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DEPARTMENT OF ECONOMICS

THE IMPACT OF EXTERNAL REMITTANCES ON POVERTY REDUCTION IN GHANA

A THESIS SUBMITTED TO THE DEPARTMENT OF ECONOMICS, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF ARTS DEGREE IN ECONOMICS

BY

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DECLARATION

I declare that, I have personally, under supervision, undertaken the study herein submitted.

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DEDICATION

This work is dedicated to the entire Owiafe family for their unflinching support, love and investing into my education.

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ABSTRACT

This study examines the impact of workers' remittances on poverty reduction in Ghana using time series data over the period 1980-2002. Employing modern time series econometric techniques such as unit root tests, cointegration and error correction techniques within an *ARDL* framework, which has been found to yield more robust estimates, the study revealed intriguing results. The results suggest that, remittances do have a significant impact on poverty reduction through increasing income, smoothing consumption and easing capital constraints of the poor. Also remittances were found to have no direct positive impact on economic growth. Nonetheless, they were found to have an indirect impact on economic growth through investment and human capital development. Among numerous policy recommendations, the study suggested policies which aimed at sustained increases in remittances through the formal channel where significant amounts can be recorded and sharpen the impacts particularly to the poor. Furthermore, transaction costs in sending remittances should be lowered and also barriers to official remittance channels should be removed. For example, capital requirements on remittance services should be lowered and formal financial intermediaries should be widened by allowing domestic banks to operate overseas. Finally, it is strongly recommended that, the government could develop appropriate training or education programs to assist returning migrants or remittance receipts in making effective investment decision. In addition, the appropriate infrastructure should be developed to generate favourable investment climate and to complement investments out of remittances.

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LIST OF ACRONYMS & ABBREVIATIONS

ADF	Augmented Dicker-Fuller
AIC	Akaike Information Criterion
AR	Autoregressive
ARDL	Autoregressive Distributed Lag
BOP	Balance of Payments
CUSUM	Cumulative Sum
CUSUMSQ	Cumulative Sum of Square
DF	Dickey-Fuller
ECOWAS	Economic Community of West African States
ECM	Error Correction Model
ERP	Economic Recovery Programme
FDIs	Foreign Direct Investments
GDP	Gross Domestic Product
GLSS	Ghana Living Standards Survey
GPRS	Ghana Poverty Reduction Strategy
HIPC	Heavily Indebted Poor Country
IMF	International Monetary Fund
ISSER	Institute of Statistical Social and Economic Research
LDCs	Less Developed Countries
ODA	Official Development Assistance
PP	Phillips Perron
SAP	Structural Adjustment Programme
SBC	Schwarz Bayesian Criterion
SSA	Sub-Saharan Africa
UN	United Nations
VAR	Vector Autoregression
WDI	World Development Indicators

CHAPTER ONE

GENERAL INTRODUCTION

1.1 Background of Study

Remittances are generally defined as that portion of migrants' earnings sent from the migration destination to the place of origin. Although they can also be sent in kind, the term "remittances" is usually limited to refer to monetary and other cash transfers transmitted by migrant workers to their families and communities back home (Adams and Page, 2003).

Migrant remittances have become an important source of earnings and foreign exchange for many developing countries. Remittance flows globally currently, exceed US$100 billion, which is higher than the value of Official Development Assistance (*ODA*). Remittance flows have great potential to generate a positive impact in migrants' home region. Remittances to developing countries amount to some US$65 billion and this amount exceed *ODA* of US$55 billion (Maimbo, 2003). An IMF report (2001) has indicated that migrant remittances are increasingly becoming a more constant source of income to most developing countries with a doubling of annual remittances between 1988 and 1999. Sander (2003) also reported that remittances have proved to be the most stable flow compared with *ODA* and private capital flows.

Solimano (2003) notes that remittance flows have concentrated in a group of developing countries. In 2002, Latin America and the Caribbean had the highest level of remittances,

totalling US$25 billion, followed by South Asia with US$16 billion and the Middle East and North Africa (*MENA*) with US$14 billion. Sub-Saharan Africa had the lowest level of remittances, amounting to US$4 billion (with an annual growth rate of 5.2%). Migrant worker remittances have been a useful source of income to many Ghanaians, particularly in times of economic shocks. The importance of migrant remittances to the economy is evidenced by the proliferation of money transfer institutions in Ghana (both formal and informal) and the rapid growth in the volume of such remittances. It has been argued that migrant remittances are becoming a potential source of foreign exchange whose magnitude exceeds the amount of *ODA* to Ghana. There are three ways of measuring remittance flows in Ghana. The first is the balance of payments (*BOP*) estimates and the second approach is based on inferences from the Ghana Living Standards Survey (*GLSS*). The third approach focuses on transfers through banks or financial institutions in origin countries (Addison, 2005).

Data from the Central Bank of Ghana (using *BOP* estimates), for example, show that migrant worker remittances have been a useful source of earnings to many Ghanaians, particularly in times of economic shocks. Migrant remittances exceed *ODA* and *FDI* and have been increasing consistently since 1990. The *BOP* figures include transfers for *NGOs* and other religious bodies. Thus, the second and third measures of private inward remittances present plausible estimates of intra household transfers. Data from resource transfer institutions in Ghana shows that the USA and Canada are the most important sources of regional flow of remittances. In 2004, a total of US$969.98 million was received through money transfer institutions as migrant remittances of which US$665.71 million came from these two countries. This was followed by the UK with US $163.3

million and the European Union with US$96.8 million, while other countries accounted for US$25.1 million of total remittances. ECOWAS and the rest of Africa accounted for US$11.7 million and US$7.5 million, respectively (Bank of Ghana, 2004).

In developing countries, remittances constitute the second largest capital flow after direct foreign investments which have helped to improve the standard of living of millions of people by providing them with essential resources for food, housing, health and education (International Organization for Migration, 2006 Journal). Moreover, remittances are person-to-person flows, well targeted to the needs of the recipients, who are often poor. Also they are mostly altruistic transfers that do not have to be paid back, hence, not affecting the average income of recipients in times of economic shocks. One benefit expected from labour emigration is that migrants would be bringing an impetus to investments, transfer of technology and machinery and new enterprises. Thus, Russell *et al* (1990) concluded that after satisfying subsistence needs, migrant remittances are used for investment purposes such as education, livestock, farming, and small scale enterprise. Taylor (1996) has also argued that remittances have multiplier effects that work to increase national income. Since remittances are believed to reduce poverty as migrants send back remittances, it is sometimes argued that remittances may increase inequality. It is believed that it is the rich who can migrate and send back remittances, making recipients even richer but this has not been empirically tested.

Adams and Page (2003), found that international migration has a strong statistical impact on reducing poverty of developing countries: On average, a 10% increase in the share of international migrants in a country's population will lead to a 1.9% decline in the share of

people living in poverty. Thus, international remittances strongly affect poverty and they tend to minimize the negative effects of economic shocks in an economy.

1.2 Statement of Problem

In the developing world international migration is often caused by individuals seeking better economic opportunities for themselves and their families. Once these migrants find employment abroad, they tend to remit or send a sizeable portion of their earnings to families back home. In 2003, international remittance flows to the developing world amounted to US $75 billion (IMF, 2004). In that year the level of international remittances was about 45 percent larger than the level of official development aid (US $52billion) to the developing world. Stated alternately, international remittance inflows have experienced a significant increase in developing countries over the past decades. For many developing countries including Ghana, such remittances constitute the largest source of foreign exchange earnings, even exceeding export revenues, FDI, aid, or other private capital flows. For instance, in 2003, remittance as a percentage of GDP in Ghana was 13.3% while FDI/GDP and ODA/GDP were 1.4% and 5.22% respectively (Bank of Ghana, 2005). Remittances become, therefore, a relatively attractive source of foreign earning for developing countries in general and Ghana in particular. However, little attention has been paid to analyze the economic impact of these financial transfers, especially on economic growth and poverty in Ghana.

It is in the pursuit of these that this study seeks to examine the impact of international remittances on poverty reduction in Ghana. This study seeks to complement the existing studies for inferences by using most current data available. These facts among others

bring the issue of identifying the importance of external remittances on poverty reduction to the fore.

1.3 Objectives of the Study

The principal aim of this study is to examine the impact of external remittances on poverty reduction in Ghana for the period 1980 to 2002. In doing so the study intends to:

- Investigate the extent to which external remittances affect income growth (GDP) in Ghana.
- Examine the extent to which external remittances affect private investment in Ghana.
- Determine the extent to which external remittances affect human capital development in Ghana.
- Ascertain whether the flow of remittances to Ghana is counter-cyclical.

1.4 Justification of the Study

Because remittances are private transaction they should not be thought of as a substitute for foreign direct investments, debt, or aid flows. Governments should treat remittances like any other source of private income. Reducing the cost of remittance transfers would benefit families and countries. In addition to raising consumption levels in the migrants' families, the steady stream of foreign exchange that remittances deliver can improve a country's creditworthiness for external borrowing. Thus the study of the impact of remittances on poverty reduction in Ghana will bring to light the role remittances play in the economy in the economic development of Ghana, that is to say, how the welfare or

poverty status of households changes with the receipts of remittances. Hence, it will assist policy makers in making concrete decisions on the flow of remittances into the country. The study also contributes to the existing literature. That is to say, the concentration of poverty in this study was motivated by the recent shifts in emphasis of the international development community that in recent years have focused on 'poverty reduction', as opposed to economic growth, as the overarching goal of economic development.

1.5 Methodology

At the outset it should be noted that any effort to examine the impact of remittances on poverty reduction involves several important methodological issues.

1.5.1 Data sources

The study employed mainly secondary macroeconomic time series data in its analysis. All data used in the analysis were taken from IMF, International Financial Statistics, Government Finance Statistics and the World Bank (CD-ROM), and The State of the Ghanaian Economy (various issues). Other augmenting sources included published articles and journals, working papers, textbooks and relevant internet resources.

1.5.2 Data Analysis

The data collated were analyzed both descriptively and quantitatively. Charts such as trend graphs and tables were employed to aid in the descriptive analysis. Additionally, stationarity tests were carried out on all variables to ascertain their order of integration to

avoid the spurious regression problem. Further, the study adopted the newly developed Autoregressive Distributed Lag econometric model for cointegration procedure introduced by Pesaran *et al* (2001) to estimate both the short and long run determinants of poverty as well as the growth, investment and human capital. All estimations were carried out using the econometric packages Microfit 4.1 and Eviews 6.

1.6 Research Hypotheses

The study seeks to test and validate the following hypotheses;

1. H_0: Remittances do not significantly reduce poverty incidence in Ghana.

   H_1: Remittances significantly reduce poverty incidence in Ghana.

2. H_0: Remittances do not significantly affect income growth in Ghana.

   H_1: Remittances significantly affect income growth in Ghana.

3. H_0: Remittances do not significantly affect private investment in Ghana.

   H_1: Remittances significantly affect private investment in Ghana.

4. H_0: Remittances do not significantly affect human capital development in Ghana.

   H_1: Remittances significantly affect human capital development in Ghana.

5. H_0: Remittances are not countercyclical in Ghana.

   H_1: Remittances are countercyclical in Ghana.

1.7 Scope of Study

The research is limited to the period 1980-2002 where six determinants of poverty were used to estimate the poverty model. The choice of the study period is dependent on data availability on most of the variables used in the study.

1.8 Organization of the study

The study is organized into five main chapters with each chapter comprising appropriate sections. Chapter one consists of general introduction of the study. Chapter two reviews the existing relevant literature on remittances and poverty which were both theoretical and empirical. This is followed by a chapter outlining the methodology adopted for the study, touching on issues such as data description and definition, and model specifications. The fourth chapter analyses the estimated poverty models. The final chapter provides a summary of major findings, policy implications of results and recommendations and conclusion.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter investigates a theoretical and empirical review on remittances. The subdivisions of this chapter consist of three main sections with section one focusing on the theoretical review on the determinants and motives for remittances. Section two empirically reviews the numerous literature on macroeconomic determinants of remittances and the uses to which these funds are put. The last section focuses on the magnitude of remittances and its impact on households.

2.1 Theoretical Review

2.1.1 Determinants of remittances

Given the broadly positive impact of workers' remittances on the economy, it is important to identify what factors may encourage remittances. The existing literature on the determinants of remittances is therefore briefly summarized. Since this study is typically limited to one country studies (i.e. Ghana), with little comprehensive analysis, this section then analyzes data on a broad sample of countries.

Remittances can be analyzed using two broad approaches: the "altruism" approach, and the "portfolio" approach.[1] The altruism approach is based on the economics of the family;

[1]See Rapoport and Occupier (2005), Gupta (2004), Chami, Fullenkamp, and Jahjah (2003), Jadhav (2003), El-Sakka and McNabb (1999), Taylor (1999), Poirine (1997), Elbadawi and Rocha (1992), Russell (1986), and Lucas and Stark (1985) for fuller surveys and analyses of the determinants of remittances.

remittances are driven by migrant workers' concern for the income and consumption needs of family members left in the home country. Under the portfolio approach, in contrast, migrant workers earn income, and must then allocate their savings between home country and host country assets. Here, remittances are fundamentally driven by an investment motive. Many studies combine the two approaches in their empirical analysis.

At a broad level, remittance flows are clearly tied closely to migration patterns. Drawing on the existing literature, the analysis here focuses on five broad groups of variables that could affect remittances (by changing either migrant stocks or the average remittances per migrant worker).

• *Economic activity in the migrant workers' host country*. Improved host country economic prospects increase migrants' employment chances and wages. This allows existing migrants to send more remittances, and may also encourage greater emigration from the home country, increasing future remittances. Empirically, host country economic activity is measured using "world output,"[2] world oil prices are included as an additional control.

• *Economic activity in the migrant workers' home country*. Negative shocks to output, employment, and wages in the home country reduce the income of any family members left behind by the migrants. This may again encourage existing migrants to send more remittances, as well as push more people to emigrate. Home country economic activity is

[2]Specifically, a weighted average of output in foreign countries, with weights equal to either (1) the share of migrant workers from the home country residing in each foreign country, where such data are available; or (2) the trade shares otherwise.

measured here using domestic *GDP*, lagged to minimize endogeneity problems.

• *Economic policies and institutions in the home country*. The presence of exchange rate restrictions and black market premia may discourage emigrants from sending remittances. In particular, it is likely to shift remittances away from formal channels, such as banks, toward informal and unrecorded channels; any remittances may also be kept in the form of foreign currency cash. Macroeconomic instability, as manifested in high inflation or real exchange rate overvaluation, may have similar effects. In contrast, greater financial sector development, by making remittances easier and cheaper to send and receive, may encourage remittances. Empirically, economic policies and institutions are measured here using an indicator of whether multiple exchange rate systems are present; an indicator of restrictions on holding foreign exchange deposits; black market premia; financial sector depth, as measured by the ratio of bank deposits, bank assets, or stock market capitalization to *GDP*; and inflation.

• *General risks in the home country*. Political instability, or low levels of law and order, may discourage migrants from sending remittances, at least for investment purposes -for instance, because of the risk of expropriation or theft.

• *Investment opportunities*. Greater potential returns on host country assets as opposed to home country assets may encourage migrants to invest their savings in the host country, rather than sending them back as remittances.

2.1.2 Motives for Migrant Remittances

The main question about remittances is: why do emigrants send part of their income to family and relatives in home countries? A common explanation is that migrants care for the ones they left behind: spouses, children, parents and other members of the extended family. A theory of altruism has the attractive feature that it is tractable and leads to straightforward predictions, although much depends on the specifics of the model of altruism (Rapoport and Docquier, 2005). With the help of a theory of altruism, in which migrants care not only for their own utility but also for the utility of the household in the origin country, one can make the prediction that the level of remittances increases with increases in the migrant's income and decreases with increases in the recipient's income.

One of the difficulties in testing the theory of altruism is that the predictions made are hard to distinguish from the predictions made with alternative theories of remittance behaviour. The encompassing feature of those alternative theories is the assumption of self-interest as the prime driving force behind remittances. So what appears as mutual altruism between the family and the migrant could just as well be enlightened self-interest. Remittances can serve both the interests of migrants and of the household in the origin country. In this set-up remittances are viewed as part of an intertemporal mutually beneficial contract arrangement (Lucas and Stark, 1985; Poirine, 1997; VanWey, 2004). The elements of investment and risk stand out in this contract theory of remittances. To start with the investment argument, it has long been recognized that remittances can be viewed as a repayment of the principal (plus interest) invested by the family for the education or training (i.e. the upbringing) of the migrant. The higher the investment of

the household in the education (upbringing) of the migrant, the higher the expectations of the family of being repaid through remittances. Migration, in other words, is seen as a portfolio investment strategy.

The other element of the self-interest view of remittances – the function of insurance contract – also points to some common practices in daily life in less developed countries. Emigration is not only viewed as a strategy for migrants to benefit from higher income opportunities but it can also be viewed as a household risk-diversification strategy to overcome missing insurance markets. Remittances viewed as 'insurance' generates the same predictions as the altruistic model with respect to the appearance of adverse income shocks but it yields different predictions with respect to the timing of remittances. The altruistic model should imply a gradual decrease of remittances over time as altruism decays with distance and time, while the insurance motive should imply no decrease during a given (contract) period and a sharp decline after a while when the insurance 'contract' expires.

Naturally, in these informal settings the strength of family ties may play a crucial role in overcoming the hurdles in financing lifetime consumption paths. Contractual arrangements between the migrant and his family are voluntary and thus must be self-enforcing. Close family relations may serve as such a force. Of course, the strength of family ties between the remitter and the recipient household plays also a large role within the altruism model, as VanWey (2004) suggests. The 'altruism' motive indicates that

emotional attachment to the household is important so that remittances reflect a kind of 'commitment' to live up to their promise to take care of their family members.

Lucas and Stark (1985) suggest a test, which could help to determine whether remittances represent altruistic or self-interested behaviour. The family may possess sanctions to overcome the hazards tied to long-distance transfers. For instance, a default to remit may be sanctioned by denying the migrant rights to future solidarity, inheritance or even the right to return to the household, once the migrant retires. In short, such sanctions may give the family bargaining power. Within a game-theoretic context, greater wealth should enhance the bargaining strength of the family. This yields a clear prediction that can challenge the prediction of the pure altruism model. The prediction of the latter model is that higher remittances flow to low-wealth households. The prediction of the self- interest mode is exactly the reverse: remittances flow to wealthy households. All in all, the predictions made by the two models overlap to some extent, but they also vary by a number of distinct driving forces.

The literature on remittances has come up with several theories to explain the motives behind migrants' decisions to send funds (cash and goods) to their relations back home. According to Solimano, 2003, the analytical literature on the motives behind remittances can be summarized in four approaches. These motives include (i) The Altruistic Motive, (ii) The Self-Interest Motive, (iii) Implicit Family Contract I: Loan Repayment and (iv) Implicit Family Contract II: Co-Insurance.

A) Altruistic Motive

The altruism or livelihoods school of thought considers remitting to be an obligation to the household. Remittances are sent out of affection and responsibility towards the family. It has been argued in the poverty literature that the major reason why people migrate to other countries is due to poverty. According to the altruistic model, sending remittances yields a satisfaction to the migrant out of a concern for the welfare of his family. However, more incisive results may be obtained from an altruistic model wherein the migrant derives utility (u_m) from the utility of those left at home, and the latter utility is presumed to depend on per capita consumption (c_h). For example, suppose the migrant maximizes his own utility with respect to the amount remitted (*r*):

$$u_m = u\left[c_m(w-r), \sum_{h=1}^{n} a_h u(c_h) \right], \tag{1}$$

where *w* is the migrant's wage, c_m is his or her consumption, a_h are altruism weights attached to various household members, and *n* is the household size. Consumption per capita may further be assumed to increase with income per capita available at the home base and may also vary with household size if there are economies or diseconomies of scale in consumption:

$$c_h = c\left(y + \frac{r}{n}, n \right) \tag{2}$$

where *y* is the income per capita at home before receipt of any remittances. Choosing a level of *r* to maximize (1) subject to (2) provides[3]

[3]Implicitly, this treats *w* and *y* as given. In particular, the migrant is assumed neither to work harder nor to accept worse working conditions with higher pay in order to remit, and no moral hazard is involved in the sense of the home group's reducing effort.

$$r = r(w, y, n) \tag{3}$$

If the migrant indeed cares about his home family and if both his utility function (1) and the home family utility functions are well behaved, two properties of the remittance function (3) are predicted:

that $\partial r/\partial w > 0$ and $\partial r/\partial y < 0$. The sign of $\partial r/\partial n$ is unrestricted, however, depending on the presence of diseconomies of scale in consumption, the rate of diminution in the marginal utility of home consumption.

B) Self- Interest Motive

An opposite motivation is to assume that the migrant is mainly motivated by an economic and financial self-interest, when sending remittances to the home country. The argument behind this theory is that, at every point in time, the successful migrant in the foreign country saves. Then, the need arises on how (in which assets) and where (in which country) to accumulate wealth. An obvious place to invest, at least part of his assets, is in the home country by buying property, land, financial assets, and so on. These assets may earn a higher rate of return than assets in the host country although their risk profile can also be greater. In turn, the family can administer, during the emigration period, those assets for the migrant, thus acting as a trusted agent.

C) Implicit Family Contract I: Loan Repayment.

The literature has also considered the discussion on the remittance process from the family perspective rather than the individual. In other words, economic theory has

developed explanations of the remittances process that take the family–rather than the individual– as the main unit of analysis. According to the theory, families tend to develop an implicit contract among those who choose to live abroad, the migrant, and those who stay at home. The implicit contract has an inter-temporal dimension, which could last for various years or even decades, as a time horizon.

The contract combines elements of investment and repayment. In the loan repayment theory the family invest in the education and training of the migrant and usually finances the costs of migrating (travel and subsistence costs in the host country). This is the loan (investment) element of the theory. The repayment part comes after the migrant settles in the foreign country and his income profile starts rising over time and is in a condition to start repaying the loan (principal and interests) back to the family in the form of remittances. This implicitly implies that the family invests in a higher yield "asset" (the migrant) who earns a higher income level in the foreign country than other family members that live and work at home. The amount to be remitted will however, depend among other things, on the income profile of the migrant.

D) Implicit Family Contract II: Co-Insurance

A variant of the theory of remittances as an implicit family contract between the migrant and those at home relies on the notion of risk diversification. Assuming that economic risks between the sending and foreign country are not positively correlated then it becomes a convenient strategy for the family as a whole, to send some of its members abroad (often the most educated) to diversify economic risks. The migrant, then, can help to support his family in bad times at home. Conversely, for the migrant, having a family

in the home country is insurance as bad times can also occur in the foreign country. In this model, migration becomes a co-insurance strategy with remittances playing the role of an insurance claim. As in any contract there is a potential problem of enforcement (e.g. ensuring that the terms of the contract, are respected by the parties). However, we can expect enforcement to be simpler, in principle, due to the fact that these are implicit family contracts, helped by considerations of family trust and altruism (a feature often absent in legally sanctioned contracts).

The theories underlying the motives for remittances transfers suggest that it is only in the altruistic case that there is a no “quid pro quo”. Transfers are made purely out of concern for the family and fits into the standard definition of transfers in the Balance of Payments (BOP) sense. The other motives behind transfers suggest that there may be a quid pro quo as in the case of the implicit family contract, although this may not be immediate or binding.

2.1.3 Channels in Remittance Flows

Channels in remittance flows are grouped into two: informal and formal. Informal remittances are all types of money transfer services that do not involve formal contracts, and hence are unlikely to be recorded in national accounts. Formal channels include money transfer services offered by banks, post office banks, non-bank financial institutions, and forex bureaus and money transfer operators like Western Union and MoneyGram.

Globally, studies indicate that informal channels are cheaper than formal ones. Informal channels include cash transfers based on personal relationships through business people, or carried out by courier companies, friends, relatives or oneself. The pure monetary cost (transaction cost) of remitting money across bordersusing the official channels is estimated at approximately 13% of the remittance value (Orozco, 2003).

The choice of migrant for remitting money depends on a number of factors. The most prominent among these are: the cost of the transaction, speed, security of funds, geographic proximity/accessibility, convenience in terms of familiarity and language. The attractiveness of formal and informal channels varies greatly across these factors (Pieke et al, 2005).

Orozco (2003) estimates the cost of a Hawala/Hundi transaction to be less than 2% of the value of the principal. For the informal remittance channels as a whole, Sander (2003) reports the average cost of remitting at 3-5% globally, although they can be higher in specific cases. Swanson and Kubas (2005) report costs from less than 1-5%. Similarly, remittances through friends, taxi drivers, etc are also low-cost channels compared to the formal channels. For instance, in a survey conducted in South Africa, remittances up to R250 to neighbouring countries cost R25 and R50, through friends and taxi drivers, respectively, as compared with over R100 through registered banks and over R80 through money transfer agents like MoneyGram and Western Union (Genesis,2003).

Similarly, Saddiqui and Abrar (2003) find that costs of informal channels in Bangladesh are about 45% of formal costs. Apart from the general perception and anecdotal evidence

of low cost of informal remittance channels, not much is known about how these costs vary with the amount transferred and the geographical location of the senders and receivers.

Formal remittance channels are typically more expensive, especially banks and money transfer operators (MTOs) like Western Union and MoneyGram. At times the cost of remitting small amounts can be prohibitively high due to a minimum fee charged by most service providers. Sanders and Maimbo (2003) report that fees for major MTOs start at about $15 and are usually structured by brackets of transfer values. Similarly, minimum fees at banks range from $5 to $50 depending on the sending and receiving countries as well as the product. Due to minimum fees, the average cost declines sharply as the amount remitted rises.

Informal channels are typically faster and more convenient as they are not constrained by banking and foreign exchange regulations and often work in close proximity to their clients and frequently provide door-to-door services. Unlike banks, informal channels do not require the customer to have a bank account or any knowledge about operating one.

2.2 Macroeconomic Impact of Remittances

The economics literature has generally considered foreign exchange resources as critical in increasing a country's capital-output ratio. Foreign capital inflows from sources such as Foreign Direct Investment (FDI), Official Development Assistance (ODA), Foreign Trade, Transfer of Technology and, most recently, remittances have gained prominence

in these analyses. The broader macroeconomic dynamics of migrants' long run transaction ties and their impact have of recent been given some attention. Generally, remittances can create a positive impact on the economy through various channels. The general understanding among various economic thinkers is that remittances can impact on the economy through savings, investment, growth, consumption, and poverty and income distribution. The importance of remittance flows become critical in economies with credit market imperfections as is the case in most developing countries.

One major impact of remittances is its effect on the current account of the BOP. Remittances help in raising national income by providing foreign exchange and raising national savings and investment as well as by providing hard currency to finance essential imports thereby curtailing any BOP crisis (Adelman and Taylor, 1990, Durand et al 1996a and 1996b, Claudia M. Buch et al 2002). Bank of Ghana's estimates of the balance of payments suggest that remittances place second after exports in terms of resource inflow in 2003. Essentially, the growth effect of remittances in receiving economies is likely to lead to an increase in savings and subsequently investment. Migrant workers' remittances come in as a component of foreign savings and as such complements national savings by increasing the total pool of resources available for investment.

Remittances also carry some positive effect on investment in developing countries in particular. The difficulty involved in raising enough and cheap capital to finance investment activities implies that remittance can serve this purpose. Remittances are used

to finance several social projects including school buildings, clinics and other infrastructure. In addition, return-migrants bring fresh capital that can help finance investment projects. In Ghana, migrants also send money down for the purpose of setting up small-scale business on their behalf. Aside from the income it generates, employment opportunities are created for the youth in the respective localities.

Another important macroeconomic impact of remittances is its poverty reducing and income distribution effect. This argument generally rests on the fact that the recipients of remittances are often low-income families whose offspring left the country to work abroad. In this case, migration is perceived as a response to escape poverty at home[4] and improve the income-earning capacity of the migrant by attempting to enter foreign labour markets in richer countries. At the same time, remittances serve to alleviate poverty of the family of migrants in the home country by supporting their income through transfers. The negative side of this is that remittances may create a certain "culture of dependence" on remittance incomes. This, in turn, can impair efforts to escape from poverty through

[4]However, extreme poverty may also impede emigration, as the very poor may not be able to finance the costs of migrating to a foreign country.

education and work by the recipients of remittances. The distributive effect of remittances is an important dimension of the development effects of remittances. Essentially, remittances may augment the income levels of the poor and eventually lift them out of poverty. There is a view that remittances flows have been responsible for reduction in rural poverty in Ghana based on data from the *GLSS*.

2.2.1 Migration and the Role of Remittances

Emigration is a precondition for remittances to come about and knowing who emigrates (e.g., the high skilled or the low skilled) and why is essential for understanding the size, direction and consequences of remittance flows. Answering these questions can easily be done within the domain of simple equilibrium models of migration in which wage differences are the prime driving force. Migration in this view is an adjustment mechanism between regions or countries. The volume and direction of migration are considered to be primarily driven by wage income differentials. Moving labour across borders is in this equilibrium view an arbitrage process just like physical and financial capital move across borders to reap the benefits of interest differentials, and as long as these differences in wage rates across countries there will be a pressure to migrate.

A drawback of the early literature on migration (Sjaastad 1962, Todaro, 1969; Harris and Todaro 1970) and its focus on migration as an individual choice process was that in such models there is in principle no significant role for remittances. All this changed with the so-called ‘new economics of labour migration’, as Stark and Bloom (1985) dubbed this strand in the migration literature. By moving from models where the migrant is motivated solely by individual incentives to models where individual decisions are influenced by household characteristics as well as individual characteristics, the issue of remittances arises naturally. As long as migrants remain part of the household in the country of origin interaction can continue through the transfer of income or information.

2.2.2 The Link between Remittances and Emigration

Whether receipt of remittances triggers emigration intentions of non-migrants has been spelled out to some extent in theory and either outcome – to emigrate or to stay - can be defended. Within the logic of the self- interest model receipt of remittances will have a negative effect on the emigration intentions of those staying behind. This is because remittances soften the perceived income and insurance constraints of the household so that there is no need for additional members to emigrate. The 'insurance contract' model suggests that if the contract pays off it will sustain household members to live their lives in the country of origin. A problem for the migrant-sending household arises when the contract is not lived up to by the emigrant. Sending another household member abroad involves a certain risk since the ones who stay behind become more dependent on the ones that emigrated. Subsequent emigrants from the household may also not be financially successful and fail to generate remittances or, as time goes by, feelings of commitment to the sending household and community may even diminish. Therefore much depends on the success and commitment of the emigrant(s). Controlling for the characteristics of migrants residing abroad is therefore an essential step in testing hypotheses about the effect of remittances on emigration intentions.

Another reason why remittances may trigger emigration within the self- interest model may be the information contained in the message which households get when receiving money. Remittances also represent information on migration (investment) opportunities. For those staying behind it may well be a signal that it pays to emigrate. And when information on the destination countries is imperfect and uncertain it helps to have a reliable information source abroad. In other words, the money sent home by migrants

'talks'. Remittances contain additional information, which enlarge or dampen the great expectations about countries of destination.

The above view on the link between migration and remittances represents the viewpoint of the (head of the) household having command over its members living abroad. One can also take the viewpoint of the emigrant who may have ulterior motives in sending remittances. For instance, Stark (1999) argues that migrants may wish others not to follow in their steps, and these first movers would be willing to pay them to stay put. The intuition behind the flow of remittances is quite simple: remittances protect the wage income of high-skilled emigrant workers from being 'contaminated' by the presence of low-skilled workers in the same pool. In other words: the decision for migrants to remit is not motivated by altruistic considerations but rather by pure self interest. Within that context, the intention to emigrate should be significantly lower among household members in remittances-receiving households than such intentions of persons in non-receiving households.

However, Stark and Wang (2002) examine another mechanism which reverses the previous prediction. The insight is essentially based on the idea that employers in the country of destination distinguish between skill types of migrants. Under those circumstances, the first-mover migrants - assumed to be high-skilled or highly entrepreneurial - will be willing to pay low-skilled migrants to follow in their footsteps and join them. High-skilled migrants draw benefits from a skill dilution of the pool of migrant workers. Testing this idea would imply that persons living in households that

have received remittances would have a higher probability to emigrate than persons living in households that did not receive anything. In addition to this straight-forward prediction, one would also need to test the prediction that recipients would be lower skilled than the emigrant-remitter. The latter prediction would imply quite detailed information on household relations, information that is unfortunately lacking in our data set.

In testing these theories one also needs to control for the complexity of migration decision making within the household context. One of the complexities refers to the networks which migrants maintain with the country of origin. Network externalities (Bauer et al. 2002; Epstein and Gang, 2005) influence whether, when and where new emigrants migrate to. For instance, the presence of emigrated relatives abroad generally lowers the costs and risks of migration for family and friends who stayed behind because emigrants in the destination countries may provide relevant information on travel to and arrival in places of destination, they may provide temporary housing, loans and be of help in finding paid work (Boyd 1989; Massey et al. 1999; Rotte and Vogler 2000). Thus, size, nature and quality of the migrant-network determines the effect that networks have on emigration intentions in migrant-sending households in origin countries and the likelihood of receiving remittances (Bauer et al. 2000).

2.2.3 Productive Uses of Remittances

In Ghana currently, remittances for investment purposes are mostly channelled into small-scale businesses/enterprise (IEA in 2003). The opportunity to promote self-

employment and small business formation amongst returning migrants and their relations back home has been recognized by some governments and international organizations, which have targeted schemes to assist investment in business activities. In order to promote the investment of remittances in business enterprises therefore, there is an increasing need for the government of the day to provide enough incentives for migrant workers to invest in productive activities here in Ghana.

It is significant to emphasize that while the contributions of remittances can be huge with positive growth effects, the very act of the citizens migrating can also create some negative growth effects. This negative growth effect will, however, depend to a large extent on the type of migrant that left home, the state of labour markets and the productivity of the migrant. It can be argued that, if the migrant was an unskilled worker of low productivity, or an unemployed person, reflecting slack or excess supply in the labour market, then the effect of migration on output in the home country is bound to be small. In contrast, if the emigrant is a highly skilled worker as is the case of general exodus of medical professionals in Ghana, an information technology expert or an entrepreneur with a high direct and indirect contribution to output for example, then the adverse growth effect of emigration is bound to be large. The permanency of remittance flows as well as the macroeconomic importance would mean, however, that the adverse effects of migration might only be a short-term phenomenon.

It is significant to note that the positive macroeconomic or developmental effects of remittances could become more prominent if migrants form associations and their commitment to their home country becomes “institutionalised”. A typical example of

such migrant associations is the Home Town Associations (HTAs) in the United States, where organized migrants from various Latin American countries such as El Salvador, Guatemala, Honduras, Mexico and the Dominican Republic come together and regularly send donations to finance investment for community projects in their home countries (See Ellerman, 2003). All these initiatives help in supplementing government savings to finance small community projects.

2.2.4 Stability of Remittances in the Economic Cycle

As mentioned in the previous section, worker remittances are more stable than portfolio investments and bank credit. Remittances can even be counter-cyclical. The different motives reviewed above can shed some light in explaining this behaviour. In the model of remittances based on altruism, the migrant can increase his remittances when there is an economic downturn in the home country (as income of the migrant's family declines). In this case, a remittance would be the equivalent of a private 'welfare payment' sent from abroad to help smooth consumption of the recipient at home.

However, business cycles may be internationally synchronized. The growing economic interdependencies of globalization make this a more plausible case. In this situation, a recession in the receiving country may be positively correlated with a recession in the source country, so that the ability of the immigrant worker to send remittances may be hampered by economic conditions in the host country. This is a real possibility, although the sender may also draw on existing savings to maintain a steady flow of remittances.

If remittances were driven by the portfolio decisions of the migrant (remittances driven by investment), again the relevant issue would be the correlation between the rate of return of the assets in the host country and the rate of return on the assets at home. Here international correlation of the business cycle matters, as does the degree of financial integration between the source and the receiving country. In the model of remittances as mechanisms of co-insurance, risk diversification may call for a steady flow of remittances if business cycles are not fully correlated between the source and the receiving country.

2.2.5 The Development Impact of Remittances

Remittances have a potential positive impact as a development tool for the recipient countries. The development effects of remittances can be decomposed into its impact on savings, investment, growth, consumption, and poverty and income distribution. The *impact on growth* of remittances in the receiving economies is likely to act through savings and investment as well as short-run effects on aggregate demand and output through consumption. Also the indirect effect of migration on output depends on the productivity level of the emigrant in the home country before departure. The *total saving effect* of remittances comes from the sum of foreign savings and domestic savings effects.

Worker remittances are a component of foreign savings and they complement national savings by increasing the total pool of resources available for investment. Part of the savings effects of remittances takes place in the 'community'. In fact, migrants associations, often called hometown associations (HTAs) in the United States, organize migrants from various Latin American countries such as El-Salvador, Guatemala,

Honduras, Mexico and the Dominican Republic. HTAs regularly send donations to finance investment for community projects and local development in the home countries. Migrants associations of former El Salvadorians send home donations of about US$10,000 per year. These are small numbers but in the recipient countries these sums can still have an impact. Migrant associations of Mexicans send home between US$5,000-25,000 per year (see Ellerman 2003). In the Mexican state of Zacatecas, the federal and local governments match every dollar donated by HTAs to local projects (it may be a two-for-one or three-for-one) oriented to small infrastructure projects: water treatment, schools, roads, parks, etc. Through this programme, more than 400 projects in Zacatecas have been completed in eight years. Total investment made by migrants to these projects amounts to around 4.5 million dollars (World Bank, 2002). Through these associations, public savings are mobilized along with remittances to finance small community projects.

The previous discussion suggests that the direct effects of remittances on investment are bound to be on small community projects. Ratha (2003) cites positive effects of remittances on investment in such receiving countries as Mexico, Egypt and SSA, where remittances have financed the building of schools, clinics and other infrastructure. In addition, return-migrants bring fresh capital that can help finance investment projects.

Remittances also finance consumption; thus, private savings will increase proportionally less than an increase in income from external remittances. A study of remittances for Ecuador (Bendixen and Associates, 2003) shows that around 60 per cent of remittances to that country are spent on food, medicine, housing rent and other basic commodities. The

study shows that less than 5 percent of remittances are used for the acquisition of residential property. The combined effects of remittances on investment and consumption can increase output and growth. The sustainability of this effect is an open discussion. If remittances are a response to recent migration, remittances may be transitory and thus their effect on investment, consumption and growth can be more of a temporary nature. In contrast, if migrants form associations and their commitment to their home country becomes 'institutionalized', then the positive developmental effects of their remittances may become more permanent.

The indirect growth effect of remittances on growth (or output) depends on the type of emigrant leaving home, the state of the labour market and the productivity of the emigrant. If the emigrant is unskilled with low productivity, or an unemployed worker, reflecting slack and excess supply in the labour market, then the effect of emigration on output in the home country is bound to be small. In contrast, if the emigrant is a highly skilled worker, an information technology expert or an entrepreneur with a high direct and indirect contribution to output, the adverse growth effect of high-skilled emigration is bound to be large (see Solimano 2001, 2002). One negative effect of (substantial) remittances is the possibility that they produce the so-called 'Dutch disease' effect. In countries receiving substantial sums of remittances, there is a tendency for the real exchange rate to appreciate which then penalizes nontraditional exports and hampers the development of the tradable goods sector.

Remittances may also have a poverty reducing and income distribution effect. As mentioned before, the recipient of remittances is often a low-income family whose offspring has left the country to work abroad. In a way, emigration is a response to escape poverty at home and to improve the income-earning capacity of the emigrant by attempting to enter a foreign labour market in a richer country. At the same time, remittances serve to alleviate the poverty of the migrant's family in the home country by supplementing its income through transfers. The negative side of this is that remittances may create a 'culture of dependence' on the income from remittances. This, in turn, can impair the efforts of the recipients of remittances to escape poverty through education and work.

The distributive effect of remittances is another dimension of the development effects of remittances. Stark (1991) studies the effects of remittances on domestic inequality in two Mexican villages near the border with the US in which villagers engage in internal rural-urban migration as well as in migration to the United States. The study finds that remittances from internal migrants are correlated more with the years of schooling than remittances from international migrants to the United States, as the later often go to low-skilled labour-intensive jobs. Stark (1991) generalizes that the inequality impact of changes in remittances depends on the remittance recipients' position in the village's income distribution scale, the share of remittances in the village incomes and the distribution of the remittances themselves. These variables in turn depend on the distribution of human capital (education and skills) among the villagers and the migration opportunities of the villages. Another piece of evidence is provided by Ratha (2003) who

reports that for Pakistan, a household data survey shows that the share of income originating from external transfers increases with the income level (the highest share of income receives the largest share of external income from remittances). However, income distribution between countries may eventually improve with remittances, as income is redistributed from source countries with a higher income level to receiving countries with a lower income per capita.

Remittances also represent a very significant share of GDP in several low-income countries. A final remark here is that, the development effect of remittances depends on the 'life-cycle' of the whole migration process at the country level. In fact, for growing economies with rising per capita incomes, differentials across countries in the income per head will diminish, reducing the incentives for emigration. Thus the relative importance of remittances is likely to decline as a country moves up ladder of development. This is valid mainly for remittances from low-skilled migrants, however. In the case of highly skilled well-educated individuals, migration flows at the high per capita income levels are likely to continue, an observation seen within the European Union or between Europe and the US. In this case, remittances may continue although their economic effects are probably quite different than those discussed earlier when the recipients of the remittances are developing countries.

2.3 Issues on Migrant Remittances and Household Welfare

Remittances are usually viewed as private financial aid that flow directly into the hands of households and the fact that they tend to be counter-cyclical seem to suggest that very

often they serve as an important source of both income and consumption smoothing strategies for vulnerable poor and non-poor households. Similarly, the literature analyzing the impact of remittance flows show that these flows are beneficial at all levels, namely, the individual, household, local community and national level and goes to suggest that if well managed it can help reduce poverty at these four levels. Buch and Kuckulenz (2004) also report that worker remittances constitute an increasingly important mechanism for the transfer of resources from developed to developing countries and remittances are the second-largest source, behind foreign direct investment, of external funding for developing countries.

The economic impact of remittances has been considered beneficial at both the micro and macro levels at least in the short term and there is increasing evidence that remittances from abroad are crucial to the survival of communities in many developing countries (Blankson and Quartey, 2003). However, there is scant literature available on the method and techniques for assessing the magnitude of both the micro and macro economic impact of remittances. The relevant literature available mainly concentrates on the main uses to which remittances are applied and also its impact on poverty, income inequality, and developments with little or no reference to economic shocks to income.

Unanticipated economic shocks[5] affect consumption through income. The mechanisms households may employ to smooth out the impacts of such shocks can take different forms. One such means is to spend accumulated household wealth (Deaton, 1992). However, there are many other mechanisms that individuals and households might employ to smooth fluctuations in consumption.

Households may seek to reallocate resources across time, by for example, borrowing from the formal financial markets (Rosenzweig and Wolpin, 1993; Udry, 1994). Households may also change the allocation of resources in any period and this might involve reallocating consumption expenditure away from more durable and deferred expenditure items.

A much more important and recent consumption smoothing mechanism is by sharing risk among people within an economy or across countries through private transfers. In the case of private inward remittances, an unanticipated economic shock such as a fuel price increase or low rainfall recorded during the farming season, or elimination of agricultural subsidies (on inputs such as fertilizer etc) will lead to low output and income shortfalls. Households with relations abroad are likely to be remitted to augment their income and thereby reduce the impact of the shock on welfare. Similarly, a decline in rainfall patterns will lead to low agricultural output which will in turn affect both rural and urban households disproportionately. In the case of rural households, the decline in yield will

[5]Defined as low agricultural output due to poor rainfall, declines in real wages due to inflation, frequent terms of trade shocks, volatility in public consumption, and volatility of credit to the private sector etc

lead to a decline in farm income which will then affect consumption and hence welfare. Similarly, urban households will experience a rise in food prices and since food accounts for a greater proportion of household budgets in Ghana, household welfare will decline unless incomes are augmented with migrant remittances or other means discussed above.

Despite the importance of remittances for consumption smoothing and also as a source of investment capital, there has not been any formal test of the impact of remittances on

households in times of macro-economic volatility. However, there has been growing literature examining how migrant workers' remittances can affect households. Among these studies, some have documented how migrants have contributed to economic and social development in their country of origin. Thus, evidence suggests that remittances from abroad are crucial to the survival of communities in many developing countries as indicated in an IMF Country Analyses report by Russell et al (1990). One benefit expected from labour emigration was that migrants would be bringing an impetus to investments, transfer of technology and machinery and new enterprises. Thus, Russell et al (1990) concluded that 'once subsistence needs are satisfied; migrants do use remittances for investment purposes including education, livestock, farming, and small scale enterprise'. Taylor (1996) has also argued that remittances have multiplier effects that work to increase national income. In a study on Senegal, Diatta and Mbow (1999), found that remittances were a substantial source of revenue for families with migrant members, and were also used to promote development in migrants' home communities.

Remittances also significantly affect welfare. Koc and Onan (2001)[6] studying the impact of remittances on the standard of living of left-behind families in Turkey argue that remittances have a positive effect on household welfare. Their study shows that remittances have both direct and indirect income effects, which potentially have important influences on production, income inequality and poverty, at least at the local level. Their study also shows that twelve percent (12%) of households used about eighty

percent (80%) of remittances to improve their standard of living though it is argued that dependency on the same leaves households vulnerable to changes in migration cycles.

Migrant remittances also serve as a source income for savings and investment and this is confirmed by Taylor (1996). He found that remittances contribute to savings and investments thereby leading to growth and development of any economy, and this is corroborated by Findley and Sow (1998) in a study on Mali. They report that remittances not only covered basic food and cash needs but also allowed to pay for irrigation in agriculture. Recent work in Somaliland has highlighted investment of remittances in production even in highly unfavourable economic and political conditions (Ahmed, 2000). Similarly, Kannan and Hari (2002) studying the macroeconomic impacts of remittance flows in India indicate that remittances have made significant impact on savings.

Migrant remittances also affect the stability of the exchange rate and inflation, depending

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[6]Their study was based on data from the *1996 Turkish International Migration Survey* (TIMS-96)

on how the inflows are managed. For instance, Amuedo-Doranates and Pozo (2002) testing the impact of workers' remittances on real exchange rate using a panel of 13 Latin American and Caribbean nations argue that workers' remittances have the potential to inflict economic costs on receiving economies. Their analysis revealed that these flows in the form of gifts usually causes growth of parallel foreign exchange markets resulting in the appreciation of the real exchange rate and also creates dependency on unreliable sources of foreign exchange that are subject to cyclical fluctuations. In a related study,

Swanson (1979) has also posited that though remitted earnings may prove to be useful in balance of payments problems, they generally contribute little to economic growth.

Whilst some researchers hold the view that remittance flows reduce income inequality between the rich and the poor others are however of the view that the reverse is true because, it is the rich that are able to get their family members to migrate. Adams (1991), in a study based on a survey of 1000 households in rural Egypt used income data from households with and without migrants to determine the effects of remittances on poverty, income distribution and rural development and found that although remittances were helpful in alleviating poverty, paradoxically they also contributed to inequality in the distribution of income. On the contrary, Gustafson and Makonnen (1994) found that in Lesotho, migrant remittances actually decrease inequality. Chimhowu et al (2004) supports the view that remittances do increase inequality at the local level, but at the international level they transfer resources from developed to developing countries and so help to reduce inequality.

Remittances have also served as a form of social insurance for migrants. In an earlier work by Stark (1991) it was argued that if remittances are seen as premium payments for future risks then it can be argued that they allow both parties to secure their livelihood in the event of external shocks, which may be in the form of loss of employment and drought occurring. Taylor (1999) argues that remittances may serve as a form of insurance policy against risks. Thus, remittances are counter-cyclical. Hulme et al, (2001) however suggest that for remittances to serve as a form of premium payment for future

risks, these flows should enable households accumulate assets that reduce vulnerability to financial shocks and to gain access to entitlements such as education and health that contribute to livelihood security and sustainability. This view point is corroborated by Azam and Gubert (2002) in their study on the impact of remittances using historical and anthropological surveys on recipients in Africa. In particular, they examined the Soninke labour migration, and interpret it as a means of diversifying risk in a context of missing insurance and credit markets. This is supported by a study by Amuedo-Doranates and Pozo (2002) when they investigated whether remittance flow serve as insurance for Mexican migrants. They argued that remittances are, in part, transferred to the home country to "purchase" family-provided insurance and self-insurance and they find that increases in income risk significantly increases both the propensity and the proportion of labour earnings sent home for family-provided insurance as well as for self-insurance.

Ratha (2003) also corroborates the point that migrants may increase remittances in times of economic hardship, especially in low-income countries where their families may depend significantly on remittances as a source of income and may live at close to subsistence levels. Ratha further argues that economic downturns may also encourage workers to migrate abroad and thereby begin to transfer funds to families left behind. He further argues that while capital flows tend to rise during favourable economic cycles and fall in bad times, remittances appear to react less violently and show remarkable stability over time. For example, he shows that remittances to developing countries continued to rise steadily, especially during 1998-2001, a period characterized by a decline in private capital flows in the wake of the Asian financial crisis. Thus, remittances augment the

recipient individuals' incomes and increase the recipient country's foreign exchange reserves thus they offset some of the output losses or economic shocks that a developing country may suffer from emigration of its highly skilled workers.

Negative economic shocks tend to have spill-over effects on various sections of an economy, the poor suffer disproportionately from shocks because they generally have limited savings and access to credit; they rely heavily on public social services, which deteriorate as spending becomes constrained; and their limited skills mean higher income shortfalls. The shocks that hit low-income countries most frequently include natural disasters and large fluctuations in export or import prices. Natural disasters damage a country's stock of physical and human capital and reduce income and output, while fluctuating prices for a country's exports reduce income in the private and public sectors.

Other types of external shocks can also be very costly. Conflicts in one country can spill over to neighbouring countries and create refugee problems, losses in export markets, higher transportation costs, lower remittances, and even conflict contagion and increased defense expenditures (See Happe et al, 2003).

In addition to physical damage and income losses, Happe et al (2003) indicate that these shocks also have indirect effects that can reverberate through an economy, hampering output and investment, upsetting macroeconomic balances, and increasing debt and poverty over a number of years. The type and magnitude of indirect effects will depend on the size and duration of a shock, whether measures were taken in advance to mitigate its impact, the government's policy response, and the amount and form of external assistance a country receives. However, estimating these effects can be tricky because it

is difficult both to identify the channels through which they are transmitted and to isolate the magnitude of their impact, especially when more than one shock has affected an economy or when an economy is recovering from a prior shock. Through direct and indirect effects, shocks can significantly impede growth.

In spite of efforts by low-income countries to raise growth rates in recent years, their vulnerability to such shocks continues to remain enormous. Other sources of inflows are of great need if their vulnerability is to be reduced significantly in order to absorb such shocks. In this vein Glytsos (2002) reiterates that given the persistent problems in the balance of trade in less developed countries including the limited effect of foreign aid, and the difficulties of borrowing, the often huge amounts of migrant remittances can substitute for the inadequacies of these forms of foreign exchange.

Several studies have attempted to model the macro-economic determinants of remittance inflows as well as quantifying its effects on the domestic economy. Klerk and Drinkwater (2001) posit that there are good reasons for adopting a disaggregated perspective. They argue that the analysis of aggregated data becomes problematic since not all remittances flow through official channels and this supports earlier work by Chandavarkar (1980) where it was argued that factors such as the difference between official and black market exchange rates lower the probability that a transfer is reported. There is therefore the need to use microeconomic data to model remittance behaviour because of the inability of macro-models to control for individual and demographic differences (Faini, 1994).

The importance of remittances has also been examined empirically in terms of its impact on poverty. Adam and Page (2003) using data from 74 low and middle-income developing countries found that international migration has a strong statistical impact on reducing poverty; on average, a 10% increase in the share of international migrants in a country's population will lead to a 1.9% decline in the share of people living in poverty. Thus, international remittances strongly affect poverty and they tend to minimize the negative effects of economic shocks in an economy.

A number of studies carried so far on migrant remittances flow to Ghana have however been mainly focused on the uses to which these funds are put, with less emphasis on the assessment of its magnitude and impact on households, particularly in times of shocks. In a much earlier study of internal migration in Ghana, Caldwell (1969) found that migrants spent remittances to pay for schooling and wages of farm labourers, and to develop small businesses. Also, a survey conducted by the Sussex Centre for Migration Research in Ghana, particularly in the Ashanti Region in March 2003 identifies three main uses to which remittance flows are applied. First, remittances are used to satisfy individual needs such as satisfying consumption needs, organizing funerals and meeting other pressing social needs. The second motive is to support social projects in migrants' originating communities. The third motive identified to be less common but perhaps the most important for the promotion of economic development is for productive investments. Under this third category, the most common is for migrants to invest in businesses of their relations in their home country.

A more recent study by Litchfield and Waddington (2003) on Ghana also examined the welfare outcomes of migrants and non-migrants in Ghana using Ghana Living Standards Survey (*GLSS*) data and found that migrant households have statistically significantly higher living standards than non-migrants though there appears to have been a slight decline in the extent of migration over the decade.

In conclusion, despite the conflicting results of the impacts of remittance flows, an overwhelming amount of the empirical literature suggest remittances make a powerful contribution to reducing vulnerability at least at the household and local community levels. It is important to emphasize, however, that much of the effects are seen at the household level suggesting that remittances underpins the welfare of households. Thus as much as it is important to assess the impact of remittance flows at the national and community levels it is more important to consider the assessment of the impact at the household level to direct policy since it has the potential for reducing overall poverty and the vulnerability of the poor to macroeconomic volatility. In sum, the literature suggests that remittances have more positive than negative impacts.

CHAPTER THREE

RESEARCH METHODOLOGY AND BACKGROUND TO THE STUDY

3.0 Introduction

The methodology adopted for the study is discussed in this chapter. The chapter is divided into two main sections. The issues discussed include the econometric framework for the study (i.e. model specification, unit root tests and cointegration analysis) and data definitions and sources.

3.1 Econometric Framework

3.1.1 Model Specification

The main purpose of this study is to assess the impact of external remittances on poverty reduction in Ghana. Thus there is the need to specify a poverty equation and incorporate into it remittances in order to find the impact of the latter on the former. It must however, be noted that, aside remittances there are other determinants of poverty which are also captured in this study.

It must be emphasized that, there is not much guidance available from theory regarding the appropriate specification for the poverty determinants. However, basing on recent cross-country empirical works on poverty (Dollar and Kraay, 2002 and Berg and Krueger, 2003), this study postulate a poverty equation as follows:

$$Pov = f(RGDP, IN, REMIT, X) \quad (1)$$

where *Pov* is the poverty measure; *RGDP*= Real Gross Domestic Product (a proxy variable for economic growth), *IN* is the inequality, *REMIT* is remittances and *X* is the control variables. The control variables (*X*) include human capital (*H*), inflation (*INF*), openness (*OPENNESS*) and a dummy (*D*) which is expected to proxy constitutional regime.

Thus an explicit estimable econometric model is formulated as follows:

$$InPov_t = \beta_0 + \beta_1 InRGDP_t + \beta_2 InIN_t + \beta_3 InREMIT + \beta_4 InH_t + \beta_5 InINF_t + \beta_6 InOPENNESS_t + \beta_7 D_t + \varepsilon_t \quad (2)$$

Where all variables are as previously defined except ε, which represents the usual error term, t, is time and *In* denotes natural logarithm. All variables are in natural logarithm.

Log transformation can reduce the problem of heteroscedasticity because it compresses the scale in which the variables are measured, thereby reducing a tenfold difference between two values to a twofold difference (Gujarati, 1995). It is important to note that the model is a multiplicative one where all parameters (coefficients) represent constant elasticities.

Theoretically, remittance is expected to have a positive effect on poverty reduction. Thus an increase in remittances can directly lead to poverty reduction, ceteris paribus. Consequently, the study expects the coefficient of remittances to be negative (i.e. $\beta_3 < 0$) on a priori and theoretical grounds. However, if remittances significantly do not reduce poverty, the coefficient of remittances is expected to be positive. The study is however; interested in testing whether the impact of remittances on poverty reduction is statistically significant. Over and above the direct impact, remittances can have indirect effect on poverty reduction since they can affect economic growth and human capital, both of which are key determinants of poverty equation.

For other control variables, real *GDP* is expected to have a positive effect on poverty reduction, hence a negative coefficient real *GDP* is expected while; income of the poor tends to grow proportionally with per capita growth.

The worsen income distribution and an increase in inflation tend to have a negative impact on poverty reduction so that their coefficients are expected to be positive $(\text{i.e. } \beta_2, \beta_5 > 0)$. While an increase in human capital factor increases opportunity of the

poor to generate income, the coefficients associated with these variables are expected to be negative (i.e. $\beta_4 < 0$).

The coefficient associated with trade openness to poverty reduction is ambiguous (Berg and Krueger, 2003). On the one hand, trade liberalization could benefit the poor at least as much as the average person. Trade liberalization could increase the relative wage of low-skilled workers and reduce monopoly rents and the value of connections to bureaucratic and political power. On the other hand, trade liberalization might also worsen the income distribution, particularly by encouraging the adoption of skill-biased technical change in response to increased foreign competition. Thus, if trade liberalization worsens the income distribution enough, particularly by making the poor poorer, then it is possible that it is not after all good for poverty reduction, despite its positive overall growth effects. A number of empirical studies using panel and cross-section data (e.g. Edwards, 1997; Ghura *et al*., 2002; Dollar and Kraay, 2004) found no link between openness and the well-being of the poor beyond those associated with higher average per capita income growth. Consequently, the coefficient of trade openness is unrestricted.

A regime of constitutional rule ensures well functioning democratic institutions, which is a precondition for a favourable investment climate and hence economic growth. Non-constitutional transfers of executive power (i.e. coups) are particularly likely to increase uncertainty (Stasavage, 2002). Thus, a socio-politically stable environment where property rights and contracts are enforced through a properly functioning judicial system

will have a positive impact on poverty reduction. Thus, the dummy variable in the model is expected to be negative.

3.2 Unit Root and Cointegration Tests

3.2.1 Unit Root Procedure

While the bounds test for cointegration does not depend on pre-testing the order of integration, the variables need to either be *I*(0) or *I*(1) or mutually integrated and not *I*(2). Hence the need to test for unit root to ascertain the absence or otherwise of *I*(2) variables cannot be overemphasized. Thus in the first stage of testing for co-integration, the study tests for the time series properties of the variables that enters the poverty model to avoid the estimated coefficients being spurious by employing the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests proposed by Dickey and Fuller (1979; 1981) and Phillips and Perron (1988). Since the error term in the Dickey-Fuller (DF) test might be serially correlated, the possibility of such serial correlation is eliminated in the following Augmented Dickey-Fuller model (ADF):

$$\Delta y_t = \mu + \delta y_{t-1} + \sum_{i=1}^{k} \beta_i \Delta y_{t-1} + e_t \qquad (3)$$

where $\delta = \alpha - 1$

The null hypothesis of ADF is $\delta = 0$ against the alternative hypothesis of $\delta < 0$. Non-rejection of the null hypothesis implies that the time series is non-stationary whereas rejection means the time series is stationary. Phillips and Perron (PP) have suggested a non-parametric test as an alternative to the ADF test, though it also tests a null hypothesis of unit root. Phillips (1987) and Perron (1988) unit roots test use non-parametric methods

to adjust for serial correlation and endogeneity of regressors thereby preventing the loss of observations implied by the augmented Dickey-Fuller test. Again, the usefulness of the PP test over the ADF is that it allows for the possibility of heteroskedastic error terms (Hamilton, 1994).

3.2.2 Co-integration Analysis

The objective of the present section is to use an appropriate method in order to empirically evaluate the theoretical and empirical propositions illustrated above. Knowledge from time-series analysis shows that the use of first-differenced (stationary) variables in regression models is required to reduce the spurious results that are likely to arise when the variables are specified in their level (non-stationary) form. However, use of variables in their differenced form removes (long-run) information from the data, resulting in a model that can only provide partial (short-run) information on the relationship between the variables. Further, by not accounting for the potential long-run relationship among the variables, models constructed using only differenced data may be misspecified should there exist such long-run influences, resulting in biased parameter estimates. To avoid such problems, one must test to determine whether a long-run relationship, exists between the variables in the model. Therefore, in the present context, application of cointegration technique would enable us to examine the long-run equilibrium relationship between poverty and its determinants. The technique would also enable us to trace out the long-run and short-run response of poverty to its determinants.

The cointegration literature has expounded different methods of testing for the existence of long-run relationship among economic variables. These methods include the residual-based cointegration test by Engle and Granger (1987), the maximum likelihood based Johansen test (1988; 1991) and Johansen and Juselius (1990; 1992) tests. These tests have been identified to give contradictory results and also provide less robust estimates. The residual-based cointegration tests are inefficient and can lead to conflicting results, especially when there are more than two *I*(1) variables under consideration (Pesaran and Pesaran, 1997). The Johansen (1988; 1991) and Johansen and Juselius (1990) approaches are used in multivariate cases, where cointegrating vectors and rank have to be determined.

3.2.3 The ARDL Cointegration Approach

A large number of past studies have used the Johansen cointegration technique to determine the long-term relationships between variables of interest. In fact, this remains the technique of choice for many researchers who argue that this is the most accurate method to apply for *I*(1) variables. Recently, however, a series of studies by Pesaran and Shin (1996); Pesaran and Pesaran (1997); Pesaran and Smith (1998) and Pesaran et al. (2001) have introduced an alternative cointegration technique known as the 'Autoregressive Distributed Lag' (ARDL) bound test. This technique has a number of advantages over Johansen cointegration techniques. First, the ARDL model is the more statistically significant approach to determine the cointegration relation in small samples (Ghatak and Siddiki 2001), while the Johansen co-integration techniques require large data samples for validity.

A second advantage of the ARDL approach is that while other cointegration techniques require all of the regressors to be integrated of the same order; the ARDL approach can be applied whether the regressors are $I(1)$ and/or $I(0)$. This means that the ARDL approach avoids the pre-testing problems associated with standard cointegration, which requires that the variables be already classified into $I(1)$ or $I(0)$ (Pesaran et al, 2001).

If we are not sure about the unit root properties of the data, then applying the ARDL procedure is the more appropriate model for empirical work. As Bahmani- Oskooee (2004) explains, the first step in any cointegration technique is to determine the degree of integration of each variable in the model but this depends on which unit root test one uses and different unit root tests could lead to contradictory results. For example, applying conventional unit root tests such as the Augmented Dickey Fuller and the Phillips-Perron tests, one may incorrectly conclude that a unit root is present in a series that is actually stationary around a one-time structural break (Perron, 1989; 1997) The ARDL approach is useful because it avoids these problems.

Yet another difficulty of the Johansen cointegration technique which the ARDL approach avoids concerns the large number of choices which must be made: including decisions such as the number of endogenous and exogenous variables (if any) to be included, the treatment of deterministic elements, as well as the order of vector autoregressive (VAR) and the optimal number of lags to be used. The estimation procedures are very sensitive to the method used to make these choices and decisions (Pesaran and Smith 1998).

Finally, with the ARDL approach it is possible that different variables have different optimal numbers of lags, while in Johansen-type models this is not permitted.

According to Pesaran and Pesaran (1997), the ARDL approach requires the following two steps. In the first step, the existence of any long-term relationship among the variables of interest is determined using an F-test. The second step of the analysis is to estimate the coefficients of the long-run relationship and determine their values, followed by the estimation of the short-run elasticity of the variables with the error correction representation of the ARDL model. By applying the ECM version of ARDL, the speed of adjustment to equilibrium will be determined.

In order to implement the bounds test procedure for cointegration, the following restricted (conditional) version of the ARDL model is estimated to test the long-run relationship between poverty and its determinants:

$$\Delta InPov_t = \alpha_0 + \sum_{i=1}^{n} \beta_i \Delta InRGDP_{t-1} + \sum_{i=1}^{n} \phi_i \Delta InIN_{t-1} + \sum_{i=1}^{n} \delta_i \Delta InREMIT_{t-1} + \sum_{i=1}^{n} \gamma_i \Delta InH_{t-1}$$
$$+ \sum_{i=1}^{n} \varphi_i \Delta InINF_{t-1} + \sum_{i=1}^{n} \mu_i \Delta InOPENNESS_{t-1} + \sigma_1 InPov_{t-1} + \sigma_2 InRGDP_{t-1} + \sigma_3 InIN_{t-1}$$
$$+ \sigma_4 InREMIT_{t-1} + \sigma_5 InH_{t-1} + \sigma_6 InINF_{t-1} + \sigma_7 InOPENNESS_{t-1} + \sigma_8 D_{t-1} + \varepsilon_t \qquad (4)$$

where all variables are as previously defined and Δ is the first difference operator. The parameters $\beta, \phi, \delta, \gamma, \varphi$ and μ denote the short-run dynamics of the model to be estimated via the error correction framework and $\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6$ and σ_7 represent the long-run

parameters. α_0 is the constant term (drift) in the ARDL model and ε_t is the white noise error term.

The *ARDL* method estimates $(p+1)^k$ number of regressions in order to obtain the optimal lags for each variable, where *p* is the maximum number of lags to be used and *k* is the number of variables in the equation. Since annual data is used, 1 lag is selected as the maximum lag (*p*) following Pesaran and Pesaran (1997). The optimal model can be selected using the model selection criteria like Schwartz-Bayesian Criterion (SBC) and Akaike Information Criterion (AIC). In this study, the optimal model is selected on the basis of their predictive power by comparing the prediction errors of the models. To ascertain the appropriateness of the *ARDL* model, the diagnostic and the stability tests will be conducted. The first step in the *ARDL* bounds testing approach is to estimate equation (4) by ordinary least squares (OLS) in order to test for the existence of a long-run relationship among the variables by conducting an F-test for the joint significance of the coefficients of the lagged levels of the variables, i.e.,

$H_N : \sigma_1 = \sigma_2 = \sigma_3 = \sigma_4 = \sigma_5 = \sigma_6 = \sigma_7 = 0$, against the alternative

$H_A : \sigma_1 \neq \sigma_2 \neq \sigma_3 \neq \sigma_4 \neq \sigma_5 \neq \sigma_6 \neq \sigma_7 \neq 0$. We denote the test which normalizes on *Pov* by $F_{Pov}(Pov / RGDP, IN, REMIT, H, INF, OPENNESS)$. Two asymptotic critical values bounds provide a test for cointegration when the independent variables are *I*(d) (where $0 \leq d \leq 1$): a lower value assuming the regressors are *I*(0) and an upper value assuming purely I(1) regressors. If the F-statistic is above the upper critical value, the null hypothesis of no long-run relationship can be rejected irrespective of the orders of integration for the time series. Conversely, if the test statistic falls below the lower

critical value the null hypothesis cannot be rejected. Finally, if the statistic falls between the lower and upper critical values, the result is inconclusive. However, given that Pesaran's critical values are based on simulated large sample size; this study uses the critical values developed by Narayan (2004) since it is more appropriate for small samples.

Once cointegration is confirmed, the next stage is to estimate the long-run coefficients of poverty function and the associated ARDL error correction models. In the second step, once cointegration is established the conditional ARDL $(p, q_1, q_2, q_3, q_4, q_5, q_6, q_7)$ long-run model for *Pov* can be estimated as:

$$InPov_t = \alpha_0 + \sum_{i=1}^{p} \sigma_1 InPov_{t-i} + \sum_{i=1}^{q_1} \sigma_2 InRGDP_{t-i} + \sum_{i=1}^{q_2} \sigma_3 InIN_{t-i} + \sum_{i=1}^{q_3} \sigma_4 InREMIT_{t-i} + \sum_{i=1}^{q_4} \sigma_5 InH_{t-i}$$
$$+ \sum_{i=1}^{q_5} \sigma_6 InINF_{t-i} + \sum_{i=1}^{q_6} \sigma_7 InOPENNESS_{t-i} + \sum_{i=1}^{q_7} \sigma_8 D_{t-1} + \varepsilon_t \qquad (5)$$

where all variables are as previously defined. The estimation of (5) involves selecting the orders of the ARDL $(p, q_1, q_2, q_3, q_4, q_5, q_6, q_7)$ long-run model using the Akaike Information Criterion (AIC).

In the third and final step, we obtain the short-run dynamic parameters by estimating an error correction model associated with the long-run estimates. This is specified as follows:

$$\Delta InPov_t = \alpha_0 + \sum_{i=1}^{n} \beta_i \Delta InPov_{t-i} + \sum_{i=1}^{n} \delta_i \Delta InRGDP_{t-i} + \sum_{i=1}^{n} \varphi_i \Delta InIN_{t-i} + \sum_{i=1}^{n} \gamma_i \Delta InREMIT_{t-i}$$
$$+ \sum_{i=1}^{n} \phi_i \Delta InH_{t-i} + \sum_{i=1}^{n} \eta_i \Delta InINF_{t-i} + \sum_{i=1}^{n} \lambda_i \Delta InOPENNESS_{t-i} + \vartheta ecm_{t-1} + \varepsilon_t \qquad (6)$$

Here $\beta, \delta, \varphi, \gamma, \phi, \eta$ and λ are the short-run dynamic coefficients of the model's convergence to equilibrium and ϑ is the speed of adjustment to long-run equilibrium following a shock to the system.

3.3 Data Sources and Definition

3.3.1 Data Sources

The study employed mainly secondary sources of data for its analysis over the period 1980-2002. The data were drawn from the World Bank's World Development Indicators, 2004 (CD-ROM) IMF's International Financial Statistics CD-ROM (various issues) and Penn World Tables (6.2), State of the Ghanaian Economy by ISSER (various issues), Quarterly Digest of Statistics of the Bank of Ghana and the Ghana Statistical Services Department and other internet sources. Other augmenting sources include the World Bank's Povcalnet database.

3.3.2 Variable Definitions

- **Poverty**

We use poverty headcount ratio to measure poverty which is defined as the share of the population living below the national poverty line. National estimates are based on population-weighted sub-group estimates from household surveys. The poverty line is defined as $1 on PPP basis (consumption base). The choice of poverty line at $1 is dictated by data availability and is widely used by several International Organisations such as United Nation, World Bank and Asian Development Bank in measuring poverty.

- **Remittances**

Remittances are generally defined as that portion of migrants' earnings sent from the migration destination to the place of origin. Although they can also be sent in kind, the term "remittances" is usually limited to or refers to monetary and other cash transfers transmitted by migrant workers to their families and communities back home. The study, however, limits itself to external remittances only.

- **GDP** (constant 1995 US$)

GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 1995 U.S. dollars. Dollar figures for GDP are converted from domestic currencies using 1995 official exchange rates.

- **Inequality**

Inequality is measured by the Gini index. Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual or household. The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. Thus a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality.

- **Human Capital**

Human Development Index (H), the new developed index of human capital by United Nations Development Programme (UNDP), is used to represent the level of human capital development. This index is a summary measure of three dimensions of human development; leading a long and healthy life (measured by life expectancy), being knowledgeable (measured by literacy and school enrolment), and having a decent standard of living (measured by GDP per capita, PPP US).

- **Real Private investment (**$US million; 1995 constant prices**)**

The series for real private investment is derived from the difference between the total gross capital accumulation and total gross investment by the government (i.e. public sector investment). Foreign Direct Investment (FDI) was subtracted from private investment to get domestic private investment. The data was normalized by expressing them as a percentage of real GDP.

- **Inflation**

Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a fixed basket of goods and services that may be fixed or changed at specified intervals, such as yearly.

- **Openness**

Openness is defined as percentage (%) trade of GDP. Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.

- **Real interest rate** (%)

Real interest rate is defined as real lending rate on banking sector's advances to the private sector adjusted for inflation.

- **Government Consumption**

General government final consumption expenditure includes all government current expenditures for purchases of goods and services. It also includes most expenditure on national defense and security, but excludes government military expenditures that are part of government capital formation.

- **D**

D represents a dummy variable constructed to capture the effect of periods of constitutional dispensation on private investment behaviour. It is constructed such that it takes the value, one (1) for the period of constitutional regime and zero (0) for unconstitutional regimes.

CHAPTER FOUR

EMPIRICAL RESULTS, ANALYSIS AND DISCUSSION

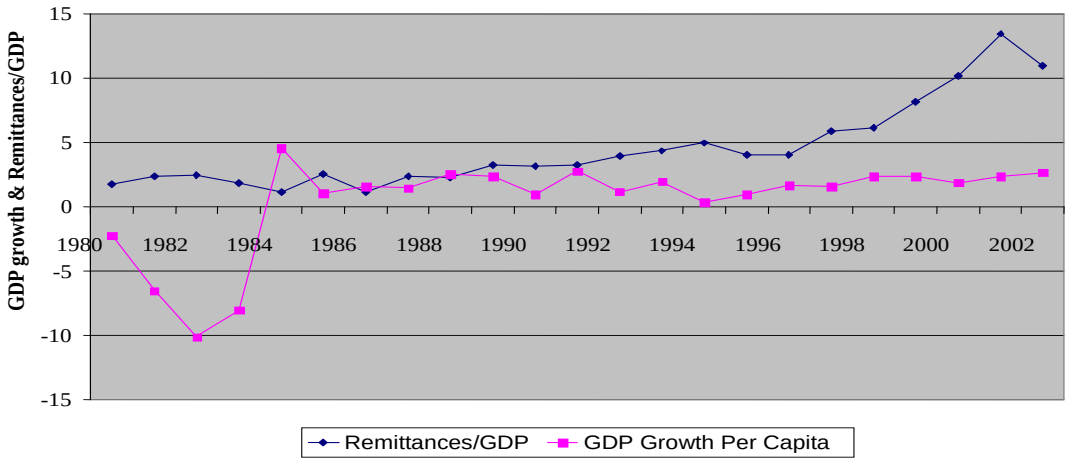
4.0 Introduction

This chapter seeks to present, analyse and discuss the results of the study. It presents the estimates of the parameters in the poverty equations as well as performing model diagnostics. Also, the impact of remittances on economic growth, human capital and investment is examined in this chapter.

4.1 Counter-cyclical Nature of Remittances in Ghana

Remittance flows tend to act counter-cyclically, that is, they increase at times of distress in the receiving countries, working effectively as an informal Stabilization Fund. This is shown in Figure 4.1.

Figure 4.1: Countercyclical Behaviour of Remittances and GDP in Ghana (1980-2002)



Source: Author's construct, (2008) using data from World Development Indicators 2004

Figure 4.1 shows the countercyclical nature of remittances for Ghana in the study. Specifically it shows that remittances as a proportion of *GDP* tend to increase whenever *GDP* growth slackens. This assertion is particularly the case after 1991 to the end of the study period. Of course, this correlation does not deal with all the complexities involved in slow-downs in economic activity, when we can witness the common effects of devaluations, adjustment policies, and adverse external conditions. The result obtained in this study is consistent with that of Giuliano and Ruiz-Arranz who found that remittances are more countercyclical in countries with less developed financial systems (Giuliano and Ruiz-Arranz, 2005).

4.2 Results of the Long Run Relationship

Equation (3.2) is estimated for Ghana using annual data covering the period of 1980 – 2002 (see Appendix D). Before testing the existence of a long run relationship among the variables, it is important to decide the order of the lag of the *ARDL*. Results based on Schwartz Bayesian Criterion suggest that the process is an *AR* (1), that is, it contains unit root (see Appendix C). Table 4.1 presents the results of the long-run parameters of the *ARDL* model.

As indicated in Table 4.1, most of the estimated coefficients have their expected theoretical signs except inequality although not all are statistically significant. The results indicate that, an increase in economic growth leads to reduction in poverty incidence. This means that, in the long-run, increases in real output has the potential of alleviating poverty in Ghana. The results show that the coefficient of real *GDP* is statistically

significant at 1 percent level, indicating that if the country were to increase her *GDP* by 1 percent, poverty incidence will reduce by 1.17 percent.

The coefficient of remittances is also appropriately signed, thus an increase in remittances can directly lead to poverty reduction. Other things being equal, an increase in remittances by 1 percent leads to a reduction in poverty incidence by 0.09 per cent. This result shows that remittances can directly increase incomes of poor people, smooth household consumption and ease capital constraints. Over and above the direct impact, remittances can have indirect effect on poverty reduction since they can affect economic growth and human capital (see Table 4.3), both of which are key determinants of poverty equation.

Table 4.1: Estimated Long-Run Coefficients using the ARDL Approach

ARDL(1,1,0,1,0,1,0,1) selected based on SBC			Dependent variable: ln*Pov*	
Regressor	**Coefficient**	**Standard Error**	**T-Ratio**	**P-Values**
Constant	14.2090	3.4920	4.0690***	0.003
$\ln GDP_t$	-1.1744	0.34418	-3.4122***	0.009
$\ln OPENNESS_t$	0.0075478	0.093308	0.080891	0.937
$\ln REMIT_t$	-0.086338	0.018622	-4.6363***	0.001
$\ln INF_t$	0.034888	0.034094	1.0233	0.333
$\ln H_t$	-0.29228	0.10059	-2.9057**	0.023
$\ln IN_t$	-1.1216	0.44417	-2.5251**	0.032
D_t	-0.41783	0.17902	-2.3340**	0.044

Note: ***,** denote significance at 1%, 5% and levels respectively. The reason why test statistics such as R^2, F, SSE etc are not reported is that the long run parameter estimates have a non-standard asymptotic distribution for which these statistics are no longer meaningful. In other words, it is because of the unit root which makes the regression of the long run relation possibly spurious. However, the error correction regression, being in terms of their first differences and error correction terms that are stationary, are not subject to the spurious regression problem.

Interestingly, the coefficient of human capital (*H*) is consistent with previous studies that a positive relationship should be observed between human capital and poverty reduction. Theoretically, if the human capital factor in Ghana increases, it increases opportunities of the poor to generate income and consequently reduce poverty. By the same token, decrease in human capital is expected to worsen the poverty situation. The findings of this study show the expected positive relationship (-0.29228) between the two variables, which means that increase in human capital factor by 1 percent in the long run, will reduce poverty by approximately 0.3 percent and is significant at 5 percent.

Openness does not seem to have a significant positive effect on poverty reduction. The estimated coefficient is positive (0.0075) and statistically insignificant. This result, however, suggests that, perhaps trade liberalization over the period worsened the income distribution, thus making the poor poorer as a result of the adoption of skilled – biased technical methods in response to increase foreign competition. Thus in the long run, openness to trade aggravated the poverty situation in Ghana. This result, however, is in conformity with a number of empirical studies (e.g. Edwards, 1997; Ghura *et al*., 2002; Dollar and Kraay, 2004), that found no link between openness and the well-being of the poor, though those studies used cross-section and panel data.

Consistent with theory, higher inflationary rates have a deleterious effect on poverty reduction but statistically insignificant. Higher inflation tends to reduce real money balances thereby subjecting private agents to larger transaction costs. Specifically, an increase in inflation by 1 percent will induce a 0.03 percent increase in poverty levels.

The implication is that, inflation subjects the poor individual to higher transaction cost and thus cannot consume adequately with his or her little income. Contrarily, the non-poor are unaffected significantly by increase in inflation unlike their poor counterparts.

Furthermore, the long-run results reveal yet a rather another unconventional outcome for income inequality. That is, the coefficient of income inequality came out significantly negative at 5 percent level of significance contrary to the theoretical proposition that the worsened income distribution seems to have a negative impact on poverty reduction. Thus the results indicate that if the income distribution worsens by 1 percent, poverty will reduce by 1.12 percent in the long run. This result contradicts the proposition that inequality could worsen the poverty situation in the country through remittances as international migration is deemed an expensive venture and as such the rich households are the one that could embark. This implies that, although remittances have helped alleviate poverty to some extent, it has been able to bridge the lacuna between the rich and the poor. Thus, this result is indicative of the fact that the better-off households are the more capable ones of producing migration and consequently sending remittances. However, the coefficient associated with inequality tends to be less than that of growth and human capital so that the negative impacts from inequality are unlikely to dominate positive impacts arising from growth and human capital.

Finally, consistent with theory, the dummy variable measuring constitutional regime has the expected negative sign at 5 percent level of significance. The result suggests that, stable political environment and hence higher level of democratization is a prerequisite

for poverty reduction as individuals within the economy would have sound minds to do business. Also, within the sample period which is characterized by no political upheavals, have seen successive governments instituted the poverty reduction strategies as tools to consolidate wealth creation for the benefit of all Ghanaians. Consequently, the long-run results confirm the need for properly constituted democratic economy for ensuring sound economic management for accelerated growth and providing direct support for human development, and eventual reduction in the poverty levels of the nationals.

4.3 Short Run Dynamics

The fact that the variables in the model are cointegrated provides support for the use of an error correction model mechanism (*ECM*) representation in order to investigate the short run dynamics. Estimation results, still based on the Schwartz Bayesian Criteria, are presented in Table 4.2. The R^2 is 0.96 suggesting that such error correction model fits the data reasonably well. More importantly, the error correction coefficient has the expected negative sign and is highly significant. This helps reinforce the finding of a long run relationship among the variables in the model.

The results in Table 4.2 suggest that the immediate impact of changes in real *GDP* on poverty reduction is positive. That is to say, the coefficient of the real *GDP* has the theorized negative sign indicating a positive impact on poverty reduction, in the short run which is consistent with the long run results. The coefficient is highly significant at 1 percent. This means that, in the short run, growth in economic activities in Ghana has the potential of reducing poverty.

Table 4.2: Estimates of the Short-Run Error Correction Representation

ARDL(1,1,0,1,0,1,0,1) selected based on SBC Dependent variable: $\Delta \ln Pov$

Regressor	Coefficient	Standard Error	T-Ratio	P-values
Constant	6.0538	1.9871	3.0466***	0.009
$\Delta \ln RGDP_t$	-2.9890	0.49359	-6.0557***	0.000
$\Delta \ln OPENNESS_t$	0.0032158	0.039261	0.081907	0.936
$\Delta \ln REMIT_t$	-0.023564	0.010103	-2.3324**	0.043
$\Delta \ln INF_t$	0.014864	0.013807	1.0766	0.301
$\Delta \ln H_t$	-0.076270	0.032937	-2.3156**	0.046
$\Delta \ln IN_t$	0.47785	0.10200	4.6847***	0.000
ΔD_t	0.042116	0.046288	0.90988	0.379
ECM_{t-1}	-0.42605	0.12873	-3.3096***	0.006

$R^2 = 0.95648$ $\bar{R}^2 = 0.89844$ F-statistic = 24.7224*** DW-statistic = 2.5877

Model Criteria/Goodness of Fit

R^2	0.95648	$\bar{R}^2$	0.89844
S.E. of Regression	.027536	F-stat. F(8, 13)	24.7224 [0.000]
Akaike Info. Criterion	44.6455	Schwarz Bayesian Criterion	37.5537
DW-statistic	2.5877	Residual Sum of Squares	0.0068238

Turning to openness, it can readily be discerned that this variable has a negative effect on poverty reduction and statistically insignificant. The results suggest that, in the short run trade liberalization worsened the poverty situation through the income distribution. This effect translated into the long run which implies that, probably there should be some restriction on trade.

Consistent with the long run results, the coefficient of remittances has the theorized positive impact on poverty reduction in the short run and is statistically significant at 5 percent. According to the short-run results, a percentage increase in remittances could reduce poverty by 0.02 percent. Thus increases in remittances have a direct positive

effect on poverty reduction through the income distribution channel and easing capital constraint.

Consistent with expectation and theory, the immediate impact of changes in inflationary rates have a harmful effect on poverty reduction, but statistically insignificant. The results suggest that, in the short run, an increase in inflation by 1% will raise poverty levels by 0.01 percent. Hence the results suggest that, sustained inflationary rates have a greater negative effect on poverty reduction as the impact of the inflation in the long run on poverty reduction is greater

Furthermore, the coefficient of the human capital variable obtained the conventional sign in the short-run. Thus an increase in the human capital factor in Ghana has a positive effect on poverty reduction in the short run. Specifically, increases in the human capital factor by 1 percent will reduce poverty by 0.08 percent.

There is concern that remittances could induce income inequality as discussed in the preceding paragraphs. This is because the international migration can be an expensive venture so that it is going to be the better-off households who will be more capable of producing migration and sending remittances. While poor households would not get the benefit from such remittance flows, they tend to generate inequality so that poverty could eventually increase. The short run results confirm this assertion, in that the coefficient of the inequality variable obtained the expected positive sign and is statistically significant at 1 percent. This result rather suggests that remittances could generate incomes even for

families who receive no remittances at all mainly through the multiplier effects of expanded spending. As migrants' families increase their consumption of services or goods produced in sectors with excess capacity, the additional demand can create jobs for other families who in turn spend and create further demand. Thus, such multiplier effect could lead to poverty reduction even some poor families do not directly get remittance inflows.

In addition to the above, the coefficient of the dummy variable measuring constitutional regime is inappropriately signed and statistically insignificant. This is indicative of the fact that, the immediate swing from unconstitutional to constitutional rule does not reduce poverty instantaneously. Thus, there might still be uncertainty which invariably affects investment and consequently poverty.

Finally, the error correction term ECM_{t-1} which increases the speed of adjustment to restore equilibrium following shock has the expected negative sign and is statistically significant at 1 percent, thus reinforcing the attainment of a long run equilibrium relationship among the variables. The size of the error correction term (-0.43) precisely indicates that around 43 percent of the deviation from the long run equilibrium is corrected every year. This suggests a relatively high speed of adjustment from the short run deviation to the long run equilibrium poverty levels.

4.4 Estimated Multiple Regression Results of the Growth, Investment, Human Capital and Poverty on Remittances.

This section presents estimates of the parameters in growth, investment, human capital and poverty equations, each as a function of remittances. For the growth equation, it shows that, ceteris paribus, the direct impact of remittances on growth is nil, that is, negative and statistically insignificant (Table 4.3 column A). Nonetheless, remittances might have indirect impact on economic growth as a result of easing household credit constraint that allows domestic investment and human capital development to expand. To support this argument, we estimate separate equations of impacts of remittances on investment and human capital (Table 4.3 columns B and C)[1].

The positive and statistical significance of coefficients associated with remittances is found in both human capital and investment equations. An increase in remittances by 1 percent is associated with an increase in human capital by 0.19 percent and investment by 0.68 percent. These results suggest that remittances can alleviate credit constraint and positively affect private investment. Where the impact on human capital is concerned, remittances seem to be used to finance education and health so that human capital is improved.

[1]Note that for the economic growth equation, we estimate the log of real GDP on log of initial real GDP, log of human capital, log of investment, log of remittances and log of openness, government consumption and inflation. For human capital equation, we estimate log of human capital on log of initial income and log of remittances. For investment equation, log of investment is a function of log of economic growth, log of remittances, real interest rate, log of inflation to capture uncertainty and log of degree of openness.

Table 4.3: Multiple Regressions of Growth, Investment, Human Capital and Poverty on Remittances, 1980-2002

	Growth (*RGDP*)	**Investment (*I*)**	**Human Capital (*H*)**	**Poverty (*Pov*)**
	(A)	**(B)**	**(C)**	**(D)**
Initial Income	-0.93		4.81	
($RGDP_{t-1}$)	(-13.49)***		(3.43)***	
Growth (*RGDP*)		0.72		-2.99
		(3.67)***		(-6.06)***
Human Capital (*H*)	0.08			-0.08
	(3.43)***			(-2.32)**
Investment (*I*)	-0.02			
	(-3.87)***			
Openness (*OPEN*)	0.04	-0.14		0.003
	(2.57)**	(-0.49)		(0.08)
Government	-0.03			
Consumption (*Gov*)	(-2.68)**			
Inflation (*INF*)	-0.002	0.50		0.01
	(-2.28)**	(2.58)**		(1.08)
Remittances (*REMIT*)	-0.04	0.68	0.19	-0.02
	(-1.64)	(2.63)**	(2.18)**	(-2.33)**
Inequality (*IN*)				0.48
				(4.68)***
Real Interest rate (*r*)		0.01		
		(1.63)		
Dummy (*D*)				0.04
				(0.91)
Constant				6.05
				(3.05)***
Number of Obs.	23	23	23	23

Note: All variables are in logarithm formula except real interest rate. T-statistics are reported in parentheses with ***, ** denoting significance at 1 and 5 percent, respectively.

It must be noted that, the other variables in growth equation are statistically significant and have the expected signs. The negative coefficient associated with initial income support the conditional convergence hypothesis that poor economies tend to grow faster than rich economies, once the determinants of their steady state are held constant. The positive and significant coefficient of openness points out that trade liberalization is a useful policy to Ghana in promoting economic growth. By contrast, an increase in inflation and government consumption tends to retard economic growth.

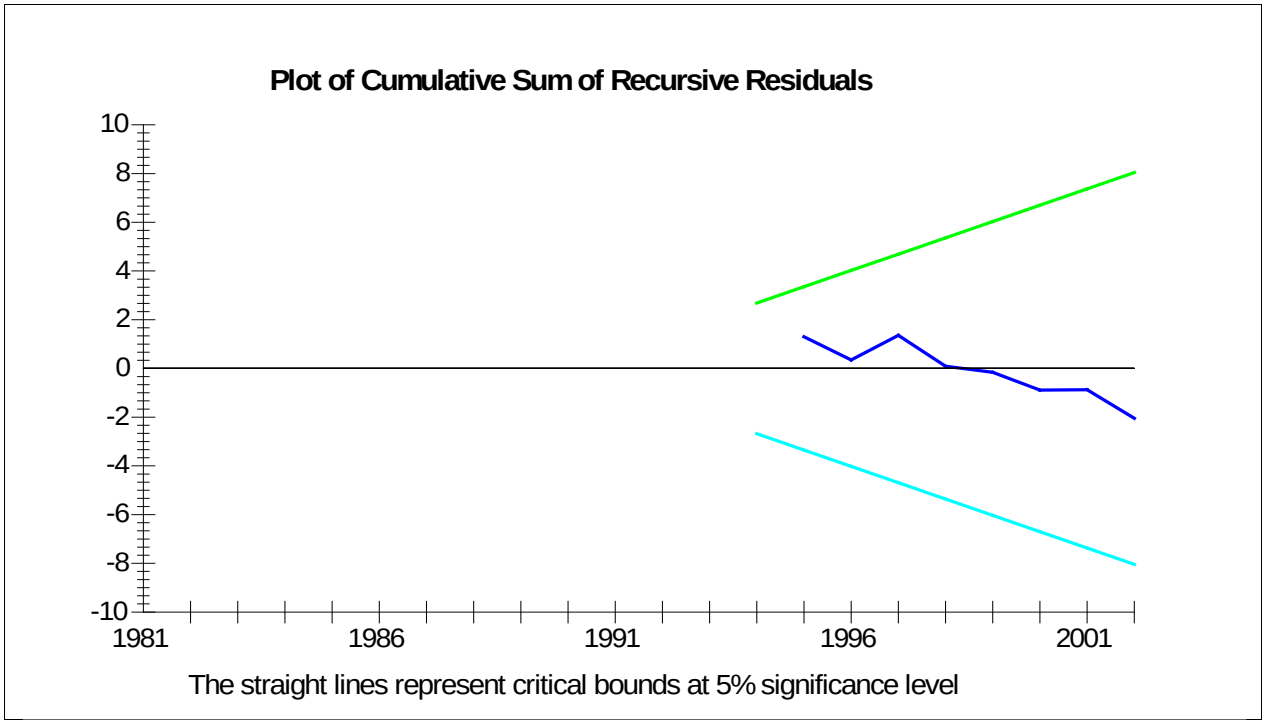
4.5 Testing for Structural Break and Model Diagnostics

To complement this study it is important to investigate whether the long run and short run relationships we found in the poverty equation are stable for the entire period of study. For this purpose, one needs to test for parameter stability. The methodology used here is based on the cumulative sum (*CUSUM*) and the cumulative sum of squares (*CUSUMSQ*) tests proposed by Brown et al (1975). Unlike the Chow test that requires break point(s) to be specified, the *CUSUM* tests can be used even if we do not know the structural break point. The *CUSUM* test uses the cumulative sum of recursive residuals based on the first *n* observations and is updated recursively and plotted against break point. The *CUSUMSQ* makes use of the squared recursive residuals and follow the same procedure. If the plot of the *CUSUM* and *CUSUMSQ* stays within the 5% critical bound the null hypothesis that all the coefficients are stable cannot be rejected. If however, either of the parallel lines are crossed then the null hypothesis (of parameter stability) is rejected at the 5% significant level.

Figures 4.5 and 4.6 clearly indicate that both the *CUSUM* and *CUSUMSQ* plots lie within the 5% critical bound thus providing evidence that the parameters of the model do not suffer from any structural instability over the period of study.

Finally diagnostic tests were conducted on the short-run model to confirm the presence of serial correlation, normality of the residuals, model specification as well as heteroscedasticity.

Figure 4.2: Plot of CUSUM and CUSUMSQ



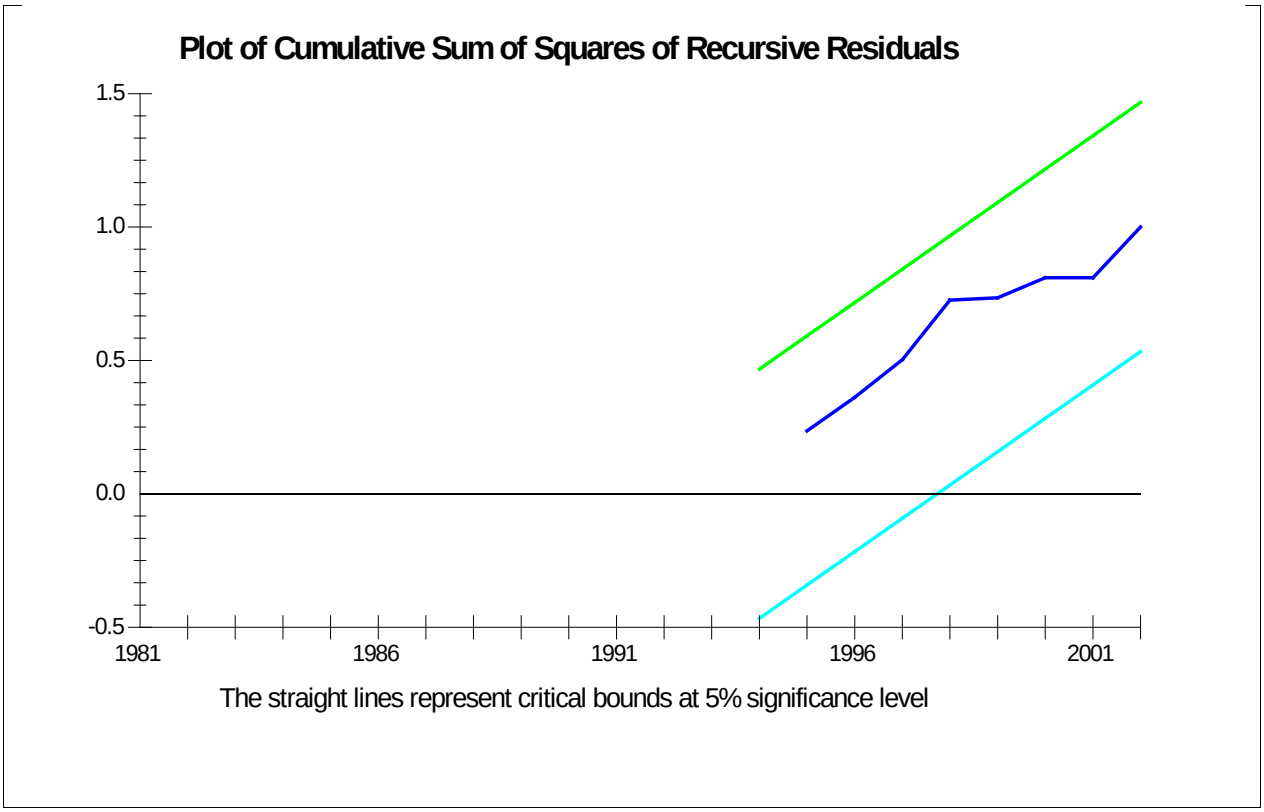


Table 4.4: ARDL-VECM Model Diagnostic Tests

Diagnostics	***Test Statistic***
$F_{Auto}(1,\ 8)$	2.3070 [0.167]
$\chi^2_{Reset}(1)$	0.14209 [0.706]
$\chi^2_{Norm}(2)$	0.34559 [0.841]
$\chi^2_{White}(1)$	0.12328 [0.726]

χ^2_{Auto}, χ^2_{Reset}, χ^2_{Norm} and χ^2_{White} are Lagrange multiplier statistics for test of serial correlation, functional form misspecification, non-normal errors and heteroscedasticity, respectively. These statistics are distributed as Chi-square values with degree of freedom in parentheses. Values in parentheses [ ] are probability values.

As indicated in the table, there is an absence of serial correlation (autocorrelation) at the 5% significance level. Moreover, the model is correctly specified using the *RAMSEY RESET* test for specification. Furthermore, the model passes the Jarque-Bera normality

test, implying that the residuals are normally distributed. Additionally, the White's statistic indicates the absence of heteroscedasticity in the model.

In the Error Correction (Short-run) model, variations in poverty are explained by approximately 96% and 90% of the variations in the regressors given R^2 and $\bar{R}^2$ values respectively. In addition, the *F*-test of joint null hypothesis that the coefficients of the regressors are simultaneously zero is rejected at the 1% significance level.

The regression for the underlying or overall *ARDL* equation fits very well at approximately 98% and 96% given R^2 and $\bar{R}^2$ values. Thus, around 96% of the variations in poverty over the sampled period are explained by the regressors in both the short and long run models.

CHAPTER FIVE

CONCLUSION, SUMMARY, POLICY IMPLICATIONS AND RECOMMENDATIONS

5.0 Conclusion

It is unique in the existing literature in terms of the well-defined functional forms and mechanism channels, and the more appropriate econometric treatment, that this study examines the impacts of external remittances on poverty reduction in Ghana for the period 1980 to 2002. By employing modern time series econometric techniques such as stationarity tests, cointegration and error correction mechanisms, the study estimated a poverty model for Ghana, incorporating remittances as a key determining factor. In addition, growth, investment and human capital equations are estimated to examine the impacts of remittances on these variables. At the outset, it was revealed that, remittances have indirect impact on economic growth through human capital development and the ease of capital constraints, albeit its direct impact is nil. Where poverty is concerned, remittances seem to have direct impact on poverty reduction, through the direct increase in the incomes of the poor, thus smoothening household consumption and easing capital constraints.

5.1 Summary of Major Findings

It was found that remittance flows to Ghana tend to act counter-cyclically, that is, they increase in times of economic distress which invariably work effectively as an informal stabilisation fund.

Remittances showed a considerable positive impact on poverty reduction in both models. Thus remittances help increase the incomes of the poor and smooth their consumption as well as ease them of capital constraints. The coefficient was also statistically significant, indicating the need for more inflows of remittances into the Ghanaian economy.

Furthermore, it was found that remittances have no direct positive impact on economic growth, as its coefficient obtained was negative and statistically insignificant. However, the coefficients associated with remittances in both the human capital and investment equations were found to be positive and statistically significant. Thus remittances might have an indirect impact on economic growth through their effects on human capital and investment as a result of easing household credit constraints that allow domestic investment and human capital development to expand.

5.2 Policy Implications and Recommendations

With regards to policy implications, the empirical results provide invaluable information for policy formulation and implementation. From the findings of this study, remittances have a significant direct impact on poverty reduction through increasing income, smoothing consumption and easing capital constraints of the poor.

The policy inference is that remittances should not be regarded as the key instrument on par with traditional growth engines like exports and foreign direct investment (*FDI*) in promoting long-term economic growth and country's prosperity. However, while remittances could have a significant impact on poverty reduction, governments in

destination and origin countries should aim to sharpen the impacts of such international flows, particularly to the poor people.

Two key policy schemes are needed to sharpen such impacts. Firstly, government needs to have the policy scheme that aims to enhance the amount of remittances, particularly through formal channel. There is evidence that around 50 percent of remittances are under recorded and through informal channel (World Bank, 2006). These informal networks of money dealers commonly offer speedier and cheaper means of transfer than going through the formal channels. However, a number of concerns have been expressed with respect to the operation of the informal fund transfer system, ranging from financial smuggling, money laundering, potential links with terrorist funding, to macroeconomic consequences with respect to inappropriate exchange rate movement and tax collection. Transaction costs in sending remittances remain high (IMF, 2005 and World Bank, 2006) so government should lower the costs and any barriers of official remittance channels to enhance the amount of remittances. Although there are other policies such as financial incentives offering premium exchange rates and interest rates to be used for enhancing the amount of remittances, these policies seem to have ambiguity impacts and limitations. Thus, to reduce such transaction costs, the government should promote competition and remove barrier to entry in the remittance market. For example, capital requirements on remittance services should be lowered. Formal financial intermediaries networks should be widened by allowing domestic banks to operate overseas, and stimulating the participation of microfinance institutions and credit unions in providing low cost remittances services. Government should also support for the introduction of technology

in payment systems. In particular, to increase the official remittances of the poor, partnerships between leading banks and the government post office network and banks without extensive branch networks in rural areas needed to be implemented.

Secondly, policy scheme should be emphasised toward how remittances will be used for productive activities. According to our econometric estimates, physical and human capital investments are two key channels through which remittances could generate the positive effects on economic development. Measures that encourage remittances to such investments would enhance its developmental impact. They can be undertaken in various forms. For example, the government could develop appropriate training or education programs to assist returning migrants or remittance receipts in making effective investment decision. In addition, the appropriate infrastructure should be developed to generate favourable investment climate and to complement investments out of remittances. Mexican experience would be a good example where their migrants form hometown associations raise funds for their communities of origin and spend to improve their infrastructure. Their contributions are matched by federal and state government.

Over and above such two key important policy schemes, the government also needs to have better data collections in terms of both magnitudes and sources of remittances. Data on remittances sometimes are scattered across overlapping categories and institutions. Remittances are often misclassified as export revenue, tourism receipts, non-resident deposits, or even foreign direct investment (*FDI*). Many types of formal remittances flows go unrecorded, due to weakness in data collection. Without such improvements, it

will be difficult for policy makers to precisely examine and evaluate the impact of remittances.

5.3 Practical Limitations & Further Research

The major limitation the study encountered, typical of such studies in developing countries, was quality and limited availability of data. Furthermore, most of the time series data were not in quarterly format and therefore variables such as real *GDP*, external remittances, human capital etc had to be used in their annual form. An attempt to extend the data length to 2007 or further was constrained by unavailability of these macro series from domestic official sources as the researcher had to fall on mainly foreign sources such as the World Bank, IMF, among others at a tremendous financial expense.

Thus, future studies on remittances and poverty reduction in Ghana should extend the context of the present study by simultaneously estimating a robust relationship between economic growth and remittances by incorporating other relevant variables such as foreign aid, government consumption since remittances can indirectly affect poverty through economic growth which is also a key determinant of the poverty equation.

Finally, the researcher was unable to test for endogeneity and simultaneity of the variables used in the study under the simple assumption that all the explanatory variables are endogenous. Consequently, the interpretation of the results should be done with a certain degree of caution. Hence further research should concentrate on addressing this so long as data availability improves.

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APPENDIX A

ARDL REPRESENTATION

An ARDL model can be represented in the following form (Pesaran and Pesaran, 1997 & Pesaran *et al*, 2001):

$$f(L,p)y_t = a_0 + \sum_{i=1}^{k} b_i(L,q_i)x_{it} + u_t$$

where $f(L,p) = 1 - f_1L^1 - f_2L^2 + \ldots\ldots\ldots\ldots - f_pL^p$

$$b_i(L,q_i) = b_{i0}L^0 + b_{i2}L^1 + b_{i3}L^2 + \ldots\ldots + b_{iq}L^q, i = 1,2,\ldots,k$$

Where α_0 is a constant; Y_T is the dependent variable; X_T is the explanatory variable and L is the lag operator such that $Lx_t = x_{t-1}$

$$y_t = m + \sum_{i=1}^{k} b_i x_{it} + e$$

In order to estimate the coefficients of long-run relationship, the equation can be written in the following form:

$$\hat{m} = \frac{a_0}{1 - (f_1 + f_2 + \ldots\ldots + f_p)}$$

where $\hat{b}_i = \frac{b_{i0} + b_{i1} + b_{i2} + \ldots\ldots b_{iq}}{1 - (f_1 + f_2 + \ldots\ldots + f_p)}, i = 1,2,\ldots,K$

In order to establish the short-run relationship between the variables, the corresponding error correction equation can be written in the following form:

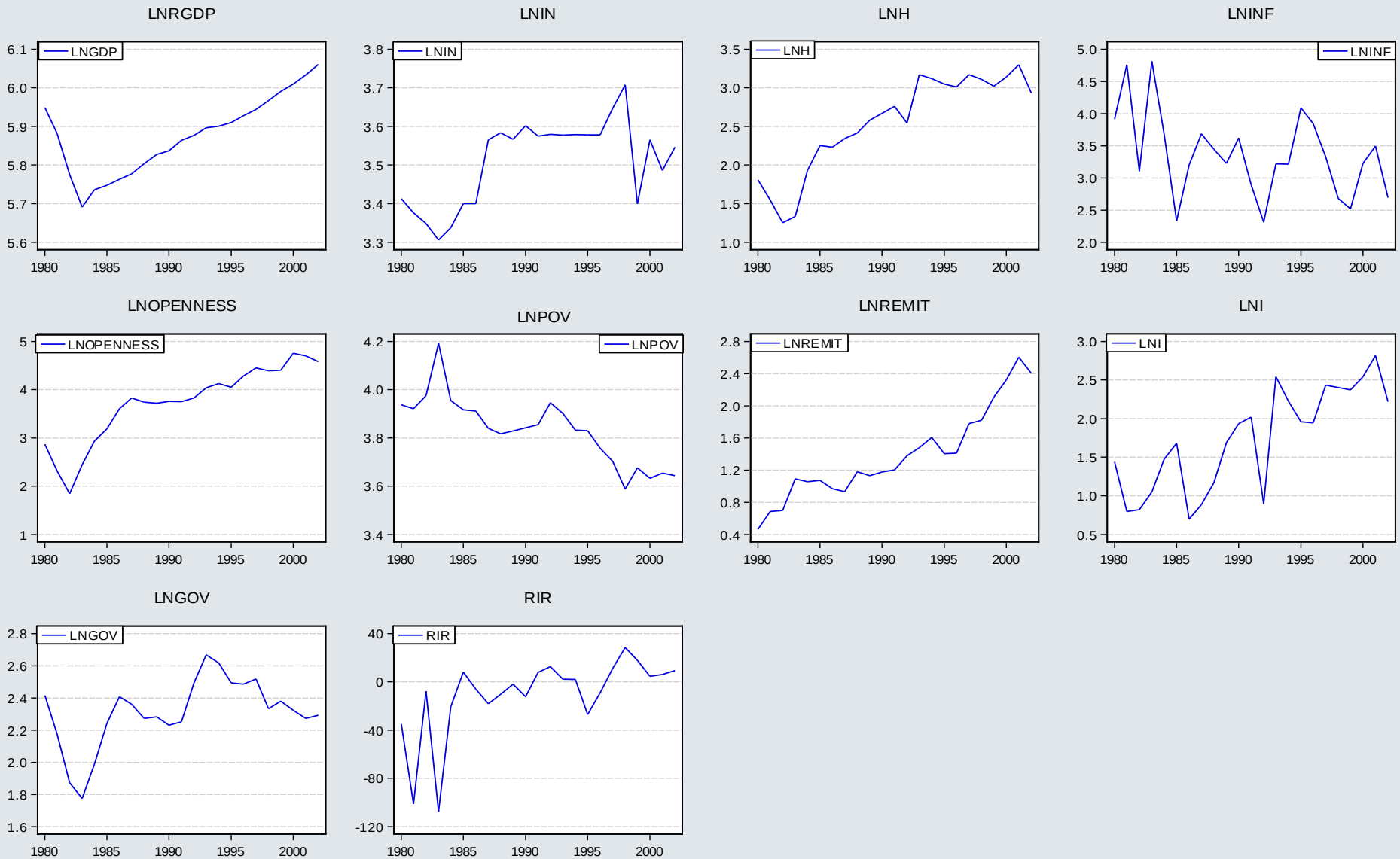
$$\Delta Y_t = a_0 + \sum_{i=1}^{k} b_{i1}\Delta X_{it} - \sum_{i=1}^{\hat{p}-1} f_{i1}\Delta y_{t-j} - \sum_{i=1}^{k}\sum_{i=1}^{\hat{q}-1} b_{ij}\Delta X_{it-1} - f(1,\hat{p})ECM_{t-1} + u_t$$

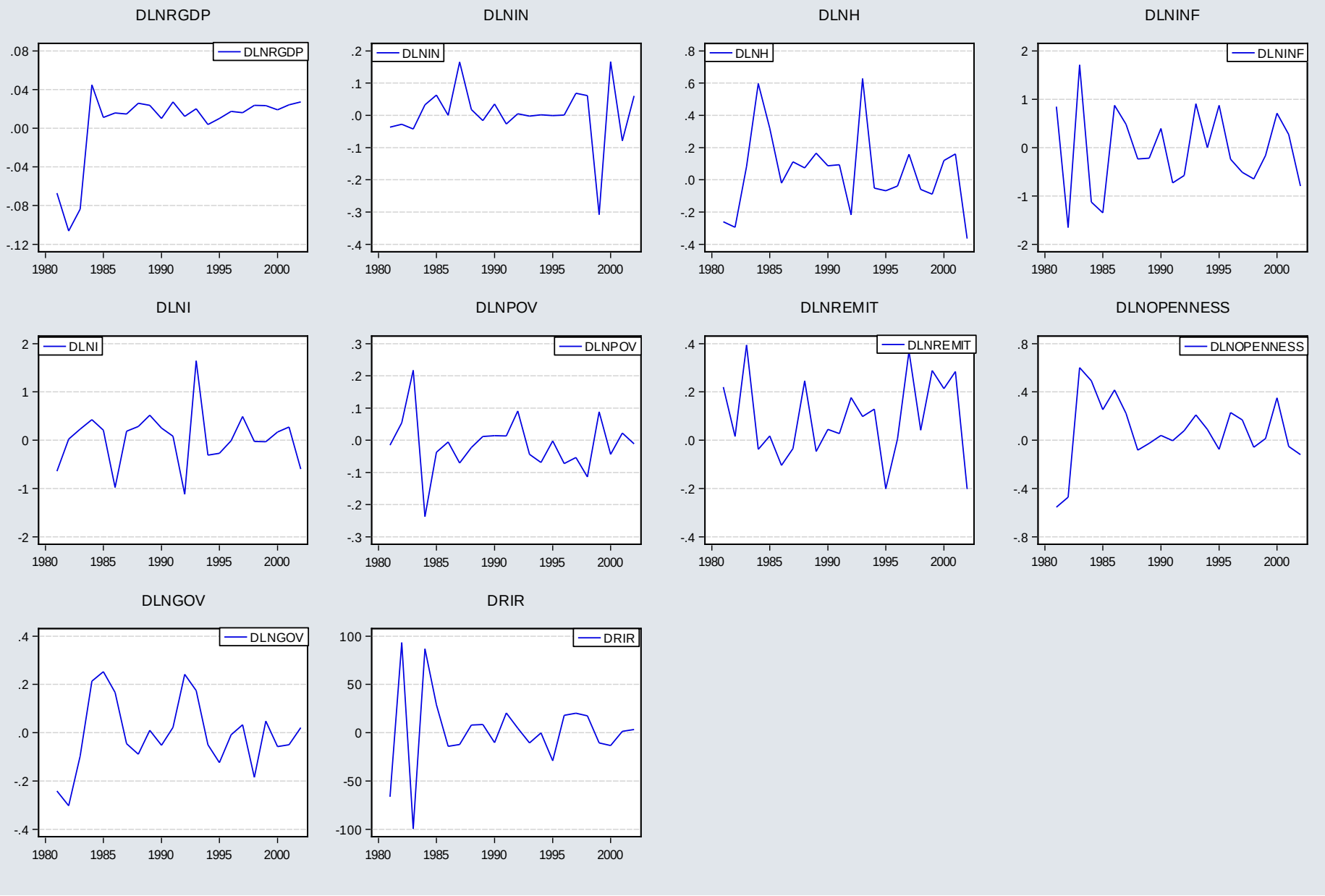
$$ECM_{t-1} = y_t - \sum_{i=1}^{k} \hat{b}_i \Delta X_{it}$$

The ECM_{t-1} is the error correction term. The coefficient of ecm_{t-1} measures the speed of adjustment towards the long-run equilibrium following a shock to the system. This representation of ARDL model can be generalized for any multivariate case(s).

APPENDIX B

Fig AI: Plots of Variables in Levels and First Differences




DLNRGDP
DLNRGDP
.08
.04
.00
-.04
-.08
-.12
1980
1985
1990
1995
2000
DLNIN
DLNIN
.2
.1
.0
-.1
-.2
-.3
-.4
DLNH
DLNH
.8
.6
.4
.2
.0
-.2
-.4
DLNINF
DLNINF
2
1
0
-1
-2
DLNI
DLNI
DLNPOV
DLNPOV
.3
DLNREMIT
DLNREMIT
DLNOPENNESS
DLNOPENNESS
.8
-.8
DLNGOV
DLNGOV
DRIR
DRIR
100
50
-50
-100

APPENDIX C

Table AI: Results of the Unit Root Tests

Panel A: Level

Variable	ADF		PP	
	Constant No Trend	Constant Trend	Constant No Trend	Constant Trend
Data Period: 1980-2002				
ln*Pov*	-1.220870	-3.133310	-1.110691	-3.125250
ln*RGDP*	-0.029486	-5.592848***	-0.618140	-15.23525***
ln*IN*	-1.527321	-1.384518	-1.928852	-2.585222
ln*REMIT*	-0.698612	-3.486697*	-1.340237	-4.191398**
ln*H*	-1.240296	-2.584035	-1.111513	-1.816105
ln*INF*	-3.557420**	-4.830717***	-3.628164**	-4.144031**
ln*OPENNESS*	-1.795884	-6.995825***	-0.845103	-2.499303
ln*GOV*	-3.063228**	-3.634800*	-1.947609	-2.430742
ln*I*	-0.625718	-4.009526**	-1.903367	-10.12087***
RIR	-2.699387*	-2.873386	-3.425170**	-5.225245***

Panel B: First Difference

Variable	ADF		PP	
	Constant No Trend	Constant Trend	Constant No Trend	Constant Trend
Data Period: 1980-2002				
Δ ln *Pov*	-5.563593***	-5.476391***	-5.729179***	-5.624186***
Δ ln *RGDP*	-2.592169	-2.633811	-3.054686**	-2.413134
Δ ln *IN*	-7.113014***	-7.061995***	-7.169169***	-7.574019***
Δ ln *REMIT*	-4.582719***	-3.752155**	-12.24577***	-11.80591***
Δ ln *H*	-6.244225***	-4.012838**	-4.305518***	-7.684760***
Δ ln *INF*	-3.980688***	-3.691894*	-13.15838***	-15.83889***
Δ ln *OPENNESS*	-5.097191***	-4.361847**	-3.966693***	-7.300056***
Δ ln *GOV*	-2.955911*	-3.946461**	-2.866659*	-3.029407
Δ ln *I*	-5.252034***	-3.562181*	-14.81388***	-14.00832***
Δ*RIR*	-4.571998***	-4.476359**	-16.02863***	-32.15053***

The null hypothesis is that the series is non-stationary, or contains a unit root. The rejection of the null hypothesis for both ADF and PP tests is based on the MacKinnon critical values. The lag lengths in both ADF and PP tests are selected based on the AIC criteria, which range from lag one to lag four. *,** and *** indicate the rejection of the null hypothesis of non-stationary at 10% , 5% and 1% significance level, respectively

Table AII: Bounds Test for Cointegration Relationship

K	10% Critical values		5% Critical values		1% Critical values	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
6	2.334	3.515	2.794	4.148	3.976	5.691
F-Statistic: $F_{POV}(POV/RGDP,IN,REMIT,H,INF,OPENNESS)$	9.3008***					

Notes: Critical values are obtained from Narayan (2004). *** represents statistical significance at the 1% level. *K* is the number of regressors.

APPENDIX D

Table AIV: Data used in the Estimation of the Poverty, Growth, Investment and Human Capital Equations

Year	OPEN	INF	H	IN	POV	D	GDP	REMIT	GOV	I	RGDP	RIR
1980	17.6	50.1	6.1	30.35	51.25	1	383.15	1.59	11.2	4.22	4231.11	-34.85
1981	10.1	116.5	4.7	29.25	50.45	1	358.24	1.98	8.8	2.22	4082.89	-101.25
1982	6.3	22.3	3.5	28.45	53.25	0	322.08	2.01	6.5	2.27	3800.2	-7.85
1983	11.5	122.9	3.8	27.26	66.14	0	296.23	2.98	5.9	2.86	3626.77	-107.55
1984	18.8	39.7	6.9	28.15	52.16	0	309.8	2.87	7.3	4.37143	3940.4	-20.66
1985	24.2	10.3	9.5	29.96	50.23	0	313.3	2.92	9.4	5.37158	4141.03	8.06
1986	36.7	24.6	9.3	29.96	49.95	0	318.24	2.63	11.1	2.01325	4356.33	-6.1
1987	45.8	39.8	10.4	35.35	46.51	0	322.95	2.54	10.6	2.41803	4565.21	-18.26
1988	42.2	31.4	11.2	35.99	45.45	0	331.4	3.25	9.7	3.21514	4822.15	-10.36
1989	41.1	25.2	13.2	35.4	45.98	0	339.34	3.1	9.8	5.40053	5067.4	-2.05
1990	42.7	37.3	14.4	36.67	46.61	0	342.74	3.24	9.3	6.92112	5236.08	-12.45
1991	42.5	18	15.8	35.69	47.24	0	352.2	3.33	9.5	7.52989	5512.64	7.91
1992	46	10.1	12.7	35.86	51.7	0	356.55	3.97	12.1	2.4487	5726.5	12.56
1993	56.7	25	23.8	35.78	49.47	1	363.76	4.38	14.4	12.6779	6004.23	2.07
1994	62	24.9	22.6	35.82	46.15	1	365.1	4.98	13.7	9.27656	6202.37	1.93
1995	57.4	59.5	21.1	35.8	46.05	1	368.79	4.07	12.1	7.08232	6457.44	-27.13
1996	72.2	46.6	20.3	35.81	42.82	1	375.22	4.09	12	6.99026	6754.64	-9.1
1997	85.4	27.9	23.8	38.35	40.56	1	381.28	5.91	12.4	11.3934	7038.09	11.08
1998	80.6	14.6	22.4	40.75	36.17	1	390.34	6.16	10.3	11.0604	7368.91	28.43
1999	81.7	12.4	20.5	29.95	39.5	1	399.52	8.22	10.8	10.7131	7693.62	17.8
2000	116	25.2	23.1	35.35	37.8	1	407.2	10.17	10.2	12.7011	7978.28	4.6
2001	110	32.9	27.1	32.65	38.65	1	417.11	13.51	9.7	16.7132	8313.37	6
2002	97.5	14.8	18.8	34.68	38.2	1	428.57	11.04	9.9	9.19286	8687.47	9.33

Source: World Development Indicators 2004 CD ROM, World Bank's Povcalnet Database, Millennium Indicators Database, United Nations (www.unstats.un.org/unsd/database), UNDP Indicators Database, State of the Ghanaian Economy (various issues), Ghana Statistical Service and Penn World Tables 6.2.