UNIVERSITY OF CAPE COAST

THE IMPACT OF FOREIGN AID ON OUTPUT GROWTH AND INFLATION IN GHANA

BY

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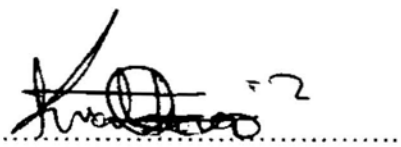
CANDIDATE'S DECLARATION

I, ELVIS OTOO, hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this University or elsewhere.



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SUPERVISORS' DECLARATION

We declare that the preparation and presentation of this thesis were in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

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Date....15/03/05.....

DEDICATION

I first dedicate this work to God Almighty. It is also dedicated to Adjoa Darkoah my precious wife, and Esi Moasiwa my mum, whose prayers and encouragements enabled me to reach this height. To Papa Noah Kwesi Mensah my dad who always says, "*hard work breaks no bone but leaves a permanent mark of success,*" I say a big thank you, Dad you have made me what I am. Last but not the least, to Ama Otoo and Esi Otoo and Araba Davis, I say a big thank you.

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Last but not the least, my thanks go to my family who endured all disappointments and setbacks with me during those difficult times. I am very proud of them. I, however, take full responsibility for any shortcomings of this work.

ABSTRACT

Foreign aid has become one of the most important sources of capital flows to developing countries in the present past. According to development theorists, this massive inflow of capital will fill the foreign exchange gap and propel developing countries into sustained growth and development.

This study attempts to examine the impact of this massive capital inflow on the inflation and the growth of output in Ghana for the period under consideration. The principal objective of the study is to examine the impact of foreign aid on the real gross domestic product of Ghana. Specifically the study examines the relationship between foreign aid and output growth and also foreign aid and inflation. The analysis is guided by the hypothesis that foreign aid enhances output and raises the level of inflation.

Based on the results of the analysis, we accept the hypothesis that foreign aid enhances output. We also accept the hypothesis that aid deflationary.

The policy implication is that Ghana should invest aid monies in areas that that yield greater and faster returns, in directly productive activities. The country should also take more concessionary loans to reduce the overall debt burden of the country.

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CHAPTER ONE

GENERAL INTRODUCTION

1.1 BACKGROUND

Foreign aid plays a very important role in the development process of many countries. Countries unable to generate sufficient domestic savings to pursue economic growth policies have historically sought finance from other countries. The United States of America relied heavily on foreign savings, particularly during the antebellum period from 1835 to 1860. Russia also needed foreign savings for its development in the three decades before World War I and the communist revolution. Developing countries have in most cases after the attainment of independence depended on aid flows. Countries like Tanzania and Zambia have had a notorious and rocky aid relationship, experiencing aid booms that mirror their policy stances. Both countries received increasing amounts of aid in the late 1970s, which decreased abruptly in the 1980s after the introduction of the policy based lending by the IMF and other aid institutions. Foreign aid thus plays a very significant role in the development process (Gillis and Perking 1992). The world over, a lot of countries have and continue to rely on foreign aid to help in its development process.

Ghana achieved independence in 1957 and experienced a relatively stable growth and prosperity due to the large foreign reserves at the time of independence. Domestic savings then were very high. Ewusi (1973) observed that foreign capital played a rather insignificant role in the growth of the economy during the colonial period. This could mean that savings that enabled the economy to grow in the colonial period were generated locally. However a few years after independence, the gross domestic savings

in Ghana started dwindling and so the need arose for the economy to depend on foreign capital in the form of aid.

In the seven-year development plan of 1963/64-1969/70, a prominent role was accorded to foreign capital in financing the plan. Out of the total amount of 1016 million pounds investment, it was estimated that one third of it was expected to come from foreign loans and grants. The role of foreign capital has since assumed a significant role in the economic policy of Ghana due to low domestic saving and worsening terms of trade. At constant prices, domestic savings in Ghana was about 14% of G. D. P. in 1957. In the 1980s however, there were problems as the economy continued to experience a downward trend, in domestic savings while at the same time demand for social infrastructure grew as population increased. Deficit in the current accounts was a common thing. In 1981 for instance, deficit on current account was ¢1,160 million and it rose to ¢2738.8 million in 1984. By 1985, this has risen to about ¢8720.9 million. In the early 1990's this deficit has reached ¢114669.8 million. Gross domestic savings declined as a result of low incomes, public consumption and investment continued to expand, external resources were needed to finance the growing deficit on the budget. In 1980 total consumption was 40737.7 million cedis and this rose to 252,663.5 million in 1984 while total investment rose from 2410 million cedis to 18607 million cedis over the same period.

According to Teye, Mosley and Harrigan (1991), population growth and improper economic policies plunged the country into hardships; consumption per capita rose while income per capita declined. This was made more serious with the decline in savings investment gap to achieve the desired growth rate. He established that the decline in the Ghanaian economy in the 1980's took the following form:

1. Domestic savings fell both in the public and private sectors. While the political environment discouraged private investment, public investment was eroded by corruption.

2. There was no growth in the economy especially as production began to decline.

3. Population growth led to substantial erosion of per capita income and consumption with reinforcing effects on the decline in domestic savings.

4. Cocoa revenue fell and the government resorted increasingly to deficit financing of the budget and printing of money to finance it. Inflation accelerated as domestic food production fell.

5. The cedi was overvalued and this created balance of payment problem.

6. Large negative interest rates emerged, wages and salaries fell too low and as the crisis deepened, not only did capital dry up but human capital exported itself. Those trained with the nations hard-earned resources had no alternative but to migrate to other West African countries.

Other negative external shocks to the economy compounded the already precarious situation of the country. First there was a fall in the price of cocoa, the country's major export item, secondly serious drought also affected the generation of hydro electronic power and further affected food production leading to near famine. Industrial capacity utilization also fell to 20-25%.

The devastated and distressed state of the Ghanaian economy in 1983 was thus as a result of three compounding sets of causes (Teye, Mosley and Harrigan 1991):

1. A flawed development strategy since the 1960.

2. Gross economic mismanagement and corruption in the 1973-81 periods.

3. A simultaneous set of severe external shocks in the early 1980's

The PNDC government in 1983 implemented the Economic Recovery Programme (ERP) to arrest the economic decay. This programme brought in its wake a considerable inflow of foreign capital. In 1983 for instance ODA inflow receipts amounted to 2.2 billion cedis, this rose to about 146 billion cedis in 1989. Between 1990 and 1992 the country received 3471.13 million dollars of foreign capital made up of medium term IMF loan, long-term bilateral and long-term multilateral loan and by the end of 1994 the total was 4242.77 million dollars. These funds came mainly from the International Monetary Fund as structural Adjustment Fund (SAF) and Extended Structural Adjustment Fund (ESAF).

Foreign aid inflows continue to play a significant role in the financing of projects in Ghana and this raises the need to study the impact of these inflows on the economic development of Ghana.

The ratio of total aid to budget revenue averaged 82% in 1989-90, reflecting a strong donor support for the ERP. Thereafter, it fluctuated in the mid 1990's and has been declining since 1995. In 1998 for example ratio of total aid to budget revenue was 46% (Ministry of Finance 1999). In terms of budget expenditure, aid flows have shown a similar pattern, most notably declining from 76% in 1989-90 to 33.5% in 1998.

For Ghana, aid inflows from official multilateral and bilateral sources (donors and creditors) have in the past ten years averaged over 70 million US dollars per annum. This is an important external resource and provides a significant financial support for the development of the country.

1.2 RESEARCH PROBLEM

For many years Ghana has received average to below average aid flows. A remarkable reversal of economic policies in the early 1980's, beginning with the ERP lunched in

1983, brought a flood of aid in the 1980's and 1990's. From a theoretical perspective, aid is supposed to reduce the foreign exchange gap, supply the much-needed foreign capital for investment and with time put the recipient economy on the path of sustainable growth. Empirical studies have also found aid to be inflationary in some economies and deflationary in others.

Empirically not much is known about the impact of this official inflow on macroeconomic aggregates such as GDP and inflationary in Ghana. It is therefore pertinent to examine how foreign aid affects GDP and inflation in Ghana.

1.3 RATIONALE FOR THE STUDY

Since the ERP started in the 1980's the amount of foreign aid received by the country has grown yearly. All things being equal, there should have been a marked improvements in the growth, increases in income and subsequent development of the Ghanaian economy. The situation however is the opposite, the cedi keeps depreciating against major currencies, there are still BOP problems, inflation is still high and investment is not as high as is expected.

While an extensive literature is available on effects of foreign aid on economic growth, because of lack of data, many questions about the impact of aid on other macroeconomic variables of recipient economies have not been studied.

This study has been motivated by the need for an extensive study into the macro-economic impact of foreign aid on output growth and inflation in Ghana. Findings of the study, it is hoped, will fill the gap created by lack of empirical study on the impact of aid on these variables.

1.4 RESEARCH OBJECTIVES

The principal objective of the study is to examine the impact of foreign aid on the real gross domestic product of Ghana. Specifically the study will examine the relationship between foreign aid and output growth and also foreign aid and inflation.

1.5 HYPOTHESES

Considering the objectives of the study, the main hypothesis of the study is as follows;

1. Null Hypothesis (H_o)

There is no relationship between foreign aid and output in Ghana.

Alternate Hypothesis (H_1)

There is a relationship between foreign aid and output in Ghana

2. Null Hypothesis (H_o)

There is no relationship between foreign aid and the level of inflation in Ghana.

Alternate Hypothesis (H_1)

There is a relationship between foreign aid and the level of inflation in Ghana.

1.6 SIGNIFICANCE OF THE STUDY

The study will contribute to the current debate on foreign aid. The outcome of the study will aid policy makers in Ghana to decide on whether aid should continue to play that crucial role in financing our budgets and projects, especially when government continues to promote policies with the aim of attracting more foreign aid. Finally, the study will also add to the stock of literature on the subject and serve as the basis for further studies.

1.7 ORGANISATION OF THE STUDY

The study is organized in six chapters. The first chapter introduces the subject of study. This includes the background to the study, statement of the problem, rational for the study and hypothesis of the study, rationale for the study, and objectives of the study.

The second chapter reviews the Ghanaian economy and the trend of foreign in Ghana. The chapter looks at aid from all the major sources. The third chapter reviews literature to set the work into perspective. It also reviews concepts, methodologies and empirical studies.

The fourth chapter presents the model and methodology the researcher will use to achieve his aims. It specifies the structure of the model for the study and outlines the estimation techniques and also the testing procedure. The sources of data and the working definition of the variables are also presented in the chapter. The fifth chapter presents the empirical results based on the analysis from the previous chapter. Chapter six, the last chapter of the study presents the policy implications on the findings of the study. It also highlights the limitations, summary and conclusions of the study.

CHAPTER TWO

GHANAIAN ECONOMY AND TRENDS IN AID

2.1 INTRODUCTION

The purpose of this chapter is to discuss the pattern of foreign aid inflows in Ghana. The chapter will first give a brief background of the Ghanaian Economy, and trace the trend aid in Ghana, since independence in 1957. Such an exposition is necessary to provide a bird's-eye-view of the nature of relationship between foreign capital inflows and domestic savings in Ghana.

2.2 THE GHANAIAN ECONOMY

In the 1960's, the economy of Ghana experienced relatively stable growth and prosperity due to large foreign exchange reserves made available at the time of independence. In addition high price for exports of cocoa and fairly stable political and macro economic environment also played a considerable role in this prosperity. Real GDP increased by an average rate of 3.4 percent per annum from 1957 to the late 1960's. However due to economic mismanagement and corruption coupled with the decline in cocoa prices, the Ghanaian economy was in total disarray by beginning of 1974. During the period 1974-1983, real GDP fell by 1.3 percent per annum; government revenue fell from 20 percent in 1970 to less than 5 percent in 1982. Government expenditure on the other hand increased significantly. Between 1972 and 1980 normal government outlays rose from 587 million cedis by 11.3 percent.

By early 1980's the Ghanaian economy was in shambles. This was due to vicious cycle of policy mistakes and four major external shocks – the fall in terms of trade; reduction on agricultural output due to drought; reduction in industrial capacity utilization due to

lack of hydro-electric power caused by drought; and the need to reabsorb over million expatriate Ghanaians expelled back to Ghana by Nigeria.

Thus, the flawed development strategy since the 1960's, the gross economic mismanagement and corruption in 1970's and the simultaneous set of severe external shocks in the early 80's created an economic crisis in Ghana which affected Domestic savings and investment, and generated the need for foreign capital inflows.

It was the result of this economic background that made the then PNDC government embarked on the I. M. F. sponsored macroeconomic stabilization policies dubbed the Economic Recovery Programme, to arrest the economic decline in Ghana, to restore economic growth and to improve domestic savings and investments.

The PNDC government introduced the Economic Recovery Programme (ERP) and the Structural Adjustment Programme (SAP) to stabilize and liberalize the economy. The ERP and its follow up SAP received substantial assistance from the international financial institutions and donors. Rehabilitation of the country's deteriorated ports, roads and railway was prioritized early in the programme. Inputs and produce marketing of most crops was liberalized over the reform. In general, price controls on goods, and interest rates were removed. In the decade following the introduction of the ERP, real GDP growth was impressive, averaging 5 percent annually. Real national income grew by 2 percent per capita during the decade and inflation remained high and variable, discouraging private investment.

The mostly successful adjustment was partially derailed in 1992 due in part to an election-related wage increase. With loss of fiscal control came macroeconomic instability, reflected for example, in higher inflation. Much of the nineties have been spent trying to regain sustained fiscal balance. Not surprisingly, the decade has been

marked by increased difficulties between the government and The Bretton Woods institutions as policy slippage occurred. On the positive side, accelerated Government efforts to increased investment paid off in the form of higher investment rates and greater foreign investment.

2.3 OFFICIAL DEVELOPMENT ASSISTANCE INFLOWS TO GHANA

Aid flows to Ghana since independence has been erratic and has been determined by a variety of exogenous and domestic factors. Ghana received little aid in the first half of the 1960s; mainly for the Akosombo dam and other related projects. Aid picked up in the second half of the 1960s but growth remained stagnant. Flows again declined in the first half of the 1970s but recovered later in the decade, although economic performance continued to deteriorate. Despite the recovery in aid, Ghana had still not caught up with most other developing countries in terms of aid flows. This changed in the 1980s. Although as with other developing countries, aid fell in the opening years of the 1980s, with the launching of the ERP in 1983 Ghana became the darling of the aid donors, a situation which continued until macroeconomic instability returned in the 1990s and both growth and aid flows fell.

The strategies of Ghana's principal donors have changed considerably over the decades. In the 1960s most donors concentrated their resources on infrastructure projects, but in the 1970s diversified to focus on poverty alleviation investments in health, education, and agriculture. The 1980s was a decade of structural adjustments, with donors concentrating their programme aid on macroeconomic stabilization and project aid on infrastructure rehabilitation. The 1990s have brought a renewed concern for poverty, neglected during much of the previous decade, and an emphasis on sector level

strategies, particularly in the agriculture sector. Since the late1970s the World Bank has become the dominant donor in Ghana.

Ghana has suffered from a number of implementation problems with project aid, which mean that aid disbursements have been significantly below commitments. Problems include: Lack of counterpart funds; foreign exchange shortages; adverse policies; and lack of qualified personnel. This has been particularly true during the ERP when Ghana reached a point of aid saturation. In 1996 measures were introduced to speed up aid utilization.

Since controls were introduced in 1965 there has been a lack of DFI in Ghana and, with the exception of investment in gold mining, DFI has not recovered since ERP. This suggests that Ghana is missing out on an important source of potential growth, namely, the technical progress and learning- by- doing that DFI often brings. Theory and empirical evidence produced ambiguous conclusions regarding the impact of aid flows on economic growth on developing countries in general. There are a number of reasons why the impact of aid on growth might be disappointing: low rates of returns on the use of aid funds; offsetting adjustments in recipient governments' savings behavior (fungibility) offsetting general equilibrium effects of foreign capital flows (crowding out of local investments and Dutch Disease); a declining marginal product of capital; and discouraging investments from a debt overhang. In the case Ghana, few of these possible explanations ring true, at least during most ERP period when aid flows increased dramatically and were correlated with increased growth rates. In earlier periods growth was erratic and not clearly correlated with aid flows but in the 1983-94 periods the correlation coefficient was 0.322.

Estimating rates of return to the projects and programmes financed by aid is a huge task. There has not been any attempt to do this, nor has it been attempted here, so much cannot be said about this factor. Fungibility during the ERP appears to have been limited, as evidenced by the similar increases in foreign aid and investment. This is probably due to the extremely limited room for maneuvers that the Ghanaian government has in its budget. Domestic revenues enable it to do little more than pay the wage bill, service its debt and provide counterpart funds. General equilibrium effects have been more problematic. Although there was little evidence of Dutch Disease effects or crowding out during most of the 1980s, the combination of expansive fiscal policy with tight monetary policy (as the government tried to sterilize aid inflows) in the last few years of the decade probably crowded out private investments. More recently, the relaxation of monetary policy (and the consequent inflation) has eased the pressure on the financial markets somewhat, but at the cost of an appreciating real exchange rate and the consequent Dutch Disease. If the potential for rapid economic growth in Ghana lies in labor intensive, export oriented, manufacturing, this is a worrying development.

Finally there is the debt problem. While it is true that Ghana has accumulated a considerable amount of foreign debt in the past 20 years, and suffered a debt crisis in the early 1980s, the concerted efforts of restructure those debts on much softer terms from the late 1980s onwards have helped to reduce their real burden significantly, to levels that appear manageable. Certainly, the figures to concentrate on are not the debt-to-GDP numbers, which look alarming, but some measure of the debt's servicing cost, which is much lower because of the debt's concessional terms.

Given that the problems that reduce the effects of aid on growth do not seem to apply to Ghana during much of the ERP period, we can identify several possible ways in which

aid may be helped to promote growth in this period. First, aid undoubtedly helped to bridge domestic savings and foreign-exchange gaps in the early years of the ERP. Secondly, aid helped to boost government spending, particularly on health, education and much needed investment. Thirdly, aid in the form of programme loans contributed to economic recovery by improving economic policy. In addition aid helped the government to persist with the reform programme in the face of exogenous shocks, in particular by helping to provide financial support for the foreign-exchange auction and for import liberalization. By helping to prevent the reversal of such reforms, aid enabled the government to survive shocks without resorting to the controls that sank the economy in the 1970s.

Over the past decade, Ghana has been successful in attracting a considerable volume of ODA, much of it in support of the economic Recovery Programmeme and Structural Adjustment Programme. According to the accelerated growth strategy (AGS) document, total aid disbursement over the ten years, 1984 to 1993, have risen to $824.2 million in 1993 or 13.6 percent of GDP.

Official Development Assistance is divided between bilateral donors on the one hand, international and regional agencies on the other. The later is documented by the World Bank group, primarily in the form of credits from its International Development Association (IDA). In 1993, IDA credits together with similar amounts from the International Finance Corporation (IFC) totaled $308.7 million, 72% of multilateral disbursements and 37% of total disbursements. Among the bilateral, the principal donors in Japan and France who together contributed 36 percent of bilateral aid. Other major donors were Canada, Germany, U.K and U.S.A each of whom provided more than $40 million. ODA is conventionally divides between capital investments on

concessionary terms (T.A). Capital aid usually includes some element of training and other forms of Technical Assistance and Technical Assistance programme to operate effectively. As a general rule Capital aid is provided in the form of soft loans and technical assistance as an outright grant.

2.4 PATTERNS AND TRENDS IN AID

The overall trends aid in Ghana, as measured by effective development assistance (EDA), reflects the country's economic and political history. In that sense, aid flows Ghana may be said to have been endogenous. Aid and flows remained at a low level in the seventies. This was a period of mostly chronic domestic economic mismanagement. An earlier default on foreign loans by the military government in 1972 did not help, further discouraging foreign assistance. With the emergence of a democratically elected government in September 1979, aid flows rose for two consecutive years. These trends reversed after 1981 following the coup d'etat by the armed forces. Starting in 1985, however, a clear and sustained increased in aid flows occurred as donor's perceived greater commitment by government to better economic management and economic reform. Indeed, between 1985 and 1996 total aid flows to Ghana increased threefold from US$150.8 million to US$450.8 million in 1995. The especially rapid increased between 1990 and 1991 was linked to the then upcoming multiparty democratic elections and was driven primarily by increased grants to support various institutional-building activities.

Following the elections, total aid fell but overall remained higher than pre-election levels. The drop was due to fiscal "slippage" in the reform programmes. This was linked to an 80 percent increased in wages to civil servants (among other factors). The immediate consequence was a suspension of World Bank disbursements between

November 1992 and the middle of 1993. This episode was short-lived, and by the end of 1993, both the World Bank and the IMF were disbursing funds and programmes were back on track. Following this brief interruption, flows resumed to pre-interruption levels. Additional fiscal slippage in 1996, however, led to a derailment of the IMF supported the programme under the Extended Structural Adjustment Facility.

2.5 MULTILATERAL AID

Multilateral aid has risen dramatically as a share of effective development assistance to Ghana since the late seventies when it accounted for less than 10 percent. The most dramatic increase occurred in the mid eighties as the World Bank and International Monetary Funds (IMF) supported Ghana's economic reform efforts with a series of adjustment loan and facilities. Between 1983 and 1984, multilateral aid doubled to 79.1 percent as a share of the total. While this share has fluctuated since then, it has never fallen below 71 percent. In 1996, it was 85 percent. The increase in multilateral aid relative to bilateral is a consequence of smaller aid budgets for the bilateral donors as well as competing demands from Eastern Europe.

Aid given to different sectors has evolved over times, reflecting both the donors' interest and changes in government priorities. In the first two years of the Economic Recovery Programme (ERP), and was financing primarily imports. However, for the rest of the decade, aid was targeted at balance of payments support and the transport sector (the latter reflecting the tremendous rehabilitation needs). Between 1986 and 1989, balance of payments support average just over 50 percent of total aid. During the nineties, BOP support continued to be important but increasingly aid went to community and social services – between 1993 and 1996 this sector averaged 37.1 percent of total aid. Both

agriculture and transport (again) are important recipients of aid in the late nineties as well.

Technical Assistance (TA) to Ghana declined during the first years of the reform programme. This was probably due to initial donor support focus on essential BOP support for imports and reconstruction. Starting from 1986 TA rose steadily, though it remained a stable or declining share of overall aid until 1990. In the nineties, TA has risen considerably, both in dollar terms and as a share of overall aid (accounting for about a fifth of the total). This trends can linked to an increasing realization that the efficiency with which aid is used and the viability of aid-funded projects depends on strengthened capacity in key institutions. Following the election-induced rise in grants, they have leveled off in the nineties.

2.6 MULTILATERAL INSTITUTIONS

The Bank and the IMF have been important leaders in external support of Ghana's reform efforts. Due to Ghana's perceived commitment to reform and good results early on, Bank and Funds financial support steadily increased. The two institutions collaborated significantly, especially in the early eighties. The Bank resumed donor Consultative Group Meetings (CGs) for Ghana in 1983 and has convened them annually since then to help mobilize large volumes of external assistance for the country. In addition to the CGs, the Bank organized social sector donors' meeting in Vienna in 1986 and a PAMSCAD (Programme of Actions to Mitigate the Social Costs of Adjustment) donors' meeting in Geneva in 1988. The bi-annual SPA (Special Programme of Assistance for Africa) meetings are used to mobilized aid and coordinate activities. The Bank also took the lead, until recently, of fostering communication and coordination among the donors. Increasingly, however, the government is playing this role.

Earlier assessment of the Bank's role in the 1996 Country Assistance Review, as well as recent structured interviews with donor agencies in Accra indicates that overall the Bank has been successful in its coordination efforts. Nonetheless, the plethora of donor projects and interest means that even stronger government aid coordination efforts are required.

World Bank lending initially focused on rehabilitating Ghana's deteriorated infrastructure, as well as BOP support. Adjustment lending emerged with the need for deeper structural reforms and spanned a number of sectors. Between FY83-94, the Bank committed US$2.4 billion, of which US$1 billion, or about 40 percent, consisted of adjustment lending. If sectoral adjustment lending is included, adjustment-lending share increases to 42 percent. T able 1 gives the list of policy-based loans by the Bank and the IMF to Ghana since 1983.

Table 2.1

POLICY-BASED LOANS FROM MULTILATERAL INSTITUTIONS, 1983-96

	Year	AMOUNT
IMF		
Standby	1983-84	238.50
Standby	1984-86	180.00
Standby	1986-87	81.80
Extended Fund facility	1987-90	245.40
Structural Adjustment Facility	1987-90	129.86
Enhanced Structural Adjustment Facility	1988-91	368-10
Enhanced Consultation	1992-95	0.0
Enhanced Structural Adjustment Facility	1995-99	16.4
TOTAL		
World Bank		
Reconstruction Import 1	1983	40.0
Export Rehabilitation 1	1984	17.1
Export Rehabilitation 2	1984	40.12
Export Rehabilitation 3 (TA)	1984	17.1
Reconstruction Import 2	1985	60.0
Health and Education	1986	15.0
Industrial Sector 1	1986	24.95
Industrial Sector 2	1986	28.5
Structural Adjustment	1987	80.9
Educational Sector	1987	34.5
Structural Adjustment	1987	14.66
Agricultural Services	1987	17.02
Structural Adjustment	1987	34.0
S.A Institutional Support	1988	10.0
PAMSCAD	1988	10.8
Financial Sector	1988	10.6
Public Enterprise Assistance	1988	100.0
Cocoa Rehabilitation	1988	10.5
Education Sector Adjustment II	1990	40.0
Structural Adjustment III	1991	50.0
Financial Sector Adjustment II	1991	100.0
Agriculture Sector Adjustment Credit	1992	80.0
Private Sector Development	1995	13.0

Sources: Armstrong, Ghana Country Assistance Review, 1996, Ghana Country Assistance Strategy 1998

These adjustment loans have had mixed record. In general, however, and certainly during the first years of reform, the adjustment loans were judged by internal Bank reviews as performing higher than the rest of portfolio. Agreed policy actions were

almost all taken and with little delay and agreed studies were carried out, albeit with more delay. The reasons for the success of the early adjustment credit seem to be high commitment on all sides for the administratively simple steps required. The Country Assistance Review showed that up to 1994, approximately 80 percent of policy-based programme and policy (principally adjustment) projects received a satisfactory rating. This was higher than the Bank-wide average of 3 percent, and considerably higher than the 59 percent reported for the Africa region.

2.7 BILATERAL AID

Bilateral aid is given for political, strategic, humanitarian or commercial reasons. It may be intended to meet foreign policy objectives, maintain a historical (usually previously colonial relationship), and to create commercial opportunities. The motivation tends to differ across donor countries. It is often reflected in sector in which they are active and the form in which they choose to give aid.

During the seventies the most important donors in Ghana were the United Kingdom, the United State and Canada. Since that time, some change has occurred over time ranking of bilateral donors by importance.

Compared to the late seventies and early eighties, the United State has fallen in importance (to number two) and Japan has been the largest donor for about a decade. Germany, the U.K., Denmark, Spain, France, Canada and the Netherlands are the other important donors by volume of aid. The rationale underlying Japanese aid is Ghana's importance in region, its good economic record and progress with democratization. In terms of sector, the Japanese have been most active in infrastructure (fishing harbors, highways, bridges, rural water supply and electrification) and food aid policy-based lending; the government has access to a large volume of non-conditional lending.

The United States had a low-level programme between 1982-92, reflecting political tensions between Ghana and the U.S. With increased democratization in Ghana, its good economic record, and the end of the Cold War, the U.S has again become an important bilateral donor. The new U.S aid paradigm places emphasis on containing and reducing sub-regional conflicts. U.S aid is going increasingly to countries in conflict and tends to taper off as countries do better. The U.S is also more interested in the comprehensive framework for reform than previously.

Several bilateral donors have provided co-financing for adjustment programmes. While bilateral donors often tie their support to either World Bank of IMF conditions, several of them also negotiate their own benchmarks with the government (for example, Canada).

2.8 DONOR COORDINATION

As indicated above, there has historically been a close relationship between the Bank and other donors in Ghana, with the Bank playing a leadership role. After 1986, the adjustment operations of the Bank typically attracted substantial co-financing from other donors. In addition to the CG and SPA meetings, the World Bank currently heads the Head of Agencies meeting in Accra. There are donors sectoral groups and donor lunches, to which ministers and in other government officials are invited. Finally, the Bank helps to coordinates the sector investment programmes on roads, education and health. The quality of donor coordination varies by sector. In some, individual interest means there is still much confusion.

Particularly close collaboration is now evident with the UN system in both programme planning and operations implementation. The World Bank and UN agencies have

completed a joint Common Country Assessment that provides the overarching framework for the collaboration.

Increasingly, however, the government is taking the leadership in sitting the agenda for aid/donor coordination meetings on a regular basis. The International Economic Relations Division (IERD) in the Ministry of Finance is responsible for managing the Country's external aid. The Bank of Ghana and the Controller and Accountant General's office are also important in monitoring aid flows. Over the years problems with disbursement information have ameliorated but remain an issue.

Several donors forgave debt or converted debt or converted debts to grant in the late eighties and nineties. The impact of this debt relief is estimated to have averaged US$30 million between 1990 and 1994.

CHAPTER THREE

LITERATURE REVIEW

3.1 INTRODUCTION

This chapter reviews the various theories on foreign aid. It looks at what is in theory about the relationship between aid and macro economic aggregates like savings, investment, and national income. Models on foreign aid will also be reviewed. Lastly empirical results on aid studies will also be reviewed to set a framework for the study. Existing methodologies used by other researchers in this area of study will also be reviewed. Such an exposition is necessary to demonstrate the interactions among macroeconomic aggregates and foreign aid.

3.2 CONCEPTUAL FRAMEWORK

Foreign aid is the transfer of real resources from developed to less-developed countries on favorable terms. The 'Development Assistance Committee' (DAC) of the 'Organization of Economic Cooperation and Development' (OECD) explains that aid includes first, official development assistance (ODA) that is grants or loans or credits. The second is technical assistance undertaken by the official sector (both bilateral and multilateral) with the principal objective of promoting economic development and welfare at concessional financial terms.

In an attempt to define foreign aid, White, (1974) writes, "The term foreign aid can only be properly applied to actions taken by people or institutions in one country towards people or institutions in another country which help, or at least intended to help the latter".

In "Economics of Development" Gillis, Perkins, Roemer, and Snodgrass, (1992) define foreign aid as loans and grants from abroad. These official transfers according theory, bridge the savings-investments gap.

The study uses the concept of Effective Development Assistance (EDA), an aggregate measure of aid flows combining total grant and the grant equivalents of all official loans. EDA is computed on a loan-by-loan basis to reflect the financial cost the creditor incurs in making loans on concessional terms. More precisely, EDA is defined as the sum of grant equivalents and grants, excluding technical assistance and any bilateral debt forgiveness. This adjusted measure uses the same conventional grant data but aggregates grant equivalent of loans rather than the full face value of all loans deemed concessional. The grant equivalent of a loan is defined as the difference between the present values of the loan's disbursements and stream of expected debt service payments, or the resources that borrowers receive in excess of their interest and payment obligations. Conceptually, for each loan, this amount is equal to the lender – equivalent to a grant. The computation of grant equivalent involves discounting two cash flow streams or each loan disbursements and interest/amortization payments. It uses discount rates that reflect both the terms structure of each loan and the market conditions specific to the loan's currency of issues at the time of valuation. Finally, total aid (TOTAID) is defined as EDA plus technical assistance.

3.3 PARADIGMS OF FOREIGN AID

The process of aid giving has been explained by many theories; popular among these are the supplemental and displacement theories. While some theories see "Aid" as political, an instrument of foreign policy, others see it as a supplement to the recipient's own resources i.e. a reverse transfer.

3.3.1 SUPPLEMENTAL THEORIES

This theory argues that aid supplements savings thus enabling a country to maintain the level of investment needed for economic growth.

This theory started with identification of savings in the early 1950's and 60's as a key factor in the development process. The proponents of the theory were strongly influenced by the early focus on savings in the sense that a country's aid requirements continue to be presented in terms of its inadequate command of some particular resource or resources essential for development, which could be supplemented by aid.

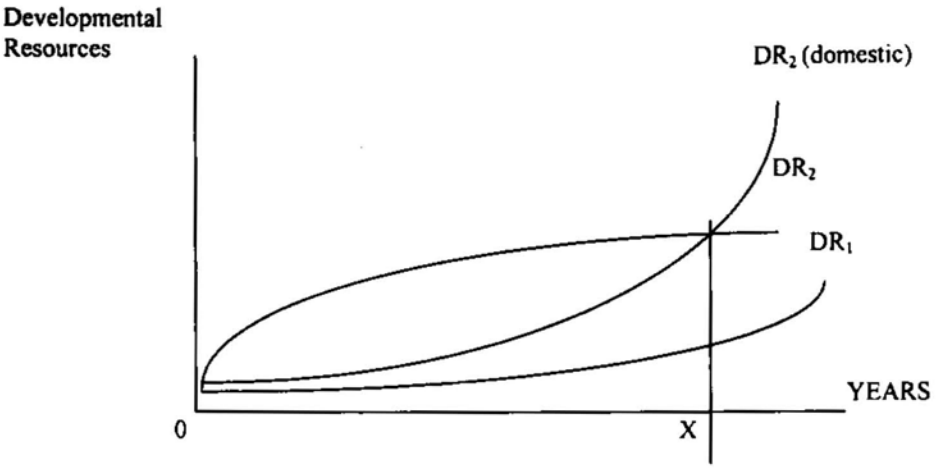
The nature of poor countries is such that the proportion of income spent on consumption is high. This is exacerbated by high population growth. This makes savings impossible or where possible very low. The investments in these economies are therefore very low with results that there is little or no growth in the economy i.e. low income, low savings, and low investment trap.

Aid then comes in to fill this gap and help raise savings as the economy grows till eventually savings is sufficient to finance the volume of investments needed to maintain the desired rate of growth without further aid. Here the theory is seen as aiming at attaining self-sustained growth. That is to attain a level of income at which a country can mobilize the resources needed to maintain a desired rate of growth.

The diagram below further explains the theory. In the diagram, time is represented on the horizontal axis and the amount of developmental resource which aid supplement e.g. savings is on the vertical axis.

FIGURE 3.1

SUPPLEMENTAL THEORIES OF FOREIGN AID



DR_1 is the amount of developmental resources available if no aid is received. This resource is just sufficient to keep the economy going at its low stagnant level so that there is little growth and hence little or no increase in developmental resource. DR_2 is the amount of developmental resources supplemented by foreign aid. In the early stages, foreign aid supplements almost all of this resource. As time elapses the growth in the economy enables the recipient to mobilize an increasing proportion of the total developmental resources needed by the economy.

DR_2 (Domestic) represent the share of total developmental resources contributed by the recipient. The point of intersection of DR_2 and DR_2 (domestic) is the point where the recipient attains self-sustaining growth and the shaded area represents the volume of aid needed to achieve this self-sustaining growth in the specific period. From point X, the recipient mobilizes its own resources in excess of development needs.

It is important to note that if the key resource needed for development is savings, then financial resource is what the recipient needs i.e. loans and grants. These loans must be repaid and so the volume of repayment must exceed the volume of new aid. After X

years, the volume of repayment must be more than the volume of new aid. The net inflow of aid must be negative.

If the developmental resource needed is skill, recipient needs technical assistance, which cannot be repaid. In principle therefore, not all supplementary theories requires an eventual intersection of the two lines.

Supplementary theories stress on limited categories of developmental resources and on the need for an increase in these resources relative to others. According to this theory, the increase in this resource will eventually lead to growth and surplus being generated in the economy to pay back these aid resources so that aid will not continue indefinitely.

These theories rest on a rather crude distinction between developmental resources, usually one or two types of developmental resources and on non-developmental resources. Because they concentrate on a single or few factors of production they cannot explain the complex interactions between many other factors, which may change over the time and vary between different societies and which constitutes the stuff of developmental processes.

In the middle of 1960's, development economics shifted its emphasis from single factor approaches to development to institutions of development and forms of social organizations, most likely to stimulate development. An attempt to incorporate this shift of emphasis fundamentally altered the characteristics of aid theories. The attempt to refine the views of the developmental process implicit in supplemental theories led inevitably, first to a view of aid as an instrument for influencing recipients developmental policies and, second, to a view of aid, not as a means of supplementing the recipients developmental resources, but as a means of replacing them with more efficient and modern resources.

Two dominant influences that have guided growth models as a basis for supplemental theories have been the Harrod-Domar model and the theory of the stages of economic growth.

3.3.1.1 THE HARROD-DOMAR MODEL

This model is named after the two economists who developed it [Harrod, (1939) and Domar, (1946)]. The model stressed three basic elements for economic development, these are investment, income and incremental capital/output ratio (ICOR) given as:

$\Delta Y/Y = k.I$

Where ΔY=output growth

Y = output

I = Investment

ICOR is the ratio of additional investment to additional output. If ICOR is constant therefore, the rate of growth of an economy will be determined by the rate of investment. Thus if ICOR is 3 and the net new investment is 9 per cent of income or output, the rate growth is 3 per cent.

From the analysis above a poor country with low savings will have low investments and therefore low growth. If domestic savings are supplemented by foreign aid, however, investments and hence the rate of growth will be increased, if domestic savings remains constant, the amount of aid needed to keep the recipients economy to grow would rise at the same annual rate. The need for more aid will continue to rise; the aid theorist therefore has to assume that the marginal savings rate is significantly higher than the average savings rate.

This model has some merits from the viewpoint of the user of aid and the donor of aid, in that, it provides a basis for arguing in favor of increased amount of aid in the

immediate future, on the grounds that this will make it possible to stop aid in the shortest possible time.

From the viewpoint of aid agencies, it also has the effect of focusing attention on the marginal saving rate, and on the extent to which the recipients' policies contribute to a raising of the rate.

The model like all other models has been criticized on the grounds that it is highly simplified. It is also criticized that the relationships to which it is addressed are not the most significant in the conditions, which prevail in developing countries. This model according to Mikesell, and Zinser (1973), was not initially formulated to deal with a developing economy in which the major problem is regarded as that of maximizing investment for growth. Rather it was developed for explaining the delicate balance among income, savings, investments and output in developed countries required to maintain steady growth and full employment income.

3.3.1.2 ROSTOW'S THEORY OF STAGES OF GROWTH

This theory has been used to reinforce a notion that a massive dose of aid over a relatively short period to those developing countries, which have already reached the appropriate stage rapidly, brings an economy to the point at which aid is no longer needed.

Rostow's stages of growth are five and these are as follows:

1. The traditional society
2. The precondition for take-off
3. The take-off into sustained growth
4. The drive to maturity
5. The area of high mass consumption

According to the theory, most developing economies are in their second stage of development, the precondition for take-off and a sizeable amount of development will let the economy reach the third stage, which is the take-off for sustained growth.

This theory has also been criticized on the grounds that it is impossible to identify any unique period or historical phase as the take-off period in the history of both developed and developing countries alike. However, this theory still features in the public discussion of aid policy perhaps because it gives a picture of a predictable sequence of historical stages, more easily grouped than mathematical models. Rostow's model, like that of Harrod-Domar, is highly aggregative and can be misleading when used to identify crucial areas of activity within a national economy.

This theory has had marked effects on the practice of aid in three ways. First, it presents aid as a part of a short, sharp effort to surmount just one crucial hurdle has been an incitement to a rather planned optimism which is exemplified by Pearson's Report, and this optimism has given way to excessive pessimism when unreasonable expectations were not fulfilled (White, 1974). Secondly, aid agencies are confused about their role during the long second stage when social and economic preconditions of growth are being evaluated, described by Rostow as the "take-off" stage. Thirdly it has given rise to an all or nothing approach in most cases. Notably in all US aid programmes; there is an expected date for the termination of aid.

Aggregative growth models trying to explain the growth of aid tend to divide the development process into phases, in some of which aid is more crucial than others. They also tend to require in terms of the phase that the economy has reached characterized not in terms of the more specific forms of aid required to perform within the economic framework. The use of these models tends to impede the perceptions of the limitations

on the aid-givers role, which would facilitate a more precise and selective identification of the purposes that aid can usefully serve in differing situations.

In supplemental theories, attention is focused on a "gap" which aid should fill and it is possible to distinguish three general approaches:

1. The savings gap which focuses attention on the gap between domestic savings and the required volume of investments.

2. The foreign exchange gap approach, which focuses attention on the gap between exports and the required volume of imports, allowing for other foreign exchange outflows.

3. The absorptive capacity approach, which focuses attention on the gap between the availability of opportunities for investments yielding economic returns and the amount of investments required to sustain a given rate of growth regardless of the rate of returns on investments.

Perhaps the most influential supplemental theories have been that of Chenery and Strout (1966). In this theory the aim of foreign aid is taken to be self-sustaining growth in the Rostowian sense but the model is extended to take account of the second stage of Rostows second stage, the precondition for take-off.

They divide this stage into three dominant periods: lack of absorptive capacity, a savings gap and a foreign exchange gap. These deficiencies can be remedied successively by technical assistance, by project aid to finance specific investments and provision of foreign exchange to finance general imports. According to them aid should be used as a means of persuading the recipient to take the necessary concomitant steps through a system of incentives.

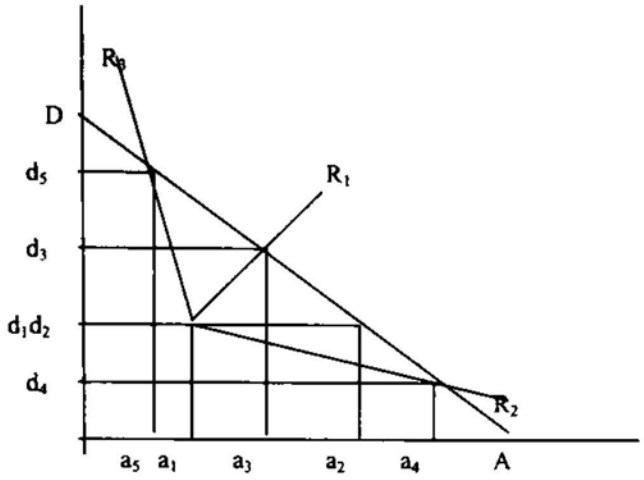
3.3.2 DISPLACMENT THEORIES

While supplemental theories contend that the organizational changes which aid stimulates are favorable to development, the displacement theorist argue that they frustrate development by imposing alien values and alien patterns of organization and thus inhibiting the emergence of a dynamic process of change within the developing countries themselves.

Displacement theory does not accept the supplementalists' view that the recipients' developmental resources must be supplemented to enhance his capacity to mobilize such resources for himself. According to these theorists aid eases pressure on the recipients and so the recipients feel less need to make an effort of his/her own. E.g. if savings are identified as the key resource, aid relieves the recipients of the necessity of taking an unpopular decisions to raise taxes, thus aid displaces public savings. They argue that because aid goes to government, they are spent on prestigious public sector projects with little returns, whereas domestic savings generated by the private sector would lead to a pattern of investments governed by market forces, thus yielding a higher return. The following diagram represents this theory.

FIGURE 3.2

DISPLACEMENT THEORIES OF FOREIGN AID



In this diagram, the vertical axis represents domestic developmental resources and foreign aid intended to supplement domestic resources, on the horizontal axis. This theory assumes that a given volume of developmental resources is required to attain a desired rate of growth and that these resources can in principle take the form of domestic resources and aid combined in varying proportions, represented by DA.

Aid and domestic resources are substitutes for each other in this diagram. Assume that the recipient already receives some amount of aid a_1 and has mobilized d_1 of domestic resources, then the donor in order to bring developmental resources to the required amount, would have to make up the whole of the difference himself, increasing aid from a_1 to a_1. The supplemental theorist would argue that an increase in aid generates an increase in domestic resources, represented by the line R_1, so that a smaller increase in aid will suffice from a_1 to a_3, because it is accompanied by an increase in domestic resources from d_1 d_2 to d_3. The displacement theorists however argue that an increase in

aid will be partially offset by a decrease in domestic resource R_2 because the recipient will make less effort. A larger increase in aid is needed therefore from a_1 to a_4 to offset the decline in domestic resources from d_1 d_2 to d_4. At the extreme, the continued decline in domestic resources or reductions in the recipient's own effort is greater than the increase in amount of aid provided R_3. In this case any increase in aid will actually reduce the total amount of developmental resources available. Conversely a decrease in aid will increase the total resources available because it will be more than offset by the increase in domestic resources, resulting from intensification of the recipients' efforts. The donor has two options. One is to finance the recipients' entire development expenditure through aid or to reduce aid from a_1 to a_5 in which case the concomitant increase in domestic resources, from d_1d_2 to d_5 will achieve the desired results.

To find out how well these theories relate to reality it is important to determine from the diagram above which of these three relationships R_1 R_2 or R1 most accurately reflects historical evidence. To do this most economist collect data on aid flows to individual countries, data on savings and anything else that aid is supposed to supplement or displace and try to establish a degree of correlation between them. Examples of such studies are Griffins (1970) analysis of aid and savings in Latin America, which gave a negative correlation between aid and savings. Papanek's (1972) paper leaves the balance of evidence in favor of supplemental view. The debate, it is safe to assume is not closed yet.

3.3.2.1 THE TWO-GAP MODEL

The macroeconomic impact of capital flows has been widely discussed in the development literature. The traditional view, based on Harrod-Domar type of growth models, asserted that capital inflows would add to the investible resources and would

ease foreign exchange shortages and would thus lead to an increase in investments and in the rate of growth (Chenery and Strout 1966).

The two-gap model analyses the impact of capital inflows on the growth rate and identifies two channels of interaction. The first of these (savings gap) focuses on the impact of capital inflows on internal accumulation balances and the second (The foreign exchange gap) on the impact of external balances of the economy.

In its simplest form, the two-gap model deals with an economy where growth is constrained by the availability of capital. Hence output growth ($\Delta Y/Y$) is determined mainly by the expansion of the capital stock i.e. investment, I, through K, the inverse of incremental capital output ratio (ICOR)

$$\Delta Y = \Delta Y/\Delta K.I \text{ ---------- (1)}$$

Total expenditures are equal to consumption C, investment I, exports X, minus imports M:

$$Y = C+I + X - M \text{ ---------- (2)}$$

Savings is given as

$$Y - C = S \text{ ---------- (3)}$$

And total net capital inflows F is equal

$$X - M + F = 0 \text{ ---------- (4)}$$

Where $F = M - X = m_k + m_i - eY = m_k + m_iY - eY$

Inserting (3) and (4) into (2) gives

$$I = S + F \text{ ---------- (5)}$$

Inserting (5) into (1) and dividing by Y gives

$$\Delta Y = K (S + F)$$

$$\Delta Y/Y = K (S/Y + F/Y)$$

$$g = K(s + F/Y) \text{ ---------- (6)}$$

Where $g = \Delta Y/Y$ and $s = S/Y$

Equation (6) sets the growth rate as determined by savings constraints. However the foreign exchange constraint may be the binding one. To examine this, total imports are split up in imports of capital goods (M_k, proportional to the level of investment) and other imports (M_i, proportional to the level of output).

$$M = M_k + M_i \text{ ---------- (7)}$$

$$M_i = m_i Y \text{ ---------- (8)}$$

$$M_k = m_k I \text{ ---------- (9)}$$

Inserting (9) into (1) gives

$$\Delta Y = \Delta Y/\Delta K.M_k/m_k \text{ ---------- (10)}$$

Assuming further that

$$X = eY \text{ ---------- (11) then}$$

$$\Delta Y = \Delta Y/\Delta K \Delta Y [(F + eY - m_i Y)/m_k]$$

And inserting (7) and (11) into (4) gives

$$M_k = F + eY - m_i Y \text{ ------ (12)}$$

Inserting (12) into (10) and dividing through by Y gives the growth rate.

$$g = \Delta Y/Y = [(\Delta Y/\Delta K)(1/m_k)][(F/Y) + e - m_i] \text{ ---------- (13)}$$

Equation (6) and (13) summarizes the effects of capital inflows on growth in the two-gap model, both equations suggest a positive impact, the actual impact depend on which of the two constraints is binding. Because M_k in equation (13) is smaller than one, the foreign exchange gap is binding.

Much of the subsequent literature on the macroeconomic impact of capital inflows can be interpreted as the questioning of the various assumptions underlying this model. Four sets of questions can be identified:

1. The growth efficiency of investment (the 'K' coefficient of the model, the inverse of ICOR) remains unchanged if capital inflows increase?

2. What happens to the growth impact of capital inflows if the debt accumulation and servicing implications of capital inflows are taken into account?

3. Will the propensity to import (M_i and M_k) change with an increase in capital inflows?

4. Will the export ratio (e) change with an increase in capital inflows?

Equation (8) and (13) are based on ex-post identities. The five questions listed above may be interpreted as asking about the dynamic interactions between capital inflows and domestic macroeconomic variables.

3.4 CONVENTIONAL APPROACHES TO ANALYSING THE IMPACT OF AID MONIES

Other researchers have put forward the argument that the analysis of the impact of aid monies and aid supported policy programmes should be in four areas and these are macroeconomic performance, poverty and welfare measures, and environmental consideration. Greatest attention has been paid to the methodology considerations in the case of the impact of structural adjustment policies on macroeconomic performance (Goldstein and Montiel 1986).

Since this is not the main thrust of this study four major distinct methodological approaches have been identified. These are as follows:

1. Before and after approach

2. With-without approach (control group)

3. Actual verses targeted approach

4. Comparison-of-simulations approach

3.4.1 BEFORE-AFTER APPROACH

This approach compares macroeconomic performance during a programme and performance prior to the programme. It compares the value of a variable before and after occurrence of the event ----- the implementation of an adjustment programme, an aid inflow or whatever -----attributing the whole of the change to the programme.

The limitations of the approach seem clear. Goldstein (1986) correctly dismissed the validity of this approach correctly in the following words "the before-after approach can be useful to show what happened in programme countries, but not why it happened".

The approach makes no allowance for other factors that influence outcomes and so cannot be accurately used as an indicator of effectiveness. This approach is however very popular in the analysis of adjustment policies. An example of explicit application of the methodology in Cornia (1991) assessment of adjustment in 24 adjusting Sub-Saharan African countries based on a table of performance indicators for 1980-81 and 1987-88. In the case of investment he concludes that "Capital accumulation slow down; five-sixth of adjusting countries. In 1987-88 the average unweighted gross investment/GDP ratio was 30% lower than in 1980-81.

Jesperson (1992) discussion of the same topic also gives before and after data on capital accumulation, manufacturing, value added and growth performance. He concludes with a few exceptions, stabilization was accompanied by sharp losses in G. D. P growth, investment and human capital development. Of the 18 countries, which managed to stabilize their economies in the 1980's, only five recorded positive growth in G.D.P per capita. In all others, macroeconomic stabilization was achieved at the expense of growth.

In a study in Ghana, Cheru (1992) concluded that the per capita income of non-cocoa farmers in Ghana has stagnated ... in summary, conventional adjustment policies ... often-aggravated poverty.

This approach is biased because it incorrectly attributes all of the change in outcomes between pre-programme and programme period to programme factors. The before and after approach in the light of these shortcomings, makes it a poor estimator of the counterfactual, because the situation prevailing before the programme is not likely to be a good predictor of what would have happened in the absence of the programme, given that non-programme determinants can and do change from year to year.

3.4.2 WITH-WITHOUT APPROACH (CONTROL GROUP)

This approach compares macroeconomic performance in countries with programmes and the performance in a "control group" of countries without programmes. It analyses aids impact by comparing the experience of adjusting and non-adjusting countries over the same period of time. The assumptions are all included countries have experienced the same external environment over the period of the analysis and that they share the same basic structure. The World Bank studies identify three groups, non-adjusting, intensively adjusting and other adjusting countries.

This approach implicitly attempts to control for the external environment, but it uses the restrictive assumption that the external environment should affect programme and non-programme countries equally. In the context of the oil shock, it implies that oil importers and exporters would be affected in the same way. This assumption breaks down whenever external factors have different effects on the performance of programme and non-programme countries.

Mosley and Hudson (1984) made an effort to ensure comparability by matching forty countries into twenty pairs, where each adjusting country was matched with a non-adjusting partner with a similar economic structure. Despite this effort, some of the pairs seem ill-matched e.g. Ghana-Zambia, both for reasons of internal structure and because these countries do not face a common external environment as assumed.

3.4.3 ACTUAL VERSUS TARGETED APPROACH

This approach compares actual macroeconomic performance under the programme and the performance specified in its targets. Goldstein and Montiel (1986) to overcome the problems of the "with-without" approach proposed this approach. This approach provides an unbiased and consistent estimate of programme effects if the model to estimate the counter-factual is unbiased. The basic idea behind the modified control group approach is to accept that programme countries are different from non-programme countries, to identify the difference between them in the pre-programme period, and then to control statistically for these differences in assessing programme performance in the post reform period. This approach can also control for world economic conditions.

The modified control group approach is a considerable advance on the before versus after and simple control group approaches. However there have been shortcomings in its applications, in particular its failure to allow for the effects of aid inflows. It is possible within the technique to allow global factors- (including aid flows) to be country specific. But to do so is to move towards the estimation of separate model for each country in the sample.

3.4.4 COMPARISON-OF-SIMULATIONS APPROACH

This approach compares the simulated performance of fund programme-type policies and simulated performance with some other set of policies. Unlike the other three

approaches, this approach does not infer programme effects from actual outcomes in programme countries. It instead relies on simulations of economic models to infer the hypothetical performance of fund-type policies and alternative policy packages. It is important to note that if the aim of this approach is to analyze the impact of specific fund programmes, then the use of actual programme outcomes is indispensable.

Khan (1990) constructed a small dynamic econometric model and estimated its parameters on a pooled cross-section, time series sample of 29 developing countries, most of which had fund programmes. He then proceeded to investigate the hypothetical case of the effects of a stabilization programme that pursued an external balance target. The simulation showed that such a programme leads to a sharp price deflation in the first year, and a temporary burst of inflation as prices readjusted. Output however contracted sharply in the first year, and then rose temporary above its full employment level, approaching that equilibrium level gradually over a period of several years.

Basically this approach has three advantages. The first is that one can draw on a wider body of adjustment experience, since the base need not be restricted to countries with fund-supported programmes. Secondly, since policy simulations are specified, one need not worry about incomplete implementation of policies, which is a problem in fund related study. Last, this approach, by its nature, focuses on the relationship between policy instruments and policy targets. It thus provides more information on how programmes work than the other approaches.

The disadvantage is that to use this approach, one should have a model that looks at the relationship between policies and macroeconomic variables. It is sad however to note that there is yet to be a single model that encompasses all aspects of fund supported programmes.

3.4.5 ECONOMETRIC MODELING

This method is an analogous technique to the modified control group approach for aid flows rather than aid policies. Mosley (1980) argues that countries receive aid because of poor performance as well as aid affecting performance. Thus the relationship between aid and performance must be estimated simultaneously.

Most literature on the macroeconomic impact of aid has relied on a single equation approach and so has fallen into the simultaneous equation trap. Single equation estimation is said to be inappropriate if any of the regressors form part of a simultaneous equation with neither aid nor the dependent variables. This is undoubtedly the case. Non-economic factors e.g. demographic, that are likely to be either interrelated or directly a function of aid inflow affects growth and other macro-economic variables.

The most substantial attempt to attack the simultaneity problems is that by Gupta and Islam (1983) who included a range of demographic variables in their analysis. The starting point is the problem of simultaneity between aid and savings since growth depends on domestic savings and recent studies suggest savings are influenced by population growth. To counter this problem, they present a nine-equation system of the determinants of savings and growth consisting of nine endogenous variables, Gross domestic savings rate (S/Y), growth of GNP (G), real output per income (Y), dependency rate (DR), total labors force participation rate (TLPR), birth rate (BR), percentage of labor force in agriculture (ALF), infant mortality rate (IMR), and female labor force participation rate (FPR) and eight exogenous variables, aid (AID), foreign private investment (FPI), other foreign inflows (RFI), rate of growth of labor force (GL), per kaput energy consumption (EN), literacy rate (LIT), population density (DEN) and number of person per hospital bed (HB).

Other relationships between (i) growth and capital accumulation (G=*f* (S/Y, AID, FPI, RFI...) and (ii) savings and capital inflows and growth (S/Y = g (G, AID, FPI RFI...). This model contains no economic relationships. Six of the remaining seven equations describe demographic relationships. They do not consider whether some of their exogenous variables, such as literacy or number of persons per hospital bed, may be endogenously determined by either aid inflows or income levels nor do they take account of the fact that the time paths of some variables for a given country (income, population density) may be described by arithmetical relationships not included in the model.

Rather surprisingly, given that their point is the invalidity of a single equation estimation of aid savings growth relationship, they proceed to estimate the model using OLS on each equation in turn, which they argue, will yield estimates of the direct effect. This is only true if the equations specifying variables on the RHS of the equation being estimated do not include the dependent variable. If this condition is not met all the estimators in that equation will be biased.

They then derive the reduced form for each endogenous variable and estimate by OLS. The full samples consist of 52 countries with three sub samples disaggregated on the basis of 1973 per income. For the sample as a whole, a negative relationship exists between aid and savings. However this relationship is positive for the two low-income groups. The impact of aid on growth is positive for the whole sample, but it is less for higher income groups than lower ones.

3.5 EMPIRICAL EVIDENCE

The impact of foreign aid on macroeconomics performance has attracted considerable attention but most studies have concentrated on domestic savings. This has been so because of the premium development economists have placed on the role of savings in

the development process, that it makes possible capital to be accumulated in the right quantities for development. In this study the researcher has reviewed some literature on the impact of foreign capital inflow on macroeconomic aggregates. This is because the method of analysis used in this study is similar to that used by investigators in foreign capital inflows on macroeconomic variables. This makes these studies relevant to the investigator. There has been rather more work on aid and savings with a lesser amount on aid and investment or aid and any other macroeconomics variable.

Many Studies have assessed the macroeconomic impact of development aid. Advocates of development aid especially apply traditional gap models to the macroeconomic impact of aid. They argue that the availability of capital goods is the constraining factor in increasing the rate of economic growth in many developing countries. It is shown that an increase in development aid is required to reach a minimum growth rate in developing countries, especially in sub-Saharan Africa. Four basic variant of the gap model can be distinguished.

The savings gap treat foreign aid as supplement to domestic savings so as to finance planned investment. First a fixed capital-output ratio is estimated and planned investment is derived from a specified target growth rate, using a Harrod-Domar production function. Next domestic savings are estimated. The needed capital inflow equals the difference between required investment and expected domestic savings.

The trade gap models (Balassa 1964, Fishlow 1987) consider foreign aid only as a source of foreign exchange, which can be used to expand the capacity to import. The required amount of development aid is estimated as the difference between expected exporters and the necessary imports to achieve a particular target growth rate. The two

the development process, that it makes possible capital to be accumulated in the right quantities for development. In this study the researcher has reviewed some literature on the impact of foreign capital inflow on macroeconomic aggregates. This is because the method of analysis used in this study is similar to that used by investigators in foreign capital inflows on macroeconomic variables. This makes these studies relevant to the investigator. There has been rather more work on aid and savings with a lesser amount on aid and investment or aid and any other macroeconomics variable.

Many Studies have assessed the macroeconomic impact of development aid. Advocates of development aid especially apply traditional gap models to the macroeconomic impact of aid. They argue that the availability of capital goods is the constraining factor in increasing the rate of economic growth in many developing countries. It is shown that an increase in development aid is required to reach a minimum growth rate in developing countries, especially in sub-Saharan Africa. Four basic variant of the gap model can be distinguished.

The savings gap treat foreign aid as supplement to domestic savings so as to finance planned investment. First a fixed capital-output ratio is estimated and planned investment is derived from a specified target growth rate, using a Harrod-Domar production function. Next domestic savings are estimated. The needed capital inflow equals the difference between required investment and expected domestic savings.

The trade gap models (Balassa 1964, Fishlow 1987) consider foreign aid only as a source of foreign exchange, which can be used to expand the capacity to import. The required amount of development aid is estimated as the difference between expected exporters and the necessary imports to achieve a particular target growth rate. The two

gap models (Chenery and Stout, 1966) take both the trade and the savings gap into account to reach a target growth rate. The dominant gap determines the outcome.

Bacha (1990) developed a new kind of gap model known as the three-gap model. Besides the savings gap and trade gap, he also considers a fiscal gap. The fiscal gap is binding when the government budget restricts economic growth. Government investment, for example, in infrastructure determines the upper limit of profitable private investment. Taylor (1988) uses the theoretical three-gap model of Bacha to assess the aid requirements of a group of developing countries.

The gap studies have in common that development aid is considered to have an important role in accelerating economic growth in the developing countries. The idea is that, in the early stage of development, domestic savings in many developing countries are too low to mount an adequate investment effort. Development aid is considered to be of major importance since it raises investment and absorptive capacity, assuming that development aid is efficiently used and that it stimulates the developing countries to make the necessary economic adjustments. After some time a process of self-sustaining growth is achieved and aid is no longer needed.

However, the gap studies in general, and the advocates of foreign aid in particular, are extensively criticized. A first branch of literature points to the possible negative effects of development aid on total domestic savings. Griffin and Enos (1970) were among the first authors who pointed at the possibility that aid may displace domestic savings.

3.5.1 AID AND SAVINGS

More recent studies like Gupta and Islam (1983), and Rana (1987) estimated models in which the simultaneity between savings and growth is considered. Although results differ per study, most studies point at a negative relation between development aid and

domestic savings. Table 3.1 presents a selection of studies on the impact of aid on domestic savings.

TABLE 3.1

EFFECTS OF AID ON DOMESTIC SAVINGS

	Data	Coefficient
Griffin (1970)	Cross-section: 32LDCs	-0.73
Weisskopf (1972)	Pooled: 44 LDCs	-0.84
Gupta and Islam (1983)	Cross-section: 52 LDCs	-0.47
Lensink (1993a)	Pooled: 21 African Countries	-0.52
Source: White and McGillivray (1992)		

Griffin (1970) put forward a hypothesis that foreign aid inflows will reduce domestic savings. He tested this proposition through a cross-section study of 32 underdeveloped countries using United Nations data. Below are the summarised results of Griffins cross-sectional study.

TABLE 3.2

IMPACT OF AID INFLOWS ON DOMESTIC SAVINGS

DEPENDENT VARIABLE	CONSTANT	F/Y	R^2	NUMBER OF COUNTRIES
$(S/Y)^1$	11.2 (N/A)	-0.73 (0.11)	0.54	32
$(S/Y)^2$	16.1 (N/A)	-0.83 (0.52)	0.71	13
$(S/Y)^3$	21.5 (N/A)	-0.84 (0.29)	0.43	1

Source: Griffin (1970)

Where S is a domestic saving, F is foreign capital inflow and Y is gross domestic income. The first set of results is from a cross section of 32 underdeveloped countries. The second is a similar result of 13 countries from Asia and the Middle East and the third is the results for Columbia.

He writes, "The evidence from cross-section data is not in conflict with our theoretical expectations" then outlined the precise channels through which an increase in foreign capital leads to a reduction in domestic savings. He supported his argument that aid displaces savings by reporting a series of regression (both cross country and time series) of savings rate on aid as a proportion of national income finding coefficients of around – 0.8. Griffin has been criticized on a number of counts. According to White (1992) this amounts to no more than performing a simple correlation. Indeed, Griffins (1990) confirms that there is an economically meaningful negative correlation between aid and savings and the correlation is strong and significant.

There has been more work on aid and savings, with a lesser amount on aid and investment. Snyder (1990) argues correctly that single equation estimation is biased and sets out a simple two equation simultaneous model, which he estimates by OLS. Levy (1987) estimates a model for Egypt in which aid can increase investment and so, through a production function, output, thus leading back to a higher income. Despite this feedback effect his empirical estimates suggest that displacement effects of aid inflows on public savings dominate. He however does not look at the dynamic aspects of his model, which is the possibility that future savings may be higher despite current displacement.

3.5.2 AID AND GROWTH

Empirical analysis of the impact of aid on growth has typically regressed real growth of income on aid inflows perhaps aggregated with other capital inflows or perhaps disaggregated into types of aid example; grant and non-grant. Usually with some additional regressors included (example: change in TOT, domestic savings rate and various dummies). The results from selected regression of growth on aid are shown in the table below.

TABLE 3.3

RESULTS OF SELECTED AID GROWTH STUDIES

STUDY	DATA	COEFFICIENTS
Papanek (1973)	Pooled: 1950s and 1960s	0.39 (5.80)
Voivodas (1973)	Pooled: 22LDCs (None SSA)	-0.01 (0.20)
Dowling and Hiemenz (1981)	Panel: Asia	0.43 (2.14)
EL Shibly (1984)	Time series: Sudan	-1.12 (1.16)
Gupta and Islam (1983)	Cross section: 52 LDCs	0.18 (N/A)
Mosley, Hudson and Horrell (1987)	Aggregate cross section 1960-70: 52 LDCs 1970-80: 63 LDCs 1980-83: 56 LDCs	 -0.05 (2.12) -0.03 (0.32) 0.01 (0.07)

Source: Compiled from authors sited in the table.

Note: Coefficients is that on aid variables, the definition of which varies between studies: Figures in parenthesis are t statistics.

The results have been criticized on the grounds that the equations on which these results are based are mis-specified in three respects:

(i) Omitted variable bias;

(ii) Single equation estimation of simultaneous relations ships; and

(iii) Parameter instability.

Levine and Rendt (1991) report that over fifty variables are significantly correlated with growth. To the extent that aid is correlated with any of these omitted variables then the equation is subject to specification error that will cause the estimate of the aid to coefficient to be bias.

Relationships may exist between aid and other variables on the right hand side so that single equation estimation is unable to capture aids full impact. For example, Mosley, Hudson, and Horrell (1987) included literacy in their regression on the right hand side, holding literacy constant whiles analyzing aids impact on growth. Yet since aid may be used to find education, increasing literacy may be as a result of more aid. Including literacy in the equation will not capture this effect, since a single equation is being used to estimate what is in fact, a simultaneous equation system.

Despite the fact that aid is intended to increase imports, there has been little empirical analysis of this issue. Some global models like the two-gap model assume that aid is fully used to finance imports, a result confirmed by the cross-country studies of Mosley Hudson, and Horrell (1992). However, Chenery and Syrquin (1975) report a coefficient of only 0.43. Moran (1989) provides a more rigorous analysis of the topic, reports his results as elasticity's so that without the data, it is not possible to know if the marginal increment is significantly less than unity, which is the hypothesis in which we are interested.

Work undertaken within the World Bank (Demery 1993) for the SPA has analyzed how much higher import volume in SPA countries in the pre and post adjustment period is because of higher aid inflow and how much because of improved export performance. The paper states that 58 percent of the increase in import volumes is from improved export performance and the remaining 42 percent from aid inflows.

A study of import support in Tanzania applying the accounting framework found import volume to fall as aid rise leading to a fall in other sources of foreign exchange [Doriye, White, and Wuyts, (1993)]. Analysis of casual links in the Tanzania case found

evidence of some of aid being used for reserve accumulation in the 1970s and a displacement effect in the first part of the 1980s.

Islam (1992) provides a test case for examining the effectiveness of foreign capital in promoting economic growth in the context of a developing country – Bangladesh. Focusing on the supply side of the economy an econometric model was developed to quantify the effects of foreign aid and its various components on economic growth. The model was tested using time series data on Bangladesh from 1972 –1988. The empirical results indicate that domestic resources exert a stronger impact on growth than foreign resources in its highly aggregate form; foreign capital did not show any significant contribution to growth. However, its decomposition into various components shows that loans are more effective than grants and food aid are more effective than commodity or project aids. Islam's work has as one of its criticisms that it suffers from the simultaneous equation bias because some explanatory variables may not be truly exogenous. For instance, the dependent variable, growth rate, may influence investment GPD ratio and savings – GPD ratio in addition to being influenced by them (Gupta and Islam, 1983). Besides, his sample is limited because the study period was only 16 years. Thus lack of adequate number of observations may prevent a meaningful generalization of the result for typical developing country.

Mosley (1980) identified four unresolved issues in previous studies regarding "Aid, savings and Growth" and addressed them accordingly. He estimated by two-stage least squares method a model of lagged response of GNP to aid for a sample of 83 less – developed countries which are stratified by income level. Considering his estimated results, he concludes among others that the negative link between foreign capital inflow

and domestic savings noted by many commentators in the 1960`s is still strong and significant (Mosley 1980)

However, Mosley accepted that his analysis is seriously incomplete in the sense that it implicitly assumes that, the possibility of transforming present savings into future consumption is not affected by the balance of payment position. This is inconsistent with the approach of the " two-gap" models of the 1950`s and 1960`s whose merit it was to demonstrate that aid might have value in enabling a less developed country to import the necessary developmental inputs even if domestic savings were already equal to desired investment.

3.5.3 AID AND INFLATION

However, there has been a debate over the macroeconomic impact of one particular form of aid, i.e. counterpart funds. This debate started in the 1960s with concern over the possibility that the use of counterpart funds in India might be inflationary. The conclusion was that avoidance of any potential inflationary impact depended upon the government's treatment of the funds and monetary policy. It was felt that the Indian government had indeed acted so as to prevent inflation occurring as a result of the expenditure of the counterpart funds.

As commodity aid to Africa has increased in importance in recent years this debate has re-emerged. An important contribution to the new literature has been that by Roemer (1989) in which he points out that there is also a substantial literature on food aid which argues that such aid will have a deflationary impact (the well known disincentive effect) and argues that the analysis of counterpart should combine these effects. He conducts such analysis using two models, named monetarist model in which output is fixed and a growth model where the commodity aid relaxes a foreign exchange bottleneck and so

allows an increase in output. Both models also allow for the fact that commodity aid will, to some extent, displace rather than supplement commercial imports.

In the monetarist model, commodity aid has a strong tendency to be inflationary, and this can only be prevented by ensuring that it is truly additional and that counterpart funds do not increase the money supply. By contrast commodity aid is potentially, though not necessarily; deflationary in the growth model, as easing the foreign exchange bottleneck allows output to grow faster than the money supply.

Recent empirical work suggests that the inflationary impact of counterpart funds is negligible or non-existent. Bruton, and Hill (1990) point out that in many countries counterpart funds are such a small percentage of the total money supply that any inflationary impact that may exist will be slight, and that experiences shows that the impact is more often than not deflationary. It is true that counterpart funds may be of little importance in many countries, and that theory leads us to expect that they may not increase the general price level. These are useful results, but they are only for one possible macroeconomic effect of one type of aid. Moreover there remain countries in which even just commodity aid alone is substantial, and even if there is no impact on the general price level there may still be an effect on relative prices. There therefore remains much more to be learnt about the macroeconomics of aid. One issue that is raised is that of the impact of aid on the monetary sector (the models discussed so far having concentrated on the real economy).

Little attention has been paid in the literature to the mechanisms through which aid enters the recipient economy and the consequent impact on the monetary sector. The contributions to the debate on counterpart funds are an exception to this and the paper by Roemer (1989) offers useful starting point for theoretical analysis. Insights may also be

gained from work on the inflationary impact of Dutch Disease through effects of money supply (such as Edwards' (1988) analysis of the coffee boom in Columbia). Finally, an isolated contribution, looking at the impact of aid on the demand rather than the supply of money, is Taslim's (1983) study of Bangladesh. He reports that, as expected, aid does increase demand for money.

It is important to note here that the literature reviewed have not been on Ghana. This emphasis points to the fact that very little is known of the effects of this massive inflow of foreign aid on the macro economy of Ghana.

This study tries to provide a theoretical and tested analysis of the impact of foreign aid on the aggregate demand and aggregate supply of Ghana.

3.5.4 MODELING THE IMPACT OF AID ON MACROECONOMIC AGGREGATES

Khan and Hoshino (1992) examine the impact of foreign capital inflows on the fiscal behavior of the recipient governments in South and South East Asia. Using data on India, Pakistan, Bangladesh, Sri Lanka and Malaysia and a three stage least square method, they estimated a whole system of equations which describe the governments' consumption, investment and taxation behavior in the presence of foreign aid. Their results confirm the hypothesis that aid does affect consumption, investment and taxation of these governments. In particular, grants and loan have different effects on investment and taxation. However, because the time series data for each country was not sufficient and cross-section is small, they combined the two and used a regression model for pooled time-series cross-section.

One other study of interest is Nyoni's (1997) work on effects of foreign aid on macroeconomic performance in Tanzania. In this study, Nyoni used the Dutch disease

model, which treats foreign aid as one of the determinants of real exchange rate. His assertion was that this will help us determine whether or not foreign aid causes real appreciation and hence the potential of the aid to cause Dutch disease in the country. Below is a summery in his results.

TABLE 3.4

MODELING LOG VARIABLES BY OLS

VARIABLE	COEFFICIENT	STD.ERROR	t-VALUE
Constant	3.256	0.494	6.592
Log AID	0.560	0.037	14.972
Log (OPEN)	0.825	0.067	12.333
Log (GTEX)	-0.864	0.148	-5.831

Source: White (1992)

R2 =0.962 F(3,23) =192.56 RSS = 0.359 S = 0.125 DW =1.97

From the results total government expenditure inversely related to the equilibrium real exchange rate in Tanzania and is statistically at the conventional level. Openness of the economy bears a positive sign and is statistically significant at 50% significance level. This implies that reduction in trade and exchange rate controls tends to cause real depreciation. Contrary to R.E.R theory, foreign aid bears an unexpected positive sign and is statistically significant at 5% significance level. This implies foreign aid inflow in Tanzania causes real exchange rate to depreciate.

Ogun (1995) obtained similar results in a similar study of aid and real exchange rate in Nigeria. Not much has been done on the impact of foreign aid and other foreign inflows on the economy. Weisskopf (1972) included Ghana in a sample of 44 underdeveloped countries selected for the period 1955 to 1965. The values of all variables compiled

were at current domestic prices and subsequently converted to constant prices by means of a single G.D.P deflator for Ghana. The time series thus obtained were then converted into three-year moving averages for use in the regression analysis. Having identified savings constraint to be active for Ghana, he estimated a model identified in the equation below;

$$S = -254.5 + 0.197Y - 0.765F + 0.688E \quad \ldots\ldots\ldots\ldots\ldots (8)$$

(-2.46) (3.51) (-2.52) (3.32) $R2 = 0.798$

The results indicate a negative response of domestic savings to net foreign capital inflows in Ghana for the period under consideration. Though this study is an improvement over Griffin's traditional empirical test, it has a number of limitations. The first is the specification and methodology. The specification is limited in range because some variables, which may affect savings, have been left out. There may also be simultaneous equation bias between saving and foreign capital inflows. The sample size is too small, only 10 years (Mosley 1980)

CHAPTER FOUR

METHODOLOGY

4.1 INTRODUCTION

This chapter formulates the model Methodology that will be employed to examine the impact of aid on the growth of output and inflation in Ghana. This will take cognizance of theoretical and empirical literature reviewed in the previous chapter. The chapter also outlines the estimation techniques and sources of data.

4.2 SPECIFICATION OF THE MODEL

The macro economic impact of aid cannot be appropriately analyzed using a single equation model. Growth of output, investment, savings, inflation and all other macro economic variables are determined by a host of other factors other than foreign aid alone. Such an influence of exogenous factors on savings for instance has been pointed out in inter-temporal models by various authors Morisset (1989).

The macro economic model used is adopted from Atta (1981) for the Ghanaian economy. The general structure of the model in described by the following system of equations and the appropriate/expected sign of each variable.

4.2.1 THE GOODS MARKET

$S = s(Y-T, r, m/p)$: $0<S_{yd}<1$; $0<S_r<1$; $S_{m/p}<0$ ---------- (1)

$I = i(Y-T, r, m/p)$: $0<i_{yd}<1$; $ir<0$; $0<i_{m/p}<0$ ---------- (2)

$G = g(Y)$: $0<g_t<1$ ---------- (3)

$T = t(Y)$: $0<t_y<1$ ---------- (4)

$Z = z(Y-T, r, RER)$: $Z_y>0$; $Z_{RER}<0$; $Zr<0$ ---------- (5)

$X = x(RER, Y^w, r^w)$: $X_{Ex}<0$; $X_{Y^w}>0$ ---------- (6)

$Y = C+I+G+X-Z$ ---------- (7)

4.2.2 THE BALANCE OF PAYMENTS

$E = g(NX, F)$ ---------- (8)

$NX = n(X, Z)$ ---------- (9)

$F = q(AID, FDI, RER, r_w, r, D, FD)$ ---------- (10)

4.2.3 THE MONEY MARKET

$M^d = m^d(r, Y, P): m_r < 0$ ---------- (12)

$M^s = m^s(FD, E, P): m_{FD} < 0; m_E > 0$ ---------- (13)

$FD = (tY - G)$ ---------- (14)

$M^d = M^s = M$ ---------- (15)

4.2.4 THE PRODUCTION FUNCTION

$Y = f(K, L, T)$: ---------- (16)

Capital consist of domestic and foreign capital

$K = k(K_d, K_F)$ ---------- (17)

$K_F = g(FDI, AID)$ ---------- (18)

$K_d = h(FD, S)$ ---------- (19)

$L^d = f`(W/p)$ ---------- (20)

$L^S = f(W/p)$ ---------- (21)

$L^S = L^d = L = f(W/p)$ ---------- (22)

$Y = f(FDI, AID, FD, S, W, P, T)$ ---------- (23)

4.2.5 DEFINITION OF VARIABLES

S = Domestic saving

tY = Government revenue

G = Government Spending

X = Export

Z = Import

E =Foreign Exchange Reserves

M^d = Nominal Money demand

M^s = Nominal Money supply

FD = Fiscal Deficit which is the difference between government spending and government revenue.

AID = Official Capital Inflows (Total loans and grants disbursed)

RER = Real Exchange rate

Y= Domestic Income or output

Y^d = Disposable income

r = Nominal Interest Rate

r^w = Rest of the world Interest Rate proxies by USA interest rates

FDI = Foreign direct investment

W = wage Rate

L^d = Demand for Labour

L^s = Supply of Labour

T = Technical Change

K = Capital Stock, which can be broken into domestic capital and foreign capital. For the purpose of this study, foreign capital inflows equal official capital inflows (grants and loans).

The first sets of equations define the goods market. Disposable income is defined as total income less tax related to income. Domestic savings (S) is also a function of real disposable income (Y_d) real interest rate and real money balances; t is the tax rate. The

regularity assumption depict that propensity to save, out of disposable income is between zero and one; the interest elasticity to save is also greater than 0 but less than 1 and the partial derivative of savings with respect to real money balances is less than zero. Investment (I) is defined as a function of interest (r), disposable income (Y_d) and money balance (M) and the general price level. Partial derivative of investment with respect to money balances is between zero and one. The interest elasticity to invest is however less than zero. Government expenditure (G) and government revenue (T) are assumed to depend on income, t is the tax rate. Imports (Z) is also assumed to be a function of disposable income and exchange rate (RER). In the same vein, a proportional tax rate (t) is assumed and so is marginal propensity to import and Z_{RER} is the partial derivative of import with respect to real exchange rate, which is defined as units of local currency per US dollar. Export (X) is defined as a function of real exchange rate (RER) and the expected sign is positive. The last equation in the goods market gives the equilibrium condition where withdrawals (S, T, and Z) are equal to total injections (I, G, X).

The second sets of equations specify the foreign capital inflow function. It assumes that foreign capital inflows depend on the international interest rate (r_w), real domestic interest rate (r), and political environment proxies by dummy D. D is zero for military rule (especially in the case of Ghana) and one for democratic rule (civilian). Then we have the variable TOT. It is assumed that the sum of the trade balance and net capital inflows must add up to zero in the balance of payments, $e = X - Z + F = O$. However in most developing countries this assumption does not hold in most cases and it may either be greater than or less than zero. This has some implication on the supply of money in the economy. If $X - Z + F > O$, then there is an increase in Central bank reserves which will lead to an increase in money supply. The second equation states the equilibrium in

the BOP. F is the net capital inflow, which is capital inflow less domestic capital outflows. In this model it is assumed that domestic capital outflow is almost negligible and so F is identical to foreign direct investment (FDI) and official foreign capital inflows (AID).

The demand for money in this model is defined by a typical Keynesian money demand equation. Where P is the price level, r is the real interest rate, Y is real domestic income and M^d/p is the real demand for money. Introducing the usual assumption that the equation above is homogenous of degree expression for real balances can be derived as $M^d = a_0 + a_1Y + a_2r$.

In this equation a_1 and a_2 are partial derivatives of real money balance with respect to real income and real interest rate respectively. a_1 is expected to have a positive sign and a_2 a negative sign. Money supply in this model is not wholly exogenous. Money supply in this model is assumed to be endogenously determined in the system owing principally to the interdependence of financial and monetary policies and the openness of the Ghanaian economy (Atta 1981). In such an open economy high-powered money (H) issued by the Central Bank is backed by either foreign exchange reserves (E) or fiscal deficit (FD) (Rebmann and Levacic 1982). However domestic money supply tends to move directly with M, thus M^s/P is the real money supply function. The last equation gives the equilibrium in money market.

W is exogenously determined and W/p is the domestic real wage rate. From theory the real wage is expected to have a positive relationship with foreign capital inflows. This is because the low wages makes labour cheap in our part of the world. This serves as a pull on foreign capital for investment.

From the model output (Y) is also a function of capital, labour, and technology. Capital can be broken into two, domestic and foreign capital. Domestic capital comprises savings and fiscal deficit. Foreign capital consists of FDI and AID.

4.3 SOLUTION OF THE MODEL

The structural equations above are solved to derive the following reduced form equations. The aggregate demand for the economy is given by:

$$Y = \partial_0+\partial_1 AID+\partial_2 G_o +\partial_3 NX+\partial_4 S_o \text{---------- (24)}$$

The aggregate supply equation for this economy will be:

$$P = \delta_0+ \delta_1 AID+\delta_2 M+\delta_3 rr+\delta_4 T \text{ ---------- (25)}$$

WHERE;

RR= real interest rate

G= government expenditure

T= technology change

AID= net foreign aid

Y= gross domestic product

P= general price level

S= savings

M= money balances

The "a priori" expectation signs of the coefficients of are as follows

$\partial 0>0$, $\partial_1>0$, $\partial_2<0$, $\partial_3>0$, $\partial_4<0$ and

$\delta_0>0$, $\delta_1>0$, $\delta_2>0$, $\delta_3<0$, $\delta_4>0$

The above gives the reduced form equations. To determine the appropriate estimation technique, the rank and order condition of the above equations must be looked at. This new model thus was

$$GDP = b_0 + b_1AID + b_2G + b_3NX + b_4S + U_t \text{ ---------- (26)}$$

The aggregate supply equation for this economy will be:

$$P = b_0 + b_1AID + b_2MS + b_3RR + b_4T + U_t \text{ ---------- (27)}$$

4.4 ESTIMATION TECHNIQUES

This section investigates the appropriate estimation method to be employed in the analysis of the system.

4.4.1 STATIONARITY TEST

Time series data are usually non-stationary in their raw state or levels. Running a regression with such data set could produce misleading results (Granger and NewBold, 1974). Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) were used to test whether the variables were stationary (I (0)) or needed to be differenced first (I (1)) or second differenced (I (2)) to induce stationarity.

The Dickey-Fuller test is a null hypothesis is a simple unit root (I (1)) takes the form:

$$\Delta X_t = \beta X_{t-1} + \Sigma \alpha_j \Delta X_{t-j} + e_t$$

Where H_0: I (1) and H_1: I (2)

The test statistics is the standard "t" test on the lagged dependent variable (β). Because the test is sensitive to whether a drift (C) and/or a time trend (T) are included, it was repeated in different forms for each variable.

4.4.2 RANK AND ORDER CONDITION

Given that there exist G number of equations or endogenous variables and K variables (endogenous and exogenous), and that the i-th equation has M variables, the order condition requires that

(a) If K-M<G-1, then the equation is under identified cannot be estimated.

(b) If K-M>G-1, then the equation is over identified. This equation can be estimated and may have multiple solutions.

(c) If K-M=G-1 then the equation is exactly identified and may be estimated with a unique solution.

The order condition is a necessary condition but is backed by the rank condition, which is the sufficient condition. The rank condition requires that, given a system of G equations or endogenous variables, the i-th equation is identified if it is possible to construct a one non-zero determinant from the coefficients of the variables excluded from the i-th equation.

4.5 SOURCES OF DATA

Data for the study covers a period of about 20 years that is from 1970 to 1999. Secondary data on macro-economic aggregates has been taken from the ministry of finance and economic planning, Ghana statistical service and the Bank of Ghana. Publications like the 'Quarterly digest of statistics' and the 'International financial

statistics' has also been used extensively. The data set includes data on foreign aid, domestic saving, domestic interest rate, international interest rate, investment, GDP, export, government tax revenue, and inflation.

For the purpose of this study, foreign aid will be defined as the sum of loans and grants minus repayments, net aid. Loans are included here because in Ghana it has been the policy of government to contract loans that are concessional. The result is that almost all loans contracted have a grant element, currently around thirty five percent (Ministry of Finance and Economic Planning).

CHAPTER FIVE

EMPIRICAL ANALYSIS

5.1 INTRODUCTION

The chapter is devoted to the presentation of the results various tests as outlined in the previous chapters and also an analysis of test results. It includes results of stationarity test carried out on the data set to remove non-stationary problems associated with time series data. The hypothesis developed in the first chapter is also evaluated in this chapter. A presentation and analysis of empirical results is also carried out.

5.2 RESULTS OF STATIONARY TEST

A time series is non-stationary if its moments are not time variant. It is said to be stationary if the mean and auto covariance of the series do not depend on time. Stationary test was performed on all the variables using the Augmented Dickey-Fuller tests (ADF). The test was performed on the null hypothesis (H_0) the series is non-stationary. The decision rule is to reject H_0 and accept H_1 if the calculated value is greater than the table value/ critical values at 95% confidence level and vice versa. Table 4.1 below reports the DF and ADF tests done on the variables with first with only a constant and second with constant and trend.

The DF and the ADF tests are reported separately for regressions with only the lagged dependent variable and with the addition of a constant term (C) and with time trend (T). The results indicate that the majority of the time series have a simple unit root. This is analytically convenient since stationarity is achieved by first differencing.

TABLE 5.1

DF AND ADF UNIT ROOT TEST FOR VARIABLES AT THEIR LEVELS

VAR	DF	ADF	C.V.	DFT	ADFT	C.V.
LRY	-2.5338	-1.9839	-2.9558	-2.4969	-1.9516	-3.5562
LRMS	-1.3614	-1.3906	-2.9558	-1.3067	-1.3383	-3.5562
LRG	-0.8394	-1.1118	-2.9558	-0.7894	-1.0392	-3.5562
RNX	-4.2894	-2.2251	-2.9528	-5.6146	-3.2866	-3.5514
LRS	-2.9885	-2.1116	-2.9528	-3.0805	-2.1954	-3.5514
RAID	-4.5106	-2.9716	-2.9558	-4.4293	-2.9749	-3.5562
RER	-1.6889	-2.9072	-2.9499	-1.7130	-2.8893	-3.5468
LP94	-0.4185	-0.0290	-2.9528	-2.0613	-2.1255	-3.5514

From above, comparing the t-values with the critical values, we accept the null hypothesis that the series is non-stationary at their levels. The test was then carried on the first difference of each of the variables and they were all found to be stationary (see table 5.2 below). This implies that all the series in table 5.1.1 are integrated of order one, i.e. I (1) and also have a lag length of one.

TABLE 5.2

UNIT ROOT TEST FOR VARIABLES AT FIRST DIFFERENCES

VAR	DF	ADF	C.V.	DF(trend)	ADF(trend)	C.V.	Lags
DLRY	-7.2478	-4.7742	-2.9591	-7.1237	-4.6904	-3.5615	1
DLRMS	-9.8136	-7.4740	-2.9627	-9.6496	-7.3411	-3.5671	1
DLRG	-8.0703	-7.0253	-2.9627	-7.9736	-6.8864	-3.5671	1
DLRR	-4.8534	-3.8831	-2.9558	-4.8885	-3.9623	-3.5562	1
DRLNX	-10.9874	-7.2082	-2.9558	-10.8227	-7.1634	-3.5562	1
DLRS	-8.1865	-5.0197	-2.9558	-8.0494	-4.9329	-3.5560	1
DRAID	-7.6245	-5.5371	-2.9591	-7.4076	-5.3248	-3.5615	1
DLP94	-9.9335	-6.8908	-2.9591	-9.9197	-7.0344	-3.5615	1

These series exhibit the characteristics of the random walk with one unit root.

5.3 RANK AND ORDER CONDITION

The two equations are over identified by the rank condition given that k = 10, G = 2 and M in both equations =5. Both equations satisfy the rank condition that is we are able to construct one non-zero determinant from the coefficient of the variables excluded from these equations.[1] This means that the equations can be estimated and the appropriate estimations procedure is the Two stage least squares (2SLS / TSLS). According to Ramanathan (1995) the TSLS can be applied to obtain unique estimates that are consistent and asymptotically efficient. It can be applied in both cases when the model is exactly identified or over identified.

[1] Appendix 2 Shows The Derivation Of The Rank And Order Condition.

The TSLS method is a single equation applied to one equation of system at a time. It provides satisfactory results for the estimates of structural parameters and is accepted as the most important of the single equation techniques for the estimation of over identified models. Theoretically TSLS may be considered as an extension of indirect least squares (1LS) and of the instrumental variable (NY) method. The method of the TSLS would therefore be applied to the set of reduced form equation to estimate the parameters of the equations above.

5.4 RESULTS OF TWO STAGE LEAST SQUARES REGRESSION

This section presents the results of the two-stage least squares regression of the reduced form equations of the AD and AS equations. An overall assessment of each equation is done with reference to the summary statistics examine its performance.

5.4.1 EFFECTS OF AID ON OUTPUT GROWTH

Table 5.3 below shows TSLS estimation results of the AD equation. The equation is meant to capture especially the impact of aid on the growth of output in Ghana for the period under consideration. The variables of this equation are GDP (DLRGDP), prices (DLP94), aid (DRAID), government expenditure (DLRG), net exports (DRNX), savings, time trend T, and a constant C.

TABLE 5.3

TWO STAGE LEAST SQUARES RESULTS OF THE IMPACT OF AID ON OUTPUT

Regressor	Coefficient	Standard Error	T-Ratio	Prob.
DRAID	.9617E-4	.5413E-4	1.7765	[.087]
DLRG	.16464	.097998	1.6801	[.051]
DRNX	-0.2952E-4	.1467E-4	-2.0126	[.055]
DLRS	0.025453	.053884	0.47236	[.641]
C	7.8836	.54188	14.5487	[.000]

R-Squared .85193 **G-R Squared** .85193

R-Bar-Squared .82791 **G-R-Bar Squared** .82791

F-stat. F (7, 24) 8.4734

F-PROB. [.000]

DW-statistic 2.0199

DIAGNOSTIC TESTS

SERIAL CORRELATION = 2.5672 (0.501)

FUNCTIONAL FORM = 0.2155E-3 (0.678)

NORMALITY = 0.52299 (0.677)

HETEROSKEDASTICITY = 0.7735E-3 (0.879)

The coefficients of multiple determinations (R^2) of 0.85 indicates a good fit. It implies that the regressors of the aggregate demand equation explain 85% of the variation in GDP in Ghana.

In instrumental variable estimation where the instruments coincide with the independent variables, a more reliable measure of fit is the generalized r-squared (GR^2) and the generalized r-bar-squared (GR^{-2}). This measure allows for the dependence of the regressors and the disturbances and simplifies the analysis to the standard r-squared type measure.

The F-statistic of 8.8764 exceeds the theoretical F (2.42) at 5% significant level. This means that the regressors do jointly explain the dependent variable. The corresponding probability of 0.000 indicates a 100% confidence that the regressors jointly determine the GDP in Ghana.

5.4.2 DISCUSSION OF RESULTS

Table 5.3 shows the results of the aggregate demand equation. Real GDP (DLRGDP) is explained by real aid (DRAID), real government spending (DLRG), real net exports (DRNX), real savings (DLRS), and a constant (C). All coefficients except real savings are significant and have the expected a priori signs and are significant at conventional levels.

In a situation where the dependent variable is logged and the independent variable is not like we have in this model, every unit change in the independent variable is expected to multiply the dependent variable by 10^x, where x is the calculated coefficient. The coefficient of real aid of 0.00009617 therefore implies that a unit change in real foreign aid will change real GDP by 1.00022 ($10^{0.00009617}$). A unit change in real aid contributes 1/10000 to GDP growth. In absolute terms, this is very insignificant. Statistically however the coefficient is positive and significant at 10 percent level of significance.

The t-statistic of 0.087 however implies the coefficient is significant. This is supported by Mosley (1980) who in his study on the impact of aid on growth concludes that though

aid is significant in the growth of output. This finding supports the supplemental theorist's view that aid supplements savings and enables a country to maintain the level of investment needed for economic growth.

Government expenditure has a positive coefficient, which is consistent with expectations. The coefficient of 0.16464 implies that a 100% change in real government expenditure will increase real GDP by 16%. The t-probability of 0.051 means the variable is significant in determining variations in real GDP.

Net exports have a negative coefficient and this is particularly true of the Ghanaian economy where imports exceed exports and net export is likely to be a leakage rather an injection. The coefficient of -0.29552E-4 is statistically significant and implies that a unit change in real net exports will change real GDP by 1.00006.

The DW-statistic of 2.0199 shows the absence of any serious serial correlation.

5.4.3 IMPACT OF AID ON INFLATION

Table 5.4 below shows TSLS estimation results of the AS equation. The equation is meant to capture the impact of aid on inflation in Ghana for the period under consideration.

TABLE 5.4

IMPACT OF AID ON INFLATION

Regressor	Coefficient	Standard Error	T-Ratio	[Prob.]
DRAID	-0.6680E-5	0.2512E-4	0.26597	[.079]
DLRMS	0.77366	0.11479	6.7395	[.000]
DLRR	-0.14932	0.079260	1.8839	[.070]
C	2.5925	0.76224	3.4011	[.002]
T	0.29725	0.024075	2.3467	[.000]

R-Squared 0.99924 **G-R Squared** 0.99924

R-Bar-Squared 0.99906 **G-R-BAR Squared** 0.99906

F-stat. F (6, 25) 5464.4

F-PROB [.000]

DW-statistic 1.9977

DIAGNOSTIC TEST

SERIAL CORRELATION = 2.5207 (0.452)

FUNCTIONAL FORM = 0.17171 (0.657)

NORMALITY = 1.0613 (0.858)

HETEROSKEDASTICITY = 0.21314 (0.774)

The R^2 of .99924indicated a good fit. It implies that 99% of variations in the regress and is explained by the regressors. The regressors do not explain only about 1% of the variability in the dependent variable. The GR^{-2} also point to the fact that about 99% of variations in the price level is explained by the variables in the equation.

The high F- statistic value of 5464.4 exceeds the theoretical value of 3.63 at 1% significant level. This indicates that the regressors jointly explain the dependent variable. The F-probability of 0.0000 indicates a 100 percent confidence that the regressors jointly determine the level of prices in Ghana.

The DW statistic of 1.9977 indicates there is no problem with serial correlation. The model was further subjected to rigors test to tests its stability. The test also shows that the model was properly formulated. The Lagrange multiplier test for residual serial correlation was performed and it shows the presence of no serial correlation. The test is conducted on the null hypothesis that there is the presence serial correlation. The results makes us fail to accept the null hypothesis and accept the alternate hypothesis that there is no serial correlation. The functional form was also tested using the Ramsey reset test using the square of the fitted values. The result also has a probability of 0.657 and so we accept the alternate hypothesis that there is no problem with the functional form.

5.4.4 DISCUSSION OF RESULTS

A look at table 5.4 shows that all coefficients achieved their a priori expected signs. All coefficients are essentially significant at conventional levels i.e. 10%. Following from the analysis on the demand side of the model, a unit change in real aid will change the general price level by 0.9999 ($10^{-0.00000668}$). A unit change in real aid will decrease price levels by 1/10000. This is consistent with the work of Brutton and Hill (1990) who concluded that aid is disinflationary.

In this model real money balance is also significant as shown by the t-statistic. The coefficient of 0.77366 implies that a change in real money balances by 100% will affect price levels by as much as 77%. This implies a strong relationship between real money balances and price levels.

Real interest rate has the expected negative sign in line with economic theory. The coefficient of -0.14932 is statistically significant and implies that increases of 100% in interest rates will impact on price level by 14% over the same period. This is particularly true because increases in interest rate may crowd out investment.

The constant term has a coefficient of 2.5925 and is statistically significant. The time trend is introduced in this model because the variables exhibit a random walk pattern and it also proxies' technology. It has a coefficient of 0.29725 and is statistically significant with a t-probability of 0.000.

5.5 HYPOTHESIS TESTING

An attempt is made here to validate the hypothesis of the study making inferences from the analysis of data.

5.5.1 FOREIGN AID ENHANCES GROWTH OF OUTPUT

The results of the DLRGDP equation reveal that foreign aid is significant in the determination of output even though it does not increase AD significantly. The coefficient of 0.00009617 implies that a unit change in foreign aid will increase real GDP proportionately. We therefore accept the alternate hypothesis that there is a relationship between foreign aid and output in Ghana.

5.5.2 FOREIGN AID INCREASES THE RATE OF INFLATION

The results of the DLP94 equation indicate that foreign aid has deflationary impact. This is shown by the negative coefficient of the aid variable. Also the coefficient -0.00000668 indicates for Ghana foreign aid is deflationary. We thus fail to accept the null hypothesis that there is no relationship between foreign aid and inflation in Ghana and accept the alternate hypothesis that, there is a relationship between foreign aid and inflation in Ghana.

CHAPTER SIX

SUMMARY AND CONCLUSIONS

6.1 INTRODUCTION

This is the final chapter and it gives a brief summary of the entire study. It also provides conclusions about the outcome of the investigations in the previous chapter. The chapter also looks at the limitations and policy implications emanating from the study and ends with brief suggestions on the future areas of research.

6.2 SUMMARY OF THE STUDY

The study examines the impact of foreign aid on growth of output and inflation in Ghana from 1968 to 1998. Foreign aid inflows play a very important role in the world economy, financing billions of dollars worth of development programmes annually. From the end of the Second World War and the start of the Marshall plan by the US to bring Germany out of economic decline, foreign aid has become a very important component of capital flows. Ghana, like most other developing countries, has had a turbulent aid relationship. Ghana has had to depend considerably heavily on aid in the period after independence.

Various theorists have explained how aid promotes development. Among these theories are the supplementalists who argue that foreign aid supplements savings and thus enables a country to maintain the level of investments needed for growth of national income and thus economic growth and the displacement theories which argue that foreign aid displaces savings and inhibit the emergence of the dynamic process of change and growth within the recipient countries itself.

The aid-development relationships have been looked at from different angles for different countries by different authors. Papanek (1973), Dowling and Hiemenz (1991) found aid to be significant in determining economic growth. Wijnbergen (1985) analysis

in selected African countries found that aid transfers lead to real appreciation of currency since aid increases the level of real income and hence stimulates demand for traded and non-traded goods.

A model is developed for the economy of Ghana taking Atta's model as the basis. In the model, foreign aid is found to be significant in determining the growth of output and has a disinflationary impact on the economy of Ghana.

6.3 CONCLUSIONS

The analysis shows that the assumption that foreign aid enhances output growth through increases in savings and hence GDP is true for Ghana for the period under review. Changes in real GDP attributable to a unit change in foreign aid positive. Foreign aid has a negative coefficient in the supply model and has a disinflationary impact; this conforms to empirical research conducted in some economies. Foreign aid, which comes mostly in the form of grants and concessional loans, has also increased the country's debt burden.

6.4 POLICY IMPLICATIONS

The impact of aid on GDP in the model has been found to be positive and proportionate in the model for the period under consideration.

In view of the findings of the study, the country should channel the aid inflows in to areas of the economy where it will yield maximum returns in the shortest possible time. Since part of these monies will be paid back, it should be put in directly productive sectors of the economy, this way it will add to the nation's income in a short time and help with repayment. Areas in agriculture and manufacturing are very important sectors and should be given priority in distributing these resources. Small irrigation projects can be built to increase agricultural productivity for both domestic and foreign markets.

There is also the need to source for untied aid. As well as receiving more 'good quality' aid, that is not tied to expensive imports, and can be disbursed quickly, without lengthy delays due to cumbersome donor procedures, as can be achieved through programme aid.

Donors are requested to provide more timely information on grants as this will assist the Government to improve its recording and monitoring of aid flows. In addition, it will also enable the Government to forecast more accurate the aid pipeline for budgetary and balance of payments purpose.

6.5 LIMITATIONS OF THE STUDY

This study may have some problems. The use of secondary data in analysis of this nature can be misleading. This stems from the fact that secondary data may not be actuals but estimates. This problem has been reduced however in this study by conducting stationarity tests on the data set and making the necessary adjustments to make them stationary where they were found not to be stationary.

Foreign aid inflow is not well documented. A lot of aid comes in kind other than cash and it is hard to find data on actual of these forms of aid. Data on the aid that comes directly to communities and institutions are not documented. This means that it is likely a substantial amount of information is lost to this analysis, which if available may have changed the results of this study.

A study of the impact of aid to the various sectors of the economy would actually paint a better picture of the impact of this massive capital inflow on the economy of Ghana but lack of efficient data on foreign aid inflow makes it impossible to embark on such an enterprise.

6.6 DIRECTION FOR FUTURE RESEARCH

In view of the limitations of the study attempts should be made by the government to streamline all aid flows into the country and adequate records should be kept on these flows. More research should be done on the impact of aid inflows on all sectors of the economy. This should be done for each sector so that a critical analysis could be done to advice government on its policies on aid.

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APPENDIX A

THE DEMAND SIDE OF THE ECONOMY

THE GOODS MARKET

$$S = s\left(Y - T, r, {}^{m}/_{p}\right)$$

$$I = i\left(Y - T, r, {}^{m}/_{p}\right)$$

$$G = g_0 + g(Y)$$

$$T = t(Y)$$

$$Z = z(Y - T, r, Ex)$$

$$X = x(Ex, Y_w, r_w)$$

$$Y = C + I + G + X - M$$

$$Y = s\left(Y - T, r, {}^{m}/_{p}\right) + i\left(Y - T, r, {}^{m}/_{p}\right) + g_0 + g(Y) + \left[\left(x(Ex, Y_w, r_w)\right) - \left(z(Y - T, r, Ex)\right)\right]$$

$$Y = s\left(Y - t(Y), r, {}^{m}/_{p}\right) + i\left(Y - t(Y), r, {}^{m}/_{p}\right) + g_0 + g(Y) + \left[\left(x(Ex, Y_w, r_w)\right) - \left(z(Y - t(Y), r, Ex)\right)\right]$$

$$Y - sY + stY - iY + itY - gY + zY - ztY = {}^{m}/_{p}(s + i) + r(s + i - z) + g0 + Ex(x - z) + xY_w + xr_w$$

$$Y\left[1 - s(1 - t) - i(1 - t) - g + z(1 - t)\right] = {}^{m}/_{p}(s + i) + r(s + i - z) + g0 + Ex(x - z) + xY_w + xr_w$$

$$Y = {}^{m}/_{p}\frac{(s + i)}{\left[1 - s(1 - t) - i(1 - t) - g + z(1 - t)\right]} + r\frac{(s + i - z)}{\left[1 - s(1 - t) - i(1 - t) - g + z(1 - t)\right]} + g0\frac{1}{\left[1 - s(1 - t) - i(1 - t) - g + z(1 - t)\right]}$$

$$+ Ex\frac{(x - z)}{\left[1 - s(1 - t) - i(1 - t) - g + z(1 - t)\right]} + Y_w\frac{x}{\left[1 - s(1 - t) - i(1 - t) - g + z(1 - t)\right]} + r_w\frac{x}{\left[1 - s(1 - t) - i(1 - t) - g + z(1 - t)\right]}$$

$$Y = \beta_1 {}^{m}/_{p} + \beta_2 r + \beta_3 g_0 + \beta_4 Ex + \beta_5 Y_w + \beta_6 r_w$$

THE ABOVE GIVES THE GOODS MARKET EQUILIBRIUM

MONEY MARKET

$$\frac{M_d}{P} = m_d(r, Y)$$

$$\frac{M_s}{P} = m_s(FD, E, P)$$

$$FD = G - t(Y)$$

$$\frac{M_d}{P} = \frac{M_s}{P} = \frac{M}{P}$$

BALANCE OF PAYMENTS

$$E = g(NX, F)$$

$$NX = h(X, Z)$$

$$F = q(AID, FDI, RER, r_w, r, FD)$$

$$a0 - ar + aY = m_0[g_0 + g(Y) - t(Y)] + m_1[((x(RER, Y_w, r_w)) - (z(Y - t(Y), r, RER))) + (FDI + AID + RER + rw + r)]$$

$$Y[a - m_0g + m_0t + m_1z + m_1zt] - r[a - m_1z - m_1] = a_0 + g_0m_0 + r_w(m_1x + m_1)$$

$$+ FD\,\mathrm{Im}_1 + AIDm_1 + RERm_1$$

$$Y[a - m_0g + m_0t + m_1z + m_1zt] - a_0 - g_0m_0 - r_w(m_1x + m_1) - FD\,\mathrm{Im}_1 - AIDm_1$$

$$- RERm_1 = r[a - m_1z - m_1]$$

$$r = Y\frac{[a - m_0g + m_0t + m_1z + m_1zt]}{[a - m_1z - m_1]} - G\frac{m_0}{[a - m_1z - m_1]} - rw\frac{(m_1x + m_1)}{[a - m_1z - m_1]}$$

$$- FDI\frac{m_1}{[a - m_1z - m_1]} - AID\frac{m_1}{[a - m_1z - m_1]} - RER\frac{m_1}{[a - m_1z - m_1]}$$

$$r = \delta_1 Y - \delta_2 G - \delta_3 r_w - \delta_4 FDI - \delta_5 AID - \delta_6 RER$$

SUBSTITUTING THE MONEY EQUATION INTO THE GOODS MARKET YIELDS THE FOLLOWING

$$Y = f(P, AID, FDI, G, M, RER, rw, Yw, S)$$

APPENDIX B

THE PRODUCTION FUNCTION

$$Y = f(K, L, T)$$

$$K = k(K_d, K_f)$$

$$K_f = g(FDI, AID)$$

$$K_d = h(FD, S)$$

$$L_d = f\left(W/P\right)$$

$$L_s = f\left(W/P\right)$$

$$L_d = L_s = L = f\left(W/P\right)$$

$$y = f\left(FDI, AID, FD, S, W/P, T\right)$$

$$y = \alpha_1 FDI + \alpha_2 AID + \alpha_3(ty - g0 - gy) + \alpha_4\left(y - ty + r + \frac{m}{p}\right) + \alpha_5 w/p + \alpha_6 T$$

$$y - \alpha_3 gy - \alpha_4 y = \alpha_1 FDI + \alpha_2 AID + \alpha_3 g_0 + \alpha_4 r + \alpha_4 \frac{m}{p} + \alpha_5 w/p + \alpha_6 T$$

$$y(1 - \alpha_3 g - \alpha_4) = \alpha_1 FDI + \alpha_2 AID + \alpha_3 g_0 + \alpha_4 r + P(\alpha_4 m + \alpha_5 W) + \alpha_6 T$$

$$P(\alpha_4 m + \alpha_5 W) = y(1 - \alpha_3 g - \alpha_4) - \alpha_1 FDI - \alpha_2 AID - \alpha_3 g_0 - \alpha_4 r - \alpha_5 m - \alpha_6 T$$

$$P = Y\frac{(1 - \alpha_3 g - \alpha_4)}{(\alpha_4 m + \alpha_5 W)} - FDI\frac{\alpha_1}{(\alpha_4 m + \alpha_5 W)} - AID\frac{\alpha_2}{(\alpha_4 m + \alpha_5 W)} - g_0\frac{\alpha_3}{(\alpha_4 m + \alpha_5 W)} - r\frac{\alpha_4}{(\alpha_4 m + \alpha_5 W)} - m\frac{\alpha_5}{(\alpha_4 m + \alpha_5 W)} - T\frac{\alpha_6}{(\alpha_4 m + \alpha_5 W)}$$

$$P = \partial_1 Y - \partial_2 FDI - \partial_3 AID - \partial_4 G - \partial_5 r - \partial_6 M - \partial_7 T$$

APPENDIX C

RANK AND ORDER CONDITIONS

ORDER CONDITION
K=9
G=2
M=5
K-M>G-1
9-5>2-1

RANK CONDITION

Y	P	AID	RER	Y_w	r_w	FDI	S	G	M	r	T	W
1	1	1	1	1	1	1	1	1	1	0	0	0
1	1	1	0	0	0	1	0	1	1	1	1	1

APPENDIX D

MACRO ECONOMIC INDICATORS

YEAR	G	GDP	EX	R	NX	S	AID	P94	MS	RMS
1965	371.1	1466	0.71	2.7	-141	110.3	4.6	0.049333991	320	6486.4
1966	272.9	1518	0.71	3.2	-76	112.7	25.7	0.049333991	320	6486.4
1967	320.8	1504	1.02	3.37	-41	112.99	17	0.049333991	321	6506.67
1968	400.2	1700	1.02	3.37	27	217	28.8	0.049333991	350	7094.5
1969	395.3	1999	1.02	3.56	19	254.99	27.2	0.049333991	390	7905.3
1970	467.9	2259	1.02	3.62	-16	3304.99	48.3	0.049333991	430	8716.1
1971	523.8	2501	1.83	8	-93	260	27.5	0.049333991	470	9526.9
1972	543.1	2815	1.28	8	164	364	85.3	0.049333991	670	13580.9
1973	548.5	3502	1.15	5.5	-555	501.02	19.3	0.049333991	790	16013.3
1974	754.1	4660	1.15	5.5	-105	502.97	-15.6	0.098667982	1000	10135
1975	1146.2	5283	1.15	8	49	720.98	2.8	0.098667982	1390	14087.65
1976	1484	6526	1.15	8	-22	555.91	-0.6	0.148001973	1900	12837.66667
1977	2136.6	11163	1.15	8	-118	1116.02	35.4	0.345337938	3040	8802.971429
1978	3164.8	20986	2.75	8	-279	1141.72	-5.3	0.592007893	5130	8665.425
1979	4295.7	28222	2.75	13	19	1864.13	-26.6	0.937345831	5940	6337.042105
1980	4668	42853	2.75	13	-297	4116	303	1.381351751	7950	5755.232143
1981	7719.3	172526	2.75	15.5	-512	2808.01	526.7	3.009373458	12030	3997.509836
1982	9530	86451	2.75	13.2	308	3226.9	267.1	3.650715343	14840	4064.956757
1983	14755.3	184038	30	9	-797	6101.63	1026.6	8.140108535	20800	2555.248485
1984	26694	270561	50	13.5	-710	17899.45	2730	11.39615195	31960	2804.455411
1985	45763	343048	59.99	16.5	-6641	26082.08	5142	12.53083374	46720	3728.40315
1986	70700	511400	90	18.5	-8600	39009.6	-1714	15.63887519	69110	4419.115773

YEAR	G	GDP	EX	R	NX	S	AID	P94	MS	RMS
1987	102100	746000	166.5	21.5	-16900	60992.99	1780	21.85495807	105970	4848.785327
1988	143900	1051200	212.1	21.5	-2900	112008	13855	28.71238283	155010	5398.715979
1989	196500	1417200	277.34	21.32	-106900	76007.93	26226	35.96447953	239750	6666.299726
1990	245500	2031700	331.15	21.32	-175400	128486.4	52390	49.33399112	271640	5506.1428
1991	340300	2574800	558.76	16.32	-206800	122014	49030	58.21410952	317050	5446.274153
1992	498800	3008800	714.15	23.63	-323500	64995.84	32986	64.08485446	519000	8098.637413
1993	813500	3932400	1125.87	23.63	-273800	189500	102982	80.06906759	667000	8330.308071
1994	1141300	5205200	1536.68	23.15	-590700	590100	-45466	100	967000	9670
1995	1698700	7752600	2154.33	28.73	-645300	865700	51200	159.48	1329583	8336.988964
1996	2515200	11339200	2522.74	34.5	-1089600	1112400	-117200	233.81	1784869	7633.843719
1997	2908900	14113400	3066.48	35.76	-2362900	1301200	-363700	298.88	2506358	8385.833779
1998	4513200	17357000	3274.49	32.05	-1416000	1456700	537100	348.58	3231355	9270.052786

RG	RR	RNX	RS	RAID	LRGDP	LRMS	LRG	LRR	LRS	LP94
7522.197	54.729	-2858.07	2235.781	93.242	10.299435	8.777463	8.9256135	4.0023937	7.7123459	-3.009142
5531.683	64.864	-1540.52	2284.429	520.939	10.334291	8.777463	8.6182474	4.1722928	7.7338714	-3.009142
6502.616	68.3099	-831.07	2290.3073	344.59	10.325025	8.7805831	8.7799598	4.2240547	7.7364413	-3.009142
8112.054	68.3099	547.29	4398.59	583.776	10.447525	8.8670751	9.0011064	4.2240547	8.3890393	-3.009142
8012.731	72.1612	385.13	5168.6473	551.344	10.609544	8.9752887	8.9887869	4.2789025	8.5503663	-3.009142
9484.333	73.3774	-324.32	66992.1473	979.041	10.731819	9.0729272	9.1573966	4.295616	11.112331	-3.009142
10617.426	162.16	-1885.11	5270.2	557.425	10.833588	9.1618747	9.2702519	5.0885835	8.5698236	-3.009142
11008.637	162.16	3324.28	7378.28	1729.031	10.95186	9.5164197	9.3064354	5.0885835	8.9062958	-3.009142
11118.095	111.485	-11249.85	10155.6754	391.211	11.170231	9.6811749	9.3163292	4.7138901	9.225788	-3.009142
7642.8035	55.7425	-1064.175	5097.60095	-158.106	10.762766	9.2237501	8.9415198	4.0207429	8.5365253	-2.3159948
11616.737	81.08	496.615	7307.1323	28.378	10.888244	9.5530538	9.3602022	4.3954363	8.8966062	-2.3159948
10026.89333	54.0533333	-148.64667	3756.098567	-4.054	10.694079	9.4601388	9.2130261	3.9899712	8.2311361	-1.9105297
6186.983143	23.1657143	-341.69429	3231.675057	102.508286	10.383592	9.0828446	8.7302029	3.1426734	8.0807559	-1.0632318
5345.874667	13.5133333	-471.2775	1928.555367	-8.9525833	10.475846	9.0670962	8.5840805	2.6036769	7.5645265	-0.5242353
4582.833632	13.8689474	20.27	1988.732374	-28.378	10.31256	8.7541674	8.4300728	2.6296523	7.5952527	-0.064703
3379.298571	9.41107143	-215.00679	29, 9.69	219.350357	10.342468	8.6578647	8.1254234	2.2418868	7.9995745	0.3230625
2565.085426	5.15057377	-170.13508	933.0879131	175.01982	10.956571	8.2934269	7.8497471	1.6391081	6.8384994	1.1017319

RG	RR	RNX	RS	RAID	LRGDP	LRMS	LRG	LRR	LRS	LP94
2610.447297	3.61572973	84.367027	883.9089595	73.1637432	10.07241	8.3101584	7.8672769	1.2852937	6.7843541	1.2949231
1812.666248	1.10563636	-97.910242	749.5760006	126.116255	10.026094	7.8459048	7.5025541	0.1004211	6.6195077	2.0968035
2342.36961	1.18461039	-62.301732	1570.657366	239.554545	10.074977	7.9389646	7.7589183	0.1694139	7.3592495	2.4332758
3652.031535	1.31675197	-529.97272	2081.432132	410.347795	10.217433	8.2237353	8.2030389	0.2751681	7.6408115	2.5281923
4520.785489	1.18294953	-549.91167	2494.399344	-109.59868	10.395148	8.3936949	8.416441	0.1680109	7.8218032	2.7497598
4671.708804	0.98375847	-773.27991	2790.807917	81.4460497	10.438053	8.4864835	8.4492802	-0.0163749	7.9340864	3.0844278
5011.774914	0.74880584	-101.00172	3901.034639	482.544416	10.508114	8.5939164	8.5195454	-0.2892756	8.2689971	3.3573285
5463.72428	0.59280713	-2972.3772	2113.416654	729.219506	10.581662	8.8048202	8.6058859	-0.5228862	7.6560612	3.5825318
4976.285	0.4321564	-3555.358	2604.419328	1061.9453	10.62577	8.6136196	8.5124389	-0.8389677	7.864965	3.8986133
5845.661864	0.28034441	-3552.4034	2095.952356	842.235678	10.697155	8.602687	8.6734551	-1.2717364	7.6477633	4.0641278
7783.430331	0.36872987	-5047.9946	1014.215302	514.723803	10.756844	8.9994511	8.9597524	-0.997691	6.9218705	4.1602081
10159.97843	0.29512021	-3419.5478	2366.706716	1286.1646	10.801871	9.0276557	9.2262116	-1.2203725	7.7692547	4.3828896
11413	0.2315	-5907	5901	-454.66	10.859998	9.1767836	9.3425083	-1.4631754	8.6828771	4.6051702
10651.49235	0.18014798	-4046.2754	5428.266867	321.043391	10.79162	9.0284574	9.2734553	-1.7139766	8.5993752	5.0719185
10757.45263	0.14755571	-4660.1942	4757.709251	-501.26171	10.789267	8.9403468	9.2833541	-1.9135495	8.4675216	5.4545088
9732.66863	0.11964668	-7905.8485	4353.586724	-1216.8763	10.762593	9.0342991	9.1832434	-2.1232122	8.3787553	5.7000422
12947.38654	0.09194446	-4062.1952	4178.954616	1540.82277	10.815639	9.1345444	9.4686492	-2.3865706	8.3378164	5.8538678