

**PRICES, MONEY AND SUPPLY SHOCKS IN THE SUB - SAHARAN AFRICA:
THE CASE OF GHANA**

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1. Introduction

On few subjects is there so much agreement as on the recognition that Africa is in deep crisis and that its position has been worsening. The last decade witnessed a serious decline in the economic and social situation in Sub - Saharan Africa. This downward shift is of especial concern because it is occurring at a time when other parts of the developing world are experiencing rapid economic expansion. Taiwan and South Korea, which had per capita incomes comparable to several African countries in the 1950s, have undergone unprecedented growth while countries south of the Sahara have experienced a significant fall in living standards.

Ghana currently is a low - income economy even though 40 years ago at independence, it had an income comparable to Greece and had the highest GDP per capita in West Africa. Figure 1.1 shows that during the 1970s, the average rate of growth of per capita real GDP of Ghana was -11.8 per cent - the biggest fall over that period of any country in the world. Figure 1.2 illustrates the rate of inflation (Wholesale Price Index) and the rate of money supply (M1), and shows that by the early 1980s, the rate of inflation ran up to 82%. Not surprisingly, over the period 1978 - 1983, Ghana suffered four violent "coups d'etat" and experienced five different governments. Persistent and high inflation is one of the ongoing problems faced the Ghanaian economy. The country had its first taste of double - digit inflation in 1964 and since 1972, inflation levels have remained high.

The objective of this paper is to analyze the inflationary process in Ghana and the main variables influencing it. This will be done by highlighting the main economic problems of Ghana. Insights from the Ghanaian experience will be used to shed light on the experiences of other African countries. The paper's principal hypothesis is that inflation in Ghana during the seventies and

eighties was mainly caused by shocks in food production and excessive money creation by the monetary authorities. The relation between money, prices and supply shock is tested by means of the vector autoregression (VAR) technique. Due to lack of data relating to supply shocks, a model of structural VAR is employed to obtain a supply shock series that can be used in the testing procedure. The available real GDP was found to be a good proxy for supply shocks.

The plan of the paper is as follows: Section 2 provides a brief review of the long-run decline of Ghana's economy; Section 3 reviews the structure of Ghana's financial sector; Section 4 surveys Ghana's price, money and supply shocks and presents an econometric analysis of these shocks; Section 5 provides policy implications and suggestions for further research. Section 6 concludes.

Figure 1.1: Log of Real Per Capita GDP of Ghana

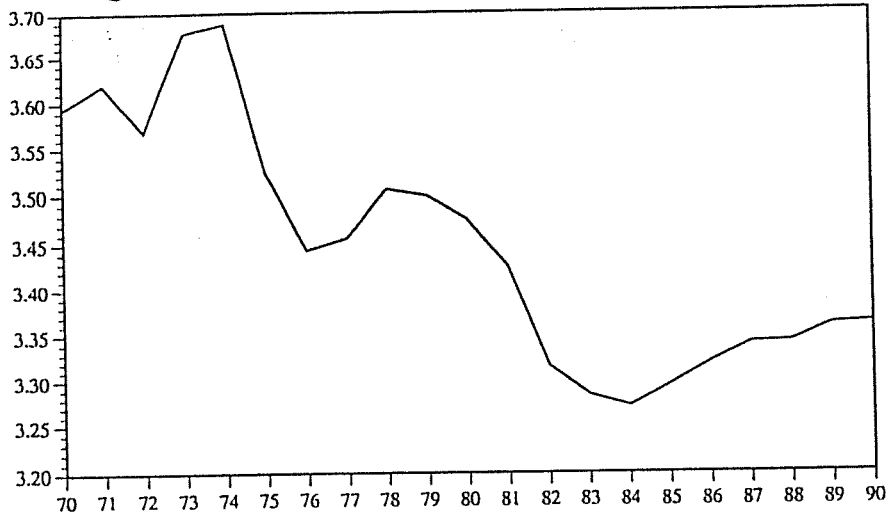
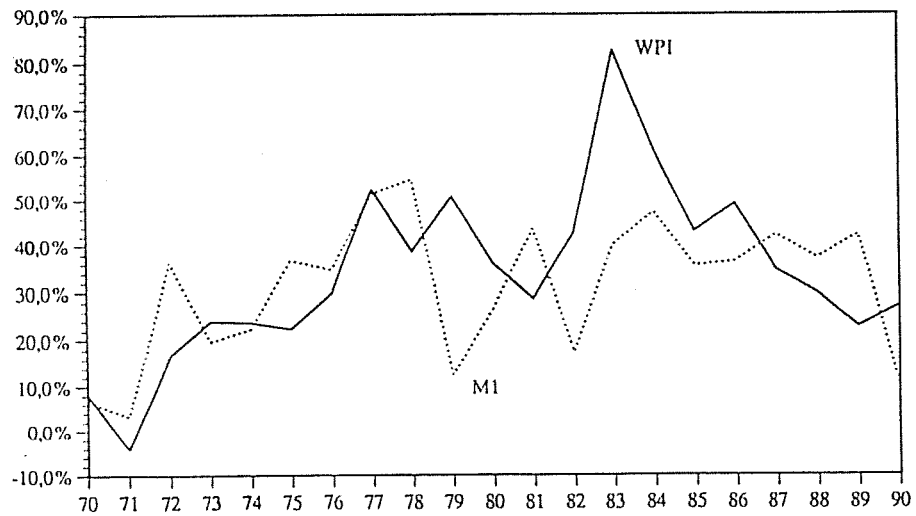


Figure 1.2: Rates of Inflation (WPI) and Money Creation (M1) in Ghana



2. **The Long Run Decline of Ghana's Economy**

Endowed with considerable financial, human and natural resources for the kind of development then possible, and under two charismatic leaders, Guggisberg (1919-1927) and Nkrumah (1950-1966), Ghana was one of the first countries in Africa to make a bold attempt at planned economic development. Sadly, Ghanaians were also the first on the African continent to suffer real failure in economic development and to resign themselves to the humiliating disintegration of a post-independence political economy.

As in most pre-industrial states in Africa, agriculture and services related to it have been the pivot of Ghana's economic activities. Commercial agriculture began at the close of the last century with the advent of cocoa exports. The new cocoa industry, using peasant methods, developed so rapidly that within two decades Ghana became the world's leading producer and exporter accounting for 40 per cent of world output. Dominated by cocoa, agriculture remained the predominant economic activity during the first half of this century. However, minerals, particularly gold (from which the country gained its earlier name), bauxite, diamonds and manganese, also played a significant role.

Among the early writers on Ghana's development theory and strategies, Sir Gordon Guggisberg, who was Governor of the Gold Coast from 1919 to 1927, was the most prominent. The essence of the Guggisberg development philosophy is captured in the sentence: "No country can develop trade to its full paying capacity without incurring a debt for the construction of the necessary infrastructure"¹. This theory, described in his Development Programme of 1920-1930 was said to be the result of his own original thinking rather than the deliberations of the Colonial Office in

London.

The following summarizes the characteristics of the Ghana economy on the eve of independence in 1957:

- A weak and primitive productive base for food crop agriculture. In fact, in his development model, Lewis identified this problem as the greatest hindrance to modernization².
- The inevitable problems of a single dominant crop.
- Monetary fragility, as identified by Seers and Ross (1952).
- A weak public service evident in the absence of proper orientation for the promotion and management of development.

Ghana became independent on March 6, 1957, under the charismatic leadership of Nkrumah.

In the 1950's and 60's, Nkrumah's development strategies were influenced by his belief in the "big push" which was the prevalent idea of the period. Nkrumah in 1963 defined his idea as follows:

"One thing is certain, unless we plan to lift Africa up out of her poverty, she will remain poor. For there is a vicious circle which keeps the poor in their rut of impoverishment, unless *an energetic effort is made to interrupt the circular causation of poverty*. Once this has been done and the essential industrial machine has been set in motion, there is a snowballing effect which increases the momentum of change³.

Nkrumah was inclined to conduct his development strategy with his sights on a socialist state displaying far more government involvement than occurred in the other countries. The primary export sectors, in particular cocoa, were squeezed rather hard for finance and this led to conflicts that inevitably had long - term adverse consequences on the industry and for development. As a result

peasant agriculture remained underdeveloped and fragmented, as it had been for centuries.

Development also meant more government jobs through the creation of state enterprises like the Cocoa Marketing Board (CMB) and in more recent public enterprises such as the Industrial Development Corporation (IDC). Observing such employment in the IDC in 1958, Arthur Lewis wrote:

“The IDC has greatly suffered from outside interferences, in the shape of Members of Parliament and other influential persons expecting staff appointments to be made irrespective of merit, redundant staff to be kept on the payroll, disciplinary measures to be relaxed in favour of constituents, businesses to be purchased at inflated prices, loans to be made irrespective of security, etc.”⁴

Other factors, both internal and external, contributed to Ghana’s decline. The internal factors included the following:

- The maintenance of a fixed and highly overvalued exchange rate. In June 1978, Ghana introduced a flexible exchange system, under which the exchange rate for the cedi, in terms of the US dollar, was to be adjusted to reflect the underlying economic, financial and balance of payments situation.
- Large government deficits, financed mainly through borrowing from the Central Bank, which resulted in inflationary pressures and distorted the real exchange rate.
- Misallocation and misuse of import licences, which created further inefficiencies by denying critical inputs and equipment to high priority areas.

The following external factors were also significant:

- Adverse weather conditions in 1978-79 and 1981-83, which seriously reduced agricultural output.
- The 1979-80 increases in petroleum prices, followed by a world recession.
- The expulsion from Nigeria in 1983 of more than one million Ghanaians who had previously provided an important source of foreign exchange for the economy.

The average growth rates summarized in Table 2.1 indicate a protracted period of economic decline. Following this period of decline, in 1983 the Ghanaian authorities pursued a comprehensive programme of financial and structural reforms, and turned to the World bank, the IMF and bilateral donors for financial and technical assistance.

2.1 Ghana post - 1983 (ERP) era

Against this background of severe economic difficulties, including strong inflationary pressures, the government of Ghana embarked on a comprehensive programme of financial and structural reforms in April 1983. This was known as the Economic Recovery Programme (ERP). Its policy framework was jointly prepared and agreed upon by the Government of Ghana, the International Monetary Fund and the World Bank. The main goals of the programme were to control inflation, restore overseas investment confidence, halt and reverse the decline in production, improve social infrastructure, stimulate exports, curb the consumption of imported luxury goods, and mobilize domestic and external resources to restore living standards.

The first phase of ERP (1983 - 1986) concentrated on the stabilisation of the economy following its steady deterioration during the preceding decade. The initial short-term strategy was

aimed at monetary stabilization and the control of credit and adjustment of the exchange rate so as to reduce price distortions in both the production and consumer sectors.

Since the inception of the ERP in 1983, a number of policies have been directed at reducing and controlling Ghana's inflation level - a key objective under the ERP. As a result of the role of monetary growth attendant upon fiscal deficit financing, efforts have focused on reducing both budgetary deficits and bank financing and channelling these much-needed resources to other sectors. Revenue has improved markedly as a result of a revived administration and broadening of the tax base. As a result, fiscal deficits have been reduced significantly since 1986.

During this period, the IMF provided support through two successive stand-by programmes in July 1983 and July 1985. A third programme was approved in October 1986 together with two purchases under its Compensatory Financing Facilities. The total amount of IMF financial resources committed to Ghana during 1983-1991 amounted to SDR 1.208 million with the World Bank and other creditors and donors also provided substantial technical and concessional financial assistance.⁵

Table 2.2 presents data on the growth of GDP by kind of economic activity for the period 1983 - 1989, while Table 2.3 provides data on fiscal performance over the same period. Following the success of the first phase of the Economic Recovery Programme, the main aim of the second phase of the programme (1987 - 1989) focussed on reforms related to structural issues. These included the liberalization of the trade and exchange system, privatization of the major state enterprises, tax reform, reducing the size of the civil service and putting in place institutional and financial reforms to strengthen the domestic banking system.

Despite the fact that industrialization remains the prime goal of political and economic policy-makers in developing countries, incentives and concern for agriculture still attract the strong interest of researchers and policy-makers.

Agriculture is the largest single sector in the majority of African economies. In Ghana agriculture contributes for about 51 per cent of the country's GDP. It is the basis of food security and the primary employment of the majority of the population, an important source of tax revenue and the major source of foreign exchange earnings⁹. This last is particularly important. In fact, Ghana needs a much more aggressive export drive focusing especially on agriculture, agro-processed products and light manufacturing industries. Currently, Ghana's export ratio of 15 per cent of GDP remains small and concentrated in a few items such as cocoa, gold and timber. Manufactured exports, the bulk of which is electricity, thus remain relatively small. In making the transition to manufactured exports, Ghana can make its initial entry through expanding and diversifying agricultural exports and, with respect to industrial products, through assembly and light manufacturing activities. In fact, there is a wide range of products that can be manufactured through labour intensive methods.

The three key factors Ghana will need to focus on are education, export-push, and the building of public-private partnerships. Ghanaians abroad with their human and material capital are a special asset; they must be encouraged to return and re-energise the development potential of the country.

Food production in Ghana follows a rainfall-determined seasonal pattern, with all production activities confined to no more than 6 to 8 months, the remaining months of the year being the so-called "off-season". By assuring year round availability of water, production can be intensified

through double or multiple cropping, thus raising resource productivity and total production. To solve the problem of chronic food insecurity which exist in Ghana, the government should give first priority to the development of small-scale, technically simple and low cost irrigation system. To improve its performance and thus 'feed' other sectors, Ghanaian agriculture needs extension service, research and credit; better infrastructure and marketing services; and incentives goods. Diversification of the export base may stabilize export earnings. In fact, export diversification can reduce the risk associated with violent fluctuations in income.

Notes

1. Guggisberg, Sir Gordon (1924) Post War Gold Coast. Government Printer, Accra.
2. Lewis, W.A. (1953) " Report on Industrialization and Gold Coast ". Government Printer, Accra.
3. Ghana Government (1959) The Second Development Plan, (1959 - 1964) Government Printer, Accra.
4. Lewis W.A. (1958) "Some Aspects of Economic Development", Aggrey - Fraser - Guggisberg memorial lectures, Accra, University of Ghana.
5. Mosley, P. And Weeks, J. (1995). "Assessing Adjustment in Africa." World Development, 23 (9): 1459-1473.
6. Source: Calculated from data obtained from International Financial Statistics (IMF), various issues.
7. Source: Calculated from IFS data (various issues). IMF.
8. Source: IFS data (1990) Yearbook. IMF.
9. Abdulai, A. and P. Hazell (1995), "The Role of Agriculture in Sustainable Development in Africa." Journal Oof African Economies, 1 (3): 446-71.

TABLE 2.1

Average Annual Growth Rates Key Indicators: 1965 - 1983⁶ (per cent)

	1965 - 1973	1973 - 1983
GDP	3.4	-1.3
Agriculture	4.5	0.0
Industry	4.3	-7.0
Services	1.1	-0.3
Exports	3.5	-6.4
Imports	-3.3	-8.0

TABLE 2.2

Growth of GDP by kind of economic activity, from 1983 - 1989⁷ (per cent)

	1983	1984	1985	1986	1987	1988	1989
Agriculture	-9.1	9.71	0.65	3.31	0.04	4.0	4.59
Industry	-6.77	11.94	17.60	7.56	11.34	13.9	14.1
Services	4.54	6.63	7.52	6.50	9.38	9.50	11.2
Total GDP	-4.34	8.96	5.09	5.20	4.80	6.2	5.10

Table 2.3

Fiscal Performance As Ratio of GDP: 1983 - 1989⁸

Revenue	0.06	0.08	0.12	0.14	0.15	0.15	0.15
Expenditure	0.08	0.10	0.14	0.14	0.14	0.14	0.14
Deficit	0.02	0.02	0.02	0.00	0.01+	0.01+	0.01+

3. Overview of Ghana's Financial System

There is a strong consensus among economists that a healthy financial system is an important prerequisite for economic growth - the healthier the financial system, the faster the growth. This is particularly true of developing countries where the pace of economic growth is strongly influenced by their monetary conditions. Financial development involves the evolution of financial instruments and markets, as well as financial institutions which fulfil an important function in the process of economic development¹. These play primarily an enabling role in ensuring that funds are appropriately allocated in the economy. It is vital that as development proceeds this role undergoes evolution to complement the changing needs of the developing economy. This chapter explores the evolutionary process and the structure of the financial system in Ghana.

The formal banking sector in Ghana consists of the Central Bank (Bank of Ghana), which supervises the operations of the banking sector comprised of three large commercial banks, seven "secondary" banks, a small co-operative bank, one hundred and twenty small rural banks, and about three hundred credit unions². Prior to 1986, there was hardly any money market, the development of which was facilitated by the establishment of a Consolidated Discount House in November 1987. The non-banking sector consists of the Social Security and National Insurance Trust (SSNIT) and eleven insurance companies. The SSNIT is a government owned institution charged with collecting social security contributions, investment deposits and making social security payments to

participating workers upon retirement.

3.1 The Bank of Ghana (BOG)

The Bank of Ghana, the oldest central bank in British West Africa, evolved from the Bank of The Gold Coast, which was established in 1953. It is responsible for the full range of functions traditionally undertaken by central banks: it is the issuer of currency, banker to the government, lender of last resort to the banking system and supervisory agency for commercial and rural banks. In addition, it handles interest and exchange rate policies and manages the country's foreign exchange reserves.

The Bank of Ghana was plagued by a number of weaknesses. In addition to lacking a secure legal basis for its regulatory framework, it had inadequate organizational policies and a shortage of qualified staff. It was therefore unable to supervise and monitor the performance of the commercial and rural banks. With a view to strengthening the regulatory framework, a revised Banking Act was adopted in December 1988 which tightened risk exposure limits, raised the capital adequacy ratio from 5.0 per cent to 6.0 per cent, strengthened accounting standards and imposed more stringent reporting requirements for banks. The outcome was improved supervision of other banks by the Bank of Ghana.

Having achieved these reforms, the Bank of Ghana is able to influence the discount rate, reserve requirements, credit controls and undertake open market controls. These controls are described in detail below:

(a) Discount rate

The Banking Act allows the Bank of Ghana to rediscount treasury bills (of three months or less), publicly-issued government bonds and various other bills, notes and fixed interest securities. In addition, the Bank is empowered to grant advances on the securities of similar types of paper. The Bank's rediscount rate is related to the average treasury bill auction rate, but varies slightly according to the time of maturity of the rediscounted paper. This rate is currently penal for banks; however, because of excess liquidity, the discount rate instrument is hardly effective.

(b) Reserve requirements

Under the Act, the Bank of Ghana has extensive power to specify the nature and level of various types of reserve and liquid asset requirements. Currently, a cash reserve requirement and a separate secondary liquidity requirement apply. Required or excess holdings of cash do not meet the secondary requirement.

The cash reserve requirement is two-tiered. It is important to note that no interest is paid on deposits at the Bank of Ghana. For the secondary reserve requirement, the qualifying assets are government stock and treasury bills, Bank of Ghana bills, cocoa bills, grain and cotton bills and any other paper approved by the Bank. These reserve requirements have not been very effective in controlling domestic liquidity as the banks have generally kept excess reserves because of credit ceilings imposed by the Bank of Ghana.

(c) Credit ceilings

The credit ceilings which the Bank of Ghana imposes on banks individually are directly derived from the macroeconomic ceilings on the banking system's net domestic assets and have so far been the predominant instrument of monetary policy. This use of bank-specific credit ceilings as the primary instrument of monetary control has discouraged banks from mobilizing deposits, caused severe resource misallocation, inhibited competition among banks and retarded the development of an efficient money market. In particular, it has compelled the banks to keep excess reserves, on which no interest is paid by the Bank of Ghana.

(d) Open market operations

Since 1987, the Bank of Ghana has been improving its capacity to engage in open market operations and in October 1987, it introduced the auction system for the sale of treasury bills to the non-bank sector, extending it to the banking sector in 1988³. Bank of Ghana bills were also introduced at this time and their features are identical to treasury bills, that is, they mature in three months, may be rediscounted, and are eligible assets for the secondary liquidity requirement.

Further, in early 1980, the Bank of Ghana introduced Bank of Ghana instruments with medium-term maturities, which are not rediscountable and not eligible as secondary bank reserves. The objective of these new instruments is to moderate the expansion of currency outside banks and on liquid assets in the economy. In spite of the enhanced capacity by the Bank of Ghana to use the instrument of open market operations and its declared objective of relying on market-based instruments, it has still not been able to give up the direct credit control measures (credit ceilings) because of existing and potential inflationary pressures.

3.2. Interest Rate and Exchange Rate Management

The deposit and lending rates were administratively fixed by the Bank of Ghana until 1987. However, in line with the overall emphasis of macroeconomic policies since 1983 on shifting away from administrative controls toward greater reliance on market forces, the maximum lending rates and minimum deposit rates were decontrolled in September 1987 and the minimum savings deposit rate was liberalized in February 1988⁴.

Since April 1983, the implementation of a flexible exchange rate policy and the progressive liberalization of the exchange and trade system have been the key elements of Ghana's adjustment and financial reform policies. Following discrete devaluations between April 1983 and May 1987, the Bank of Ghana took major steps toward a market-determined exchange rate. In order to float the cedi, it first introduced in September 1986 an auction market for foreign exchange; this was a dual exchange rate system under which the first window exchange rate was fixed at cedi 90 = U.S. dollar¹, and the second window exchange rate was determined by supply and demand in a weekly auction conducted by the Bank of Ghana. These two windows were unified on February 19, 1987, in the context of the auction market, at the prevailing rate of cedi 150 per U.S. dollar, thus changing the dual exchange rate system to a floating rate system⁵.

The improvement in Ghana's external competitiveness has also strengthened the incentives for export growth and diversification and resulted in a notable expansion in the volume of cocoa and gold exports. However, the short-term supply response of non-traditional exports has been limited.

3.3 Commercial Banks

The Ghana Commercial Bank (GCB) and two expatriate-owned banks, Barclay's Bank of Ghana (BBG) and the Standard Chartered Bank of Ghana (SCBG), provide the traditional commercial banking services, especially to major corporations and large-scale exporters. They are the primary commercial banks, with 224 branches and 60 per cent of deposits⁶. The government fully owns or has a majority ownership in one of these primary banks, the GCB, and in all secondary banks, either directly or through the Bank of Ghana. Of the other banks the Social Security Bank (SSB) has the largest deposit share (18 per cent) and largest number of branches (5). The SSB opened in 1977 and is wholly owned and administered by the Social Security and National Insurance Trust (SSNIT). It operates like any other commercial bank, with some emphasis on consumer lending facilities for workers. Fifty per cent of its activities are devoted to development banking.

A number of commercial banks were established to provide more specialized banking services in specific sectors of the economy. The Agricultural Development Bank (ADB) caters to the credit needs of agriculture and related activities. The National Investment Bank (NIB), a small portion of which is owned by international institutions, serves industry. The Bank of Housing and Construction (BHC) provides deposit and lending facilities for housing, construction and other service-oriented sectors. These banks were established as development finance institutions, but with liberalization and the new Banking Act of 1989 they have introduced commercial banking services and operate on a commercial basis.

Competition in the banking sector has increased with aggressive marketing efforts adopted by newly established, predominately foreign-owned banks. They have tried to adapt financial

products to customers' needs, and there is some evidence that borrowers are beginning to "shop" the banks to find the best bargains. ECO BANK Ltd. and Continental Acceptances Ltd. were established in 1990. Later, two more private banks were established: Meridian Bank and Citibank. As a result, as much as 50 per cent of the savings base in large banks comes from customers who deposit in multiple banks⁷. Financial sector liberalization has somewhat increased the availability of new financial instruments. The Merchant Bank (Ghana) Ltd., partially owned by the government, provides a variety of financial instruments, including trade finance, supplier and other documentary credits, bill discounting and acceptances, export finance, working capital finance and project finance. The Merchant Bank is also seeking to make long-term project financing available on a selective basis to medium-scale industries that are highly profitable and which are well positioned in the domestic or export markets.

Two small government-owned banks and rural banks complement the activities of the others. The National Savings and Credit Bank (NSCB) and the Ghana Co-operative Bank both provide predominantly short-term credit facilities to customers, including small holding agriculturalists and small traders and retailers. To help mobilize resources and extend credit locally, and to cover credit delivery not catered for by the commercial banks, 124 rural banks were established. These were established as unit banks, with initial capital from BOG while management and ownership were given to the local communities. Despite their large network and significant growth, their total assets are only about 3 per cent of the total assets of the banking system⁸.

The composition of the deposit liabilities of banks in Ghana has not changed much with financial liberalization. The liability structure of the banks has remained predominantly short term. The short-term nature of the deposit base of the banking sector has repercussions on its lending

structure.

Ghana's financial market is served by several non-banking institutions which are not regulated by banking law. These include the Ghana Stock Exchange, several insurance companies, two discount houses, and a building society. The capital market in Ghana is still at a preliminary stage and is not able to mobilize significant amounts of long term resources. The reorganized Ghana Stock Exchange began trading in November 1990, handling active trading for some thirty listed companies which are primarily public limited companies. The discount houses, Consolidated Discount House Ltd. (CDHL) and the Securities Discount House (SDH), were established in 1987 and 1990, respectively, to promote the development of a money market. CDHL is essentially a short-term financing institution and is required to hold at least 70 per cent of its assets in short-term paper, while its borrowing must not exceed 25 times its capital and reserves. CDHL is allowed to accept short term deposits from financial institutions. The SDH was set up in June 1991 to provide a secondary market for commercial paper issued by larger public and private companies.

The credit unions have primarily social rather than commercial objectives and no minimum capital requirement other than the nominal purchase of redeemable shares by each member. Of the approximately 300 credit unions in Ghana, the majority are in small towns or rural areas. Their total assets are less than one per cent of the total assets of the banking system⁹.

3.4 Financial Development and Economic Growth

One of the core problems in Africa is the fragmented state of domestic resource mobilization. The economic decline in Ghana led to such weakening of the country's financial system that, by 1983, it was no longer able to perform its primary function of resource mobilization and resource allocation based on sound criteria so as to improve investment and productive efficiency. This resulted in a near collapse of the financial system¹⁰: The ratio of M2 to GDP, which gives an indication of real additions to the ongoing loanable capacity of the banking system, declined from 27.6 per cent in 1975 to 12 per cent in 1983, the ratio of savings and time deposits to M2 declined from 32 per cent in 1975 to 20 per cent in 1983 while time deposits, as a proportion of total deposits, declined from 14 per cent in 1975 to just 1 per cent in 1983.

One of the problems of the Ghanaian financial system is the failure to evolve deposit instruments that provide an incentive to save. The banking system needs to improve the net yield (interest plus productivity plus liquidity premium minus transaction costs and risk) to savers¹¹. Currently the net yield to savers is negative: deposits are not linked to lending and poor customer service has raised transaction costs much above the nominal interest rates. Lending-linked deposits might improve the productivity of deposit instruments. In the end it is not possible to reform and develop the financial system without macroeconomic stability. Without monetary and fiscal discipline, and a realistic exchange rate, relative prices becomes distorted and the price system cannot perform the role of resource creation and allocation.

In Ghana, the potential for diversifying into new areas of business and activities exists, but it requires banks and financial institutions to implement. While the potential for development and

growth of financial markets is enormous, banks and financial institutions must also demonstrate a willingness to be imaginative and resourceful if the potential is to be exploited fully for the benefit of Ghana's future growth and development.

The structural adjustment and financial reform strategy adopted by Ghana since 1983 have relevance for other Sub-Saharan countries. The Ghana experience teaches the following lessons:

(a) The importance of preconditions for financial reform and development.

It is not possible to reform and develop the financial system without macroeconomic stability. Macroeconomic instability can weaken the portfolio of financial institutions and this can have feedback effects on the economy and seriously complicate adjustment and growth policy.

(b) The need for market-based instruments for monetary and credit regulation.

Direct overall and selective credit controls do not provide the basis for competitive and efficient functioning of the financial system. They need to be replaced by market-based instruments like treasury bills, Central Bank bills and other types of financial instruments conducted through open market operation.

(c) The importance of flexible interest rate policy.

If interest rates are administratively fixed, they are unlikely to reflect the relative scarcity of capital, and further, they provide a disincentive to the financial system to introduce innovative financial instruments for resource mobilization and allocation. Thus, the decontrol of interest rates is essential for financial development. In fact, as part of the process of liberalisation under the ERP, rates of interest have since 1988 been liberalised to be determined on the free market by demand and supply.

(d) The importance of developing money markets.

To enable the Central Bank to conduct open market operations to regulate money and credit, and to

enable the banks to determine their deposit and lending rates, it is essential to develop a money market. A money market is also necessary for creating competitive conditions in the financial markets and for introducing financial instruments like commercial bills.

(e) The need for the restructuring of banks and improvement of management capabilities.

Once the financial system is weakened because of inappropriate policies, it is difficult to restore its health without financial, organizational and management restructuring. This can be a time-consuming process. Improvement of management capabilities requires providing continuous training to the staff of the financial system at all levels and some sound linkage with appropriate financial institutions abroad.

(f) The need for a secure regulatory framework and prudential supervision

The financial system in all countries in the region is inherently fragile. To maintain its health and dynamism, it is essential to have a sound regulatory framework, which authorizes and obliges the Central Bank to conduct on-site and off-site supervision and inspection.

In summary, the Ghanaian experience since 1983 shows that monetary policies have been successful in restraining the growth in domestic credit, while accommodating a strong expansion in real output and supporting the exchange rate policy. However, Ghana's experience also shows that even though the monetary policies are in place, their efficiency in achieving macroeconomic stability is also determined by negative supply shocks. The impact that negative supply shocks have had on Ghana's inflation will be examined in the chapter 4.

Notes

1. For the literature on the relation between financial development and economic growth, see Gurley and Shaw (1955, 1956, 1960 and 1967); Cameron (1962); Goldsmith (1969); and Parre (1973).
2. Adjetei, S.M.A. (1995). "The financial System in Ghana: A Research Memorandum." Bank of Ghana, Accra.
3. Saal, M.I., and Lorena M.Zamalloa, "Use of Central Bank Credit Auctions in Economies in Transition." IMF Paper Analysis and Assessment 94/11, IMF, Washington DC.
4. Leite, S. And V. Sundararajan, (1990) "Issues in Interest Rate Management and Liberalization", Staff Papers, IMF, Vol. 37.
5. Kimaro, S. (1988) "Floating Exchange Rates in Africa", IMF Working Paper 88/47 IMF, Washington DC.
6. Ibid., note 2.
7. Ibid., note 2.
8. Bank of Ghana, (1990), Rural Banks Annual Report. Bank of Ghana, Accra.
9. Ibid., note 8.
10. Source: Computed from International Financial Statistics, 1996 Yearbook, IMF; and from Quarterly Digest of Statistics, Ghana Statistical Service, March 1989.
11. For an elaborate account of deposit schemes linked to basic motives to save, see V.V. Bath, Structure of Financial Institutions (Bombay: Vora & Co., 1972), chapter 2.

4. **Prices, Money and Supply Shocks: An Econometric Analysis**

The basic purpose of this chapter is to examine the relations between money, prices, GDP and supply shocks. Monetary factors are an important determinant of price movements but, in the case of Ghana's economy, prices seem to be influenced also by movements of GDP related to exogenous shocks, such as droughts in 1975-77 and 1981-83, in domestic food supply, and macroeconomic policies.

Perhaps the most important form of supply inelasticity that can cause considerable inflationary pressure in Sub-Saharan Africa lies in agriculture, and particularly in food production. The general nature of the process is straightforward. Economic growth is accompanied by increased food demand. However, if food production does not grow enough to meet the increased demand, food prices rise and inflation results. This, of course does not imply that inflation in Sub-Saharan Africa is entirely determined by structural factors and is beyond the control of the authorities. Inflationary processes have to be financed and their outcome depends strongly on the degree of monetary accommodation. In fact, another cause of monetary growth in Sub-Saharan Africa lies in the difficulty to raise enough taxes to balance the fiscal budget.

The importance of agricultural shocks on prices in Ghana is examined using vector autoregressive (VAR) analysis (Sims, 1980)¹. The technique involves estimating a multivariate autoregression in which past values of money, prices and GDP influence current values of the variables, i.e., no structure is imposed on the relationships. For each variable, a regression is specified in which the explanatory variables are lagged values of money, prices and GDP.

The lag length was chosen by picking the lag that minimizes the value of the Swartz Bayesian Information Criteria (SBIC)². Using the estimated unrestricted VAR, a block exogeneity test (Granger exogeneity test) was performed on money and GDP against prices to study the dynamic response of prices to innovations in money and GDP. The VAR was estimated using annual data taken from the IMF, International Financial Statistic CD ROM, a sample period 1968-1990³. The results are reported in Table 4.1. The order of the VAR is one (1) because, from preliminary analysis, one was found to be the lag length that minimizes the SBIC⁴.

To determine whether the data were stationary, a Dickey - Fuller test was carried out. It showed that the data was non stationary. This test was then repeated, taking the first and second differences. The result of the test only M1 became stationary, which has critical value -3.633; thus I do not reject the null hypothesis that the logarithm of the M1 is a difference stationary process.

Table 4.1 indicates that all the coefficients in the Wholesale Price Index (WPI) are significant, while in the money (M1) and GDP equations, only the first lag of money and GDP are significant. The WPI, therefore, seems to be the only endogenous variable in the system. The variables were detrend taking the first differences as the detrended series. A formal test of the hypothesis is given by the block (Granger) exogeneity test reported in the last column of Table 4.1. The reported F statistic tests the hypothesis that only lagged values of the dependent variables enter each equation in turn. The hypothesis can be accepted in cases of money and GDP equations, but can be rejected in the WPI case. In other words, while WPI does not Granger-cause money and GDP, the latter variables do Granger-cause prices. Such a result confirms the idea that in Ghana prices are influenced by money and also suggests that GDP moves independently from changes in the lagged money supply.

These findings have a rather “classic” flavour and are consistent with the idea that real GDP is dominated by exogenous supply shocks, rather than by demand shocks. To investigate this further, the relationship between GDP, demand shocks, and supply shocks is examined using a methodology developed by Blanchard and Quah (1989). The approach can be used to derive separate supply and demand shocks series to estimate a restricted VAR in GDP and rate of price change, i.e. ,

$$X_t = \sum_{i=0}^{\infty} L^i \phi_i \varepsilon_t = \phi(L) \varepsilon_t \quad (1)$$

where X_t is a 2x1 vector whose elements are the percentage change of real per capita output and prices. X_t has the following infinite-order moving average representation, and ε_t is a 2x1 vector of demand and supply shocks. $\phi(L)$ indicates a 2x2 matrix polynomial in the lag operator L which, if the invertibility conditions hold, i.e., if $\det(\phi(L)) \neq 0$, has all the roots greater than one in absolute value. It can be written⁵

$$\phi^{-1}(L)X_t = \varepsilon_t \quad (2)$$

Note that ε_t is a vector normal white noise with

$$E(\varepsilon_t) = 0 \quad E(\varepsilon_t \varepsilon_s) = \Sigma \quad \text{and} \quad \det(\Sigma) \neq 0$$

Where Σ is the variance - covariance matrix of the VAR residuals.

$E(\varepsilon_t \varepsilon_s) = 0$ for $t \neq s$. This means the size of ε_t has no bearing on the likely size of ε_s .

X_t has also an autoregressive representation that can be approximated by the finite order VAR

$$[I - \phi(L)]X_t = e_t \quad (3)$$

Estimation of (3) yields a vector of innovations e_t related to the vector of demand and supply shocks ε_t by equation (4)

$$\varepsilon_t = Ce_t \quad (4)$$

where $E(e_t) = 0$ and $E(e_t e_t') = I$

The ε_t vector is regarded as being generated by a linear combination of independent (orthonormal) disturbances which is referred to as e_t .

$$\varepsilon_t \varepsilon_t' = Ce_t e_t' C' \text{ taking expectations, } \Sigma = CC'$$

According to (4), demand and supply shocks can be obtained from the residual of the estimate VAR e_t , provided the elements of the 2x2 matrix C are known. Such elements can be identified by imposing the restriction that demand shocks have a temporary effect on output, normalising the variances of demand and supply shocks to unity and requiring them to be orthogonal⁶. This methodology was used to plot the supply and demand shocks series in Figure 4.1. Two points are worth noting. First, the supply shock series shows two strong negative shocks in correspondence with the drought episodes of 1975-77 and 1981-83 and seems to be able to correctly capture the most important actual shocks. Second, the supply shocks are highly correlated to the percentage changes in real per capita GDP series, the correlation coefficient between the two being $\rho=0.96$. Such high correlation indicates, as expected, that variations of actual real per capita GDP are almost completely dominated by the supply side, so that in the case of Ghana real per capita GDP can be seen as a good proxy for supply shocks⁷.

4.1 An Impulse Response Analysis

The results indicate that real GDP movements appear to be determined by supply shocks. Impulse response analysis can be used to examine the dynamic property of the changes in WPI from shocks in lagged M1 and GDP.

The technique of impulse response analysis, first introduced in VAR modelling by Sims (1980), is a descriptive device representing the reaction of each variable to a shock in each equation of the system. The technique consists of simulating the dynamic responses of the model to one standard deviation shock that affects all the variables. The simplest method to present the results of the simulation is to graph the impulse response functions against time.

In the usual impulse response analysis “there is no unique best way to do this⁸”; if one chooses a solution not explicitly based on economic theory, such as the ‘Cholesky decomposition’, many impulse response functions have to be analysed. In the present case, with a VAR made up of three variables, 18 impulse response graphs could be plotted. For each of the three possible variables ordering of the VAR Cholesky decomposition, it is possible to plot the response of each variable to all shocks and the response of all variables to these shocks. However, in this case the results do not depend on the order of the Cholesky decomposition since they are almost identical in all the cases. In order to study the behaviour of prices, then, it is necessary only to plot the response of WPI to one standard deviation as shown in Figure 4.2.

Figure 4.2 reveals a very interesting pattern. First, shocks to money supply have a permanent effect on the price level. Second, shocks that directly affect the WPI are reverted over time. In fact, a steady decline of price level follows the initial jump. Third, and most interestingly, the effect of

GDP (supply) shocks are temporary in nature. The first effect of positive GDP (supply) shocks is a decrease in the price level for about three periods. Starting from the fourth period, however, the price level starts to increase and after about twelve periods prices return to the initial level. In the case of Ghana, therefore, supply shocks seem to affect the WPI in a transitory way. This is seen in Figure 4.3, where the variance decompositions of the WPI impulse response function are reported.

After twelve periods, money supply accounts for almost 90 per cent of WPI variations, while supply shocks (GDP) , after reaching a peak in the third year, explain only about 7 per cent of the price variation. The importance of these results and their insights for macroeconomic policy in Ghana is discussed in chapter 5.

Notes

1. Judge, G.G., R.C.Hill, W.E. Griffiths, H. Lutkepohl, and T.C. Lee. (1988) Introduction to the Theory and Practice of Econometrics. Wiley: New York.
2. For more details see: Press, S.J. (1989), Bayesian Statistics: Principles, Models and Applications., J.Wiley and Sons, New York, Inc.
3. A full description of the data set is given in appendix.
4. Also the Akaike Information Criterion (AIC) unambiguously supports the choice of a VAR of order one.
5. For more details see: Andrew C. Harvey. (1993) Time Series Models. (2nd. ed.). Cambridge, Ma: The MIT Press.
6. Define the vector $K=[1 \ 0]'$ and the restrictions needed to identify the matrix C are then $CC' = \Sigma$ and $K'[I-\phi]C^{-1}K = 0$.
7. Recall the derived supply shock series is expressed in percentage terms.
8. Sims, C.A. (1980), "Macroeconomics and Reality", *Econometrica*, 48.

Table 4.1: VAR Estimate Results

	M1 equation	GDP equation	WPI equation
<i>Constant</i>	1.55 (0.94)	0.97 (1.60)	5.21** (3.93)
M1(-1)	1.11** (8.63)	-0.06 (-1.39)	0.41** (4.00)
GDP(-1)	-0.36 (-0.78)	0.17** (4.21)	-1.38** (-3.69)
WPI(-1)	-0.9 (-0.79)	0.04 (1.06)	0.61** (6.53)
R ² -corr.	0.99	0.81	0.99
DW	1.70	1.48	1.29
F-Granger Test	0.48	2.14	13.04**

Note: the sample period was 1968-1990; all the variables are transformed to logarithm, t-statistics in parenthesis; *indicates values significant at the 5% level; ** indicates values significant at the 1% level.

Figure 4.1: Estimated Demand and Supply Shocks

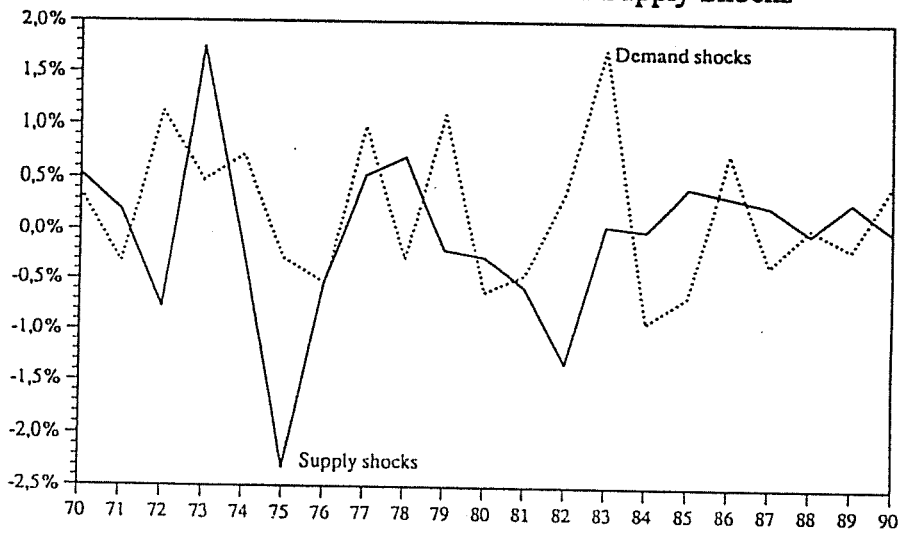


Figure 4.2: Response of WPI to One Standard Deviation Shocks

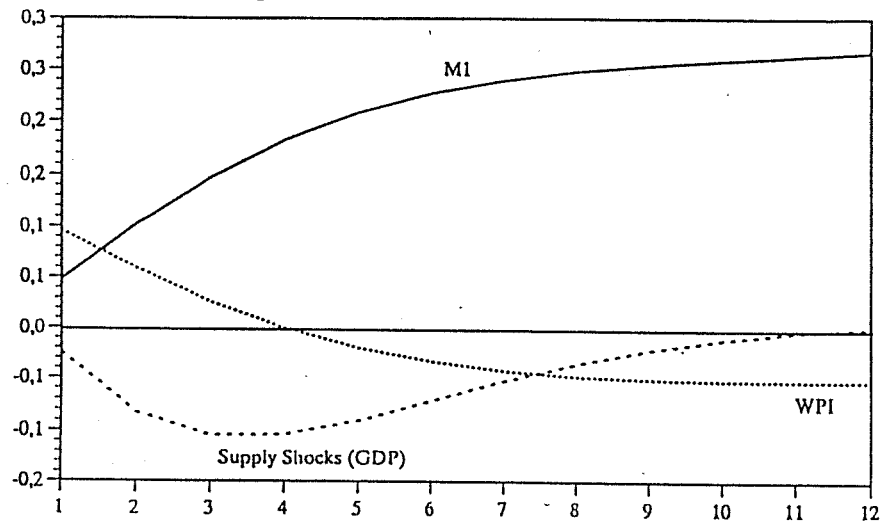
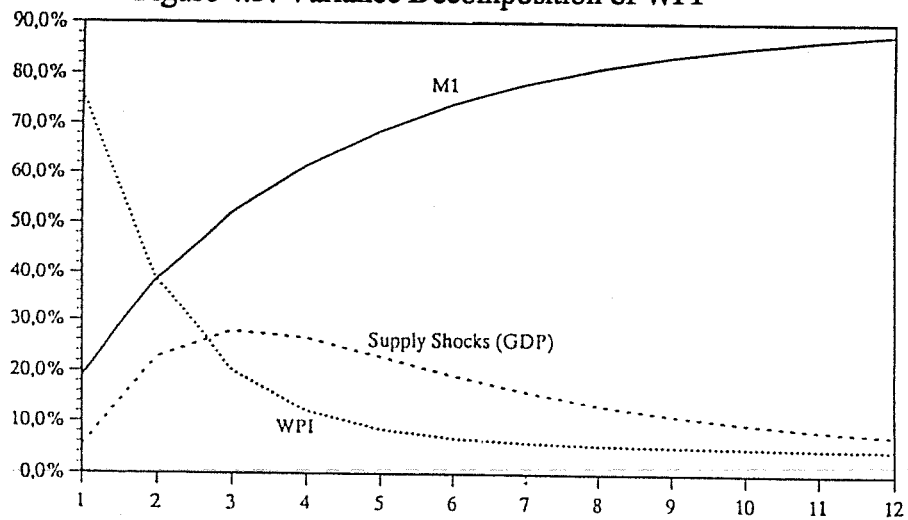


Figure 4.3: Variance Decomposition of WPI



5. Policy Implications

Prior to 1983, inappropriate domestic policies and external shocks led to a severe decline in economic and financial performance in Ghana¹. Following a protracted period of decline, in April 1983 the Ghanaian authorities adopted an economic recovery programme. This programme has enjoyed a measure of success and Ghana's economic and financial performance have improved markedly since 1983.

The ERP of Ghana continues to captivate both policy makers and academics alike. Governments elsewhere in Africa hope to distill from it policy lessons which are relevant to their own circumstances as they grapple with the complexities of economic reform. Academics seek insights into what makes African economies work, so as to deepen their understanding of. The case of Ghana, therefore, appears to be an excellent case-study for the view that price stability is the key to developing economic success.

Ghana's adjustment experience can be classified into three phases. During the first phase from 1983-1986, the emphasis of policies was on "getting the prices right", reducing the severe imbalances in government finances, and restraining credit expansion. This policy package included large discrete devaluations of the exchange rate, and tightening control over government expenditure.

The second phase of structural adjustment, covering the period 1987-1989, included the initiation of structural changes which began to address the deep-rooted causes of imbalances in the economy and rebuild the productive base. During this phase, policy actions were focussed on a comprehensive liberalization of the exchange and trade system. Civil service reforms aimed at a reduction in the number of employees and increased remuneration for workers. Institutional and

financial reforms to strengthen the domestic banking system were adopted together with substantial increases in government investment outlays for the rehabilitation of the economic and social infrastructure.

During 1989-1992, Ghana's adjustment programme entered into a third, perhaps more demanding phase, under which the implementation of structure and institutional reforms was accelerated. This was in order to achieve more balance between macroeconomic adjustments and structural policies. In terms of its own self - assessment of performance to 1989, the government of Ghana had identified four main problem areas²:

- the need to overcome the domestic savings constraints which effectively limits GDP growth;
- the need to improve the climate for private investment so as to achieve enhanced targets for the rate of investment;
- the need to reduce the inflation rate; and
- the need to compensate for the decline in the world price of cocoa.

The World Bank and the IMF also shared these concerns but add a further one -- slow progress in implementing structural reforms. On their analysis, although the slow pace of progress was not responsible for the decline in cocoa prices, it was closely linked to the other three problems listed above³.

While the economic performance of Ghana in the 1990s has remained robust, the recent decline in the rate of growth and the resurgence of inflation highlight the fragility of Ghana's recovery programme. These are the two most worrying factors. They underline the need to more systematically address both the issue of food supply and the issue of price stability. These policy areas should be given the highest priority. Managing inflation is likely to be particularly difficult

given the widespread incidence of poverty and the low average living standards.

There is a general consensus that Ghana's pre-1983 inflation may be largely attributed to excessive demand pressure fuelled by monetary growth attendant upon fiscal deficit. Price stabilization policies under the adjustment programme have, therefore, mostly involved steps directed at curtailing increases in money supply. These have included the imposition of a "credit squeeze" on the banking system and the elimination of fiscal deficits. In spite of these policies, inflation rates have continued to be above the targets set within the programme, although well below the rates during the last decade.

As far as the post - 1983 inflation is concerned, little published work is available on its causes or effects. A recent study by Chhibber and Shafik (1990) of the World Bank is an exception. They indicate that monetary growth was instrumental in determining the pace of inflation in Ghana. In particular, they observe that the large inflow of external resources over the ERP recovery period has led to a huge expansion of the money stock, which in turn has exerted strong demands and inflationary pressures. While emphasizing that the high pace of monetary expansion has a strong effect on inflation, they also observe that the foreign inflows leading to the rehabilitation of factories and the import of final goods have eased the supply pressures as well. Thus, the sources of inflation in Ghana cannot be limited only to demand factors; supply factors must be taken into account as well.

This paper supports the adoption of policies that gradually reduce the deficit of the public sector and indicates that improvement in the productivity of the agriculture sector can also contribute to a steady reduction of prices, if such improvements are equal to permanent positive supply shocks. Further, to control inflation in Ghana, more attention should be paid to inadequate

food production and supply. For instance, Ghanaian agriculture suffers from low productivity, poor storage and preservation facilities, unreliable weather conditions, inadequate marketing and distribution arrangements, among other problems.

It is not within the scope of this paper to offer a detailed assessment of structural adjustment policies in Ghana. However, the results suggest that the government of Ghana must give proper attention to agriculture and not only for the traditional reasons of economic development (Mellor, 1984)⁴ but due to reasons of price instability. Agricultural development in Ghana, by reducing supply shocks, will also have a beneficial effect on price stability. The paper suggests yet another role for agriculture in the development strategies of countries such as Ghana.

Notes

1. For more details, see Beaugrand (1984) and Chand and van Til (1988).
2. World Bank , February 1989, P.38.
3. IMF p 3, May 1990.
4. Mellor J.W. (1984) "Agricultural Development and the Intersectoral Transfer of Resources".
in Eicher C.K. and Staatz J.M. (Eds.) Agricultural Development in the Third World. The Johns
Hopkins University Press. Baltimore.

6. Conclusions

This paper has examined relationship between prices, money and supply shocks in Ghana. Using VAR analysis the paper has shown that negative temporary supply shocks, with a high rate of money creation, explain much of the dynamic behaviour of prices in Ghana during the last two decades. While monetary shocks permanently affect the price level, supply shocks have a transitory but significant impact on prices.

In this regard, positive supply shocks lead to downward pressures on food prices and, given the high share of food items in the price index, to a lower inflation rate. The sensitivity of food prices to changes in domestic food production points to the importance of measures to improve the efficiency of marketing, storage, and distribution of food products with a view to increasing the returns to farmers, reducing the costs of customers and stimulating a more positive supply.

The Ghana economy has had one of the longest periods of structural adjustment reform of any economy in Africa and is regarded as one of the most successful reformers. However, the Ghanaian government and the international institutions involved in that reform have not sufficiently emphasized the importance of supply shocks in creating price instability.

Development literature for example, Johnston and Mellor drew on insights the importance of agriculture as a motive force in economic growth. They argued that far from playing a passive role in development, agriculture could provide labour, capital, foreign exchange, and food to a growing industrial sector and could supply a market for domestically produced industrial goods. Agriculture's overwhelming role in the development of Sub Saharan Africa economies is self

evident, but for instance, serious discussions between the World Bank and the Ghanaian government on an agriculture programme did not begin until March 1989, six years after the start of the ERP, and government policy remains very underdeveloped in so far as the food sector is concerned. The process of incorporating the food sector into the programme has been slow, and must become one of the principal objectives of the government. The insights of supply shocks in Ghana are also relevant to other African countries. Thus, further research on supply shocks and price stability in other countries is recommended.

Appendix

All the data used in the paper was annual and the source was the IMF International Financial Statistics (IFS) data base on CD ROM. The results were generated from the following data series:

Money supply M1: IFS row 34

Prices, WPI (whole sale prices): IFS row 63

Real per capita GDP: IFS row 99b.p (GDP, 1985 prices) divided by IFS row 99z (population).

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