Parity

The use of the purchasing power parity to guide exchange rate policy rests on the assertion that purchasing power parity (PPP) is the equilibrium towards which the exchange rate will converge over time (Genberg, 1981), especially in high inflation situations like that experienced in Ghana in the 1970's (McKinnon, 1979). Purchasing power parity asserts that relative price levels indicate the equilibrium rate of exchange between currencies, and the rate of change of prices in turn determine the rate of change of the exchange rates over time.

It is widely accepted that the 'relative version' of PPP provides a relative indicator of what the current exchange rate should be viz-a-viz the other country's

currency (Officer, 1976). The version can be represented by:

$$R_t = \frac{P_t}{P_t^*} R_o$$

where R_t = the exchange rate at a particular time

R_o = the exchange rate at the base period

P_t = the domestic rate of inflation

P^* = the foreign rate of inflation.

Table 4.3a shows the exchange rate for Ghana from 1957 to 1982, using the PPP equation above.

TABLE 4.3a

PPP OF GHANA'S EXCHANGE RATES, 1957-82

(1) Year	(2) P_t^*	(3) P_t	(4) PPP'	(5) $P_t^{*''}$	(6) PPP''	(7) ER
1957	100.00	100.0	0.71	100.00	0.71	0.71
1958	103.79	100.0	0.68	103.38	0.69	0.71
1959	106.16	102.6	0.69	104.73	0.70	0.71
1960	108.53	103.9	0.68	106.76	0.69	0.71
1961	111.37	109.8	0.70	108.45	0.72	0.71
1962	115.64	120.3	0.74	111.49	0.77	0.71
1963	119.94	124.8	0.74	114.19	0.78	0.71
1964	125.59	140.5	0.79	116.89	0.85	0.71
1965	131.28	177.8	0.96	120.27	1.05	0.71
1966	137.92	201.3	1.04	124.66	1.15	0.71
1967	142.65	185.6	0.92	128.39	1.03	1.02
1968	150.24	200.7	0.95	133.45	1.07	1.02
1969	157.82	215.0	0.97	139.53	1.09	1.02
1970	167.30	221.6	0.94	147.64	1.07	1.02
1971	177.25	242.5	0.97	155.07	1.11	1.82
1972	187.20	267.3	1.01	162.16	1.17	1.28
1973	205.21	314.4	1.09	174.66	1.28	1.15

1974	236.49	371.2	1.11	197.97	1.33	1.15
1975	268.25	482.4	1.28	219.93	1.56	1.15
1976	298.10	752.9	1.79	238.18	2.24	1.15
1977	331.75	1629.4	3.49	258.45	4.48	1.15
1978	363.98	2820.3	5.50	277.03	7.23	2.75
1979	409.48	4354.9	7.55	302.03	10.24	2.75
1980	473.93	6535.9	9.79	337.84	13.74	2.75
1981	540.76	14149.7	18.58	371.28	27.06	2.75
1982	606.11	17304.6	20.24	398.99	30.79	2.75

Notes: (2) Pt^* = World Consumer Price Index

(3) Pt = Ghana Consumer Price Index.

(4) PPP' = Purchasing Power Parity, calculated with Pt^* .

(5) Pt^{**} = Industrial Countries Consumer Price Index.

(6) PPP'' = Purchasing Power Parity, calculated with Pt^{**} .

(7) ER = Official Exchange Rate.

The table shows the degree of divergence of the PPP rate of exchange from the official parity. Column 4 of the table shows the PPP calculated with the consumers' price index of the world and that of Ghana; column 6 shows the PPP with respect to the consumer price index of the industrial countries who are the major trading partners of Ghana, supplying about three-quarters of the country's imports. Because the consumer price index in the industrial countries were generally lower than the average for the whole world, the PPP with respect to industrial countries (measured in cedis per dollar) were higher than the PPP with reference to the world. The table shows that by 1982 the PPP was about £30 to a dollar compared with the official rate of £2.75=\$1.00.

Table 4.3b has been calculated with the wholesale

price index of Ghana and the industrial countries. The rationale for using wholesale price index is that it enables the exclusion of non-tradeables like services. Ideally one should use the consumer price index of tradeables, but in its absence, we use the wholesale price index which covers agricultural commodities, industrial materials and manufactured goods sold in the domestic economy, goods which can be considered as potentially tradeable (McKinnon, 1979; cf. Keynes, 1971, pp.72-74). In fact, much more interesting results occur in Table 4.3b. For example, the table shows that for most of the years till 1962 the Ghana currency (then called pound) was undervalued, and that it was not till 1965 that overvaluation became a problem, diverging the PPP from the official parity. Columns 4 and 5 of Table 4.3b also show that the 1967 devaluation was in fact overdone, and it was not till about 1969/70 that two parities became equal. If this is the case then it means that until the middle of the 1970's the exchange rate was not very much disaligned from PPP and the various governments of the period could have been more liberal in their trade and external payments policies, provided the necessary fiscal and monetary policy measures could be used to sustain a viable balance of payment position. From 1975 onwards however, the currency became overvalued, and severely so. In this situation, no meaningful monetary or fiscal policy could be effective without first adjusting the exchange rate.

TABLE 4.3b

PPP OF GHANA'S EXCHANGE RATES, 1957-1982

(1) Year	(2) Pt(WPI)	(3) Pt [*]	(4) PPP	(5) ER
1957	100.0	100.0	0.71	0.71
1958	100.9	101.2	0.71	0.71
1959	100.9	105.0	0.68	0.71
1960	103.6	106.7	0.69	0.71
1961	104.5	108.1	0.69	0.71
1962	113.6	110.0	0.73	0.71
1963	110.4	113.2	0.69	0.71
1964	118.1	117.0	0.72	0.71
1965	137.1	121.1	0.80	0.71
1966	137.1	125.8	0.77	0.71
1967	154.3	128.7	0.85	1.02
1968	176.5	131.6	0.95	1.02
1969	192.3	136.6	1.00	1.02
1970	199.5	143.5	0.99	1.02
1971	190.5	150.0	0.90	1.82
1972	226.2	157.7	1.02	1.28
1973	285.1	174.9	1.16	1.15
1974	363.3	216.7	1.19	1.15
1975	452.5	239.2	1.34	1.15
1976	609.5	264.8	1.63	1.15
1977	1028.5	291.4	2.51	1.15
1978	1514.9	313.6	3.43	2.75
1979	2565.6	356.9	5.10	2.75
1980	3603.6	421.8	6.07	2.75
1981	5386.0	458.9	8.33	2.75
1982	7336.7	485.4	10.73	2.75

Notes: (2) Pt(WPI) = Ghana Wholesale Price Index.

(3) Pt^{*} = World Price Index.

(4) PPP = Purchasing Power Parity.

(5) ER = Official Exchange Rate (cedis per dollar).

Table 4.3b also shows that the 1971 devaluation could have been less and that the 1972 re-valuation as well as the 1973 rate were right. Furthermore, when the cedi was floated in 1978, the government should have left the value to depreciate further than it was allowed at the time.

If the PPP is calculated with the consumer price index, then it is clear that the Ghana currency was overvalued from 1960 onwards and that the 1967 devaluation and the revaluation in 1972 about got it right. But it also confirms the previous observations that the 1971 devaluation could have been smaller and the exchange rate allowed to depreciate more in 1978. After 1975, a more flexible policy, e.g. crawling peg, should have been used to depreciate the exchange rate more regularly to acceptable and defendable levels.

These observations have been made on the assumption that the PPP adequately describes the equilibrium (or desirable) level of exchange rate. However, the construction of PPP exchange rate series and their interpretation have been subject to much criticism. One group of criticism relate to the indices used to calculate the relative changes in the purchasing power of the currencies of the home country and that of the the country or group of countries abroad (Officer, 1976). One view is that since each country uses different weights

for its index, reflecting differences in consumption and production patterns, parity will vary with different weighting patterns used in the price measures. Another problem with the indices relate to the base period. The problems of base periods with respect to the construction and use of index numbers are well known (Merrill and Fox, 1970, chap. 3). In relation to PPP, it is important that the base period exchange rate, used for the calculation, be in long-run equilibrium. Often, this cannot be guaranteed even when the exchange rate is floating. It is instructive in this respect to acknowledge that the exchange rate in 1957 (our base year) was nothing other than the exchange rate between the pound sterling and the dollar, the Ghana currency fixed on one-to-one parity with the sterling. If the exchange rate in 1957 was in disequilibrium then the PPP construction merely perpetuates this disequilibrium. In addition, the economic conditions in Ghana in the 1970's, and also in the 1960's, were different, marked at home by severe trade restrictions and abroad by a different international economic environment. Thus, it is difficult to argue for a parity that is based on the 1957 exchange rate.

Another problem with PPP is that it assumes perfect international commodity arbitrage. But it is well known that international commodity arbitrage is far from perfect (Richardson, 1978), not least because of government restrictions. There are also transport and insurance cost to consider. Moreover, currency inconvertibility hinders commodity arbitrage.

Finally, it has been demonstrated by Dervis et al. (1982) that PPP which only reflects relative rates of inflation fails to take into account other factors that influence the equilibrium rate of exchange e.g. external shocks from changes in export commodity or major import commodity prices on the world market. If this is the case in Ghana, and the oil price increases of the 1970's could be a factor, then the equilibrium exchange rate was much higher than given in Tables 4.3 a and b.

These observations notwithstanding, one cannot but agree with Frenkel (1978) that the usefulness of PPP is not to determine the day-to-day fluctuations in exchange rate but its long-term trend; it also serves as a reminder of the effects of domestic inflation rates and possibly credit creation on the exchange rate and the balance of payment. In conditions of hyperinflation, monetary factors tend to dominate structural factors and the PPP becomes a very relevant means of estimating what equilibrium the exchange rate should approximate (Officer, 1976).

2. Special Drawing Right

As noted earlier (p.144), the SDR peg is becoming increasingly popular among developing countries for its convenience and as a half-way policy between fixed parity and free floating.

TABLE 4.4

Special Drawing Right Exchange Rate (Cedis per SDR)

(1)	(2)	(3)	(4)
Year	Cedis per SDR	ER	Cedis per SDR
1957	0.71	0.71	0.71
1958	0.71	0.71	0.71
1959	0.71	0.71	0.71
1960	0.71	0.71	0.71
1961	0.71	0.71	0.71
1962	0.71	0.71	0.71
1963	0.71	0.71	0.71
1964	0.71	0.71	0.71
1965	0.71	0.71	0.71
1966	0.71	0.71	0.71
1967	1.02	1.02	1.02
1968	1.02	1.02	1.02
1969	1.02	1.02	1.02
1970	1.02	1.02	1.02
1971	1.97	1.82	1.97
1972	1.39	1.28	1.39
1973	1.39	1.15	1.39
1974	1.41	1.15	1.41
1975	1.35	1.15	1.35
1976	1.34	1.15	1.34
1977	1.40	1.15	1.40
1978	3.57	2.75	1.50
1979	3.62	2.75	1.52
1980	3.51	2.75	1.47
1981	3.20	2.75	1.34
1982	3.03	2.75	1.27

Notes: (2) End of Year.

(3) Official Exchange Rate (cedis per dollar).

(4) Without the 1978 depreciation of the cedi.

Table 4.4 shows the exchange rate between the cedi and the SDR, on an assumption of SDR peg since 1974. Interest is on the parity after 1973 for reasons that the SDR was determined in terms of a basket of currencies from July 1, 1974 which gave it the stability advantage; also it was after 1973 that generalised floating was adopted by the industrial countries. Compared with the official dollar parity, the SDR parity (in column 2) devalues the cedi after 1971. (It should be noted here that the SDR did not exist before 1970). However, compared with the PPP the cedi would have been apparently highly over-valued if it had been pegged to the SDR. Column 4 of Table 4.4 shows a hypothetical SDR peg without the 1978 depreciation of the cedi. Without the 1978 depreciation, the adoption of SDR peg would have made the cedi more over-valued. This shows that the advantages of SDR peg can be realised only when the country's rate of inflation is similar to that of the countries whose currencies are components of the SDR, in addition to the requirement that its trading pattern should reflect the weighting in the SDR. Otherwise, the country would have to be willing to devalue the currency frequently to maintain its real effective exchange rate.

3. The Black Market Rate of Exchange

I have noted that for most of the period under study, the official exchange rate was below what would be considered as the equilibrium rate. Economic theory makes it clear that in such a situation, an effective black market develops outside the official or legal market to

satisfy the excess demand that is created. The price of the commodity (in our context, the foreign exchange) is bound to be higher on the black market than the legal price.

The supply of foreign exchange on the black market is derived from the activities of smugglers (especially of cocoa along the borders into Togo and Ivory Coast (May, 1985)), under-invoicing of exports and over-invoicing of imports (Gupta, 1981). Another important source is the remittances of residents abroad. Since there is risk in engaging in the black market, which in Ghana is illegal and carries very heavy sentences if discovered, the size of the premium or rent that is associated with it must be high to attract people into it. I propose that this premium depends on the differential between producer price of cocoa in Ghana and that in Ivory Coast and Togo, and the differential between price levels in Ghana and in the rest of the world. In addition, the level of black market exchange rate should also influence its supply. Thus, I formulate a supply function of the nature:

$$S_B = a_1 + a_2 (P_g - P_w) + a_3 (CP_w - CP_g) + a_4 R_B + a_5 R_o$$

$$a_2 > 0, a_3 > 0, a_4 > 0, a_5 < 0$$

where P_g = price levels in Ghana

P_w = world price levels

R_B = black market exchange rate

R_o = official exchange rate

CP_w = producer price of cocoa outside Ghana

CP_g = producer price of cocoa in Ghana

S_B = quantity of foreign exchange supplied to the
black market

If the official rate is depreciated, resulting in more cedis per dollar, more foreign exchange is diverted to official channels by those whose cost of smuggling is greatest, e.g. because of distance from the frontier or because they consider their marginal rate of risk aversion is greater (Nowak, 1984). These people may consider the cost of selling in the black market greater than the premium they will obtain by participating in the black market after the depreciation. This reduces supply to the black market and increases the black market rate of exchange.

In the demand equation, I make demand for black market foreign exchange a function of the money supply (probably the ex ante excess money supply over real demand for money (Blejer, 1978)), the black market rate and the official rate:

$$D_B = b_1 + b_2 R_B + b_3 M + b_4 R_O$$

$$b_2 < 0, b_3 > 0, b_4 < 0$$

where R_B = black market exchange rate

R_O = official exchange rate

M = money supply

D_B = quantity of foreign exchange demanded on the
black market

An increase in the official rate (i.e. more cedis per dollar) will reduce the demand in the official market thus enabling some dealers in the black market to have their demand satisfied in the official market. Those who will leave the official market include inefficient traders and producers whose profits had been boosted by the premium on the official exchange rate at the pre-devaluation price. There will then be a fall in demand on the black market.

Equilibrium in the black market for foreign exchange requires equality of demand and supply:

$$D_B = S_B$$

$$a_5 R_O + a_1 + a_2 (P_g - P_w) + a_3 (CP_w - CP_g) + a_4 R_B = b_1 + b_2 R_B + b_4 R_O + b_3 M$$

$$R_B - (b_2 R_B) / a_4 = [b_1 - a_1 + (b_4 - a_5) R_O + b_3 M - a_2 (P_g - P_w) - a_3 (CP_w - CP_g)] / a_4$$

$$R_B = \frac{(b_1 - a_1)}{(a_4 - b_2)} + \frac{(b_4 - a_5) R_O}{(a_4 - b_2)} + \frac{b_3 M}{(a_4 - b_2)} - \frac{a_2 (P_g - P_w)}{(a_4 - b_2)} - \frac{a_3 (CP_w - CP_g)}{(a_4 - b_2)}$$

$$R_B = h_0 + h_1 R_O + h_2 M + h_3 (P_g - P_w) + h_4 (CP_w - CP_g)$$

$$h_2 > 0, h_3 < 0, h_4 < 0$$

where the h's replace the combinations of a's and b's as the coefficients.

The sign of h_1 cannot be determined from the model. This is consistent with the finding of Sheikh (1976) that the demand for black market foreign exchange is positively sloped in a range because of the two effects of an increase in the black market rate: first, it decreases the official supplies of foreign exchange, thus diverting greater unsatisfied demand to the black market; and second, the higher black market rate directly decreases demand for foreign exchange. As long as the first effect is stronger than the second, an increase in the black market demand make the demand curve positively sloped. Our hypothesis is that if the official exchange rate is depreciated then, first, supply to the official sources will increase thereby reducing the supply to the black market, but secondly, demand in the official sources will also decrease and enable the authorities to satisfy some of the demand which would have gone to the black market, thus reducing the demand in the black market. Whether black market exchange rate will fall depends on the relative strength of the two influences.

On the basis of the last equation we estimated the equation:

$$B = a_0 + a_1ER + a_2M + a_3PR + a_4CPT + a_5CPIC + e$$

where e is an error term.

B is the black market rate of exchange while ER is the official exchange rate. M is the money supply, defined as currency plus all bank deposits of the public. PR is the

ratio of price levels in Ghana to price levels in the rest of the world, which accounts for the divergence of price level in Ghana from world price levels. CPT and CPIC are respectively the ratio of producer price of cocoa in Togo and Ivory Coast to the producer price in Ghana.

The data and sources are reported in Table 4.5. The period of estimation is 1957 to 1982, using annual data. The method of estimation is ordinary least squares. The result of the regression is:

$$B = 12.456 - 18.187ER + 0.017M - 8.575PR + 11.674CPT$$

$$(1.841) \quad (-3.572) \quad (3.655) \quad (-2.217) \quad (1.868)$$

$$-8.694CPIC$$

$$(-2.147)$$

$$R^2 = .863; \quad \bar{R}^2 = .829; \quad F_{(5,20)} = 25.239; \quad DW = 1.654; \quad \rho = .085$$

The figures in brackets are the t-statistics, and show that M, ER and PR are statistically significant at 5%, using a two-tailed test. Both M and PR are of the expected signs. This shows that excessive money creation by the authorities in Ghana has been a significant factor in determining the levels of the black market exchange rate. It also supports the hypothesis that as inflation in Ghana escalated, widening the gap between price levels in Ghana and abroad, there was developed a large premium on the use of foreign exchange which had the tendency to increase its supply to the black market and (without the effects of the other variables) decrease the black market exchange rate.

The sign of official exchange rate, ER, cannot be

determined a priori. The fact that it is negative in the regression means that in Ghana, the authorities could reduce the black market rate of exchange by devaluation, accompanied by trade liberalisation. The reduction in demand for black market exchange rate as a result of depreciation of the official exchange rate exceeds the reduction of supply to the black market, resulting in the reduction in the black market rate of exchange. Similar signs as ours were obtained for both ER and M by May (1984, p.64).

The sign of CPIC agree with our model and is 5% statistically significant in a two-tailed test. It shows that as the producer price of cocoa fall behind that in Ivory Coast incentives for cocoa smuggling increases which, other things being equal, increases the supply of foreign exchange on the black market and causes the fall in the black market rate.

The sign of CPT is different from that of CPIC and at a lower level of significance. Indeed, in May's regression of cocoa supply for the Volta Region, which shares the border with Togo, not only was the ratio of producer price of cocoa in Togo to that in Ghana statistically not significant from zero, it also had the wrong sign (ibid., pp.77-78). We offer two explanations: Possibly, most of the foreign exchange that is obtained from cocoa that is allegedly smuggled into Togo are immediately used to purchase goods and therefore do not come into the black market. Alternatively, increased differential in producer price so increases smuggling that it effectively engages the attention of the

government to increase policing, thus helping to increase the black market rate.

Over-all, the results of the regression are very good, and show the effects of government's monetary and exchange rate policy on the development of the black market for foreign exchange. Probably, it is heartening result that official exchange rate devaluation could reduce the differential between the black market rate and the official rate and in turn the level of smuggling. Devaluation, however, must be supplemented by a relaxing of trade restrictions and exchange control to reduce the need to acquire foreign exchange from outside the official system. There must also be equal attention to the other factors in the model that are determinants of the black market exchange rate.

TABLE 4.5

DATA FOR BLACK MARKET RATE EQUATION

YEAR	(1) B	(2) ER	(3) PR	(4) M	(5) CPT	(6) CPIC
-----	-----	-----	-----	-----	-----	-----
1957	0.71	0.71	0.567	110.6	1.408	1.334
1958	0.71	0.71	0.545	119.9	0.865	0.819
1959	0.71	0.71	0.543	136.5	1.080	1.023
1960	0.71	0.71	0.533	159.9	1.320	1.251
1961	0.71	0.71	0.552	174.0	1.256	1.255
1962	1.11	0.71	0.582	200.4	1.193	1.436
1963	1.15	0.71	0.582	215.0	1.299	1.515
1964	1.28	0.71	0.629	294.8	1.714	1.851
1965	2.27	0.71	0.758	300.5	3.570	3.577
1966	1.72	0.71	0.814	315.3	1.857	2.746
1967	1.61	1.02	0.722	319.2	1.813	2.324
1968	1.79	1.02	0.748	351.8	2.052	2.058

1969	1.64	1.02	0.762	388.5	1.901	1.742
1970	1.69	1.02	0.740	427.1	1.830	1.710
1971	1.82	1.82	0.766	474.7	2.022	1.838
1972	1.56	1.28	0.797	667.7	1.540	1.411
1973	1.72	1.15	1.857	793.6	1.680	1.677
1974	1.54	1.15	0.876	1005.1	1.240	1.641
1975	1.92	1.15	1.000	1386.1	1.740	2.652
1976	3.45	1.15	1.408	1902.8	2.760	4.070
1977	7.69	1.15	2.742	3043.8	4.128	6.291
1978	10.00	2.75	4.335	5131.0	3.905	6.517
1979	18.12	2.75	5.988	5942.1	4.311	5.666
1980	12.03	2.75	7.808	7948.7	3.419	4.339
1981	33.33	2.75	14.812	12028.7	5.826	7.945
1982	106.38	2.75	15.719	14838.0	6.362	8.482

Sources and Notes:

(1) B = Black Market Exchange Rates, in cedis per dollar, average of last 3 months of the year; from Pick's Currency Yearbook 1962 to 1976 and International Currency Yearbook 1984.

(2) ER = Official exchange rates, in cedis per dollar, end of year data; from IMF International Financial Statistics Yearbook, 1983.

(3) PR = Ratio of price levels in Ghana to world average price levels, from International Financial Statistics Yearbook 1983 and Price Supplement 1981.

(4) M = Money supply, defined as currency plus demand, savings and time deposits, in millions of cedis, from International Financial Statistics Yearbook 1983.

(5) and (6), CPT and CPIC are respectively the ratio of producer price of cocoa in Togo and Ivory Coast to that in Ghana, using the black market rate of exchange for conversion of CFA into cedis, data from May (1985) p.129.

I propose further that the other factors could in fact be related to the level of the official exchange

rate. It is known, for example, that the major factor which fuelled the increases in money supply, especially the period 1975 to 1982, was the large budget deficit financed by the banking system (Chapter 3). It is also asserted that the budget deficits were primarily due to the over-valued currency (May, 1984, p.59).¹ Therefore, currency devaluation could enable the government to reduce the budget deficit and in turn the increases in money supply. This would also be expected to ameliorate the inflationary conditions and thereby reduce the ratio of price levels in Ghana to that in the rest of the world. Furthermore, devaluation would not only enable the country to pay competitive producer price of cocoa, relative to prices in Togo and Ivory Coast, it would also reduce the differential between producer price of cocoa in Ghana and in Togo and Ivory Coast if it reduced the black market rate. Remember that the black market rate contributes towards the price differential of cocoa on the black market or through smuggling. The conclusion then is that a more aggressive exchange rate policy that seeks to maintain an equilibrium exchange rate over the long run, and which therefore makes exchange control and trade restrictions unnecessary, could, by itself, and through its influence on other factors, remove the differential between the black market and the official

¹For example, the exchange rate adjustments of 1983 and 1984 replaced the 'cocoa deficit' of £7,400 million in 1983 with a surplus in 1984 (West Africa, 24/31 December, 1984, p.2642).

exchange rates.

TABLE 4.6

THE BLACK MARKET EXCHANGE RATE, 1957-1982
(cedis per dollar)

Year	(1) Period Average	(2) End of Year	(3) ER'	(4) ER''
1957	0.71	0.71	0.71	0.71
1958	0.71	0.71	0.71	0.71
1959	0.71	0.71	0.71	0.71
1960	0.71	0.71	0.71	0.71
1961	0.71	0.71	0.71	0.71
1962	0.97	1.11	0.71	0.71
1963	1.15	1.15	0.71	0.71
1964	1.18	1.28	0.71	0.71
1965	1.04	2.27	0.71	0.71
1966	1.64	1.72	0.71	0.71
1967	1.82	1.81	1.02	0.84
1968	1.85	1.79	1.02	1.02
1969	1.69	1.64	1.02	1.02
1970	1.69	1.69	1.02	1.02
1971	1.52	1.82	1.82	1.03
1972	1.67	1.56	1.28	1.31
1973	1.49	1.72	1.15	1.16
1974	1.72	1.54	1.15	1.15
1975	1.89	1.92	1.15	1.15
1976	2.56	3.45	1.15	1.15
1977	9.12	7.69	1.15	1.15
1978	8.95	10.00	2.75	1.51
1979	15.61	18.12	2.75	2.75
1980	16.70	12.03	2.75	2.75
1981	26.26	33.33	2.75	2.75
1982	61.61	106.38	2.75	2.75

Notes: (1) Monthly average for the year.

(2) Average for December.

(3) End of Year official parity.

(4) Period Average official parity.

Sources: IMF International Finance Statistics Yearbook 1983; Pick's Currency Yearbook, various issues 1965 to 1976; International Currency Yearbook 1984.

Table 4.6 shows the black market exchange rate and the official exchange rate in end of year and monthly averages. The increasing gap between the official and the black market rates are evident. It also shows the effect of the 1967 and 1972 devaluations on the black market. Nevertheless, the black market exchange rate may not be equal to the equilibrium rate that can attain in the absence of trade and exchange rate restrictions, and therefore cannot be a good guide to the degree of over-valuation of the currency at any time.

4. The Real Effective Exchange Rate

The term effective exchange rate has been used to describe the value of a country's currency in terms of other currencies, which, as opposed to the official exchange rate, is what exporters receive from exports and importers pay for imports. The definition is problematic because in reality governments, including Ghanaian governments, have used other measures like surcharges and tariffs to increase the price importers paid for foreign exchange, and subsidies and export taxes to alter the exchange rate faced by exporters. In an index form, it shows how the value of the country's earnings (in local currency) from commodity exports for the current period compares with the value of its earnings for a base period

as a result of the cumulative effects of exchange rate movements (Maciejewski, 1983).

Nominal effective exchange rates can be converted to real effective exchange rates by deflating the nominal values by an index of relative price movements, in order to remove the inflationary effects of much of the changes in nominal exchange rates. The real effective exchange rates is thought to reflect not only the international competitiveness of the country's exports and import-substituting industries, but also to be the benchmark for determining what the equilibrium exchange rate is.¹ In order to capture the type of competitive relationship that the country faces and the effect of exchange rate changes among third countries which are major trading partners, a weighting system is added. This is particularly relevant because of the adoption of general floating among the major industrial countries.

¹Equilibrium exchange rate is defined to be that which, given the inflow of foreign capital, is consistent with the achievement of full employment of domestic resources and the balance of payment target (e.g. a certain level of reserve).

TABLE 4.7a

VARIOUS ESTIMATES OF REAL EFFECTIVE EXCHANGE RATES FOR
GHANA, 1957-82

Year	(1a) Imports	(1b) Exports	(2) REER	(3) REER
----	-----	-----	-----	-----
1957	0.839	0.574		
1958	0.840	0.494		
1959	0.824	0.543		
1960	0.836	0.626		
1961	0.873	0.531		
1962	0.912	0.692		
1963	0.919	0.601		
1964	0.930	0.725		
1965	1.057	0.348	2.37	
1966	1.111	0.459	2.58	
1967	1.272	0.837	1.98	
1968	1.394	0.756	1.74	
1969	1.352	0.705	1.78	
1970	1.405		1.71	
1971	1.456		1.71	
1972			1.32	
1973			1.53	1.15
1974			1.64	1.18
1975			1.84	1.44
1976			2.80	2.09
1977			5.48	4.00
1978			6.16	2.52
1979			4.58	3.53
1980			6.00	5.32
1981			13.26	10.53
1982			16.51	

Sources: (1) J. Clark Leith (1973), pp. 11-13.

(2) Ernesto May (1985), p. 131.

(3) World Bank (1984), p. 11.

Three estimations of the real effective exchange rate of Ghana between 1957 and 1982 have been reported in Table 4.7a. The third estimate, column III, by the World Bank (1984), is actually purchasing power parity index but presented as the real effective exchange rates. Using the 1973 exchange rate as the base year, we have calculated the exchange rates of cedis per U.S. dollar.² Table 4.7a demonstrates some of the problems of constructing and using real effective exchange rates. Columns Ia and Ib have been calculated with consideration for import and export taxes and other surcharges and bonuses, which makes direct comparison with the other estimates not possible. Even so, the concept of real effective exchange rates has a number of problems, some of which have been reviewed by Maciejewski (1983).

The basic method of calculation is usually presented as a formula. The nominal effective exchange rate, NEER, is:

$$NEER = \sum_j^J (M_{jk} / \sum M_{jk}) R_{jk}$$

where M_{jk} is the volume of country k's imports from country j and R_{jk} is the exchange rate of k's currency per unit of j's currency.

²We use 1973 as base year because the World Bank states that the exchange rate was relatively undistorted in 1973 (World Bank (1984) p.4).

The real effective exchange rate is then defined as:

$$REER = \sum_j W_j \frac{R_t^{jk}}{R_o^{jk}} \cdot \frac{P_o^{jk}}{P_t^{jk}} \cdot 100$$

where j is partner country and k is reporting country, t is time such that $t > 0$; (R_t^{jk}/R_o^{jk}) and (P_t^{jk}/P_o^{jk}) are respectively, the bilateral exchange rate of j to k , relative to the base period, and the ratios of prices of j to those of k relative to the base year. $W_j = M_{jk}/\sum M_{jk}$ is the bilateral import share of k 's total imports originating from country j . W_j then, is simply the weighting that is afforded to country j in the calculation of the real effective exchange rate.

The usefulness of presenting the formula this way is seen in the fact that there are several weighting procedures used. Rhomberg (1976) discusses seven of these methods. Widely used for the developed countries and by the IMF is the Fund's MERM (Artus and Rhomberg, 1973) which seeks to simultaneously capture all the relevant factors such as origin and destination of all the commodities that enter international trade and the different competitor countries, as suppliers or buyers, whose exchange rates changes can have influence on a particular country's real effective exchange rates. The OECD has a weighting procedure which takes into account both the export and import shares of the i th partner country. Attempts to develop a MERM for primary producing countries was made by Feltenstein et al. (1979) and Belanger (1976). The weighting method used by May (1985)

and which we use in Table 4.7b is import weights. Import weights give an indication of the price competitiveness and profitability for the import-substituting sector and therefore describes how much it should cost an individual or firm to use a unit of foreign exchange.

The weighting procedure, whatever the method used, together with the use of base years present certain difficulties. The problems of base years with respect to index numbers are well discussed elsewhere (Merrill and Fox, 1970). In the calculation of index for real effective exchange rate, these problems take on extra importance. For example, up to about 1972, little was imported by Ghana from Nigeria; but after the oil crisis of 1973 imports from Nigeria rose quickly to between ten and fifteen per cent of total imports. Ratio of total imports from other traditionally important trading partners like Italy, France and the Netherlands also experienced wide fluctuations from one year to another. In addition, trade with some Eastern Bloc countries were important in some years. It was difficult to establish a useful exchange rate between the cedi and currencies of these countries for meaningful inclusion in the estimation of the real effective exchange rate.

On the base year problem, we note that the arithmetic-averaging method used in the calculation results in loss of uniqueness in determining relative changes, the latter being influenced by the choice of the base year (Maciejewski, 1983). Changing the base year also necessitates changing the weighting frequently. But this fails to solve one more significant problem: that

the base year exchange rate is deemed to be right. This point is demonstrated by column 2 of Table 4.7b. Thus, while column 1, with one base year has unrealistic values the further one moves from the base, column 2 shows that if shorter indices are to be used there is the further problem of ensuring that each base year had the 'right' exchange rate.

TABLE 4.7b

<u>REAL EFFECTIVE EXCHANGE RATES, 1957-82</u>						
(1)		(2)		(3)		
Base 1972		Five-Year Indices		Hypo. Indices		
Year	Index	Exch. Rate	Index	Exch. Rate	Index	Exch. Rate
-----	-----	-----	-----	-----	-----	-----
1957	116.21	1.525	100.00	0.714	100.00	0.714
1958	112.79	1.480	96.53	0.689	96.53	0.689
1959	116.02	1.523	98.42	0.703	98.42	0.703
1960	115.20	1.512	97.78	0.698	97.78	0.698
1961	118.56	1.556	101.19	0.723	101.19	0.723
1962	126.01	1.654	100.00	0.714	100.00	0.768
1963	127.70	1.676	101.47	0.725	101.47	0.779
1964	140.48	1.843	111.79	0.799	111.79	0.859
1965	172.83	2.268	139.38	0.981	137.38	1.055
1966	188.96	2.480	150.27	1.073	150.27	1.154
1967	144.32	1.894	100.00	0.840	100.00	1.042
1968	127.54	1.674	90.84	0.763	110.31	1.150
1969	130.71	1.715	93.13	0.783	113.09	1.179
1970	125.74	1.650	90.02	0.756	109.31	1.139
1971	127.38	1.672	91.29	0.767	111.75	1.165
1972	100.00	1.312	100.00	1.312	100.00	1.179
1973	116.81	1.533	117.17	1.538	103.55	1.221
1974	125.45	1.646	125.38	1.645	109.87	1.295
1975	146.27	1.920	146.05	1.917	127.98	1.509
1976	230.36	3.023	229.20	3.008	200.85	2.368
1977	444.12	5.828	442.67	5.809	387.92	4.573

1978	515.94	6.744	100.00	1.515	100.00	6.915
1979	381.21	5.003	73.79	1.118	133.97	9.265
1980	498.05	6.536	95.49	1.446	173.37	11.989
1981	1103.06	14.476	215.12	3.258	390.55	27.008
1982	1383.85	18.160	271.19	4.108	492.35	34.048

Notes: (1) Base Year is 1972, for comparison with column (2) of Table 4.6a.

(2) Indices have base years 1957, 1962, 1967, 1972, and 1978.

(3) Hypothetical Indices, with same base years as (2).

All exchange rates are cedis to US dollar.

Column 3 of Table 4.7b provides a partial solution for the above mentioned problems. It assumes that only the 1957 exchange rate was at 'equilibrium'. Assuming that Ghana adopted as a policy to maintain the official exchange rate equal to the real effective exchange rate, the exchange rate is estimated every year, with a new base year every five years or so. In this way, our estimates show that in 1982 the year's average exchange rate should be about ₵34.00 to US\$1.00 which is very realistic. This hypothetical exchange rate avoids any of the sharp downward movements observed in column 1 for every year there was a devaluation. This smoothness is due to the gradual adjustment made every year in accordance with the real effective exchange rate.

Even with this, some problems associated with the real effective exchange rate concept and methodology remain. First, the methodology has an underlying purchasing power parity connotation, problems of which have been discussed earlier (p.151).

Secondly, the concept assumes that the exchange rates of the trading partners used in the estimation were all right. This may not be true.

Thirdly, the concept ignores structural changes in the domestic economy, and in particular changes in relative prices between traded and non-traded goods. As such, it may not be useful for indicating competitiveness of import-competing industries.

Finally, it fails to take into account international trade and exchange restrictions which in Ghana have been very prevalent and not effeciently administered and which could in fact distort the effective exchange rate that the estimation reports.

4.6. CONCLUSION

This chapter has described in detail the operation of exchange rate policies in Ghana between 1957 and 1982. One major feature of the exchange rate policy during the period is the objective of the authorities to maintain a stable exchange rate. This objective explains the reluctance to make parity adjustments when it is required and the abandoning of the short-lived experiment with floating in 1978. This objective led to the situation in which the country, for most of the period under review, maintained an over-valued currency with all the consequences of external imbalance and internal distortions.

The costs of the exchange rate policies have been very high. They include the development of a parallel market economy which effectively reduced the control of

the authorities on a sizeable portion of the country's foreign exchange, in spite of severe exchange control laws and direct allocation of import licences. Control over monetary policy was also lost. The government also lost most of its tax revenue (May, 1985). The World Bank mission (World Bank, 1984) also linked over-valued exchange rate to disincentive for exports and fall in imports, shift in economic activity from production to import trading, which contributed to the negative GDP growth rate experienced from 1978, a reduction in the tax base and growth in government budget deficit, and the near-collapse of the infrastructure.

There is therefore much to be gained by re-thinking the exchange rate policies. Ghana could simply peg to the SDR, like other developing countries have done. This policy is simple and ensures stable exchange rates, but is economically feasible and optimum only if the authorities first determine a realistic initial parity and can subsequently maintain an inflation rate that does not deviate substantially, in the long run, from what the world average is. Failing this, it can adopt any of the purchasing-power-parity based methods to determine an exchange rate that would be consistent with domestic price changes and external balance needs. Alternatively, the authorities may aim at removing the black market exchange rate, in which case a substantial amount of liberalisation would be required to enable buyers and sellers to satisfy their demand and supply requirement, not only in the foreign exchange market but also in the money and capital markets.

Whatever the policy adopted, it would be necessary to compliment the exchange rate policy with appropriate monetary policy to ensure stability and a reasonable internal and external balance, and an economic environment in which growth would be possible and distortions are minimum. We propose then that since the exchange rate is influenced by factors that could be external and outside the effective control of the authorities, it may be necessary to determine and maintain a reasonable (i.e. not over-valued) exchange rate. Monetary policy would then be that which is consistent with the target exchange rate.

The following chapter examines how such a policy can be achieved and the implications for the economy and the conduct of monetary and exchange rate policies.

CHAPTER FIVE

MACROECONOMETRIC MODEL AND SIMULATION

5.1 INTRODUCTION

The need for coordination of monetary and exchange rate policies for stability and reasonable external balance in Ghana has been noted in the last chapter. In this chapter, I have developed a simple macroeconomic model which is used to study the effect of the real effective exchange rate policy, recommended in the last chapter, on the desired monetary policy and other macroeconomic objectives. Like all models, it is hoped that a better understanding of the theoretical relations and the interaction of economic variables in the economy will be achieved. But more important, it is hoped that the conclusions that will emerge will aid policy formulation.

Stemming from the last objective, this chapter will conclude with a set of simulation experiments to investigate the effects of a given set of policy targets, specifically, exchange rate policy system which is basically a crawling peg exchange rate but which takes into account the rate of inflation and the trade pattern.

It is the accepted premise of the model that there exists significant inter-dependencies among certain economic variables. The model developed is, therefore, a multi-equation simulation model which accounts for the interrelationships between the important variables in the economy, explaining the dependencies and feedbacks in the system.

The model follows the structuralist macroeconomics perspective (Taylor, 1983). This perspective takes into account the 'specific and durable structural features' of the Ghanaian economy, its institutions and the behavioural characteristics of the economic agents in the system. As a result, it moves away from any grand theorising and bases each equation on the economic structure of the country. By doing so, it is able to give adequate description of the long-term features of the economy.

Because the exchange rate is institutionally fixed, it is determined outside the model. But it influences the level of imports and exports directly, and other variables indirectly.

5.2 THE MODEL

The model consists of five sectors, made up of six structural equations and three identities. The sectors are the monetary sector, the external sector, the government sector, the national income and the price equation.

(a) The Monetary Sector:

The money supply equation has two explanatory variables, the reserves of the commercial banks (RE) and the budget deficit of the government (B). The formulation derives from Chapter Three in which we alluded to the implications of government budget deficit on the money supply. The equation also allows for the ability, and indeed action, of the commercial banks to create credit by the multiple expansion of their reserves. In Chapter Three we also discussed the fact that the holding of foreign exchange by the commercial banks were insignificant, at least after 1961. Most of the foreign assets were kept and controlled by the central bank. Even though this foreign asset holding could influence domestic credit creation, foreign asset was found to be insignificant in the money supply equation and was accordingly dropped. The money supply equation is therefore given as:

$$M_t = a_1 + a_2 RE_t + a_3 B_t + e_t \quad \dots (6.1)$$

(b) The Government Sector:

The government sector has equations for government revenue and government expenditure.

The importance of custom duties in government revenue has been noted by Killick (1978). This is also evident from a study of sources of government revenue (see eg. IMF (b), 1984) As a result of this importance, both imports (IM) and exports (EX) are made explanatory variables. Total income excluding exports (ie. $Y-EX$) is also required to account for income tax component of

government revenue. The exclusion of the export component of income is made to take into account the exemption of the most important export products, agricultural commodities, from income tax. It is also hoped that Y-EX will account for excise taxes on locally produced and locally manufactured goods. In addition, we include a trend variable (T) to represent the long run secular trends of tax rates and the increasing monetisation of economic activities which then become subject to taxation.

$$GR_t = b_1 + b_2 (Y-EX)_t + b_3 IM_t + b_4 EX_t + b_5 T + e_t \quad \dots (6.2)$$

Government expenditure (GX), on the other hand, is modelled in a very simple way, and made dependent (all positively) on the country's population level (POP) and the level of prices (P). There is no doubt that some of the government's expenditures are related directly to the level of population, eg. education and health. There is also some evidence that governments are expected to keep their rate of real purchases roughly constant (Sargent and Wallace, 1973); hence, the need to include the price variable. Also included are a dummy variable (Z2) representing the oil price increases of the years from 1973, and a lagged dependent variable (GX_{t-1}) to capture various sources of persistence in government expenditure. (The last point is related to the theory of incremental budgeting).

$$GX_t = c_1 + c_2 POP_t + c_3 P_t + c_4 Z2 + c_5 GR_{t-1} + e_t \quad \dots (6.3)$$

Finally, government activities are closed in an identity which makes the difference between revenue and expenditure equal to the budget deficit (B):

$$B_t = GX_t - GR_t \quad \dots (6.4)$$

(c) The External Sector:

This sector consists of imports and exports, and a balance of payment identity.

Imports (IM) are made a function of national income, in line with traditional economic theory. In addition I include the rate of exchange (ER) since it helps to determine domestic price of imports, and also include a dummy variable (Z1) to represent the years in which import and exchange controls were severe. Finally, there is a lagged dependent variable (IM_{t-1}) to portray the fact that imports in any year will take into account the stock of imported goods in the system.

$$IM_t = d_1 + d_2 Y_t + d_3 ER_t + d_4 Z1 + d_5 IM_{t-1} + e_t \quad \dots (6.5)$$

The export equation also has national income (Y) and the exchange rate (ER) as explanatory variables. It also has the index of export prices (PX) and the level of imports (IM) as additional explanatory variables. Imports determine not only the amount of raw materials and capital equipment available to manufacturing industries, but also machinery to mining and timber industries as well as tools and pesticides for cocoa farmers and other producers of agricultural commodities. It is also being argued that imported goods serve as

incentive goods for farmers.

In a small country such as Ghana, exporters are generally price takers in the world market and can sell whatever they produce without influencing the equilibrium price. Even for cocoa in which Ghana is a major world producer, individual producers at home have a government guaranteed market for everything produced. Supply of exports, therefore, is determined by supply conditions in the export sector of the economy. An increase in the capacity to produce in the export sector is related to capacity to produce in the entire economy. Thus, we use total output or GDP as a proxy for capacity to produce.

The export equation, not unlike the other equations, owes much to the structuralist macroeconomists (Taylor, 1983) and their emphasis on deriving the model from the economic structure. The need for imported inputs in developing countries, for example, has been noted by Taylor (ibid. p.5)

$$EX_t = f_1 + f_2 Y_t + f_3 PX_t + f_4 IM_t + f_5 ER_t + e_t \quad \dots (6.6)$$

The export sector is closed by a balance of payment identity:

$$BP_t = EX_t - IM_t \quad \dots (6.7)$$

(d) The National Income Identity:

The identity describing national income is derived from national income accounting and is the sum of private consumption (PC), government expenditure (GX), private investment expenditure (I), and the net exports

(EX-IM):

$$Y = PCON + GX + I + (EX-IM) \quad \dots(6.8)$$

(e) The Price Equation:

Given the very high rates of inflation in Ghana since 1974, it is only appropriate that the price equation should include some hypothesis of inflation expectation. Economic agents tend to form expectations about price levels in an attempt to adjust their behaviour to deal with the expectations.

I assume that inflationary expectations are formed under the rational expectation hypothesis. Because the cost of making mistakes (in one's expectations) is high in periods of high inflation, it is only reasonable to assume that individuals do not make systematic mistakes. A major assumption of rational expectation is that economic agents' expectations are the same as the mathematical expectations of the corresponding economic variables generated by an econometric model.

The econometric model I postulate is given as

$$B_1 P_t + B_4 P_t^e + B_5 M_t + B_6 PM_t = u_t \quad \dots(1)$$

where P_t is general price level, u_t is a vector of serially uncorrelated disturbances and M_t and PM_t are exogenous variables, money supply and price of imports respectively, known at the end of $t-1$ so that

$$M_t = M_{t|t-1} \text{ etc.}$$

The rational expectation assumption requires that

$$P_t^e = EP_{t|t-1} \quad \dots(2)$$

where $EP_{t|t-1}$ is the mathematical expectation of P_t

formed using the model and information available as of time $t-1$.

Sargent and Wallace (1973) have shown that under conditions of very high inflation, when there is feedback from inflation to subsequent rates of money creation, adaptive expectations of the Cagan (1956) type are fully rational. Such expectation formulation makes lagged rates of inflation the best predictor of inflation. According to Sargent and Wallace, under these conditions 'inflation itself is best predicted by extrapolating lagged rates of inflation'. As a result we define the expected rate of inflation at time $t-1$ as

$$EP_{t|t-1} = (1-\lambda)/(1-\lambda L)P_{t-1}$$

where L is the lag operator defined as

$$L^n P_t = P_{t-n} \text{ as in the Koyck scheme.}$$

On this basis I postulate expectation formation which depends on the past two periods' price levels.

This makes the price equation

$$P_t = g_0 + g_1 P_{t-1} + g_2 P_{t-2} + g_3 M_t + g_4 PM_t + v_t \quad \dots (6.9)$$

I assume that v_t follows the Markov process $v_t = v_{t-1} + \eta_t$, where η_t is a serially uncorrelated random term with mean zero and finite variance. The inclusion of two lagged dependent variables in the equation ensures that there will be little identifiable serial correlation in the error term v_t . The reason is that any shock that persists from one period into another will have its effect reduced in the subsequent period.

The above set of equations describe the model. The model is highly aggregated but it is hoped that it is an

approximate representation of the economy bearing in mind that any specification of a model is a combination of theory, data availability, insight, pragmatism and expediency. It is for the sake of convenience, but particularly data availability, that the model does not contain specific equations for consumption, savings, investment and rate of interest, choosing rather to treat these as exogenous variables. The assumption of which variables to treat as exogenous and the number of equations in the model will be justified if it enables us to achieve the aim of evaluating the effects of a given exchange rate policy on the conduct of monetary policy and on the behaviour of prices, national income, budget deficit and the balance of payment. Exchange rate action cannot be expected to significantly influence investment, consumption and saving when there is severe restriction on capital flows, as pertains in Ghana.

The endogenous variables in the model are imports (IM), exports (EX), price (P), money supply (M), national income (Y), government revenue (GR), government expenditure (GX), budget deficit (B), and balance of payment (BP).

5.3 ESTIMATION OF THE MODEL

The equations of the model were estimated, using annual data from 1957 to 1982. Some of the data were collected from dates earlier than 1957 to accommodate the inclusion of lags, wherever it was required.

Two-stage least squares (2SLS) were used to estimate the behavioural equations. The statistical

problems associated with two-stage least squares are acknowledged.

The two-stage least squares estimation of a system of equations is actually instrumental-variable (IV) estimator, where all the predetermined variables are treated as instruments for each equation. The first stage involves estimation of the reduced form of the model and deriving fitted values of the dependent variables. The fitted values of the endogenous variables become purged of the stochastic component and are then used to get the two-stage least squares estimates of the equations in the system.

While Full Information Maximum Likelihood estimator is more efficient with a system of equations, the cost is high if there is a specification error. In addition, two-stage least squares are known to perform better than FIML in the presence of high correlation among the predetermined variables (Summers, 1965). There is no doubt that some of our predetermined variables are highly correlated. It should, however, be noted that though 2SLS is consistent estimator, the presence of a bias is a possibility. Consistency arises from the fact that the probability limit of the 2SLS coefficient is equal to the true structural coefficient or true slope parameter (Chow, 1983 pp.155-156; Pindyk and Rubenfield, 1981 p.180). The reason is that the probability limit of the random term is zero for large samples. Knowledge about small sample properties, though, are limited. As my sample size is rather small, I use the 2SLS without detailed analysis of the properties of the estimator. It

is agreed that there is no generally applicable method of obtaining unbiased estimators of the structural parameters of a simultaneous model and questions of estimator choice are usually resolved by considering asymptotic properties of large samples.

5.4 RESULTS OF MODEL ESTIMATION

The summary of the estimated model appears below in the order in which they were solved. The model comprises 2 blocks. Block one contains 8 simultaneous equations and identities while the last identity is a recursive identity in block 2. Number of observation is 26, annual data from 1957 to 1982.

$$1. \text{ IM} = -4.113 - 0.038Y + 4.654ER - 1.457Z1 + 1.456IM \\ (1.348)(0.007)(1.417) (1.051) (0.211)^{t-1}$$

$$\bar{R}^2 = 0.942 \quad F = 103.043 \quad SER = 2.404 \quad DW = 1.709 \quad D = 0.721$$

$$2. \text{ EX} = -1.761 - 0.012Y + 0.010PX + 0.850IM + 1.510ER \\ (1.050)(0.005)(0.008) (0.107) (1.220)$$

$$\bar{R}^2 = 0.965 \quad F = 174.453 \quad SER = 1.745 \quad DW = 2.632$$

$$3. \text{ P} = 284.26 - 7.256PM + 84.570M - 0.372P^{t-1} + 2.271P^{t-2} \\ (192.39)(1.969)(19.549)(0.163)^{t-1} (0.508)^{t-2}$$

$$\bar{R}^2 = 0.992 \quad F = 764.874 \quad SER = 377.657 \quad DW = 2.00$$

$$h = 0.00137 \quad D = -0.110$$

$$4. \text{ M} = 0.764 + 3.295RE + 0.655B \\ (0.697) (0.337) (0.243)$$

$$\bar{R}^2 = 0.994 \quad F = 2009.29 \quad SER = 3.048 \quad DW = 1.860$$

$$5. \text{ GR} = 0.098 + 0.046(Y - EX) - 0.902IM + 1.162EX + 0.138T \\ (0.838)(0.003) (0.228) (0.217) (0.084)$$

$$\bar{R}^2 = 0.980 \quad F = 301.580 \quad SER = 1.698 \quad DW = 2.675$$

$$6. \text{ GX} = -6.278 + 0.003\text{P} + 1.008\text{POP} + 4.900\text{Z} + 0.425\text{GX}_{t-1} \\ (4.363)(0.042)(0.578) \quad (1.774) \quad (0.115)$$

$$\bar{R}^2 = 0.992 \quad F = 764.327 \quad \text{SER} = 2.196 \quad \text{DW} = 1.589$$

$$h = 1.293 \quad D = 1.623$$

$$7. \text{ Y} = \text{PCON} + \text{I} + \text{GX} + (\text{EX} - \text{IM})$$

$$8. \text{ B} = \text{GX} - \text{GR}$$

$$9. \text{ BP} = \text{EX} - \text{IM}$$

Values in parentheses are the standard errors of the coefficients.

5.5 DEFINITION OF VARIABLES AND SOURCES OF DATA

- B Budget deficit, defined as GX-GR and is therefore positive for budget deficit and negative for budget surplus.
- BP Balance of payment on the current account; defined as EX-IM and therefore positive for surplus payment and negative for deficit payments.
- ER Exchange rates, in cedis per US dollar; end of year values; from IFS.
- EX Exports, measured in hundred million cedis; from IFS and ITS.
- GR Government revenue, in hundred million cedis; from IFS and GFS.
- GX Government expenditure, in hundred million cedis; from IFS and GFS.
- I Private Investment in hundred million cedis; because of the absence of adequate data, this series was derived as a residual from equation 7

above.

IM Imports, in hundred million cedis; from IFS, ITS and QEB.

M Money supply, in hundred million cedis, is defined as M2 (see Chapter 3); from IFS.

P Consumer price index with base=1960; based on data from IFS.

PCON Private consumption expenditure, in hundred million cedis; from IFS.

PM Import price index, with base=1970; from NIA and IFS2.

POP End of year estimated population levels, in millions of people; from IFS.

PX Export price index, from NIA and IFS2.

RE Reserves of the commercial banks, in hundred million cedis; from IFS.

T Trend variable.

t-i Lag operator

Y National income (GDP), in hundred million cedis; from IFS.

Z1 Dummy variable, 1 for years in which import restriction and exchange control were most severe; 0 otherwise.

Z2 Dummy variable to represent the oil price shocks of the 1970s and 1980s; 1 for years after 1973, 0 otherwise.

SOURCE KEY

IFS IMF International Financial Statistics, Yearbooks

from 1970 to 1983 and monthly issues from January 1984 to August 1985.

ITS United Nations Yearbook of International Trade Statistics, various issues up to 1981.

NIA UN Yearbook of National Income Accounts, various issues up to 1981.

QEB Bank of Ghana Quarterly Economic Bulletin, various issues.

IFS2 IMF International Financial Statistics, Price Supplement 1981.

GFS IMF Government Finance Statistics, 1974-84.

5.6 STATISTICAL AND EMPIRICAL RESULTS OF THE MODEL

The main interest of the exercise is to see how the model presented responds to policy changes. But to do this, a fairly plausible reproduction of the economy of Ghana between 1957 and 1982 is needed to serve as a background for the policy simulation. On a very reasonable basis, we can say that the model is a fair representation of the economy of Ghana.

Looking at the standard errors we can conclude that most of the estimated coefficients have high t-ratios. However, the normal t-tests are not strictly appropriate when 2SLS is used and the sample is small (Pindyck and Rubinfeld, 1981 p.197).

The adjusted squared multiple correlation coefficient, (\bar{R}^2), for each equation is significant at 1%. This, together with the low standard error of regression and high F-statistics, show that the

equations are quite good.

The signs of the coefficients have all turned out to be as economic theory would predict, except that of income in both import and export equations, PM in price equation and IM in government revenue equation. The sign of income in the import equation may not be surprising since with time, and as import substitution takes place in a less developed country, the proportion of imports to income may fall as income increases.

The sign of exchange rate in the import equation shows that the country's import bill (in nominal terms) increases as the exchange rate (cedis per dollar) increases. This is to say devaluation results in higher import bill, as expected. The nominal value of exports also increases, however.

The coefficient of all the equations (excluding the constants) are significant at 10% level, except Z1 in GR equation and ER in EX equation.

The DW statistics for equations 2, 4 and 5 enable us to reject the hypothesis of the presence of serial correlation. The presence of lagged endogenous variables in equations 1, 3 and 6 makes the DW test inappropriate. Instead, we have calculated for equations 3 and 6 the alternative Durbin h test (see p.103, Appendix 3B) and find no evidence of serial correlation. The h test cannot be performed on equation 1 because $T(V)$, the estimated sampling variance of the coefficient of IM_{t-1} multiplied by the number of observations, is greater than one. Durbin shows that an asymptotically equivalent test can be done by regressing e_t (the residuals from

the fitted regression) on e_{t-1} and the set of explanatory variables (including lagged dependent variables) in the original relation and testing the significance of the coefficient of e_{t-1} by ordinary least-squares procedures, ie. t-test. Following this procedure we estimated, for equations 1, 3 and 6, equations of the general form:

$$e_t = a_0 + a_1 e_{t-1} + a_2 Y_{t-1} + a_3 X_t + u_t$$

where e_t are the residuals from the original equation,

Y_{t-1} is the lagged endogenous variable,

and X_t are the other exogenous variables.

The resulting t-statistic for a_1 , the coefficient of the lagged residuals in each case, has been reported as D in equations 1, 3 and 6 above. The tests clearly enable us to reject, at 5% level of significance, the hypothesis of the presence of serial correlation in each equation.

Whatever the limitations of the model, especially as it is an annual data with small sample size, the high values of the square of correlation coefficient and the small standard errors give satisfaction. The goodness of the model is shown in Table 5.1.

TABLE 5.1

GOODNESS OF FIT (ACTUAL AND ESTIMATED)

YEAR	BP		M		GR	
	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED
1957	-0.22	-0.32	1.11	0.79	1.30	0.72
1958	0.30	-0.07	1.20	0.64	1.25	1.21
1959	-0.12	-0.15	1.37	0.94	1.39	1.20
1960	-0.50	-0.40	1.60	1.08	1.36	1.30
1961	-0.82	-0.63	1.74	1.06	1.47	1.36
1962	-0.30	-0.54	2.00	1.71	1.57	1.37
1963	-0.56	-0.42	2.15	1.79	1.70	1.47
1964	-0.36	-0.42	2.95	2.49	2.54	1.74
1965	-1.41	-0.78	3.01	2.90	2.84	1.84
1966	-0.76	-0.82	3.15	3.65	2.31	1.99
1967	-0.41	-0.49	3.19	2.82	2.54	2.88
1968	0.27	-0.32	3.52	2.95	2.98	3.31
1969	0.19	-0.32	3.89	3.38	3.32	3.73
1970	-0.16	-0.35	4.27	4.24	4.37	4.12
1971	-1.52	-0.12	4.75	2.72	4.51	5.98
1972	1.54	-0.53	6.68	4.44	4.20	5.30
1973	1.51	0.30	7.94	6.72	4.45	5.41
1974	-1.86	0.60	10.05	10.41	5.79	6.85
1975	0.49	-0.21	13.86	16.46	8.10	7.96
1976	-0.22	-0.21	19.03	22.85	8.70	8.23
1977	-1.18	0.56	30.44	29.57	11.41	11.16
1978	-2.79	0.64	51.31	55.06	13.92	17.85
1979	4.67	-0.50	59.42	68.43	26.00	21.09
1980	-3.14	-2.35	79.49	79.27	29.50	26.64
1981	-7.61	-5.59	120.29	113.02	32.34	40.02
1982	-2.18	-3.71	148.38	147.39	48.03	43.15

YEAR	GX		B		P/100	
	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED
1957	0.96	0.39	-0.34	-0.33	0.96	-0.06
1958	1.06	0.54	-0.19	-0.68	0.96	-0.11
1959	1.17	0.81	-0.22	-0.39	0.99	0.02
1960	1.54	1.05	0.17	-0.25	1.00	-0.02
1961	2.17	1.29	0.71	-0.07	1.06	0.03
1962	3.12	1.89	1.55	0.52	1.16	0.79
1963	3.14	2.48	1.45	1.00	1.20	1.11
1964	3.75	3.07	1.21	1.33	1.36	1.69
1965	3.78	3.77	0.94	1.93	1.72	2.01
1966	3.07	4.45	0.77	2.46	1.92	3.52
1967	3.21	4.09	0.67	1.21	1.79	2.81
1968	4.00	4.74	1.02	1.43	1.93	4.07
1969	3.95	4.96	0.63	1.24	2.07	3.17
1970	4.68	4.99	0.31	0.87	2.13	2.79
1971	5.24	4.99	0.73	-0.98	2.33	1.08
1972	5.45	5.18	1.25	-0.13	2.58	0.20
1973	5.57	5.89	1.12	0.49	3.03	1.20
1974	7.54	10.76	1.75	3.91	3.59	0.26
1975	11.41	13.05	3.37	5.09	4.65	3.89
1976	14.83	16.27	6.13	8.04	7.26	7.31
1977	21.37	19.19	9.96	8.04	15.71	10.89
1978	31.65	29.17	17.73	11.31	27.20	31.90
1979	42.96	40.50	16.96	19.41	42.00	52.86
1980	46.68	53.20	17.18	26.56	63.04	75.67
1981	77.19	70.45	44.85	30.43	136.48	122.81
1982	95.30	97.66	47.26	54.51	166.91	165.19

YEAR	Y		IM		EX	
	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED
1957	7.40	6.73	2.14	1.82	1.92	1.50
1958	7.80	6.90	1.90	2.05	2.20	1.97
1959	8.90	8.51	2.52	1.64	2.40	1.49
1960	9.56	9.17	2.96	2.52	2.46	2.11
1961	10.22	9.51	3.26	3.14	2.44	2.51
1962	10.94	9.46	2.70	2.12	2.40	1.58
1963	12.08	11.55	2.90	1.23	2.34	0.81
1964	13.57	12.94	2.83	1.47	2.47	1.05
1965	14.66	15.28	3.92	2.74	2.51	1.96
1966	15.18	16.50	2.98	2.82	2.22	2.01
1967	15.04	15.84	3.15	4.38	2.74	3.89
1968	17.00	17.15	3.69	4.57	3.96	4.26
1969	19.99	20.49	4.28	5.24	4.47	4.92
1970	22.59	22.72	5.39	6.01	5.23	5.66
1971	25.01	26.17	6.89	11.22	5.37	11.10
1972	28.15	25.81	4.28	9.45	5.82	8.92
1973	35.01	34.12	6.00	4.73	5.71	5.02
1974	46.60	52.28	10.54	6.55	8.68	5.15
1975	52.83	53.71	9.74	13.11	10.23	12.90
1976	65.26	66.72	10.47	11.45	10.25	11.24
1977	111.63	111.20	12.87	10.84	11.71	11.40
1978	209.86	210.81	20.33	19.52	17.54	20.15
1979	281.90	274.27	27.92	26.50	32.59	26.01
1980	409.95	417.26	38.35	33.63	35.21	31.27
1981	766.55	761.82	31.23	34.38	23.62	28.79
1982	859.54	859.38	20.20	20.34	18.02	16.63

The table shows that the model is able to track the movement of the endogenous variables. Table 5.2 presents a summary statistics of the historical simulation of the model.

TABLE 5.2

SUMMARY SIMULATION STATISTICS

	MAE	RMS ERROR	U	U ^M	U ^S	U ^C
	---	-----	---	----	-----	-----
B	2.293	4.035	0.0798	1.05D-12	0.00001	0.999
BP	0.992	1.570	0.5400	2.52D-13	0.215	0.785
Y	1.677	2.680	0.0001	5.07D-13	0.009	0.991
P	271.844	459.930	0.0103	3.99D-12	0.015	0.985
M	1.542	2.666	0.0036	7.17D-13	0.005	0.995
GR	1.329	2.312	0.0251	2.06D-13	0.009	0.991
GX	1.522	2.273	0.0064	2.09D-12	0.004	0.996
IM	1.613	2.197	0.0262	5.76D-14	0.012	0.989
EX	1.744	2.495	0.0389	4.38D-15	0.021	0.979

MAE = Mean Absolute Error

RMS ERROR = Root-Mean-Squared Error

U = Theil's Inequality Coefficient

U^M = Fraction of error due to bias

U^S = Fraction of error due to different variation

U^C = Fraction of error due to different covariation

The relatively poor (but nevertheless good) performance of the budget and balance of payment is due to the fact that these identities were derived from government revenue and expenditure, and imports and exports respectively. As a result, the small errors of each of the component equations became magnified as they were combined in the B and BP identities. Even so, the results are reasonably satisfactory. Note the small value of fraction of error due to bias and the small Theil's inequality coefficient.

The formulation of the price equation to account for the high rates of inflation in the second half of the period, not unexpectedly, fails to adequately estimate the period before 1962 when prices were stable.

Also, the relative high values of MAE and RMS ERROR for price is due to the large range of the price index between 1957 and 1982. The U, which does not depend on the unit of measurement, adequately shows how good the price equation is.

5.7 POLICY SIMULATION

As noted earlier, the intention of the exercise is not to derive the significance and elasticities of each equation. The concern is to simulate the response of the model to a policy change - namely an exchange rate policy change. Two caveats must be noted at the beginning:

1. It would have been desirable to investigate the effects of a positive interest rate policy. But the ability of interest rate to significantly influence the endogenous variables is limited by the absence of any representation for savings, investment and consumption in the model. Many large models treat rate of interest, and indeed exchange rate, as endogenous variables (see eg. Dornbusch, 1978). Given the historical fact that rate of interest has been institutionally determined, and has been fixed at negative real rates for most of the period under study, we cannot expect elasticities with respect to interest rates to be significant or even meaningful.

2. Exchange rate appears in both the import and export equations and have positive signs in both cases. However, the simultaneous nature of the model ensures that imports and exports respond in different degrees to exchange rate action. Eventually, increase in exchange rate leads to increased imports, and also to a greater increase in exports.

These points must be remembered as we look at the effects of exchange rate policy similar to the one recommended in Chapter 4, Table 4.7B Column 3. The simulation experiment is performed with these hypothetical exchange rates. The effects on the endogenous variables are noted as follows:

1. Government Revenue, Government Expenditure and Budget Deficit:

The effect of the recommended exchange rate policy is an increase in government revenue in all years from 1965 to 1982 (except 1970 and 1971), such that in 1981 and 1982, government revenue is more than twice the realised value. This result is achieved because of increase in income and therefore of income tax revenue, but also, and more particularly, because of the increase in revenue from export duties. The result of the simulation is presented in Table 5.3 and Figs. 5.1, 5.2 and 5.3:

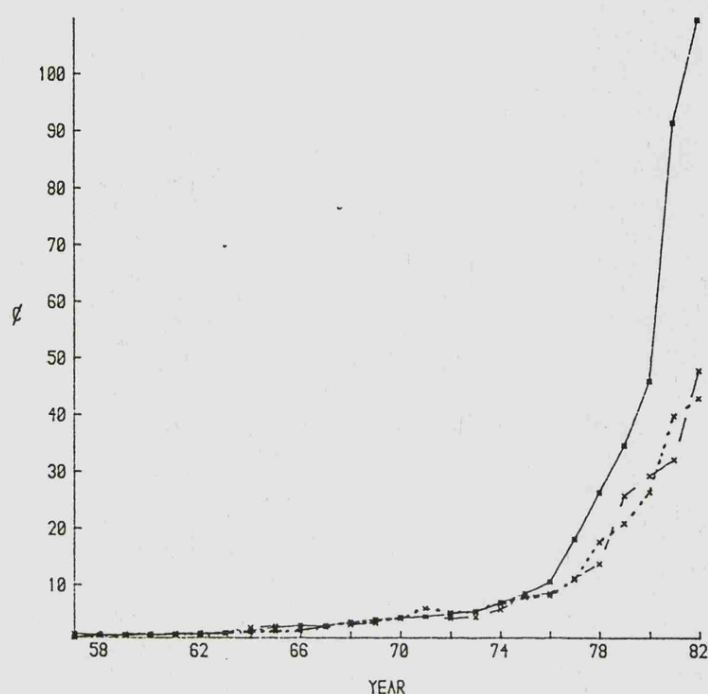
TABLE 5.3

ACTUAL AND PREDICTED GR, GX AND B

YEAR	GR		GX		B	
	ACTUAL	PREDICTED	ACTUAL	PREDICTED	ACTUAL	PREDICTED
1957	1.30	0.69	0.96	0.40	-0.34	-0.28
1958	1.25	1.09	1.06	0.56	-0.19	-0.53
1959	1.39	1.17	1.17	0.82	-0.22	-0.35
1960	1.36	1.24	1.54	1.06	0.17	-0.18
1961	1.47	1.32	2.17	1.30	0.71	-0.02
1962	1.57	1.43	3.12	1.85	1.55	0.43
1963	1.70	1.62	3.14	2.41	1.45	0.79
1964	2.54	2.02	3.75	2.96	1.21	0.94
1965	2.84	2.53	3.78	3.57	0.94	1.04
1966	2.31	2.89	3.07	4.16	0.77	1.27
1967	2.54	2.88	3.21	4.00	0.67	1.22
1968	2.98	3.51	4.00	4.57	1.02	1.06
1969	3.32	3.99	3.95	4.81	0.63	0.82
1970	4.37	4.28	4.68	4.87	0.31	0.59
1971	4.51	4.48	5.24	5.26	0.73	0.78
1972	4.20	4.82	5.45	5.27	1.25	0.45
1973	4.45	5.55	5.57	5.83	1.12	0.28
1974	5.79	7.35	7.54	10.65	1.75	3.30
1975	8.10	8.45	11.46	12.82	3.37	4.37
1976	8.70	10.48	14.83	15.59	6.13	5.12
1977	11.41	17.54	21.37	17.58	9.96	0.04
1978	13.92	25.57	31.65	26.63	17.73	1.06
1979	26.00	33.29	42.96	36.40	16.96	3.12
1980	29.50	44.56	46.68	47.25	17.18	2.68
1981	32.34	85.68	77.19	57.49	44.85	-28.19
1982	48.03	102.76	95.30	80.59	47.26	-22.17

FIG. 5.1

GOVERNMENT REVENUE (£100 MILLION)

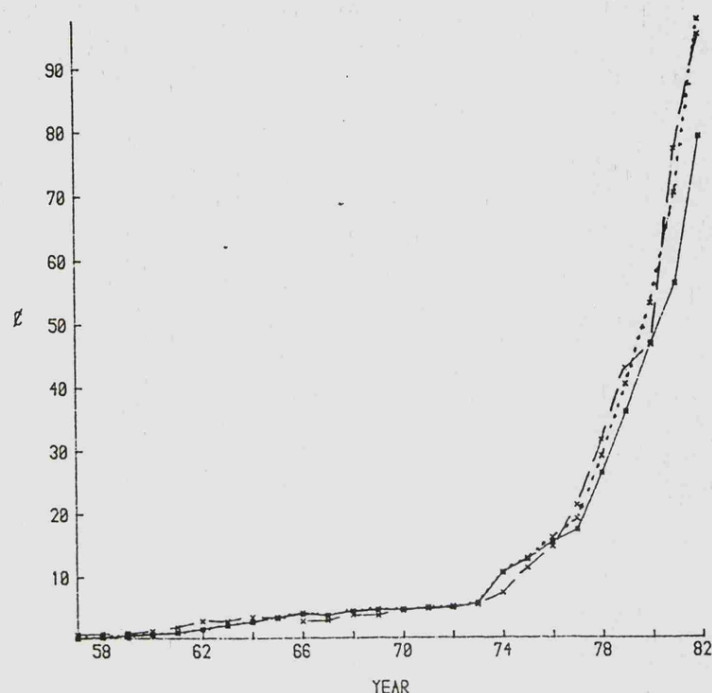


--- Actual series
 ... Historical simulation
 — Simulation under the experiment

Table 5.3 shows also that government expenditure, under the experiment, is higher in some years in the late 1960s and early 1970s, but generally at the same level as that realised. In 1981 and 1982 government expenditure is much less than the actual value. The combined government revenue and expenditure give a much smaller budget deficit in all years from 1972 (with the exception of 1974 and 1975) and surplus budget in 1981 and 1982. The relatively high deficits in 1974, 1975 and 1976 can be attributed to the oil price shock and the strain it put on government finance, but by 1977 the required adjustment is completed.

FIG. 5.2

GOVERNMENT EXPENDITURE (€ 100 MILLION)



--- Actual series
... Historical simulation
— Simulation under the experiment

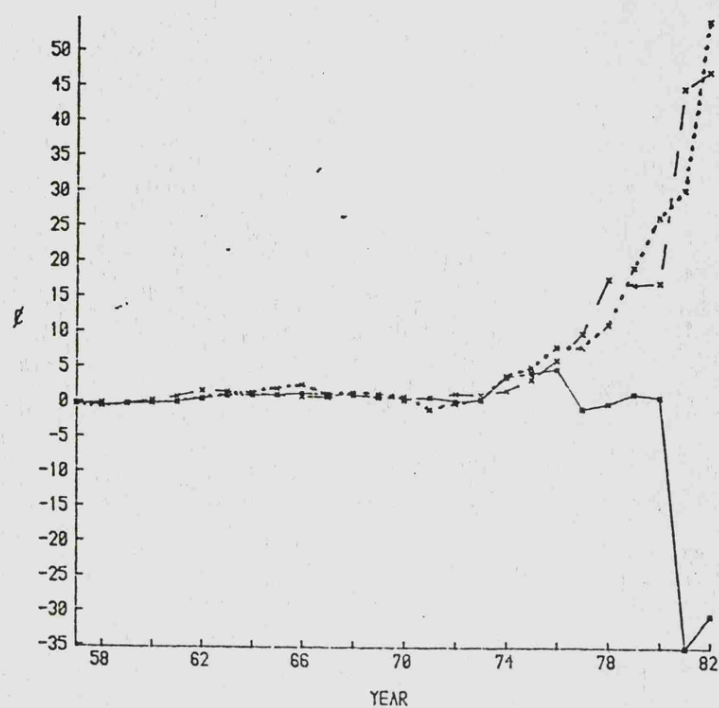
2. Money Supply:

Money supply under the experiment is much smaller than the actual data except in a few years - 1975 and 1976. Once again, the effects of the oil price shock in the years 1974-1976 is apparent.

The effect of the smaller budget deficit on money supply is clear. From about the same level in 1974 money supply increases by 35% per annum, on the average, up to 1982, as compared with 41% growth rate actually achieved in those years. Money supply in 1982 would have been 65.5% of the actual value. This indicates that the smaller budget deficit would have strengthened the hand of the monetary authorities in their effort to control

FIG. 5.3

BUDGET DEFICIT (Ø 100 MILLION)



--- Actual series
... Historical simulation
— Simulation under the experiment

the growth of money supply, and monetary policy would have been an effective instrument in economic stabilisation. The effect of the proposed exchange rate on money supply is shown in Table 5.4 and Fig. 5.4.

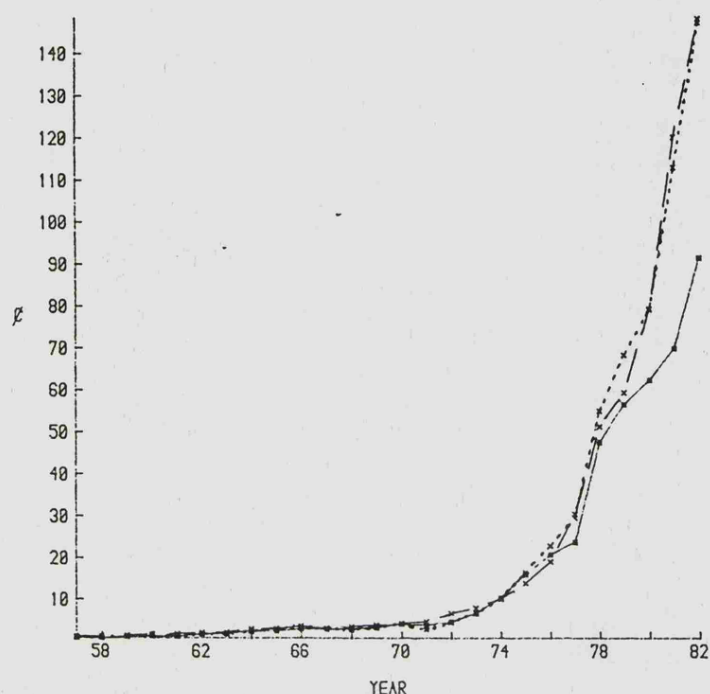
TABLE 5.4

ACTUAL AND PREDICTED M, P AND Y

YEAR	M		P		Y	
	ACTUAL	PREDICTED	ACTUAL	PREDICTED	ACTUAL	PREDICTED
1957	1.11	0.82	96.28	-3.06	7.40	6.71
1958	1.20	0.74	96.28	-2.40	7.80	6.87
1959	1.37	0.96	99.07	4.23	8.90	8.47
1960	1.60	1.13	100.00	2.64	9.56	9.14
1961	1.74	1.09	106.05	5.33	10.22	9.51
1962	2.00	1.65	115.81	74.25	10.94	9.45
1963	2.15	1.65	120.47	98.89	12.08	11.52
1964	2.95	2.23	135.81	147.17	13.57	12.81
1965	3.01	2.31	171.63	151.55	14.66	15.34
1966	3.15	2.88	193.95	285.97	15.18	16.55
1967	3.19	2.76	179.07	276.70	15.04	15.75
1968	3.52	2.71	193.49	386.42	17.00	17.05
1969	3.89	3.11	207.44	293.83	19.99	20.43
1970	4.27	4.05	213.49	263.36	22.59	22.65
1971	4.75	3.88	233.95	205.53	25.01	25.86
1972	6.68	4.81	257.67	51.55	28.18	25.77
1973	7.94	6.58	303.26	108.28	35.01	34.04
1974	10.05	10.01	358.14	-7.94	46.60	52.19
1975	13.86	15.99	415.12	348.33	52.83	53.67
1976	19.03	20.94	726.05	569.13	65.26	66.92
1977	30.44	24.33	1571.16	646.12	111.63	112.19
1978	51.31	48.34	2720.00	2621.80	209.86	211.45
1979	59.42	57.76	4200.00	4383.50	281.90	275.23
1980	79.49	63.62	6304.19	6245.39	409.95	418.51
1981	120.29	74.62	13647.91	9035.15	766.55	768.12
1982	148.38	97.15	16690.94	12274.03	859.54	867.21

FIG. 5.4

MONEY SUPPLY (£ 100 MILLION)



--- Actual series
... Historical simulation
— Simulation under the experiment

3. Prices:

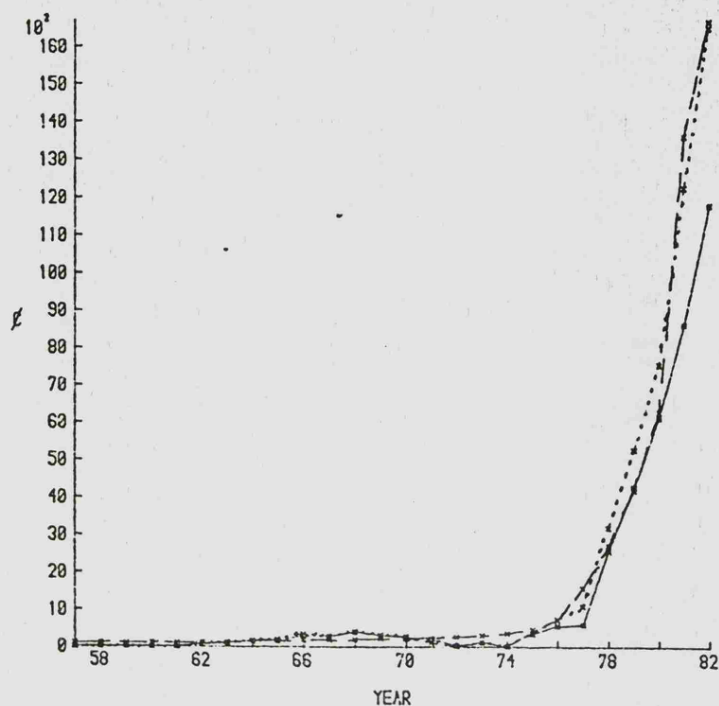
The experiment produces much lower price levels, due among other things, to the reduced growth of money supply. After 1970, the prediction is a much lower general price level than the actual data, except in 1979. Price level in 1982 would have been three-quarters of the actual level. (See Table 5.4 and Fig. 5.5).

4. Income:

There is a growth of national income above the achieved levels in most years after 1964. We have noted earlier in Chapter 4 that over-valuation became a problem only after 1964. This seems to suggest that the

FIG. 5.5

PRICE LEVEL (BASE=1960)



--- Actual series
 ... Historical simulation
 — Simulation under the experiment

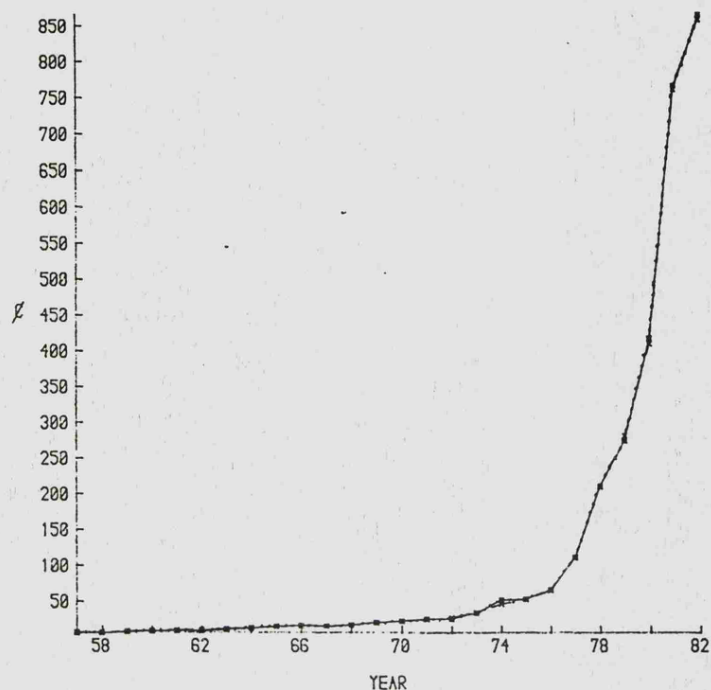
adoption of the proposed exchange rate, thereby ensuring that there is no currency over-valuation after 1964, lifts some of the constraint on growth of output. The difference in growth rates would have been more significant after 1974. At any rate, and contrary to what is usually predicted (see Donovan, 1981) national income at least does not fall. (Note that the national income is in nominal values.) See Table 5.4 and Fig. 5.6.

5. Import, Export and Balance of Payment:

Not unexpectedly it is the external sector that experiences the most profound impact of the experiment.

FIG. 5.6

NATIONAL INCOME (¢ 100 MILLION)



--- Actual series
 ... Historical simulation
 — Simulation under the experiment

Imports increase dramatically. The predicted imports in 1982 is over eight times the actual level of imports. The effect on export is even more dramatic, yielding a forecast of ten times the actual exports value. The combined effect is a balance of payment surplus of over two billion cedis in 1982, compared with realised deficit of 200 million cedis. In fact, the forecast is that there would have been a persistent surplus in all years from 1973 to 1982, except 1975. See Table 5.5 and Figs. 5.7 5.8 and 5.9.

TABLE 5.5

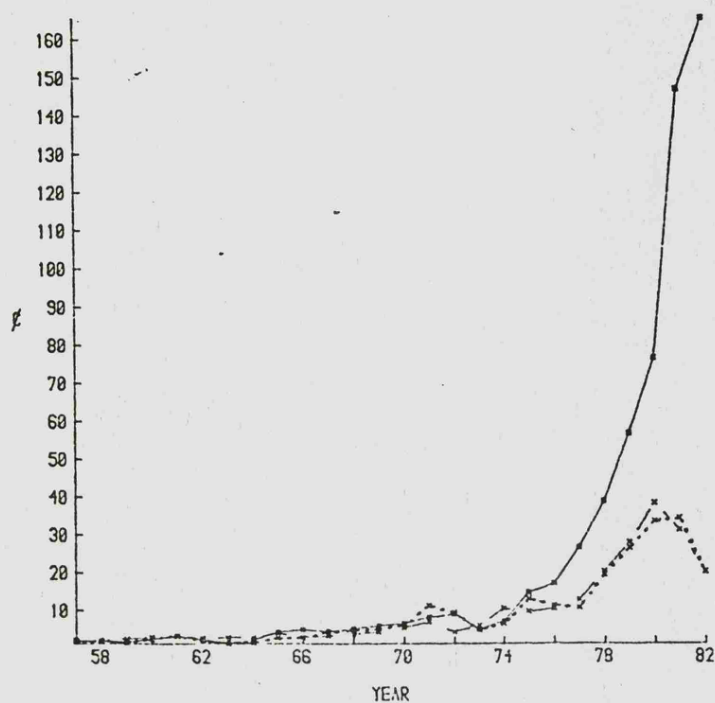
ACTUAL AND PREDICTED IM, EX AND BP

YEAR	IM		EX		BP	
	ACTUAL	PREDICTED	ACTUAL	PREDICTED	ACTUAL	PREDICTED
1957	2.14	1.84	1.92	1.49	-0.22	-0.35
1958	1.90	1.95	2.20	1.81	0.30	-0.14
1959	2.52	1.60	2.40	1.41	-0.12	-0.19
1960	2.96	2.46	2.46	2.01	-0.50	-0.45
1961	3.26	3.20	2.44	2.55	-0.82	-0.65
1962	2.70	2.39	2.40	1.87	-0.30	-0.52
1963	2.90	1.55	2.34	1.15	-0.56	-0.40
1964	2.83	2.16	2.47	1.83	-0.36	-0.33
1965	3.92	4.33	2.51	3.81	-1.41	-0.52
1966	2.98	4.88	2.22	4.40	-0.76	-0.48
1967	3.15	4.48	2.74	3.98	-0.41	-0.50
1968	3.69	5.18	3.96	4.93	0.27	-0.25
1969	4.28	5.97	4.47	5.74	0.19	-0.23
1970	5.39	6.56	5.23	6.26	-0.16	-0.30
1971	6.89	8.17	5.37	7.48	-1.52	-0.69
1972	4.28	8.97	5.82	8.31	1.54	-0.66
1973	6.00	5.05	5.71	5.34	1.51	0.29
1974	10.54	7.21	8.68	7.83	-1.86	0.62
1975	9.74	14.76	10.23	14.73	0.49	-0.03
1976	10.47	17.09	10.25	17.76	-0.22	0.67
1977	12.87	26.69	11.71	29.85	-1.18	3.16
1978	20.33	38.80	17.54	42.62	-2.79	3.82
1979	27.92	56.68	32.59	61.24	4.67	4.56
1980	38.35	76.42	35.21	81.27	-3.14	4.85
1981	31.23	146.75	23.62	160.42	-7.61	13.67
1982	20.20	165.37	18.02	186.57	-2.18	21.20

The predicted exports in 1982, though ten times the

FIG. 5.7

IMPORTS (£ 100 MILLION)



--- Actual series
 ... Historical simulation
 — Simulation under the experiment

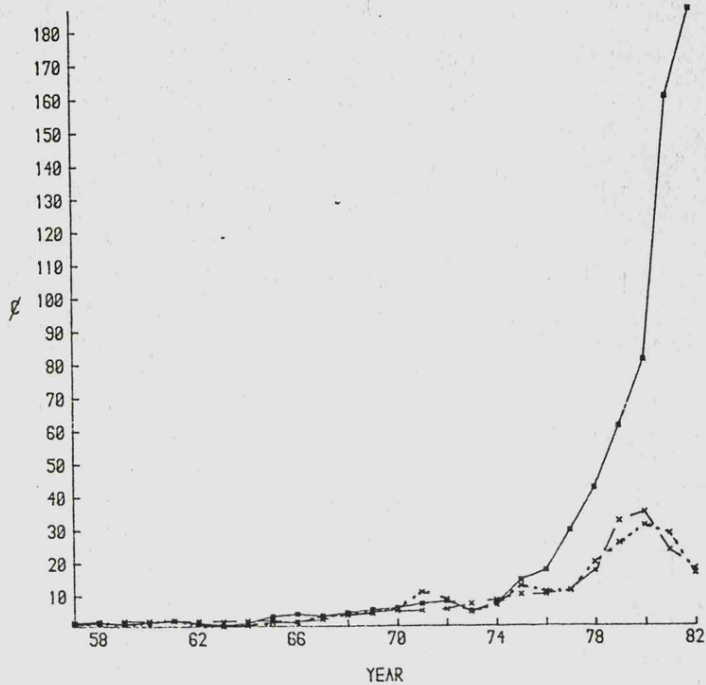
actual figure, would have been 21.5% of the predicted national income, a little less than the 25.8% achieved in 1957. Imports would have been 19% of national product in 1982, much less than the actual percentage of 28.05 in 1957. (Notice that in 1982 exports were just 2% of national product and imports were just over 2.3%).

Finally, it is apparent that while both imports and exports increase under the assumptions of the experiment, exports increase much more than imports after 1975, yielding overall balance of payment surplus on the current account from 1976 to 1982, even when the oil price shock is taken into account.

The simulation experiment tries to project the

FIG. 5.8

EXPORTS (£ 100 MILLION)

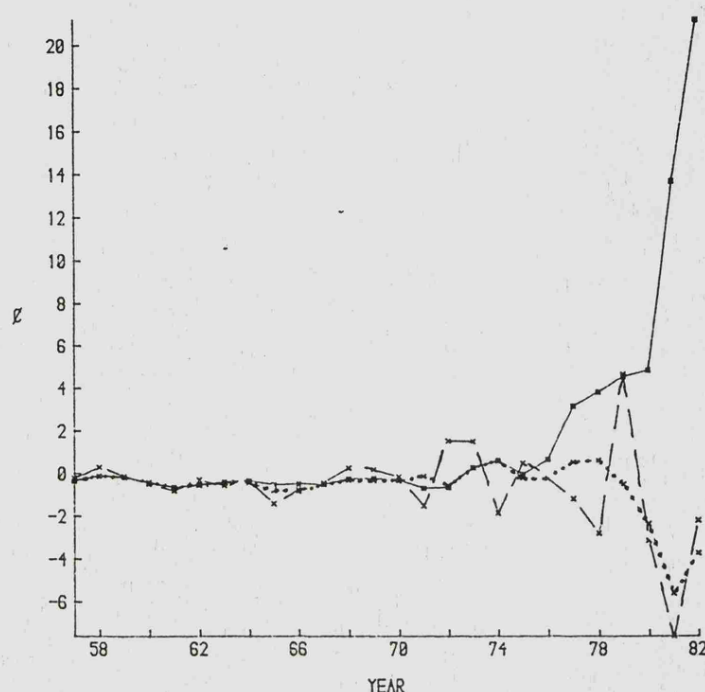


--- Actual series
 ... Historical simulation
 — Simulation under the experiment

effect of a long-term policy of adjustable peg which aims at preventing the currency from being over-valued for a significant length of time. Consequently the conclusions that emerge cannot be equated with the short-term effects of a devaluation. It is conceivable that the effects of devaluation on government revenue and expenditure and on imports will be similar, but its effect on price levels and relative prices and incomes may be more complex and may need a more detailed investigation than the simple and aggregate model used can allow. Furthermore, the effects of a devaluation may involve lags and produce expectation formations that are not dealt with by the model presented here.

FIG. 5.9

BALANCE OF PAYMENT (¢ 100 MILLION)



--- Actual series
 ... Historical simulation
 — Simulation under the experiment

5.8 CONCLUSION

In the previous chapter, the argument was advanced that as a developing country, Ghana faced some impediments which cast doubt on the feasibility of adopting a floating exchange rate regime. On the other hand, it was demonstrated that there was a good case for adopting a more flexible exchange rate arrangement, even if floating was not for offer. We were able to argue for a policy of greater flexibility based on inflation differential at home and abroad and on the changing pattern of external trade. This chapter has demonstrated that such a policy is capable of ensuring macroeconomic

stability - both internal and external, a stability that is consistent with the economic structure of the country.

CHAPTER SIX

THEORETICAL AND PRACTICAL IMPLICATIONS OF THE SIMULATION

6.1 INTRODUCTION

In Chapter 4 we proposed a policy for exchange rates in Ghana which, it was hoped, would produce exchange rates that were as near to the equilibrium as was possible in an officially determined exchange rates system. From the proposal was derived a series of hypothetical exchange rates from 1957 to 1982, as reported in Column 3 of Table 4.7b. In Chapter 5, the hypothetical exchange rates were used in a simulation macromodel to trace the time path of certain important macroeconomic variables between 1957 and 1982. The simulation experiment provided us with time series for actual exchange rates, money supply and national income, and correspondent series for simulated money supply and national income which were consistent with the hypothetical exchange rates. At the end of Chapter 5 it was argued that if the exchange rates were as given by the hypothetical exchange rates, then the money supply for the sample period would be as simulated and presented in Table 5.4. In this chapter the question that is addressed is: If the money supply and national income were as simulated, will the hypothetical exchange rate, as given by the proposed policy, be in fact a good

approximation of the equilibrium exchange rate? Of course, there is difficulty in defining the equilibrium exchange rate. Williamson (1983) defines the 'fundamental equilibrium' exchange rate as "that which is expected to generate a current account surplus or deficit equal to the underlying capital flow over the cycle in the absence of abnormal internal demand conditions or trade restrictions".

To answer the question posed above, I employ the theory of the monetary approach to the determination of exchange rates.

6.2 THE MONETARY APPROACH TO THE DETERMINATION OF EXCHANGE RATES

The first proposition of the monetary approach to the determination of exchange rates is that the exchange rate is the relative price of two monies, the domestic and the foreign money (see Mussa, 1978). The second proposition is that the equilibrium exchange rate is attained when the stocks of the two monies are willingly held (Frenkel, 1976). The third proposition brings the two together: As the relative price of two monies the exchange rate is primarily determined by the relative supplies and demands for these two national monies. While supply of the monies may be considered exogenously determined, demand is influenced by expectations, incomes and rates of return on alternative assets. These variables, therefore, indirectly also help to determine the exchange rate. But in a simplified way it is clear that quantities of the two monies determine the exchange

rates; put in another way, the rate of change of money supply (money supply equals money demand) determines the rate of change of exchange rates.

The role given by the 'monetary approach' to money in determining the exchange rate is clear when the exchange rate is flexible and is determined by the supply of and demand for the two monies on the foreign exchange market. For the sample period, except for a short while in 1978, Ghana's exchange rates were institutionally fixed. As a result, tests of the theory with the actual series of exchange rates and money supply cannot be expected to yield any meaningful results. If our hypothetical exchange rates are regarded to be close approximation of what a flexible exchange rate policy will produce, we should expect results which are similar to the predictions of the theory of the 'monetary approach'. (The predictions are discussed below). The reason is that the monetary approach sees the exchange rate as the equilibrium relative price of two monies, each of which follows an equilibrium path (at least in the medium term) between the demand for and supply of the stock of money. If our expectations are confirmed then the hypothetical exchange rates are good approximations of the equilibrium rates and our proposed exchange rate system is vindicated, assuming the assumptions and predictions of the 'monetary approach' are correct. As a corollary, it also means monetary policy should aim at producing complementary monetary growth rates similar to the simulated series in Table 5.4.

6.3 THE MODEL

The starting point of the model is the demand for money function (see Holdrick, 1978; Dornbusch, 1976). This is written as the standard function, as discussed in Appendix to Chapter 4. (See also Goldfeld, 1973; Dornbusch, 1976; Branson and Halttunen, 1979).

$$M_t^d / P_t = A I_t^{a_1} Y_t^{a_2} + u_t$$

where M^d = per capita cash balances

P = general price level

I = the rate of interest

and Y = real per capita income

or in natural logarithms,

$$(m_t^d - p_t) = a_0 + a_1 i_t + a_2 y_t + u_t \quad \dots\dots(1)$$

The formulation states that the natural logarithm of real per capita cash balances ($m_t^d - p_t$) is related to the natural logarithm of nominal interest rates on alternative assets (i_t) and real per capita income (y_t). As a long run function and using annual data, we assume that the observed money supply is equal to the people's desire to hold money. This is different from the adaptive expectation approach taken in the appendix. Furthermore, both money supply and income are in per capita terms because of the cross-country analysis. The error term is included as u_t .

The formulation also assumes that the elasticity of demand for real balances with respect to price level (p)

is equal to one (see Laidler (1976), pp.137-9).

Next, we assume that the money supply is exogenously determined by the monetary authorities and is equal to the demand for money:

$$M_t^d = M_t^s \quad \dots\dots(2)$$

Finally, we employ once again the purchasing-power-parity equation:

$$e_t = p_t - p_t^* \quad \dots\dots(3)$$

In equation (3) the natural logarithm of the exchange rate is equal to the difference between the natural logarithms of domestic and foreign prices, or in terms of natural numbers, $E_t = P_t / P_t^*$. [Throughout this chapter '*' refers to the foreign country variable (the relevant country here being the US) and lower-case variables are natural logarithms of the corresponding upper-case variables]. The US is the relevant foreign country since Ghana's exchange rates have been fixed for most of the period to the US dollar.

From equations (1) and (2), the p_t function becomes:

$$p_t = a_0 + a_1 i_t + a_2 y_t + a_3 m_t + u_t \quad \dots\dots(4a)$$

The equivalent equation for the foreign country is

$$p_t^* = a_4 + a_5 i_t^* + a_6 y_t^* + a_7 m_t^* + \epsilon_t \quad \dots\dots(4b)$$

Substituting (4a) and (4b) in (3) gives an exchange rate equation with error term v_t as:

$$e_t = b_0 + b_1 (i_t - i_t^*) + b_2 (y_t - y_t^*) + b_3 (m_t - m_t^*) + v_t \quad \dots\dots(5)$$

where the b's are the new coefficients of the combined

variables. The signs of all the coefficients have been ignored for the moment.

Equation (5) states that the exchange rate (or rather its rate of change) depends on (the rate of change of) the differential between the interest rates, per capita incomes and per capita money balances at home and abroad. While the model is inherently monetarist, the inclusion of interest rates and incomes takes into account institutional and structural factors affecting exchange rates.

In this final form, the predictions of the theory are set out as follows (see Hodrick, 1978; Bilson, 1978):

1. In the long run, the rate of change of the exchange rate is equal to the difference in the rate of growth of per capita nominal money balances in the domestic country and in the foreign country. This proposition should mean a value for b_3 not significantly different from unity.
2. A fall in real per capita income in a country (like experienced in Ghana during the sample period) would lead to a decline in the demand for domestic money and a depreciation of the exchange rate. This proposition means we expect the estimated value of b_2 to be not significantly different from negative one.

The expected signs of the coefficients are:

$$b_1 > 0, \quad b_2 < 0, \quad b_3 > 0$$

If interest rates at home increase more than abroad the fall in demand for money at home should lead to increase (depreciation) in the exchange rate. Similarly, if there

is higher growth rate of money in the country than abroad then the exchange rate (in cedis per dollar) should increase (depreciate). On the other hand, higher growth rate of local per capita incomes should decrease (appreciate) the exchange rate.

6.4 SOURCES OF DATA

The data for the official exchange rate, in cedis per dollar, are as reported in Chapter 3 and in the appendix as ER. The data for the hypothesised exchange rate are as reported in Table 4.7b Column (3). The data for the simulated money supply (MT) and income (YT) are derived from Table 5.4. The corresponding historical series for these variables, (M) and (Y), are also reported in Table 5.4. Each of these four variables were divided by the population of Ghana (POP) to get the per capita income or money balances. In addition, the income variables in nominal form were deflated by the GDP deflator (DF) to get the real income in 1980 prices. Both the deflator and the population data were obtained from International Financial Statistics Yearbook 1985.

The US data consists of money supply (M1), defined as in the case of Ghana, as Money plus quasi-money, and gross national product (Y1) at constant 1980 prices. Each variable was divided by the population (POP1) to obtain the per capita value. All the US data were similarly taken from the IFS Yearbook 1985.

To obtain conceptually comparable data for the rate of interest (i), we used the discount rate in both countries, also obtained from the IFS Yearbook 1985.

6.5 METHOD OF ESTIMATION

Because of the presence of first-order serial correlation in the equations all the equations in this chapter were modelled with the disturbance term having an autoregressive, (AR1), process, given as

$$u_t = \phi u_{t-1} + \varepsilon_t, \quad |\phi| < 1$$

where u_t are the residuals of the OLSQ estimation.

The method of estimation is the Beach and MacKinnon (1978) Maximum Likelihood (ML) technique. Like the Cochrane-Orcutt method, the ML is a two-stage iterative method. The first stage finds a value of rho, the coefficient of serial correlation, and the data are transformed according to the equation:

$$\underline{X}_t = X_t - \rho X_{t-1} \quad \text{for } t > 1 \quad \dots\dots\dots(6)$$

$$\underline{X}_t = \sqrt{(1-\rho^2)} X_t \quad \text{for } t=1 \quad \dots\dots\dots(7)$$

Then a regression is run on the transformed data. A new value of ρ is computed and the process is repeated until convergence is reached, ie. ρ does not change from one iteration to the next or the process is stopped when two successive values of ρ are sufficiently close (ibid).

The ML method differs from the Cochrane-Orcutt (C-0) method in four respects:

(a) Convergence is much faster in the ML method.

(b) The ML includes the first observation in each series, treating it as shown in equation (7) above. As a

result, estimation that uses ML has one observation more than one that uses C-0 on the same data. Beach and MacKinnon (ibid) point out that in small samples, disregarding the first observation may make a substantial difference.

(c) In the C-0 method, ρ is obtained by computing for the simple correlation coefficient from the residuals of the previous step. In the ML on the other hand, ρ is solved for in the cubic equation:

$$f(\rho) \equiv \rho^3 + a\rho^2 + b\rho + c = 0 \quad \dots\dots(8)$$

where $a = -(T-2)\sum A_t A_{t-1} / [(T-1)(\sum A_{t-1}^2 - A_1^2)]$,

$$b = [(T-1)A_1^2 - T\sum A_{t-1}^2 - \sum A_t^2] / [(T-1)(\sum A_{t-1}^2 - A_1^2)],$$

$$c = T\sum A_t A_{t-1} / [(T-1)(\sum A_{t-1}^2 - A_1^2)],$$

and $A_t = y_t - X_t \beta$ for given β ; y_t is dependent variable and X_t the independent variable(s); the summations run from $t=2$ to T .

Following Uspensky (1948), Beach and MacKinnon show that the desired root of equation (8) is

$$\tilde{\rho} = -2\sqrt{-p/3} \cos(\phi/3 + T/3) - a/3$$

where $p = b - a^2/3$,

$$\phi = \cos^{-1}((q\sqrt{27})/(2p\sqrt{-p})),$$

$$q = c - ab/3 + 2a^3/27$$

(d) In the C-0 method the process involves the

minimization of the standard error of the residuals. In the ML method, the process is concerned with the maximization of the likelihood function. Although asymptotically the two methods should produce the same result, the different treatment of the first observation and the different objective functions can make quite a lot of difference to the estimation when the sample size is small or just moderate.

It follows from the foregoing that one of the issues we considered in choosing the ML method is to avoid losing the first observation and to run the regression from 1957 to 1982, using all the available observations.

6.6 RESULTS OF THE REGRESSION

The sample space is annual data from 1957 to 1982, 26 observations. The result of the estimation is reported in the 3 equations in Table 6.1.

In Table 6.1, Equation A is the result of the ML estimation of text equation (5). Equation B of the table, like EQ.A, is estimated on the basis of the observed data but with the restriction that b_1 is zero. This restriction is justified on theoretical and on empirical grounds. EQ.C is based on the simulated data.

Theoretically, the inclusion of the differential between the interest rate of Ghana and the US, $(i_t - i_t^*)$, can be justified only on the strength of the interest-rate parity theorem. The theorem states that in the absence of exchange controls interest rates on assets issued in different currency denominations are

TABLE 6.1

THE EFFECTS OF DIFFERENTIAL GROWTH RATES OF MONEY AND INCOME ON

EXCHANGE RATES IN GHANA, 1957-1982

$$[e_t = b_0 + b_1(i_t - i_t^*) + b_2(y_t - y_t^*) + b_3(m_t - m_t^*)]$$

EQ	SSR	SER	\bar{R}^2	DW	F	ρ	b_0	b_1	b_2	b_3
A	1.016	0.215	0.583	1.900	12.079	0.447 (0.186)	1.133 (1.27)	0.074 (0.18)	-0.538 (0.69)	0.407 (0.20)
B	1.025	0.211	0.617	1.881	20.213	0.424 (0.19)	1.050 (1.23)		-0.603 (0.67)	0.394 (0.19)
C	1.603	0.264	0.636	1.836	21.831	0.745 (0.16)	-2.151 (3.65)		-1.180 (0.57)	0.932 (0.21)

Standard Errors are in Parenthesis

EQ = Equation

SER = Standard Error of the Regression

\bar{R}^2 = Coefficient of determination, adjusted for degrees of freedom.

DW = Durbin-Watson statistic

F = F-statistic, $F_{(3,22)}$ for EQA and $F_{(2,23)}$ for EQB and EQC

SSR = Sum of Squared Residuals

ρ = First-order serial correlation coefficient, $\epsilon_t = \rho\epsilon_{t-1} + v_t$.

equivalent, via the exchange rate. Any observed differential will be due to the forward premium (Aliber, 1973). If f_t is the forward premium, then equation 9 will hold:

$$f_t - e_t = \ln(1+i_t) - \ln(1+i_t^*) \quad \dots\dots(9)$$

The period under study was characterised by exchange control in Ghana. As such, the interest parity could hardly prevail in situation in which free movement of capital into and out of Ghana was officially restricted. Moreover, we have described in Chapter Three how controls over interest rates led to constant nominal rates for long periods and negative real rates for most of the time. In addition, one can hardly find assets which can be described as equivalent in yield and with equivalent term-structure in Ghana and in the US. The discount rate used in the regression hardly represent yields on assets which residents in Ghana and the US may consider as substitutes.

On practical grounds, we note the insignificant coefficient (b_1) of the interest rate differential in Equation A. In addition, we perform the F test to show that b_1 is zero.¹ This is done by calculating the Sum of Squared Residuals of the unrestricted model, in EQ. A of Table 6.1, which we call SSR_{UR} . Then, we calculate the Sum of Squared Residuals of the unrestricted model, EQ. B, and call it SSR_R . Both SSRs are shown in Table 6.1. If the null hypothesis that $b_1=0$ is correct then dropping $(i_t - i_t^*)$ from the model will have little effect on the explanatory power of the model and SSR_R will be only slightly higher than SSR_{UR} . The relevant test statistic is:

¹See Chapter 3 p.93 for similar test.

$$F = \frac{(SSR_R - SSR_{UR})/q}{SSR_{UR}/(T-k)}$$

where q = the number of parameter restrictions,

here equals 1

T = number of observations

and k = the number of parameters, including constant,

in the original model.

In the model this test comes to

$$F = \frac{(1.0245 - 1.0158)/1}{1.0158/(26-4)} = 0.188$$

which is not significant at the standard 5% level and enables us to accept the null hypothesis and the validity of the restriction that $b_1=0$.

Equation C in Table 6.1 uses the simulated data in Table 5.4 for Ghana and the same data as in EQ. B for the US.

Our main interest is in comparing EQ. B to EQ. C. With the exception of the standard error of b_2 for EQ. B all the test statistics are significant at the 5% level. Both equations (A and B) are therefore good in their explanatory power and goodness of fit.

The standard errors of b_2 in EQ.B and EQ.C indicate that the (rate of change of) differential in income under our hypothesised exchange rate policy provide a better explanation of the (rate of change of) exchange rate than under the actual exchange rate policy of the period. The per capita money balances differential are significant, at 5% level, in both equations. However,

the size of the coefficient and the 95% confidence interval are different for b_2 in EQ.B and EQ.C, as seen in

Table 6.2.

2

TABLE 6.2

COEFFICIENT OF $(y_t - y_t^*)$ AND $(m_t - m_t^*)$ AND CONFIDENCE INTERVALS

EQ	VARIABLE	COEFFICIENT	STANDARD ERROR	95% CONFIDENCE INTERVAL
B	$(y_t - y_t^*)$	-0.603	0.669	$-1.987 < \hat{b}_2 < 0.781$
C	"	-1.180	0.573	$-2.366 < \hat{b}_2 < 0.006$
B	$(m_t - m_t^*)$	0.394	0.188	$0.005 < \hat{b}_3 < 0.783$
C	"	0.932	0.208	$0.502 < \hat{b}_3 < 1.362$

t_c , critical $t = 2.069$, at 5% level of significance, in two-tailed test.

In the case of the differential per capita incomes, the 95% confidence interval estimate of the coefficient include the expected value of -1. If we re-state our prediction (in Section 6.3) into the null hypothesis:

$$H_0 \equiv b_2 = -1$$

we cannot reject the null hypothesis at the 5% level of significance in both Equations A and B. It must be remembered that in Chapter Five we found that the

²The confidence interval of $\beta = \hat{\beta} \pm t_c \text{se}(\hat{\beta})$ where $\hat{\beta}$ is the estimated value of β , t_c is the critical value from the t-statistics at the appropriate value of significance, and $\text{se}(\hat{\beta})$ is the estimated standard error of β .

simulated income was not very different from the actual data. However, the estimated coefficient of -1.180 in EQ.C in Table 6.2 is much closer to the predicted value of -1 than the -0.603 estimated for EQ.B.

The difference between the coefficients of the per capita money differential, b_3 , is much more clear. The null hypothesis here is:

$$H_0 \equiv b_3 = 1$$

The null hypothesis is rejected at the 5% level of significance in the case of Equation B, and accepted in the case of Equation C. Clearly, in the case of Equation C, and not in EQ.B, 1 lies within the 95% confidence interval of between 0.502 and 1.362.

6.7 CONCLUSION

The conclusion from this analysis is that we find the coefficient of per capita money differential and the per capita real income differential to be unity and minus one respectively, if the exchange rates in Ghana between 1957 and 1982 had been as proposed. The corresponding real per capita real income and money balance data for the hypothesised exchange rate were derived from the simulation in Chapter 5. The coefficient of the per capita money differential for the actual data is less than the predicted value of unity.

Since the natural logarithms of the data were used in the estimation, the estimated coefficients are in fact the elasticities. Therefore, we can make the following statements about the elasticities:

1. In the case of the hypothesised exchange rate, a unit

increase in the differential between per capita incomes in Ghana and per capita incomes in the US will lead to equi-proportional fall (appreciation) in the exchange rate, ceteris paribus. The fall predicted by the actual data is less than predicted by the simulated data but the difference between them is not very significant statistically. This finding suggests that as per capita real income in Ghana fell relative to the per capita real incomes in the US, the exchange rate of the cedi in terms of the dollar had to depreciate. But the actual depreciation was less than was warranted by the increase in the income differential.

2. The simulated money balances support the hypothesis that the rate of change of the exchange rate between the currencies of Ghana and the US is the same as the difference between the rate of growth of per capita nominal money balances in the two countries, ceteris paribus. The actual data however produced an elasticity which was significantly less than unity. This means that while per capita money balances in Ghana increased more than the increase in the US (by a factor of about 10 between 1957 and 1982) the exchange rate was allowed to depreciate by less than a factor of 4. This explains why the currency was generally regarded as over-valued. It does not mean the depreciation in the exchange rate should be the same as the difference in the growth of per capita money balances. The ceteris paribus caveat is important, and this means other things should remain unchanged, including the difference in the per capita real income growth. The implication is that the optimum

exchange rate cannot simply be determined by considering only the difference in the growth rate of money balances. The model in Chapter Four, however, provides an adequate basis for the the determination of the equilibrium exchange rate. The resulting exchange rate conforms to the predictions of the monetary approach to the determination of exchange rates.

In addition, the results provide an indirect support for the thesis that by pegging its currency, a country loses its monetary independence; and that monetary policy becomes constrained by balance of payment considerations. Thus, Blundell-Wignall and Masson (1985) assert the need for the authorities to be willing to adjust monetary policy in order to achieve their exchange rate objectives.

If the monetary approach is accepted as an adequate theory of the determination of exchange rates then, the implications of this work is clear. The confirmation of the theory's predictions by the hypothetical exchange rates and the simulated money and income indicates that if Ghana were to avoid having over-valued currency or having to live with the unacceptable consequences of currency devaluation, then she could not ignore the differential in the growth rate of per capita money balances and per capita real income at home and abroad. So long as Ghana continued to peg its currency to the US dollar, the per capita money balances and real income which are relevant in this context are those of the United States.

Finally, if the equilibrium exchange rates, as

produced in a system of freely floating exchange rates with no exchange controls, conforms to the predictions of the monetary approach to the determination of exchange rates, then our proposed exchange rate policy results in exchange rates which are good approximations of the equilibrium exchange rates. And the proposal deserves attention in the formulation of long term exchange rate policy. Monetary policy too has much to learn from this chapter and the last.

CHAPTER SEVEN

CONCLUSION

The decline in the economy of Ghana between 1957 and 1982 was very dramatic. It was also characterised by instability of many kinds, including budgetary and external payment as well as price instability. It was clear that monetary and exchange rate policies were not able to play the stabilisation role that are normally expected of them when used with clear objectives and in appropriately coordinated fashion.

The objectives of exchange rate policy during this period were identified as one that sought to maintain a stable nominal exchange rates for Ghana. The objective of monetary policy was to contain the tendency for excessive monetary growth. The main instrument was quantitative external payment and monetary control measures, though other instruments were applied with varying degrees of success.

The major reason for the unsatisfactory effectiveness of monetary and exchange rate policies was the inability of the economic and financial authorities to coordinate the monetary and exchange rate policies to ensure consistency of purpose and action. Thus, while the Bank of Ghana tried to employ all the statutory

powers at its disposal to control the growth of money supply, the maintenance of excessively over-valued exchange rate for most of the period (except perhaps 1969-1971) resulted in serious external imbalance. The government tried unsuccessfully to correct the external imbalance by means of import licencing and exchange control.

Meanwhile, the budget deficit increased. On the government expenditure side, the government was forced by the distortion that arose from the foreign exchange and price control measures to subsidise certain products. But by far the greatest harm was done to the ability of the government to raise revenue. Many imports and exports were diverted to the unofficial market through smuggling, thus depriving the state of import and export duties. Those goods that went through the official channel had to be valued at the ridiculous official exchange rate, though most were eventually sold at the retail level for the equivalence of the real effective exchange rate. The loser was the government, such that by 1982, government revenue was only 5.59% of the GDP, compared with 23.87% in 1957. Government expenditure, on the other hand, was maintained at 11.10% in 1982 compared with 14.65% in 1957. The result was a budget deficit of 5.5% of GDP in 1982, compared with 1.8% in 1960 when budget deficit first appeared.

Budget deficit increasingly became the major factor in the monetary growth so that the monetary policy of the Bank of Ghana became sterile and ineffective by the budget deficit of the government. It looked obvious then

that any attempt to break the cycle must include some exchange rate measure that moved away from the rigid adherence to a fixed nominal exchange rate that did not take into account the differential rate of inflation between Ghana and her trading partners or exchange rate movements among the trading partners themselves.

Among other things, Chapter Four considered the issues that needed to be taken into account in selecting an appropriate exchange rate policy for Ghana. In particular, the thesis argued that while a freely floating exchange rate is supposed to enable the market conditions to determine an equilibrium exchange rate, the absence of a well developed monetary and capital markets in Ghana can dampen the effectiveness of the arbitraging forces to make a freely floating a viable option. But if Ghana is to continue a policy of fixed (officially determined) exchange rates then there is need for a willingness to be more flexible and an inclination to alter the exchange rate more frequently to reflect the underlying economic and financial conditions.

The thesis identifies a real effective exchange rate that is adjusted every year with a new base year (for calculation purposes) every five years or so. Such an exchange rate policy aims at ensuring that the official exchange rate is never diverged from what can be considered as a realistic and 'optimum' exchange rate, and as close as possible to what equilibrium conditions, both in the external sector (exports and imports) and internal sector (money supply and demand,

price levels and output), will sustain. That exchange rate is import weighted to reflect the exchange rate movements among Ghana's important trading partners. It also takes into account the differential between Ghana's rate of inflation and that of the trading partners.

By making use of the differential between the rates of inflation at home and abroad, the proposed exchange rate policy draws on the essential ingredient of the Purchasing Power Parity theory of exchange rates. However, the proposal goes further by taking into account the pattern of Ghana's import trade at any given time. This ensures that fluctuations in the exchange rates among the major trading partners, who are mainly floaters, are reflected in the official exchange rate. This will be a significant departure from the policy of single currency peg.

By means of a simulation experiment Chapter Five shows the effect of the recommended exchange rate policy as presented in Table 4.7b Column 3. The proposed policy not only ensures external balance between imports and exports, but results in some growth of output, restores balance to the government budget and dampens the growth of money supply and the rate of inflation. Between 1975 and 1982, money supply increases at a rate of 35% per annum when the proposed policy is followed, compared to the achieved growth rate rate of 41% per annum. This reduction will certainly promote the effectiveness of monetary policy.

The influence of the growth rate of money supplies, at home and abroad, and relative price levels on the

movement of the real effective exchange rate is again demonstrated in Chapter Six. The implication is that monetary policy cannot be conducted to achieve domestic objectives only. It must be seen as having consequential effect on the balance of payment.

It is conceivable that if the proposed exchange rate policy is combined with a monetary policy that seeks to maintain a positive rate of interest, the consequences for increased savings and output will be immense, and may reduce further the level of prices. The lower price levels that result from our proposed exchange rate policy will make the objective of positive interest rate attainable. But with or without a positive interest rate, the pursuit of a more realistic and flexible exchange rate policy is bound to yield significant results not only on the internal and external balance but also on the effectiveness of monetary policy.

CHAPTER SEVEN

CONCLUSION

The decline in the economy of Ghana between 1957 and 1982 was very dramatic. It was also characterised by instability of many kinds, including budgetary and external payment as well as price instability. It was clear that monetary and exchange rate policies were not able to play the stabilisation role that are normally expected of them when used with clear objectives and in appropriately coordinated fashion.

The objectives of exchange rate policy during this period were identified as one that sought to maintain a stable nominal exchange rates for Ghana. The objective of monetary policy was to contain the tendency for excessive monetary growth. The main instrument was quantitative external payment and monetary control measures, though other instruments were applied with varying degrees of success.

The major reason for the unsatisfactory effectiveness of monetary and exchange rate policies was the inability of the economic and financial authorities to coordinate the monetary and exchange rate policies to ensure consistency of purpose and action. Thus, while the Bank of Ghana tried to employ all the statutory

powers at its disposal to control the growth of money supply, the maintenance of excessively over-valued exchange rate for most of the period (except perhaps 1969-1971) resulted in serious external imbalance. The government tried unsuccessfully to correct the external imbalance by means of import licencing and exchange control.

Meanwhile, the budget deficit increased. On the government expenditure side, the government was forced by the distortion that arose from the foreign exchange and price control measures to subsidise certain products. But by far the greatest harm was done to the ability of the government to raise revenue. Many imports and exports were diverted to the unofficial market through smuggling, thus depriving the state of import and export duties. Those goods that went through the official channel had to be valued at the ridiculous official exchange rate, though most were eventually sold at the retail level for the equivalence of the real effective exchange rate. The loser was the government, such that by 1982, government revenue was only 5.59% of the GDP, compared with 23.87% in 1957. Government expenditure, on the other hand, was maintained at 11.10% in 1982 compared with 14.65% in 1957. The result was a budget deficit of 5.5% of GDP in 1982, compared with 1.8% in 1960 when budget deficit first appeared.

Budget deficit increasingly became the major factor in the monetary growth so that the monetary policy of the Bank of Ghana became sterile and ineffective by the budget deficit of the government. It looked obvious then

that any attempt to break the cycle must include some exchange rate measure that moved away from the rigid adherence to a fixed nominal exchange rate that did not take into account the differential rate of inflation between Ghana and her trading partners or exchange rate movements among the trading partners themselves.

Among other things, Chapter Four considered the issues that needed to be taken into account in selecting an appropriate exchange rate policy for Ghana. In particular, the thesis argued that while a freely floating exchange rate is supposed to enable the market conditions to determine an equilibrium exchange rate, the absence of a well developed monetary and capital markets in Ghana can dampen the effectiveness of the arbitraging forces to make a freely floating a viable option. But if Ghana is to continue a policy of fixed (officially determined) exchange rates then there is need for a willingness to be more flexible and an inclination to alter the exchange rate more frequently to reflect the underlying economic and financial conditions.

The thesis identifies a real effective exchange rate that is adjusted every year with a new base year (for calculation purposes) every five years or so. Such an exchange rate policy aims at ensuring that the official exchange rate is never diverged from what can be considered as a realistic and 'optimum' exchange rate, and as close as possible to what equilibrium conditions, both in the external sector (exports and imports) and internal sector (money supply and demand,

price levels and output), will sustain. That exchange rate is import weighted to reflect the exchange rate movements among Ghana's important trading partners. It also takes into account the differential between Ghana's rate of inflation and that of the trading partners.

By making use of the differential between the rates of inflation at home and abroad, the proposed exchange rate policy draws on the essential ingredient of the Purchasing Power Parity theory of exchange rates. However, the proposal goes further by taking into account the pattern of Ghana's import trade at any given time. This ensures that fluctuations in the exchange rates among the major trading partners, who are mainly floaters, are reflected in the official exchange rate. This will be a significant departure from the policy of single currency peg.

By means of a simulation experiment Chapter Five shows the effect of the recommended exchange rate policy as presented in Table 4.7b Column 3. The proposed policy not only ensures external balance between imports and exports, but results in some growth of output, restores balance to the government budget and dampens the growth of money supply and the rate of inflation. Between 1975 and 1982, money supply increases at a rate of 35% per annum when the proposed policy is followed, compared to the achieved growth rate rate of 41% per annum. This reduction will certainly promote the effectiveness of monetary policy.

The influence of the growth rate of money supplies, at home and abroad, and relative price levels on the

movement of the real effective exchange rate is again demonstrated in Chapter Six. The implication is that monetary policy cannot be conducted to achieve domestic objectives only. It must be seen as having consequential effect on the balance of payment.

It is conceivable that if the proposed exchange rate policy is combined with a monetary policy that seeks to maintain a positive rate of interest, the consequences for increased savings and output will be immense, and may reduce further the level of prices. The lower price levels that result from our proposed exchange rate policy will make the objective of positive interest rate attainable. But with or without a positive interest rate, the pursuit of a more realistic and flexible exchange rate policy is bound to yield significant results not only on the internal and external balance but also on the effectiveness of monetary policy.

APPENDIX

The following are some of the variables used in the thesis and their sources. All data are on Ghana except indicated otherwise.

USM	United Staes, Money plus Quasi-Money, Billions of US dollars, Average of Figures for last Month of the Year.
USPOP	United States Population, in millions; mid-year estimates.
USR	United States Discount Rate, percent, end of year.
USRY	United States Gross National Product, Billions of US dollars, 1980 prices. All United Staes Data are from IFS Yearbook 1985
POP	Population, Millions; mid-year estimates, from IFS, Yearbook 1985.
DF	GDP Deflator, (1980=100), from IFS Yearbook 1985
RY	GDP 1980 Prices, 100 million cedis, from IFS Yearbook 1985.
R	Discount Rate, percent, end of year; from IFS Yearbook 1985.
GR	Government Revenue, 100 million cedis, year ending June 30; from IFS yearbook 1984, GFS Yearbooks, 1972-84, Birmingham et el. (1966), Leith (1973).
GX	Government Expenditure, 100 million cedis, Year ending June; from same sources as GR.
B	Government Budget Deficit (GX-GR).

P General Price Level, Consumer Price Index, (1960=100), average of the year; from IFS Yearbook 1985, IFS Supplement on Prices, 1981.

M Money plus Quasi-Money, 100 million cedis, end of year; from IFS Yearbook 1984.

ER Exchange Rates, cedis per US dollar, end of period; from IFS.

PM Import Price Index, percent, (1970=100); from IFS Price Supplement 1981 and UN National Income Accounts.

PX Export Price Index, percent, (1970=100); from same sources as PM.

RE Commercial Banks' Reserves, 100 million cedis, end of period; from IFS Yearbook 1984.

Z1 Dummy Variable, 1 for year with severe import restriction, 0 otherwise.

Z2 Dummy Variable, 1 for years after the oil price increase of 1973, 0 otherwise.

PCON Private Consumption Expenditure, 100 million cedis; from IFS.

I Private Investment, 100 million cedis, derived as $I = Y - PCON - GX - (EX - IM)$.

IM Imports, 100 million cedis; from IFS, UN International Trade Statistics, and Bank of Ghana Quarterly Economic Bulletin.

EX Exports, 100 million cedis; from same source as IM.

BP Balance of Payment, $(EX - IM)$.

Y Gross Domestic Product, 100 million cedis; from IFS.

	USM	USPOP	USR	USRY
1957	189.10001	171.98000	3.00000	1220.00000
1958	200.00000	174.88000	2.50000	1214.90002
1959	301.79999	177.83000	4.00000	1287.69995
1960	316.39999	180.67999	3.00000	1315.30005
1961	339.89999	183.69000	3.00000	1349.90002
1962	366.79999	186.53999	3.00000	1427.90002
1963	398.39999	189.24001	3.50000	1485.30005
1964	430.20001	191.89000	4.00000	1563.69995
1965	465.20001	194.30000	4.50000	1658.09998
1966	485.79999	196.56000	4.50000	1757.09998
1967	530.20001	198.71001	4.50000	1804.50000
1968	571.59998	200.71001	5.50000	1887.90002
1969	592.20001	202.67999	6.00000	1940.50000
1970	630.59998	205.05000	5.50000	1936.90002
1971	714.09998	207.66000	4.50000	2002.59998
1972	806.50000	209.89999	4.50000	2115.89990
1973	859.29999	211.91000	7.50000	2237.89990
1974	905.59998	213.85001	7.75000	2223.69995
1975	1020.40002	215.97000	6.00000	2197.39990
1976	1159.90002	218.03999	5.25000	2316.30005
1977	1282.50000	220.24001	6.00000	2443.80005
1978	1381.30005	222.59000	9.50000	2566.80005
1979	1467.40002	225.06000	12.00000	2639.60010
1980	1571.50000	227.70000	13.00000	2631.69995
1981	1644.80005	229.85001	12.00000	2698.10010
1982	1788.59998	232.06000	8.50000	2640.60010
	POP	DF	RY	R
1957	6.20000	3.00000	22448.00000	4.00000
1958	6.39000	3.10000	23302.00000	4.00000
1959	6.58000	3.10000	25967.00000	4.00000
1960	6.78000	3.30000	26574.00000	4.00000
1961	6.85000	3.30000	28214.00000	4.50000
1962	6.93000	3.40000	29576.00000	4.50000
1963	7.01000	3.60000	30602.00000	4.50000
1964	7.40000	4.00000	31261.00000	4.50000
1965	7.74000	4.60000	31688.00000	4.50000
1966	7.91000	4.80000	31718.00000	7.00000
1967	8.08000	4.90000	30767.00000	6.00000
1968	8.26000	5.20000	32744.00000	5.50000
1969	8.44000	5.80000	34668.00000	5.50000
1970	8.61000	6.10000	37012.00000	5.50000
1971	8.86000	6.40000	39071.00000	8.00000
1972	9.09000	7.40000	38097.00000	8.00000
1973	9.39000	8.00000	43908.00000	6.00000
1974	9.61000	10.30000	45398.00000	6.00000
1975	9.87000	13.40000	39557.00000	8.00000
1976	10.31000	17.10000	38165.00000	8.00000
1977	10.63000	28.60000	39026.00000	8.00000
1978	10.97000	49.60000	42335.00000	13.50000
1979	11.09000	68.70000	40995.00000	13.50000
1980	11.54000	100.00000	40995.00000	13.50000
1981	11.83000	190.39999	40261.00000	19.50000
1982	12.24000	229.80000	37363.00000	10.50000

	GR	GX	B	P
1957	1.30200	0.96100	-0.34100	96.28000
1958	1.24600	1.05800	-0.18800	96.28000
1959	1.39400	1.17100	-0.22300	99.07000
1960	1.36400	1.53500	0.17100	100.00000
1961	1.46700	2.17300	0.70600	106.05000
1962	1.57000	3.12300	1.55300	115.81000
1963	1.69600	3.14100	1.44500	120.47000
1964	2.54200	3.74800	1.20600	135.81000
1965	2.84100	3.78200	0.94100	171.63000
1966	2.30800	3.07400	0.76600	193.95000
1967	2.54000	3.20800	0.66800	179.07001
1968	2.97900	4.00200	1.02300	193.49001
1969	3.32000	3.95300	0.63300	207.44000
1970	4.37300	4.67900	0.30600	213.49001
1971	4.50700	5.23800	0.73100	233.95000
1972	4.19900	5.44600	1.24700	257.67001
1973	4.45000	5.57000	1.12000	303.26001
1974	5.78900	7.54100	1.75200	358.14001
1975	8.09700	11.46200	3.36500	465.12000
1976	8.69800	14.82600	6.12800	726.04999
1977	11.40900	21.36600	9.95700	1571.16003
1978	13.92100	31.64800	17.72700	2720.00000
1979	26.00000	42.95700	16.95700	4200.00000
1980	29.49900	46.67500	17.17600	6304.18994
1981	32.34100	77.19300	44.85200	13647.91016
1982	48.03300	95.29500	47.26200	16690.93945
	M	ER	PM	PX
1957	1.10600	0.71000	73.00000	69.00000
1958	1.19900	0.71000	73.00000	96.00000
1959	1.36500	0.71000	75.00000	85.00000
1960	1.59900	0.71000	77.00000	74.00000
1961	1.74000	0.71000	77.00000	61.00000
1962	2.00400	0.71000	74.00000	55.00000
1963	2.15000	0.71000	72.00000	56.00000
1964	2.94800	0.71000	75.00000	61.00000
1965	3.00500	0.71000	76.00000	48.00000
1966	3.15300	0.71000	67.00000	47.00000
1967	3.19200	1.02000	77.00000	55.00000
1968	3.51800	1.02000	69.00000	76.00000
1969	3.88500	1.02000	81.00000	89.00000
1970	4.27100	1.02000	100.00000	100.00000
1971	4.74700	1.82000	110.00000	85.00000
1972	6.67700	1.28000	143.00000	98.00000
1973	7.93600	1.15000	161.00000	137.00000
1974	10.05100	1.15000	222.00000	213.00000
1975	13.86100	1.15000	254.00000	231.00000
1976	19.02800	1.15000	293.00000	222.00000
1977	30.43800	1.15000	342.00000	337.00000
1978	51.31000	2.75000	388.00000	350.00000
1979	59.42100	2.75000	460.50000	413.29999
1980	79.48700	2.75000	556.00000	499.00000
1981	120.28700	2.75000	655.00000	587.79999
1982	148.38000	2.75000	753.29999	676.00000

	RE	POP	Z1	Z2
1957	0.07500	6.20000	0.00000	0.00000
1958	0.09700	6.39000	0.00000	0.00000
1959	0.13000	6.58000	0.00000	0.00000
1960	0.14500	6.78000	0.00000	0.00000
1961	0.10300	6.85000	0.00000	0.00000
1962	0.18300	6.93000	1.00000	0.00000
1963	0.11100	7.01000	1.00000	0.00000
1964	0.26000	7.40000	1.00000	0.00000
1965	0.26300	7.74000	0.00000	0.00000
1966	0.38800	7.91000	1.00000	0.00000
1967	0.38300	8.08000	0.00000	0.00000
1968	0.37900	8.26000	0.00000	0.00000
1969	0.54700	8.44000	0.00000	0.00000
1970	0.88000	8.61000	0.00000	0.00000
1971	0.78900	8.86000	0.00000	0.00000
1972	1.14000	9.09000	1.00000	0.00000
1973	1.71100	9.39000	1.00000	0.00000
1974	2.14900	9.61000	1.00000	1.00000
1975	3.75300	9.87000	1.00000	1.00000
1976	5.10500	10.31000	1.00000	1.00000
1977	7.14300	10.63000	1.00000	1.00000
1978	14.23000	10.97000	0.00000	1.00000
1979	16.67700	11.09000	1.00000	1.00000
1980	18.54400	11.54000	0.00000	1.00000
1981	28.01800	11.83000	1.00000	1.00000
1982	33.66000	12.24000	1.00000	1.00000

	PCDN	I
1957	5.96000	0.69900
1958	5.72000	0.72200
1959	6.50000	1.34900
1960	6.94000	1.58500
1961	8.04000	0.82700
1962	8.30000	-0.18300
1963	9.16000	0.33900
1964	9.87000	0.31200
1965	11.33000	0.95800
1966	12.01000	0.85600
1967	11.65000	0.59200
1968	11.98000	0.74800
1969	14.59000	1.25700
1970	16.64000	1.43100
1971	19.74000	1.55200
1972	21.06000	0.10400
1973	26.52000	1.41000
1974	36.70000	4.21900
1975	38.73000	2.14800
1976	51.71000	-1.05600
1977	86.38000	5.06400
1978	177.66000	3.34200
1979	236.49001	-2.21701
1980	342.32001	24.09501
1981	681.26001	15.70698
1982	760.00000	5.42498

	IM	EX	BP	Y
1957	2.14000	1.92000	-0.22000	7.40000
1958	1.90000	2.20000	0.30000	7.80000
1959	2.52000	2.40000	-0.12000	8.90000
1960	2.96000	2.46000	-0.50000	9.56000
1961	3.26000	2.44000	-0.82000	10.22000
1962	2.70000	2.40000	-0.30000	10.94000
1963	2.90000	2.34000	-0.56000	12.08000
1964	2.83000	2.47000	-0.36000	13.57000
1965	3.92000	2.51000	-1.41000	14.66000
1966	2.98000	2.22000	-0.76000	15.18000
1967	3.15000	2.74000	-0.41000	15.04000
1968	3.69000	3.96000	0.27000	17.00000
1969	4.28000	4.47000	0.19000	19.99000
1970	5.39000	5.23000	-0.16000	22.59000
1971	6.89000	5.37000	-1.52000	25.01000
1972	4.28000	5.82000	1.54000	28.15000
1973	6.00000	7.51000	1.51000	35.01000
1974	10.54000	8.68000	-1.86000	46.60000
1975	9.74000	10.23000	0.49000	52.83000
1976	10.47000	10.25000	-0.22000	65.26000
1977	12.89000	11.71000	-1.18000	111.63000
1978	20.33000	17.54000	-2.79000	209.86000
1979	27.92000	32.59000	4.67000	281.89999
1980	38.35000	35.21000	-3.14000	409.95001
1981	31.23000	23.62000	-7.61000	766.54999
1982	20.20000	18.02000	-2.18000	858.53998

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