Università di Pisa

FACOLTÀ DI ECONOMIA

ESSAYS ON LIBERALISATION, GROWTH AND DEVELOPMENT IN SUB-SAHARAN AFRICA

Thesis submitted to

Dipartimento di Scienze Economiche

in partial fulfilment of the requirements for the degree of

Doctor of Philosophy in Economics

Supervisor:

Prof. Davide Fiaschi

Author:

Daniel Sakyi

Contents

Preface

Research on economic growth and development in developing countries has often highlighted the role of liberalisation policies (economic and political) in improving economic performance in the developing world. In sub-Saharan Africa, in particular, efforts at fostering economic growth and development have not only resulted in the adoption of these policies, but have also led to the proliferation of regional economic integration (include monetary unification). Nonetheless, the impact of these policies on economic performance continues to be a subject of debate among policy makers, development partners, academic researchers, and the international community at large. This debate has become increasingly important in light of the challenges facing the aforementioned agents in helping to improve the economic performance of these countries. This thesis focuses on this topic providing empirical evidence for sub-Saharan African countries.

The first chapter uses post-liberalisation data on Ghana and focuses on the extent to which trade openness and foreign aid inflows impact on economic growth. Ghana, being one of the forerunners to adopt liberalisation policies in sub-Saharan Africa, has received commendations from the international community for its post-liberalisation economic growth performance. This has increased government commitment in recent years to open the economy to international competition. Moreover, foreign aid inflows over the period have been relatively large. The study, which employs the Autoregressive Distributed Lag (ARDL) bounds testing approach to cointegration, provides empirical findings, which clearly indicate that the impact of both trade openness and foreign aid on Ghana's post-liberalisation economic growth is positive and statistically significant in both the short-run and the long run, although this is somewhat reduced by their interaction. In addition, the study reveals long run economic growth benefits of Ghana's political system whilst government spending and labour force performance retarded economic growth over the study period. The empirical findings and policy recommendations are relevant for Ghana's long-term economic growth policy reforms.

The second chapter, taken cognisance of the fact that sub-Saharan Africa has been characterised by low-income levels for decades, analyses the impact of economic globalisation and democracy on income levels in the area using panel cointegration techniques. The study considers a composite indicator for economic globalisation and several indicators of democracy and highlights the essence of the simultaneous adoption of economic globalisation and democracy for sub-Saharan African countries. The empirical results, based on a sample of 31 countries over the period 1980-2005, clearly indicate that, whilst the total long run impact of economic globalisation on income levels has been beneficial, the total long run impact of democracy has been the bane of the level of income in sub-Saharan Africa. The study concludes that policy reforms should be aimed at improving democratic institutions in sub-Saharan Africa for its potential benefits to be realised

The third chapter focuses on the implications of trade openness, foreign aid and democracy for the fulfilment of Wagner's law in West African Monetary Zone (WAMZ) countries. Although the impact of trade openness, foreign aid and democracy on government expenditure in developing countries has been emphasised in the literature in recent decades most recent studies of Wagner's law have often neglected the increasing role played by these policy variables. The study provides an empirical analysis of the long run implications of trade openness, foreign aid and democracy for the fulfilment of Wagner's law in WAMZ countries using panel data techniques for the period 1980-2008. The study finds the existence of Wagner's law in WAMZ countries, but only when the role of these policy variables has been catered for. The analysis concludes that, if these countries are to meet the fiscal convergence criteria and ensure the sustainability of a single currency area, explicit sets of restraint on the national authorities and innovative and efficient ways of domestic revenue generation necessary to ensure that government revenue keep pace with its expenditure become crucial, because the monetary union by itself may not necessarily ensure fiscal discipline.

The fourth chapter focuses on the relationship between democracy, government spending, and economic growth. Although, economic theory predicts that various core functions of governments are growth enhancing, its spending in non democratic countries often goes beyond these core functions, namely into rent-seeking and non-productive activities. The study employs the Autoregressive Distributed Lag (ARDL) bounds testing approach to cointegration to investigate the extent to which democracy and government spending have had an impact on economic growth in Ghana over the period 1960-2008. The empirical results obtained are encouraging, revealing support for the high efficiency of government spending in democracies hypothesis. The study demonstrates that democracy and government spending go hand in hand in providing a complementary role to impact positive on economic growth in Ghana in both the long-and short-run.

The fifth chapter investigates the impact of trade openness on economic growth and development for a sample of 85 middle-income countries over the period 1970-2009. The study employs non-stationary heterogeneous panel cointegration techniques that take into consideration the impact of cross-section dependence. The analysis reveals four important findings. Firstly, that trade openness has been one of the main drivers of the level of development, but not of economic growth in middle-income countries. Secondly, that trade openness is both a cause and a consequence of the level of development in middle-income countries. Thirdly, that neglecting the impact of cross-section dependence overestimates the coefficient linked to the long-run relationship between trade openness and development. Lastly, and most importantly, that these results are consistent for all the 20 middle-income sub-Saharan African countries included in the sample.

Acknowledgements

My utmost thanks go to the Lord God Almighty for bringing me this far. I am deeply grateful to my supervisor Prof. Davide Fiaschi for his detailed comments and suggestions and unreserved assistance rendered to me in all possible ways. I wrote most parts of the thesis while visiting the University of Cantabria (Spain). Special thanks go to Prof. Jose Villaverde Castro for given me the opportunity to visit the University of Cantabria. His constructive guidance throughout the preparation of the thesis has been an invaluable contribution to the accomplishment of the entire study. Heartfelt thanks go to conference participants (The AEL Development Economics and Policy Conference, hosted by KfW and DIW Berlin, June 24-25, 2011, Berlin, Germany; The Annual Paris Conference on Money, Economy and Management", July 14-15, 2011, Paris, France and The 13th Annual Conference of the International Network for Economic Research (INFER), September 12-13, 2011, London, UK) for the valuable comments and suggestions received. I further wish to express my deepest appreciation to all members of staff and colleges involved in the PhD programme in Economics (University of Pisa) and the International Doctoral programme in Economics (Sant'Anna School of Advanced Studies) and to the Italian Government for awarding me the scholarship which has seen me through the successful completion of the entire thesis. Suffice it to sum up by requesting all those who accorded me any form of assistance to accept my thanks with utmost sincerity. God richly bless you all. Nevertheless, any mistakes, inaccuracies and inadequacies, substantial or marginal, which may be found in this work are fully and totally my responsibility.

Chapter 1

Trade Openness, Foreign Aid and Economic Growth in Post-liberalisation Ghana: An Application of ARDL Bounds Test

1.1 Introduction

At year's end statistics are compiled for all countries of the world showing their relative rates of economic growth. Does it really matter if a country's national output rises or falls over time? For the many developing countries faced with poverty and growth problems the answer may be obvious. "Aggregate growth is probably the single most important factor affecting individual levels of income" (Barro and Sala-i-Martin, 2004). It has important implications for the welfare of individuals, most importantly the plight of the poor, making it widely considered a necessary (though not sufficient) condition for poverty alleviation (Oosterbaan and Van Der Windt, 2000). These statements reflect the recognition that the difference between prosperity and poverty for a country depends on how fast it grows. In view of the importance and the central role that economic growth has assumed in the development process of modern economies (more importantly in developing countries) it is imperative that its nature and determinants are well understood for each country.

Ghana prior to the adoption of liberalisation policies in 1983 witnessed poor economic growth performance. Although the highest economic growth performance (after independence in March 1957 and before liberalisation policies in 1983) of 7.2% occurred in 1970, economic growth performance for most periods was poor. For example, the years 1964-1966, 1968, 1972-1973, 1975-1976, and 1979-1983, saw Ghana with negative real GDP per capita growth with the lowest of -14.5% occurring in 1975 (see Figure 1.1). This result was mainly due to the adoption of import substitution industrialisation (ISI) policies coupled with successive political instability, disinvestment, total factor productivity slowdown, and the deep economic crisis that occurred in the mid-1970s. Moreover, there were conflicts in policy objectives and a number of trade control regimes and instruments (high tariffs, stringent quota restrictions, export restrictions, foreign-exchange restrictions, and high black-market premium) that resulted in exchange rate and balance of payment problems[1]. For instance, it was expected that a policy to expand the manufacturing base through ISI would automatically be accompanied by an increase in manufactured exports (and therefore a diversification of export) supported by an effective export promotion package (Aryeetey et al., 2000). Unfortunately, the export incentive package was ineffective resulting in drastic decline in export performance. The conclusion we can draw from the poor performance of the economy during the greater part of the pre-liberalisation period is that, the policies that were implemented were inappropriate and inadequate.

The need for alternative policies that could turn the economy of Ghana around became evident, as in particular the ability of developing countries to receive financial assistance[2] from the World Bank, IMF and other bilateral and multilateral institutions routinely became conditional upon the adoption of liberalisation policies (see Edwards, 1993; World Bank, 1998; Remmer, 2004). For these reasons, Ghana undertook a broad range of eco-

[1]See (Rodrik, 1999; Aryeetey and Fosu, 2005)

[2]They usually come in the form of foreign aid given for budgetary support, technical assistance, development projects, emergency and humanitarian assistance and for colonial, political, governance and diplomatic reasons (see Alesina and Dollar, 2000; Bourguignon and Leipziger, 2006)

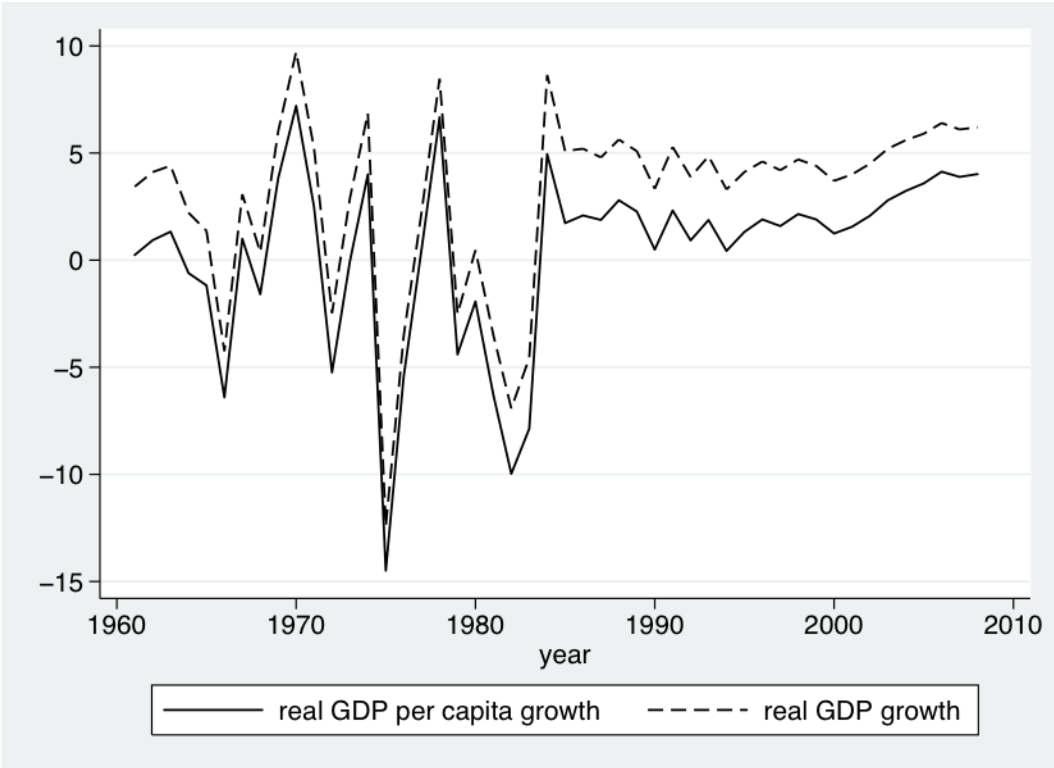

Figure 1.1: Trend in Real GDP/Real GDP per capita growth (annual %), 1961-2008

nomic reforms (Rodrik, 1999) launched on the basis of liberalised policy regime that began with the World Bank and IMF sponsored Structural Adjustment Programme in 1983. It initially focused on removing distortions in the foreign exchange market, trade restrictions and then corrected for structural and macroeconomic imbalances that were believed to have caused the economic decline. The government believes that, because the domestic market is small in general, economic growth must necessarily come from international trade. For this reason, the government has in recent years been committed towards trading partnerships and agreements, international trading rules, as well as participation in negotiations in multilateral trading[3]. Moreover, we observe (see Figure 1.2[4]) that foreign aid (left y-axis) increased significantly in the 1960s, but was almost stable in the 1970s (the 1960s and 1970s also saw Ghana with declining degree of trade openness (right y-axis)). On the contrary, we observe increases in both trade openness and foreign aid after

[3]See Ghana Trade Policy (2004)

[4]In Figure 1.2 both openness and aid are expressed in natural logs

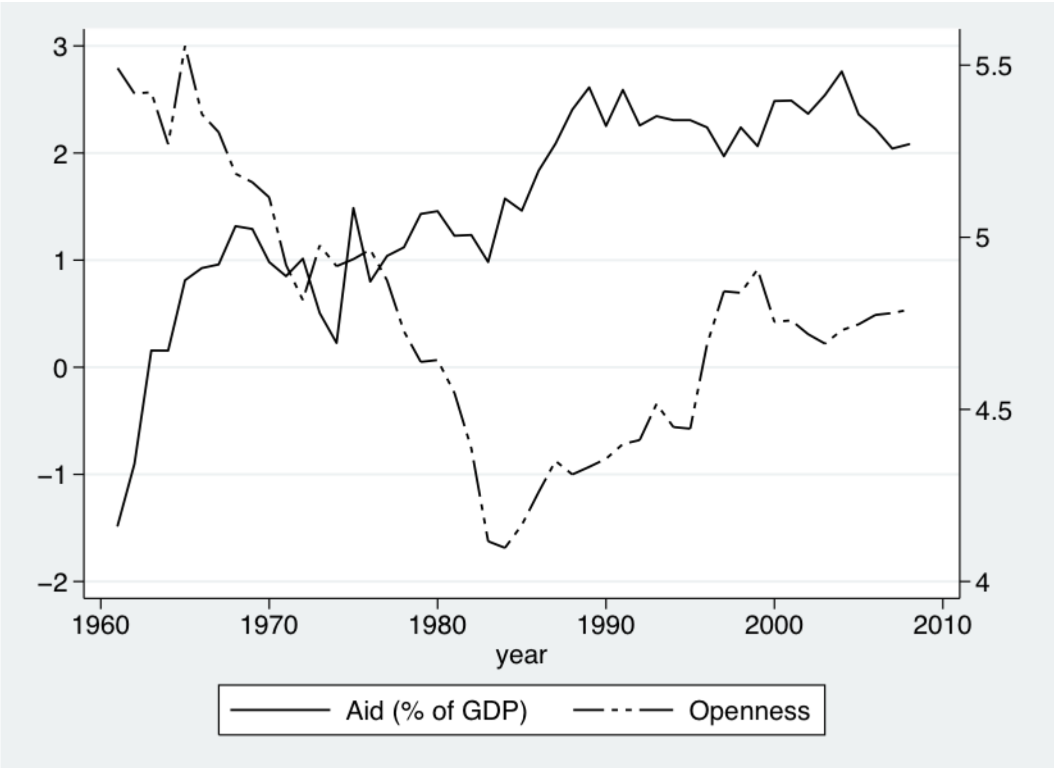

Figure 1.2: Trend in Trade Openness and Foreign Aid (% of GDP), 1961-2008

1983. It is not surprising that post-liberalisation growth performance has been encouraging with the highest real GDP growth of 8.6% in 1984, the first year after liberalisation (see Figure 1.1). To a much greater extent the reforms combined with inflow of foreign aid have helped Ghana recover from a prolonged period of economic decline.

However, it was expected that real GDP growth could accelerate from the 8.6% rate achieved in 1984, but unfortunately the country has since not exceeded this rate. In particular, in 1993, under its Vision 2020 programme, Ghana set for itself a target aimed to move from a lower-income country to an upper middle-income country by the year 2020. The economy was expected to grow at an average of 8% between 1995 and 2020. More ambitiously, and in order to achieve the Millennium Development Goals (MDGs) by 2015, the Vision 2020 policy document was amended and it is now aimed at 2015 (i.e. Ghana Vision 2015)[5]. In spite of these policy efforts, the average real GDP growth in the country

[5]Beginning in 2003, Ghana Vision 2015 policy document has been implemented under the Ghana Poverty Reduction Strategy (GPRS I and II)

from 1990 to 2000 was only 4.3% while from 2000 to 2005 it increased only to 5.1% (African Development Indicators, 2010). The rate in terms of real GDP per capita growth is even lower. For this reason, government commitment to trade openness, in particular, has not been shared by all, as the country has since 1984 made only modest progress towards the 8% growth target. Pessimists argue that, in spite of the many efforts of government towards trade openness, the recent growth record is still inadequate. To them, although the recent growth achievement is commendable, it is not unique as similar growth records were achieved under different policies in the early post-independence period[6](Aryeetey et al., 2000). The impact of the reform policies and foreign aid inflows are deemed much lower than expected, if Ghana aims to achieve its 8% growth target. This raises a number of questions on the extent to which trade openness and foreign aid inflows have contributed to economic growth in Ghana, over the post-liberalisation period.

The present study employs the Autoregressive Distributed Lag bounds testing approach to cointegration (henceforth, ARDL bounds test)[7] proposed by Pesaran et al. (2001) to investigate whether there is a level long run equilibrium relationship between trade openness, foreign aid and economic growth in Ghana over the post-liberalisation (1984-2007) period. The main results of the study suggest that while the labour force, gross domestic investment and government expenditure have no short-run and long run statistically significant positive impact on economic growth, trade openness and foreign aid have statistically significant short-run and long run positive impact on economic growth, although this is somewhat reduced by their interaction. Moreover, the political system predicts both short-run and long run positive impact on growth, although this effect is not significant in the short-run.

The rest of the study is organised as follows. Section 1.2 review related literature. Section 1.3 describes the estimation method and the data. Section 1.4 report and discuss the empirical results. Section 1.5 concludes the study with policy recommendations.

[6]This is not surprising as we observe from Figure 1.2 that the trade openness degree has not yet reached the level achieved in the 1960s

[7]The rational for the choice of the ARDL bounds test is discussed under estimation method and the data

1.2 Related Literature

1.2.1 Trade Openness

The idea that trade openness enhances economic growth dates back to at least the 18th century when Adam Smith first published his famous treatise, *The Wealth of Nations*[8]. Smith's ideas were that international trade permits increased specialisation, economics of scale, diffusion of knowledge, heightened domestic competition and increased utilisation of a country's abundant resources (Sachs and Warner, 1995). However, these ideas became less popular during the post-war period when most developing countries adopted protectionist policies aimed at protecting domestic industries from intense foreign competition. Although during a greater part of the post-war period a large number of development economists accepted this protectionist view, and developed models that relied heavily on the import-substitution ideas, others argued that abundant evidence exists suggesting that more open and outwardly oriented economies had outperformed those countries pursuing protectionist policies (Edwards, 1993). Developing countries, that adopted protectionist policies later realised that such inwardly oriented policies were no longer sustainable as their economies had over the period performed poorly. In particular, while many developing countries, especially those in Latin America that followed protectionist policies experienced slower growth rates, East Asian countries, that adopted export oriented policies, consistently outperformed these countries (Yanikkaya, 2003).

Two influential theoretical growth theories (neoclassical and endogenous) provide alternative explanation to economic growth in both developed and developing countries. Neoclassical growth theories highlight technological progress[9] as the engine of economic growth. They provide a means to measure productivity growth and assume that capital accumulation only drives productivity in the short-run (as capital suffers from diminish-

[8] He emphasised that increased imports leads to increased competitive pressure on domestic firms to improve their technologies which helps reduce domestic monopoly power that holds production below and prices above socially optimal levels

[9] On the balanced growth path in the Solow model, for example, the growth rate of output per worker is determined solely by the rate of technological progress. See Romer (2001)

ing returns in the long run). This makes productivity growth in the long run solely the result of exogenous technical progress meant to provide a vehicle for explaining the rate of growth of output over time (Zipfel, 2004). Although neoclassical growth theory made significant contribution to the understanding of economic growth, they did lack empirical relevance and explanatory power, as for example, their ability to predict economic growth in the long run. For this reason, macroeconomic research for about 15 years focused on short-run fluctuations when active research on growth theory effectively died by the early 1970s (Barro and Sala-i-Martin, 2004). Endogenous growth theories, on the other hand, provide additional explanation of sustained productivity and output growth, and most importantly of the openness-growth nexus. They provide "enough theoretical support for the positive relationship between trade openness and economic growth" (Edwards, 1998) and economic explanation for why capital might in the long run not suffer from diminishing returns (Romer, 2001). They depart from treating technological progress as exogenous and assume rather that, technological progress results from the allocation of resources to the creation of new ideas[10]. This makes improvement in technology and the process of economic growth itself understood as an endogenous outcome of the economy.

Trade openness is seen as one of the engines that would foster the needed technological progress, highlighted in neoclassical and endogenous growth theories. It makes it possible for poor countries access intermediate inputs and technology transfer from more advanced countries, promotes exports by reducing anti-export bias, generates positive spillovers through exploiting scale economies, and encourages competitiveness and efficiency in both domestic and international markets (Balassa, 1978; Feder, 1982; Grossman and Helpman, 1991; Rodrik, 1999; Manning, 2005; Kaplan and Aslan, 2006). For a developing country such as Ghana, greater openness to trade may bring about the upgrading of skills through the importation of superior technology and innovation (Aryeetey, 2005). These ideas stimulated the unprecedented wave for unilateral trade reforms in the

[10]Thus the model, instead of assuming that economic growth occurs because of automatic improvements in technology, is rather focused on the understanding of the economic forces that underlie technological progress

1980s, for many developing countries (Greenaway et al., 2002) because greater openness plays a vital role in shaping the economic and social performance and prosperity of countries (UNCTAD, 2005). For these reasons, the empirical results have generally indicated a positive relationship between trade openness and economic growth[11]. However, the strength of the link has greatly depended on whether the specification uses time series, cross-section or panel data techniques, the time period considered, the problem of data, and the measurement and potential endogeneity of trade openness itself (see Sachs and Warner, 1995; Harrison, 1996; Dollar and Kraay, 2001; Kaplan and Aslan, 2006). Moreover, although neoclassical and endogenous growth theories predict that higher trade can increase growth globally, a subset may experience slower growth depending on their initial condition and level of technological progress, making the openness-growth debate still an empirical question[12]. Lee et al. (2004) used identification through heteroskedasticity to address potential endogeneity of trade openness for 100 countries over the 1961-2000 period and concluded that trade openness have a positive impact on growth, although this effect is small in magnitude. The present study recognises these estimation problems and agrees with earlier researchers that trade openness measures are not free from methodological problems. This is important because different trade openness measures capture different aspects of openness in general. However, Harrison (1996) argues that, regardless of the many trade openness measures that exist in the literature, the simplest ones are those based on actual trade flows, such as the sum of exports and imports (% of GDP). We use this measure as a proxy for trade openness in this study.

1.2.2 Foreign Aid

Foreign aid, on the other hand, is seen as another important variable that should complement trade openness boost technological progress and domestic investment, and hence long run growth. The argument for foreign aid is evident in the standard theoretical "two-gap" model of (Chenery and Strout, 1966), the empirical work of (Papanek, 1972, 1973)

[11]See (Sachs and Warner, 1995; Harrison, 1996; Dollar and Kraay, 2001; Lee et al., 2004)
[12]See, for example, Rodriguez and Rodrik (2001)

and the emergence of the twin peak phenomenon (Quah, 1997; Sachs, 2005; Sala-i-Martin, 2006). As noted in the "two-gap" model, developing countries faces two fundamental financing gaps: the investment-saving and the import-foreign exchange gaps, that foreign aid is to fill (Papanek, 1973; Easterly, 2003). It supplements insufficient domestic savings by providing foreign income for the importation of desired capital goods to augment the level of capital stock used for domestic production (Hudson, 2004). It is believed that an aid-financed imports and investment would be growth enhancing for the many developing countries constrained with savings and foreign exchange earnings. This phenomenon has led many developing countries become highly dependent on foreign aid, and it is not surprising that following the Monterrey consensus in 2002 (based on the need to help achieve the MDGs by 2015) developed countries pledged massive inflow of foreign aid to developing countries[13]. In spite of the theoretical support for foreign aid to developing countries as a growth enhancing policy variable, the empirical evidence is one that has received divergent views over the past few decades. These views have often focused on whether foreign aid have significant positive impact on growth or not, and/or whether certain conditions are required by foreign aid donors and the recipient country's government for aid to have significant positive impact on growth.

Foreign aid optimists argue for a positive relationship between foreign aid and economic growth[14]. For example, Gomanee et al. (2005) in a sample of 25 sub-Saharan African countries for the 1970-1997 period argued that foreign aid has a significant positive impact on growth and for that matter the poor economic growth performance of many African countries should not be attributed to aid ineffectiveness. Nonetheless, the argument of other optimists have been more "conditional"[15]. Whilst proponents like (Burnside and Dollar, 2000; Collier and Dollar, 2002) have argued that foreign aid appears to be effective but only in countries with good economic policies and institutional environment, others like (Collier and Dehn, 2001; Guillaumont and Chauvet, 2001; Dalgaard et al.,

[13] Sachs (2005) provides further evidence for the need for such massive foreign aid inflows to these countries

[14] See (Papanek, 1973; Gupta and Islam, 1983; Gomanee et al., 2005; Karras, 2006)

[15] Readers interested in a comprehensive survey on this point should consult (Roodman, 2007)

2004) argue that foreign aid is rather effective inn countries with more vulnerable economic conditions and/or outside the tropics (i.e. export prices shocks, terms of trade volatility, and geographical considerations). For example, Burnside and Dollar (2000) argues that "aid has a positive impact on growth in developing countries with good fiscal, monetary, and trade policies but has little effect in the presence of poor policies" for a sample covering the 1970-1993 period. For this reason, if foreign aid is allocated optimally and combined with good policies should have positive impact on growth. This result have made the argument for foreign aid today moved away from conditionality to policy selectivity - where foreign aid is now targeted to developing countries with track record of good policies and the right institutional environment (Easterly, 2003; Baulch, 2006; Bourguignon and Leipziger, 2006). In addition, foreign aid though can have positive short-run impact on growth, may have detrimental long run growth effect as it may be subject to decreasing marginal returns over the long-term (Lensink and White, 2001; Clemens et al., 2004). For instance, Clemens et al. (2004) argues that foreign aid does not have robust long run effect on growth, although in the short-run some types of foreign aid may be growth enhancing. This may be the result of foreign aid being volatile and the possibility that overreliance on foreign aid undermines innovative ways of increasing domestic tax revenue and/or encouraging exports when aid is not forthcoming.

Foreign aid pessimists, on the other hand, argue that aid does not have a positive robust effect on growth. Neither does good policy environment a necessary condition for aid to be effective as advocated in (Burnside and Dollar, 2000)[16]. For example, Boone (1996) finds that foreign aid does not increase investment (and hence economic growth) as suggested by the "two-gap" model, but rather finance consumption. Easterly (2003) considered both alternative definitions of "aid", "policies" and "growth" for the same sample period and an expanded sample covering the 1970 to 1997 period, but the same definitions of variables as in (Burnside and Dollar, 2000). Easterly concluded that in both cases good policy is not a necessary condition for aid to have positive impact on growth. In

[16]See (Mosley, 1980; Boone, 1996; Hansen and Tarp, 2001; Easterly, 2003; Easterly et al., 2004; Rajan and Subramanian 2005)

a comprehensive empirical investigation, Rajan and Subramanian (2005) used both cross-section and panel data techniques, over different time periods and considered different kinds of foreign aid. They concluded that no evidence exists to support the argument that foreign aid works better in good policy, institutional and/or geographical environment or that the kind of foreign aid[17] matter for growth. In addition, Roodman (2007) investigated the robustness of the results of seven foreign aid and economic growth papers[18] and concluded that the results on whether aid is effective under good policies, vulnerable economic conditions, subject to diminishing returns, and/or works better outside the tropics but not in them among others are only fragile when the sample size is extended.

1.2.3 Summary

The discussion on the relationship between trade openness, foreign aid and economic growth, though inconclusive does not mean the factors identified in the literature may not have effect on aid effectiveness and the impact that trade openness have on economic growth. For example, the results on the relationship between foreign aid and economic growth rather indicates that a strong coordination and partnership is required between both foreign aid donors and recipient country's government on the best institutional framework under which foreign aid could be effective in order to impact positively on long-term growth, as the effect of these conditions may differ from country to country. For this reason, that country-level study on whether trade openness and foreign aid inflows impact positive on long-term growth becomes particularly important.

1.3 Estimation Method

1.3.1 Model Specification and The Data

To investigate the impact of trade openness and foreign aid on economic growth in Ghana, we specify an empirical growth model that introduces trade openness, foreign aid and their

[17] Short/long impact aid and/or bilateral/multilateral aid

[18] (Burnside and Dollar, 2000; Hansen and Tarp, 2001; Guillaumont and Chauvet, 2001; Collier and Dehn, 2001; Collier and Dollar, 2002; Collier and Hoeffler, 2004; Dalgaard et al., 2004)

interaction term as additional explanatory variables to labour force growth, gross domestic investment, government expenditure, political system and labour force participation rate as:

$$\begin{aligned} RGDPPCG_t = \alpha_0 + \beta_1 LABFG_t + \beta_2 lnGDI_t + \beta_3 lnOPEN_t + \beta_4 lnAID_t + \\ \beta_5 (lnOPEN * lnAID)_t + \beta_6 lnGEXP_t + \\ \beta_7 PSYSTEM_t + \beta_8 lnLFPR_t + e_t \end{aligned} \tag{1.1}$$

where $RGDPPCG$ is the growth rate of real GDP per capita, $LABFG$ is the growth rate of the labour force, GDI is the capital stock, which is proxied by the share of gross domestic investment in GDP, $OPEN$ measures trade openness (i.e. $(EXPORTS + IMPORTS)/GDP$), AID is the share of foreign aid in GDP, $GEXP$ is the share of government expenditure in GDP, $PSYSTEM$ measures the political system, $LFPR$ is the labour force participation rate, "ln" is the natural logarithmic operator, α_0 and β_s are respectively constant and parameters to be estimated, and e is the error term with zero mean and constant variance. The data for $PSYSTEM$ is Polity2 score obtained from Polity IV project (Marshall and Jaggers, 2009). $PSYSTEM$ is a combine measure of the extent to which a country is autocratic or democratic and it ranges from -10 (strongly autocratic) to +10 (strongly democratic). The rest of the data are obtained from the World Bank (2010) - African Development Indicators, 2010.

1.3.2 The ARDL Bounds Test

The building of dynamic economic models often entails detailed analysis of the characteristics of the individual time series variables involved (Lutkepohl and Kratzig, 2004). When these characteristics are ignored, and the set of series modelled jointly, the regression results obtained may exhibit a high level of correlation between the variables. Nonetheless, "the existence of a high degree of correlation between two variables does not automatically imply the existence of a causal relationship between the variables concerned" (Holden and Thomson, 1992). This correlation may be "spurious"[19]. However, if two or more variables are cointegrated then the cointegration relationship among the variables rules out the possibility of the estimated relationship being "spurious" (Engle and Granger, 1987). Cointegration test such as the Engle-Granger two-step (Engle and Granger, 1987), Johansen maximum likelihood (Johansen and Juselius, 1990), Phillips and Hansen (Phillips and Hansen, 1990) among others rely on strictly $I(1)$ variables. The reason being that if all the variables are $I(1)$, then there are special cases where a linear combination result in an $I(0)$ variable and hence cointegration (Asterius and Hall, 2007). However, the requirement of $I(1)$ variables often makes estimates of these cointegration test subject to biases. This is the case as the order of integration of a variable often depends on the type of unit root test, the choice of optimal lag length, and whether a constant and/or trend is included in the underlying unit root test.

The present study overcomes some of these problems by employing the ARDL bounds test. The method allows the estimation of the long run level relationship between variables and its choice is motivated by key benefits it has over strictly $I(1)$ variables dependent cointegration tests. Firstly, the method yields valid results irrespective of whether the underlying variables are $I(0)$, $I(1)$, or a combination of both[20]. This is important when it becomes difficult to treat a variable as either $I(0)$ or $I(1)$, although it may not necessarily be $I(2)$. Secondly, the method is asymptotically efficient in finite and small sample study[21] and applicable even in the case where the regressors are endogenous[22]. This is appropriate for the present study with only 24 observations, and the fact that some of our explanatory variables may be plagued by the endogeneity problem. Thirdly, the method allows the introduction of optimal lags of both the dependent and independent variables. Thus, different variables are allowed to have their optimal speed of adjustment to equilibrium. Last but not the least, OLS is easily employed to estimate the cointegration relationship.

[19] It exists regardless of the sample size and makes the existence of a long run relationship between variables hardly possible. See Granger and Newbold (1974) for more details

[20] For this reason, the order of integration need not be the same for all variables, as is the case for cointegration methods that relies on strictly $I(1)$ variables

[21] For more details, see Pattichis (1999) who used only 20 observation covering the 1975-1994 period

[22] See Alam and Quazzi (2003)

In what follows, we outline the procedure involved in the ARDL bounds test. Based on equation (1.1) the general ARDL representation of conditional error correction model (ecm) gives[23]:

$$\begin{aligned}\Delta RGDPPCG_t = \alpha_0 + \sum_{i=1}^{p}\gamma_i \Delta RGDPPCG_{t-i} + \sum_{i=0}^{p_1}\beta_i \Delta LABFG_{t-i} + \\ \sum_{i=0}^{p_2}\delta_i \Delta lnGDI_{t-i} + \sum_{i=0}^{p_3}\lambda_i \Delta lnOPEN_{t-i} + \\ \sum_{i=0}^{p_4}\theta_i \Delta lnAID_{t-i} + \sum_{i=0}^{p_5}\rho_i \Delta(lnOPEN * lnAID)_{t-i} + \\ \sum_{i=0}^{p_6}\vartheta_i \Delta lnGEXP_{t-i} + \sum_{i=0}^{p_7}\psi_i \Delta PSYSTEM_{t-i} + \\ \sum_{i=0}^{p_8}\omega_i \Delta lnLFPR_{t-i} + \phi_1 RGDPPCG_{t-1} + \phi_2 LABFG_{t-1} + \\ \phi_3 lnGDI_{t-1} + \phi_4 lnOPEN_{t-1} + \phi_5 lnAID_{t-1} + \\ \phi_6 (lnOPEN * lnAID)_{t-1} + \phi_7 lnGEXP_{t-1} + \\ \phi_8 PSYSTEM_{t-1} + \phi_9 lnLFPR_{t-1} + \epsilon_t \qquad (1.2)\end{aligned}$$

where all variables are as previously defined and Δ is the first difference operator. Next, we choose the maximum lag ($p = 1$) for the ARDL model selection. This is reasonable given the annual series in our sample and the short time span considered. However, in selecting the optimum lag structure for the ARDL $(p, p_1, p_2, p_3, p_4, p_5, p_6, p_7, p_8)$ model we use the Schwarz Information Criterion (SIC). We then compute the F-statistic to trace the presence of cointegration by testing the null hypothesis of no cointegration restricting the coefficients of the lagged level variables equal to zero (i.e $H_0 : \phi_1{=}\phi_2{=}\phi_3{=}\phi_4{=}\phi_5{=}\phi_6{=}\phi_7{=}\phi_8{=}\phi_9{=}0$ against the alternative hypothesis that $H_1 : \phi_1{\neq}\phi_2{\neq}\phi_3{\neq}\phi_4{\neq}\phi_5{\neq}\phi_6{\neq}\phi_7{\neq}\phi_8{\neq}\phi_9{\neq}0$) by estimating equation (1.2) by OLS. The approach involved in computing the F-statistic (see Pesaran and Pesaran, 2009) first estimate

[23]In this study, we are only interested in the case with $RGDPPCG$ as the dependent variable. However, the method allows representation for the regressors as the dependent variable

$$\Delta RGDPPCG_t = \alpha_0 + \sum_{i=1}^{p} \gamma_i \Delta RGDPPCG_{t-i} + \sum_{i=0}^{p_1} \beta_i \Delta LABFG_{t-i} + \sum_{i=0}^{p_2} \delta_i \Delta lnGDI_{t-i} + \sum_{i=0}^{p_3} \lambda_i \Delta lnOPEN_{t-i} + \sum_{i=0}^{p_4} \theta_i \Delta lnAID_{t-i} + \sum_{i=0}^{p_5} \rho_i \Delta (lnOPEN * lnAID)_{t-i} + \sum_{i=0}^{p_6} \vartheta_i \Delta lnGEXP_{t-i} + \sum_{i=0}^{p_7} \psi_i \Delta PSYSTEM_{t-i} + \sum_{i=0}^{p_8} \omega_i \Delta lnLFPR_{t-i} + \upsilon_t \quad (1.3)$$

by OLS. A variable addition test is then applied to equation (1.3) by including the lagged level variables $\phi_1 RGDPPCG_{t-1}$, $\phi_2 LABFG_{t-1}$, $\phi_3 lnGDI_{t-1}$, $\phi_4 lnOPEN_{t-1}$, $\phi_5 lnAID_{t-1}$, $\phi_6 (lnOPEN * lnAID)_{t-1}$, $\phi_7 lnGEXP_{t-1}$, $\phi_8 PSYSTEM_{t-1}$, $\phi_9 lnLFPR_{t-1}$. Microfit 5.0 provide the F-statistic for the selected ARDL model with two sets of asymptotic critical values bounds, based on whether all variables are $I(0)$ for the lower bound or $I(1)$ for the upper bound. We report the 90% and 95% critical value bounds provided by Microfit 5.0[24]. The null hypothesis of no cointegration is rejected if the computed F-statistic is greater than the upper bound critical value. On the other hand, we cannot reject the null of no cointegration if the computed F-statistic is less than the lower bound critical value. However, if it happens that the computed F-statistic falls within these two bounds then the results will be inconclusive and additional information will be required before a conclusive inference can be made (see Pesaran et al., 2001). The asymptotic distribution of the critical values bounds, are non-standard under the null hypothesis of no cointegration relationship in levels and are computed by stochastic simulations.

Once, the existence of a long run level cointegration relationship is confirmed we estimate the long run and short-run model parameters. For the long run model parameters,

[24]The critical value bounds are still valid with the inclusion of dummy variables amongst the deterministic variables. See Pesaran and Pesaran (2009)

we estimate the following conditional long-run model for $RGDPPCG_t$:

$$\begin{aligned} RGDPPCG_t = \alpha_0 + \sum_{i=1}^{p} \phi_{1i} RGDPPCG_{t-i} + \sum_{i=0}^{p_1} \phi_{2i} LABFG_{t-i} + \\ \sum_{i=0}^{p_2} \phi_{3i} lnGDI_{t-i} + \sum_{i=0}^{p_3} \phi_{4i} lnOPEN_{t-i} + \\ \sum_{i=0}^{p_4} \phi_{5i} lnAID_{t-i} + \sum_{i=0}^{p_5} \phi_{6i} (lnOPEN * lnAID)_{t-i} + \\ \sum_{i=0}^{p_6} \phi_{7i} lnGEXP_{t-i} + \sum_{i=0}^{p_7} \phi_{8i} PSYSTEM_{t-i} + \\ \sum_{i=0}^{p_8} \phi_{9i} lnLFPR_{t-i} + u_t \end{aligned} \tag{1.4}$$

where u_t is the error term, and the long run model parameters are derived based on ϕ_s[25]. For the short-run model parameters we estimate the *ecm*:

$$\begin{aligned} \Delta RGDPPCG_t = \alpha_0 + \sum_{i=1}^{p} \gamma_i \Delta RGDPPCG_{t-i} + \sum_{i=0}^{p_1} \beta_i \Delta LABFG_{t-i} + \\ \sum_{i=0}^{p_2} \delta_i \Delta lnGDI_{t-i} + \sum_{i=0}^{p_3} \lambda_i \Delta lnOPEN_{t-i} + \\ \sum_{i=0}^{p_4} \theta_i \Delta lnAID_{t-i} + \sum_{i=0}^{p_5} \rho_i \Delta (lnOPEN * lnAID)_{t-i} + \\ \sum_{i=0}^{p_6} \vartheta_i \Delta lnGEXP_{t-i} + \sum_{i=0}^{p_7} \psi_i \Delta PSYSTEM_{t-i} + \\ \sum_{i=0}^{p_8} \omega_i \Delta lnLFPR_{t-i} + \eta ect_{t-1} + u_t \end{aligned} \tag{1.5}$$

where u_t is the error term, β, δ, λ, θ, ρ, ϑ, ψ and ω denotes the short-run impact multipliers, and η is the coefficient of the lagged error correction term (ect_{t-1}) which measures the speed of adjustment to equilibrium or the extent of disequilibrium correction.

[25] Specifically $\frac{\phi_2}{1-\phi_1}$, $\frac{\phi_3}{1-\phi_1}$, $\frac{\phi_4}{1-\phi_1}$, $\frac{\phi_5}{1-\phi_1}$, $\frac{\phi_6}{1-\phi_1}$, $\frac{\phi_7}{1-\phi_1}$, $\frac{\phi_8}{1-\phi_1}$ and $\frac{\phi_9}{1-\phi_1}$ defines the long run model parameters. Note that these are the estimates of long run coefficients (β_s) in equation (1.1)

1.3.3 Testing for Unit Root

In order to be sure that all variables are not $I(2)$ and to ensure that structural break is not a problem, we determine the time series properties of individual variables that enter our empirical growth model. We adopt the Dickey-Fuller Generalised Least Squares (DF-GLS) unit root test, proposed by [Elliot, Rothenberg and Stock (ERS, 1996)], the Kwiatkowski, Phillips, Schmidt and Shin (KPSS) unit root test with the null hypothesis that the series are stationary, proposed by (Kwiatkowski, Phillips, Schmidt and Shin, 1992) and the unit root test due to Lee and Strazicich (2001, 2003) that takes into consideration the impact of structural breaks. The choice of the DF-GLS unit root test, in particular, is motivated by the fact that it has become more preferred to the traditional ADF and PP tests that are known to suffer severe finite sample power and size distortions. DF-GLS is more efficient as it exhibits the best overall small sample size performance and "substantially improved power when an unknown mean or trend is present" [Elliot, Rothenberg and Stock (ERS, 1996)] in the underlying time series. The test first applies a generalised least square detrending (demeaning) to the data, prior to running an Augmented Dickey-Fuller (ADF) regression. This leads to improved power of the test in the differenced series when a large AR root is present and minimises size distortions in the presence of large negative MA root. Another important feature of the test is on the choice of the optimal lag length p, which is based on Ng and Perron (1995) sequential t test, SIC and the Ng and Perron (2001) modified AIC (MAIC) criterion. The null hypothesis that the series have unit root is tested against the alternative that the series have no unit root[26]. The approximate critical values obtained from [Elliot, Rothenberg and Stock (ERS, 1996)] are reported with the test. The test results are summarised in Table 1.1[27]. All test results allow us to treat all variables as either $I(1)$ or $I(0)$.

[26]We computed the DF-GLS unit root test using the "DFGLS" routine in Stata

[27]Not reported, we also computed the KPSS unit root test using the "KPSS" routine in Stata and the unit root test due to Lee and Strazicich (2001, 2003) using the procedure available in RATS. All not reported results are available upon request

Table 1.1: DF-GLS unit root test results

	Level		First-differences	
Variable	Intercept + Trend	Intercept	Intercept + Trend	Intercept
$RGDPPCG$	-3.485**	2.319**		
$LABFG$	0.751	-1.153	-3.105*	-4.999***
$lnGDI$	-0.827	1.187	-5.812***	-5.290***
$lnOPEN$	-1.782	-0.956	-4.342***	-4.116***
$lnAID$	-2.382	-2.073**	-6.556***	-5.513***
$lnOPEN * lnAID$	-2.355	-1.887*	-7.020***	-5.703***
$lnGEXP$	-2.464	-1.745*	-3.662**	-3.155***
$PSYSTEM$	-2.959*	-0.162	-4.717***	-1.725***
$lnLFPR$	-2.579	-2.141**	-2.980*	-2.212***

Note: ***(**)[*] indicates rejection of the null hypothesis of unit root at 1%(5%)[10%] level. The approximate critical values at the 1%, 5% and 10% level for model with trend (no trend) are respectively -3.770 (-2.660), -3.190 (-1.950) and -2.890 (-1.600)

1.4 Empirical Results and Discussion

The empirical results from the estimated ARDL models needed for the discussion are presented in Tables 1.2-1.5. All computations are done using Microfit 5.0. For all Tables, we report in column [2] the results for equation (1.1). In columns [1], [3], [4] and [5] we respectively report the results for equation (1.1) without $lnLFPR$, the results for equation (1.1) without $LABFG$, the results for equation (1.1) without $lnGDI$, and the results for equation (1.1) without both $LABFG$ and $lnGDI$[28]. The ARDL (1, 0, 0, 1, 1, 0, 0, 1), ARDL (1, 0, 0, 1, 1, 0, 0, 1, 0), ARDL (1, 0, 1, 1, 0, 0, 1, 0), ARDL (1, 0, 1, 1, 0, 0, 1, 0) and ARDL (1, 1, 1, 0, 0, 1, 0) models are respectively selected by SIC. The critical value bounds reported with the ARDL model in columns [1], [3] and [4] for the 95% and 90% lower and upper bounds are 3.1917-5.0286 and 2.5759-4.0936 respectively. The critical value bounds reported with the ARDL model in column [2] for the 95% and 90% lower and upper bounds are 3.1665-5.0260 and 2.5261-4.1011 respectively. The critical

[28]With the exception of $lnLFPR$, we drop the other variables, as they do not enter significant. In this way, we also check whether the results are robust to alternative specifications. Based on the literature on growth theory we also introduced private credit, FDI, human capital, remittances, interest rate, inflation and exchange rate into the analysis. However, these variables were dropped as they were insignificant, neither does their exclusion affects the estimated models given that all are cointegrated

value bounds with the ARDL model in column [5] for the 95% and 90% lower and upper bounds are 3.2981-4.9675 and 2.6485-4.0603 respectively. The results for the computed F-statistic reported in Table 1.2 reveals that [1], [2], [4] and [5] are significant at the 5% level while that for [3] is significant at the 10% level. Based on these results, we conclude that a level long run cointegration relationship exists for all estimated ARDL models. Tables 1.3-1.5 respectively report the results of the long run coefficients, the short-run dynamic coefficients and the model diagnostic and stability tests.

Table 1.2: ARDL bounds test for cointegration relationship

Model	[1]	[2]	[3]	[4]	[5]
Test statistic	5.2602**	6.1355**	4.8347*	6.1462**	5.4613**

Note: **(*) indicate rejection of the null hypothesis of no cointegration at 5%(10%) significance level. The critical value bounds are computed by stochastic simulation using 20000 replications

In line with neoclassical growth theory, $LABFG$ enters with the correct sign (negative) but insignificant at any conventional level in both the short-run and the long run as in [1], [2] and [4]. However, $lnLFPR$ enters negative and statistically significant in both the short-run and the long run in [2]-[5]. The estimated long run and short-run coefficients on $lnGDI$ enters positive in [1] and negative in [2]-[3][29], but they are all statistically insignificant at any conventional level. The estimated long run and short-run coefficients on $lnGEXP$ enters negative and statistically significant in both the short-run and the long run for all estimated models. The result indicates that while $LABFG$ and $lnGDI$ does not have statistically significant short-run and long run impact on $RGDPPCG$, $lnLFPR$ and $lnGEXP$ have detrimental short-run and long run effects on $RGDPPCG$. Although the results on $lnGDI$ is quite surprising (as we would have expected $lnGDI$ to have statistically significant positive impact on $RGDPPCG$), the result on $lnLFPR$ and

[29]Not reported, we also estimated the model in [1], [2] and [3] with the "ln" of gross fixed capital formation (% of GDP), in place of $lnGDI$, but did not affect the final results. Gross fixed capital formation (% of GDP) enters positive in all models but statistically insignificant

$lnGEXP$ are not surprising considering the quality of labour force, frequent industrial actions, the way the labour market is regulated and the expenditure patterns of government. As Nketiah-Amponsah (2009) note,"increases in government expenditure without corresponding increase in managerial efficiency have been the bane of Ghana's economic growth". Moreover, the labour market is mostly characterised by labour intensive agriculture and petty trading with limited employment benefits (Oteng-Abayie and Frimpong, 2006). The combined effect of the characteristics of the labour market, the possibility that government spending is in non-productive sectors (including payment of wage bills to "ghost" workers, common in many low income countries) and the possibility of diminishing marginal returns to capital may explain to some extent why $lnGDI$, $LABFG$, $lnLFPR$ and $lnGEXP$ does not have significant positive impact on $RGDPPCG$.

Table 1.3: Estimated long run coefficients using the ARDL approach

Regressor	[1]	[2]	[3]	[4]	[5]
$LABFG$	-0.245	-0.118		-0.122	
	[0.625]	[0.433]		[0.402]	
$lnGDI$	0.073	-0.047	-0.112		
	[1.588]	[1.033]	[0.982]		
$lnOPEN$	28.827**	18.510**	18.875**	18.486**	18.850**
	[12.672]	[7.603]	[7.348]	[7.224]	[7.034]
$lnAID$	79.510**	42.652*	43.555**	42.673**	43.693**
	[31.319]	[19.247]	[18.612]	[17.808]	[17.808]
$lnOPEN * lnAID$	-17.855**	-9.827**	-10.017**	-9.835**	-10.055**
	[7.011]	[4.311]	[4.174]	[4.106]	[3.991]
$lnGEXP$	-6.152*	-6.734**	-7.032***	-6.760***	-7.125***
	[3.205]	[2.146]	[1.820]	[1.975]	[1.566]
$PSYSTEM$	0.689*	0.504***	0.525***	0.503***	0.524***
	[0.238]	[0.142]	[0.118]	[0.132]	[0.112]
$lnLFPR$		-102.487**	-105.275**	-102.344**	-105.188**
		[36.057]	[33.765]	[34.227]	[32.341]
$INTERCEPT$	-109.765*	380.047**	390.846**	379.513**	390.561**
	[52.132]	[162.223]	[153.357]	[154.182]	[146.916]

Note: Dependent variable $RGDPPCG$. In parenthesis are standard errors. ***(**)[*] indicate rejection of the null hypothesis at 1%(5%)[10%] significance level

On the contrary, the estimated long run and short-run coefficient on $PSYSTEM$ is positive and significant in the long run, although this is not captured in the short-run. This result indicates that, the political system although enters positive but statistically insignificant in the short-run have statistically significant positive long run impact on $RGDPPCG$. The result may provide further support for a positive impact of democracy on long run growth, as for a greater part of the study period (1993-2007) Ghana has enjoyed peaceful democratic governance. The estimated long run and short run coefficients on $lnOPEN$ and $lnAID$ are positive and statistically significant whilst that on their interaction term $lnOPEN * lnAID$ is negative and statistically significant. The result indicates that both $lnOPEN$ and $lnAID$ have positive and statistically significant long run and short-run impact on $RGDPPCG$. However, the total effect that $lnOPEN$ and/or $lnAID$ have on $RGDPPCG$ is somewhat reduced by their interaction term $lnOPEN * lnAID$ in both the long run and the short-run. The result of the positive impact that both trade openness and foreign aid have on economic growth provide further support for the theoretical predictions of positive impact that these policy variables have on long-term growth, although this effect may not necessarily be evident in all aid receiving developing countries that for the past few decades have adopted liberalisation policies aimed at improving economic performance.

The ecm results suggest satisfactory statistical fit and adequacy of the estimated models to the data. This is supported by the following statistical tests. The F-statistics are highly significant (at the 1% significance level). The $R - bar^2$ of approximately 0.90 is really impressive and indicates that the included explanatory variables are capable of explaining approximately 90% of the short-run variations in $RGDPPCG$. The results are not “spurious” as the coefficient on $ecm(-1)$ of approximately 0.53 or more (associated with the long run relationship) is negative, considerably high in absolute magnitude and highly significant (at the 1% significance level). This provides further evidence on the existence of stable long run level cointegration relationship. The negative and statistically significant coefficient on $ecm(-1)$ means that there is no problem of adjustment in the

Table 1.4: Error-correction representation of the selected ARDL models

Regressor	[1]	[2]	[3]	[4]	[5]
$\Delta LABFG$	-0.219	-0.077		-0.080	
	[0.359]	[0.288]		[0.268]	
$\Delta lnGDI$	0.039	-0.031	-0.071		
	[0.840]	[0.674]	[0.628]		
$\Delta lnOPEN$	22.341***	17.298***	17.208***	17.310***	17.227***
	[4.734]	[4.239]	[4.043]	[4.035]	[3.874]
$\Delta lnAID$	44.845***	31.017***	31.085***	31.054***	31.178***
	[10.586]	[9.942]	[9.510]	[9.449]	[9.074]
$\Delta(lnOPEN * lnAID)$	-9.431***	-6.411***	-6.405***	-6.421***	-6.429***
	[2.356]	[2.201]	[2.106]	[2.089]	[2.008]
$\Delta lnGEXP$	-3.249**	-4.393***	-4.496***	-4.413***	-4.555***
	[1.414]	[1.212]	[1.098]	[1.077]	[0.928]
$\Delta PSYSTEM$	0.132	0.092	0.097	0.092	0.096
	[0.112]	[0.091]	[0.085]	[0.086]	[0.082]
$\Delta lnLFPR$		-66.860**	-67.316**	-66.815**	-67.252**
		[25.054]	[23.916]	[23.873]	[22.905]
$ecm(-1)$	-0.528***	-0.652***	-0.639***	-0.653***	-0.639***
	[0.114]	[0.125]	[0.110]	[0.119]	[0.106]
$R-bar^2$	0.813	0.880	0.891	0.891	0.900
F-statistic	13.396***	19.326***	23.738***	23.911***	29.560**
DW-statistic	2.227	2.523	2.489	2.519	2.476

Note: Dependent variable $\Delta RGDPPCG$. In parenthesis are standard errors. ***(**) indicates rejection of the null hypothesis at 1%(5%) significance level.

long run in case of shocks in the short-run (i.e. a considerable high speed of adjustment to long run equilibrium every year after a short-run shock). In addition, the model diagnostic test statistics fulfil the conditions of no specification errors, structural stability, normality of residuals and homoskedasticity. The stability tests further confirm the stability of the estimated coefficients.

Table 1.5: Diagnostic (LM version) and stability test for selected ARDL models

Diagnostic/Stability Test	[1]	[2]	[3]	[4]	[5]
Serial Correlation	0.614	2.541	1.847	2.403	1.737
	[0.433]	[0.111]	[0.174]	[0.121]	[0.188]
Functional Form	0.018	0.480	0.211	0.409	0.223
	[0.893]	[0.488]	[0.646]	[0.523]	[0.637]
Normality	0.983	2.227	1.789	2.273	1.832
	[0.612]	[0.328]	[0.409]	[0.321]	[0.400]
Heteroskedasticity	0.224	0.467	0.398	0.484	0.511
	[0.636]	[0.494]	[0.528]	[0.486]	[0.431]
CUSUM	Stable	Stable	Stable	Stable	Stable
CUSUMSQ	Stable	Stable	Stable	Stable	Stable

Note: Probability values in parenthesis

1.5 Conclusions and Policy Implications

The stylised facts about economic growth is that it is a function of many variables that for many developing countries trade openness and foreign aid becomes particularly important. This study investigated the level long run level cointegration relationship between trade openness, foreign aid and economic growth in post-liberalisation Ghana (i.e. over the period 1984-2007) using the ARDL bounds test. The study estimated economic growth model that considered trade openness, foreign aid and their interaction term as well as a number of other important determinants of economic growth.

The empirical results suggest that, although the total short-run and long run positive impact that trade openness and foreign aid have on economic growth is somewhat reduced by their interaction term, both trade openness and foreign aid have been beneficial to economic growth in Ghana, since the adoption of liberalisation policies in 1983. The result is not surprising as Ghana is currently named among the star performers in efforts to reach the MDGs by 2015. The result further reveals that there are long run growth benefits of the political system currently operating in Ghana. However, due to the negative and statistically significant short-run and long run impact that both labour force participation rate and the share of government expenditure in GDP have on economic growth, it is recommended that the government pay particular attention to its expenditure and the labour market if Ghana aims to achieve an upper middle-income status by the year 2015.

Chapter 2

Economic Globalisation, Democracy and Income in Sub-Saharan Africa: A Panel Cointegration Analysis

2.1 Introduction

The past few decades have seen a resurgence of research on the impact of economic globalisation and democracy on economic performance of developing countries. Does economic globalisation and democracy go hand in hand to impact positive on economic performance of developing countries in the long run? For sub-Saharan Africa (SSA), most governments prior to the 1980s were very skeptical on the success of opening their economies to international competition. However, this perception changed in the early 1980s and the result has been the adoption of trade and financial liberalisation policies for many of these countries (Rudra, 2005). Democracy, on the other hand, was virtually not in existence in SSA prior to the 1990s as many impediments[1] existed that undermined democratisation (Ndulu and O'Connell, 1999; Brown, 2005). Nonetheless, as Fosu (2008) note, democracy became important in SSA beginning in the early 1990s as it was expected

[1]As Brown (2005) note, such impediments mainly constituted lack of formal institutional structures (including rule of law) conducive for sustaining the immediate survival of democracy

would help improve the dismal economic performance that had existed for decades.

The arguments in favour of economic globalisation as a determinant of economic performance are well documented in the literature. For example, Dreher (2006), Chang and Lee (2010) and Villaverde and Maza (2011) have argued that economic globalisation is conducive for economic performance, although this effect is small in magnitude. For many developing countries, economic globalisation (in particular trade liberalisation) became important, due to the perceived ineffectiveness of foreign aid as an "engine" of development. Trade liberalisation makes possible to import intermediate inputs to augment domestic savings, as well as the exploitation of economics of scale and technological/knowledge spillovers (McKinnon, 1964; Grossman and Helpman, 1991; Marin, 1992; Prasad et al., 2003). Financial liberalisation on the other hand has the potential to stimulate the development of the domestic financial sector for long-term growth (Levine, 1996; Henry, 2000). Therefore, economic globalisation would in general play a critical role as a catalyst for economic prosperity in the developing world.

Many empirical studies on the relationship between economic globalisation and economic performance have focused on specific dimensions of economic globalisation (mainly trade and financial liberalisation). The most interesting discussion on the link between economic globalisation and economic performance is the contrast between empirical papers on trade and financial liberalisation. For example, trade liberalisation has often reported statistically significant positive relationship with income and/or growth (see Balassa, 1978, 1985; Ram, 1985, 1987; Sachs and Warner, 1995; Harrison, 1996, Thornton, 1996; Dalley and Kraay, 2001; Ibrahim and MacPhee, 2003; Yanikkaya, 2003; Abual-Foul, 2004). However, the result of a positive impact of financial liberalisation especially for developing countries has been limited, although the financial integration of developing countries to the global economy has increased in recent decades (Prasad et al., 2003)[2]. For example, Edwards (2001) note that financial liberalisation is conducive for economic

[2]Prasad et al. (2003) further note that for developing countries financial liberalisation is neither a necessary nor sufficient condition for economic performance, as over the period 1970-2000 for example, Botswana relatively closed to capital flows achieved strong growth rates whilst Peru relatively open to capital flows suffered a decline in growth rates

performance in high-income countries but not in low-income countries. Moreover, not all developing countries have benefited adequately from capital flows as the inflows of capital have only been confined to a few developing countries, with the majority left behind (Mishkin, 2007). One reason being that many developing countries are characterised by low institutional quality (Alfaro et al., 2005). For these reasons, the predictions of theoretical models on the benefits of financial liberalisation for developing countries are not evident so far.

The accession of SSA countries to the global economy[3] has been achieved through trade and financial liberalisation programmes initiated by the IMF, the World Bank and the WTO. However, the choice of trade and/or financial liberalisation policies involves a political component. According to Gordon (1996), "the single most important characteristic of recent political change in sub-Saharan Africa is the diminished ability of the states to monopolize the political, economic, and institutional environments as they had since independence". Moreover, although the benefits of economic globalisation can fully be realised when combined with improvements in governance and democratic institutions (Gordon, 1996), trade and financial liberalisation have both economic and political consequences. For many developing countries "globalization has provided the best opportunities for political democracies and good governance" (Marquardt, 2007). As Sorensen (2010) note, an important element associated with democratisation is the support of a market-based economy. Thus, while economic globalisation may pave the way for democracy, this may also have the potential to develop market-oriented policies[4] that may or may not be conducive for a better economic performance. Moreover, the simultaneous adoption or the interaction of both economic globalisation and democratisation, though may also have short-run conflicting impact on economic performance, have the poten-

[3]SSA countries have been involved in numerous bilateral and multilateral development partnership agreements with the external world for decades. Recent agreements have included the New Partnership for Africa's Development (NEPAD), the Economic Partnership Agreements (EPA), Heavily Indebted Poor Countries (HIPIC) Initiative and Aid for Trade (AFT), all aimed at improving economic performance of the sub-region

[4]For a discussion on the relationship between economic globalisation and democracy readers are referred to (Giavazzi and Tabellini, 2005; Eichengreen and Leblang, 2008)

tial for a long run complementary role on economic performance (Van De Walle, 1994; Gordon, 1996). For this reason, if the concept of "policy trilemma", as discussed in Rodrik (2002), is what actually explains the relationships between economic globalisation, the nation state and democratic politics, then with the current speed (and it seems irreversible nature) of economic globalisation, democratic politics seem to be the choice alongside economic globalisation with the role of the nation state left at the background (Bairoch, 2000; Nasstrom, 2003). This result is particularly important for SSA countries, as economic globalisation would not impact on economic performance in isolation from democratic institutions[5].

Democracy is crucial to economic success (Giavazzi and Tabellini, 2005) and it can affect economic performance through a number of channels. Democratic institutions have the potential to redistribute income from the rich to the poor, reduce corruption and support policies encouraging international trade and investment (Acemoglu, 2009; Aghion and Howitt, 2009). Moreover, in addition to sound macroeconomic policies, democracy can have an important impact on a country's ability to attract less volatile capital inflows (Prasad et al., 2003). It is not surprising that different authors (Barro, 1996; Sala-i-Martin, 1997; Minier, 1998; Rodrik, 2002; Roll and Talbott, 2003; Rigobon and Rodrik, 2005) provide empirical evidence in support of a positive relationship between democracy and economic performance. For instance, Roll and Talbott (2003), in a cross-country investigation for between 134 and 157 countries over the period 1995-1999, find highly significant positive impact of political rights and civil liberties on Gross National Income per capita. They further stressed that democratic institutions "allow citizens to provide feedback to government leaders about the effectiveness of policies and their impact on general welfare". Rigobon and Rodrik (2005) used identification through heteroskedasticity to study the interrelationship between rule of law, democracy, openness, and income and concluded that democracy is good for economic performance.

[5]A special case in contrast to this point is China that has chosen economic globalisation (without democracy) and has performed so well in terms of economic performance in recent decades. However, we do not know if China had performed much better than its present state if it was also a democracy

Nonetheless, many countries in SSA are not only characterised by low-income (based on World Bank (2011) - Classification of economies, January 2011)[6], but they still remain non-democracies (Acemoglu et al., 2008). Moreover, although many empirical studies test specific dimensions of economic globalisation and income, a comprehensive study on SSA that considers a composite indicator for economic globalisation as well as the interaction of economic globalisation and democracy is rare. The results of many of the existing studies are also plagued by estimation problems. For example, the problem of unit root, cross-section dependence, cross-country heterogeneity and potential endogeneity of regressors are often not addressed. This study overcome some of these problems. We use a composite indicator for economic globalisation and several indicators of democracy[7] to analyse the relationship between economic globalisation, democracy and income for SSA countries. We adopt panel data techniques (including panel cointegration analysis) that allow us to deal with problems of non-stationarity, cross-section dependence, cross-country heterogeneity and potential endogeneity of regressors. Moreover, we address the issue of whether the link between economic globalisation, democracy and income can be considered a long run relationship for SSA countries. The main results of the study, clearly indicate that, whilst the total long run impact of economic globalisation on income has been beneficial, the total long run impact of democracy has been the bane of income in SSA countries. The study concludes that policy reforms should be aimed at improving democratic institutions in SSA countries for its potential benefits to be realised.

The rest of the study is organised as follows. In section 2.2 we specify the empirical model to be estimated and a description of the data. In addition, we consider issues of cross-section dependence in panel data models and provide some preliminary results using OLS methodology. Section 2.3 describes the panel cointegration techniques. Section 2.4 provides a discussion of the panel cointegration results. Section 2.5 concludes the paper with some policy implications of the empirical findings.

[6] Out of 40 low-income economies, 29 are from SSA. In addition, 11 of these economies fall in the lower-middle-income group. Details on World Bank classification of economies, January 2011 is available at URL *http://data.worldbank.org/about/country-classifications/country-and-lending-groups*

[7] Details on these indicators are discussed under the data in Section 2.2

2.2 Empirical Model

2.2.1 Model Specification

To estimate the impact of economic globalisation and democracy on income, we consider the following model specification:

$$y_{it} = \alpha_i + x'_{it}\beta_i + e_{it}, i = 1, ...N, t = 1, ...T \tag{2.1}$$

where y_{it} is the dependent variable, i is the cross-section dimension for individual countries, t is the time series dimension of the data, α_i denotes country-specific intercept or fixed-effects, $\beta_i = (\beta_{1i}, \beta_{2i}, ..., \beta_{Mi})$, $x_{it} = (x_{1i,t}, x_{2i,t}, ..., x_{Mi,t})$, $m = 1, 2, ..., M$ where m is the number of regressors and e_{it} is the error term[8]. To define m we consider economic globalisation, democracy and their interaction term. Therefore, based on equation (2.1) the following specific equation is estimated:

$$logY_{it} = \alpha_i + \beta_1 EG_{it} + \beta_2 DM_{it} + \beta_3 (EG * DM)_{it} + e_{it} \tag{2.2}$$

where Y_{it} is real per capita GDP (i.e. income), EG_{it} is economic globalisation, DM_{it} denotes measures of democracy, $(EG * DM)_{it}$ is the interaction term between economic globalisation and democracy, log is the logarithm operator, α_i and e_{it} are as previously defined and β_1 to β_3 are the parameters of interest to be estimated.

2.2.2 The Data

The panel data consists of annual observations for 31 SSA countries (i.e. N=31) for the period 1980-2005 (i.e. T=26). The countries included are: Benin; Botswana; Burkina Faso; Burundi; Cameroon; Central African Republic; Chad; Congo, Republic of; Cote d'Ivoire; Gabon; Ghana; Guinea; Guinea-Bissau; Kenya; Lesotho; Madagascar; Malawi;

[8]Where appropriate the intercept/country-specific fixed-effects α_i is extended to include deterministic time trends. In addition, the intercept, deterministic time trends and the slope coefficients β_i are allowed to vary across individual countries. The inclusion of country-specific fixed-effects and deterministic time trends allow us to capture any omitted variables assumed to be stable in the long run relationship

Mali; Mauritania; Niger; Nigeria; Rwanda; Senegal; Sierra Leone; South Africa; Swaziland; Tanzania; Togo; Uganda; Zambia; Zimbabwe[9]. The data have been drawn from various sources. Data for real GDP per capita is taken from the World Bank (2010) - African Development Indicators 2010. Data for economic globalisation is taken from KOF Index of Globalisation 2010[10]. KOF's economic globalisation index combines data on trade, foreign direct investment (flows), foreign direct investment (stock), portfolio investment, income payments to foreign nationals, hidden import barriers, mean tariff rate, taxes on international trade and capital account restrictions.

The democracy variable is proxied by three indicators[11]. The first indicator of democracy is Polity2 obtained from Polity IV Project (Marshall and Jaggers, 2009). Polity2 is a continuous variable that measures the democratic quality of political regimes using polity scores; it ranges from -10 (strongly autocratic) to +10 (strongly democratic). Polity scores (i.e. autocracy score (-10 to 0) and democracy score (+10 to 0) - from which Polity2 is derived - are themselves derived from a combination of measures: competitiveness of executive recruitment, constraint of chief executive, openness of executive recruitment, regulation and competitiveness of participation. The second and third indicators of democracy are political rights and political rights + civil liberties respectively. Data for political rights and civil liberties are obtained from the Heritage Foundation's subjective "Index of Economic Freedom" (Freedom House, 2006). These two measures are based on annual ranking of countries from 1 (the highest rank) to 7 (the lowest rank) for each measure[12]. We normalise the three indicators of democracy to range from 0 (full autocracy) to 1 (full democracy). We denote the three normalised democracy indicators as PS (Polity2), PR (political rights) and PC (political rights + civil liberties). It is important to note that, although the three democracy indicators may be highly correlated,

[9]The selection of countries was influenced by data availability for all variables considered

[10]Details on KOF's Index is available at URL *http://globalization.kof.ethz.ch/*

[11]We define democracy in this study as the extent to which the political system is democratic or nondemocratic

[12]We combine the two measures (i.e. political rights + civil liberties) for the third indicator of democracy such that the annual ranking of countries ranges from 2 (the highest rank) to 14 (the lowest rank). Similar approach was adopted in Burkhart and Lewis-Beck (1994) and Glasure et al. (1999) to measure overall democracy index

they are measuring different dimensions of the political system and we should expect that they have independent implications for income in SSA countries. Additional information on the data is presented in Appendix A.1.2.

2.2.3 Cross-section Dependence in Panel Data Models

Economic globalisation implies strong and increasing interdependencies between countries so it is no wonder that the importance to consider the impact of cross-section dependence in cross-country panels has been emphasised in the literature (see Frees, 1995; Driscoll and Kraay, 1998; Pesaran, 2004, 2007; De Hoyos and Sarafidis, 2006; Baltagi, 2008). As De Hoyos and Sarafidis (2006) note, cross-section dependence may be present in cross-country panels due to unobserved common shocks that become part of the error term. For this reason, cross-section dependence if present and not accounted for may result in inconsistent standard errors of the parameters, although the estimated parameters may be consistent (Driscoll and Kraay, 1998). This effect becomes even more important in cross-country panels where $N > T$.

To determine the presence of cross-section dependence the two semiparametric test proposed by Friedman (1937) and Frees (1995), and the parametric test proposed by Pesaran (2004) appropriate for $N > T$ panels are employed in this study. The procedures involved in computing the test statistics as well as the test results are provided in Appendix A.2. Where appropriate, Tables in this study report in columns I, II and III the model with PS, PR and PC respectively. The results suggest that there is enough evidence to reject the null hypothesis of cross-section independence in all estimated models. In the presence of cross-section dependence Driscoll and Kraay (1998) propose a nonparametric correction for the standard errors in standard panel data estimators such as pooled OLS. We provide preliminary results (Table 2.1) using the pooled OLS estimator with Driscoll and Kraay corrected standard errors.

The coefficient on EG is positive and statistically significant at the 1% level for all estimated models. The coefficient on all indicators of democracy is negative, but statistically significant only when we consider PS as an indicator of democracy. However, the result is different when we consider the impact of the interaction terms. All interaction terms enters positive and statistically significant for all estimated models. It is important to note that the impact of economic globalisation (democracy) on income is not only captured by the coefficient on economic globalisation (democracy) but depends also on their respective interaction terms. For this reason, the results clearly indicate that, the total effect of economic globalisation on income is positive for all the indicators of democracy used whilst that of democracy is negative (although this negative effect is not captured when we consider PR and PC as indicators of democracy as they are insignificant). The implications we can draw from this results is that whilst economic globalisation has been beneficial, democracy has not yet regardless of the democracy indicator used.

Table 2.1: Pooled OLS estimates

Variables	I	II	III
EG	0.021***	0.026***	0.024***
	[0.002]	[0.003]	[0.004]
PS	-1.496***		
	[0.277]		
PR		-0.611	
		[0.507]	
PC			-0.6762
			[0.554]
$EG * PS$	0.032***		
	[0.004]		
$EG * PR$		0.019*	
		[0.010]	
$EG * PC$			0.023*
			[0.011]

Note: Dependent variable $logY$. Driscoll and Kraay standard errors are reported in parenthesis. ***(*) denote statistical significance at the 1% (10%) level.

Notwithstanding this, an important limitation of the Driscoll and Kraay pooled OLS estimator is that potential endogeneity problems are not catered for. Moreover, pooled

OLS estimates are based on stationarity assumption (i.e. for panels where T is of moderate size). For these reasons, we resort to panel cointegration techniques to check the robustness of these results.

2.3 Panel Cointegration Approach

2.3.1 Testing for Panel Unit Roots

Testing for panel unit roots has become conventional in panel cointegration studies. The argument in favour of panel unit root tests (as against performing individual unit root test for each cross-section of the panel) is the increased power associated with the test especially for $N > T$ panels[13]. Due to the problem of cross-section dependence in our panel dataset we only rely on unit root tests that treat this effect. Two alternative unit root tests, the LLC statistic due to Levin et al. (2002) and the $CADF$ statistic due to Pesaran (2007), are considered[14]

The LLC test evaluates the null hypothesis that each individual unit in the panel contains a unit root against the alternative hypothesis that all individual unit of the panel is stationary. The test is appropriate for panels of moderate size (i.e. N=10-250 and T=25-250) and is generalised to allow for "fixed effects, individual deterministic trends and heterogeneous serially correlated errors" (Baltagi, 2008). Both N and T are allowed to approach infinity asymptotically. In the presence of cross-section dependence, Levin et al. (2002) suggest allowing for a limited degree of cross-section dependence by subtracting cross-sectional averages from the data (i.e. data demeaning). In order to mitigate the impact of cross-section dependence we demeaned the data when implementing the LLC test.

Pesaran (2007) provides cross-sectionally augmented Dickey-Fuller ($CADF$) test statistic in heterogeneous panels with cross-section dependence. The tests augment the stan-

[13]See Levin et al. (2002)

[14]Additional information on LLC and $CADF$ panel unit root tests are provided in Appendix A.3.1. Readers are also referred to (Levin and Lin, 1992; Levin et al., 2002; Pesaran, 2007) for further technical details on these tests

dard ADF regressions with the cross-sectional averages and their first differences to eliminate the impact of cross-section dependence. The null hypothesis assumes that all series are non-stationary versus the alternative hypothesis that only a fraction of the series is stationary. The asymptotic distribution of $CADF$ is non-standard and asymptotic critical values are provided for different values of both N and T (see Pesaran, 2007)

The panel unit root test results reported in Appendix A.3.1 suggest that all variables can be treated as $I(1)$ or integrated of order one. This indicates that the Driscoll and Kraay pooled OLS results may not be adequate since OLS estimates are based on stationarity assumption. For this reason, the use of panel cointegration techniques becomes particularly important.

2.3.2 Testing for Panel Cointegration

In this study we employ Pedroni (1999, 2004) panel cointegration test to determine whether the variables included in our panel data models are cointegrated[15]. Pedroni (1999, 2004) proposes seven panel cointegration test statistics that correct for bias introduced by potentially endogeneous regressors. The test allows "not only the dynamics and fixed effects to differ across members of the panel, but also that they allow the cointegrating vector to differ across members under the alternative" (Pedroni, 1999). For this reason, all the test statistics are robust in the presence of panel data heterogeneity. Moreover, in the presence of cross-section dependence (most importantly in small samples), Pedroni suggest including common time dummies to mitigate this effect. This is important as Pedroni's test is only valid on the assumption that any cross-sectional correlations are captured by an aggregate time effect.

Four of Pedroni's tests are based on within-dimension of the panel (panel cointegration test statistics): panel v-statistic, panel ρ-statistic, panel t-statistic (non-parametric) and panel t-statistic (parametric). The other three (that allows for potential heterogeneity across individual members of the panel) are based on between-dimension of the panel

[15] Pedroni's panel cointegration test is an extension of the Engle and Granger (1987) two-step procedure applied to panel data

(group mean panel cointegration test statistics): group ρ-statistic, group t-statistic (non-parametric) and group t-statistic (parametric).

These tests are particularly appropriate as they are applied to the estimated regression residuals after the panel statistics have been normalised with correction terms. The procedure involved in computing the seven test statistics as well as the test results are provided in Appendix A.3.2. The panel cointegration test results suggest that there is enough evidence to reject the null hypothesis of no cointegration for all estimated models. In other words, the link between economic globalisation, democracy and income can be considered a long run relationship.

2.3.3 Estimation of Panel Cointegration Regression

Given that we find panel cointegration, we need to estimate the associated long run cointegration parameters. The OLS estimator is known to yield biased and inconsistent estimates. For this reason, several estimators have been proposed. For example, Kao and Chiang (2000) argue that their parametric panel Dynamic OLS (DOLS) estimator (that pools the data along the within-dimension of the panel) is promising in small samples and performs well in general in cointegrated panels. However, the panel DOLS due to Kao and Chiang (2000) does not consider the importance of cross-sectional heterogeneity in the alternative hypothesis. To allow for cross-sectional heterogeneity in the alternative hypothesis, endogeneity and serial correlation problems to obtain consistent and asymptotically unbiased estimates of the cointegrating vectors, Pedroni (2000; 2001) proposed the group mean Fully Modified OLS (FMOLS) estimator for cointegrated panels.

The group mean FMOLS estimator (which is based on the between-dimension of the panel) applies a semi-parametric correction to the OLS estimator and it produces t-statistics that allows for more flexibility in the alternative hypothesis. Pedroni (2001) argues that pooling the data along the between-dimension of the panel has a more useful interpretation as the mean value of the cointegrating vectors in heterogeneous panels. Moreover, the group mean FMOLS estimator generates consistent estimates in small samples and does not suffer from large size distortions, in the presence of endogeneity and heterogeneous dynamics (as it allows for heterogeneity in the fixed effects and in the short run dynamics). In the presence of cross-section dependence, Pedroni (2001) suggest estimating the model with common time dummies to mitigate this effect. We employ the group mean FMOLS estimator to estimate the long run cointegration parameters in equation (2.2). The procedure involved in estimating the panel group mean FMOLS is provided in Appendix A.4. However, we complement the group mean FMOLS results with the estimates from the within-dimension panel DOLS (WDOLS) due to Kao and Chiang (2000) and the between-dimension group mean panel DOLS (BDOLS) due to Pedroni (2001). All estimators are asymptotically normally distributed[16].

2.4 Panel Cointegration Regression Results and Discussion

In this section, we report and discuss the estimated long run results. The estimated long run results from the FMOLS, WDOLS and BDOLS are summarised in Tables 2.2 -2.4 respectively.

The coefficient on EG enters positive and statistically significant in the panel WDOLS estimates for all indicators of democracy and positive and statistically significant in the panel FMOLS and BDOLS estimates when we consider PS and PR as indicators of democracy. However, EG enters negative in the panel FMOLS and BDOLS estimates when we consider PC as an indicator of democracy, but insignificant at any conventional level. The results, clearly indicate that, the impact of EG on income in SSA countries is positive (though marginal in magnitude). The coefficient on all democracy indicators are negative and statistically significant for all estimators. The estimated results, clearly indicate that, the impact of democracy (i.e. PS, PR and PC) on income in SSA countries is negative. Nonetheless, the impact of the interaction of economic globalisation and

[16]For more technical details on the panel FMOLS and the panel DOLS estimators, readers are referred to (Pedroni, 2000, 2001) and (Kao and Chiang, 2000)

Table 2.2: Panel FMOLS estimates

Models	I	II	III
EG	0.003***	0.002*	-0.004
	[3.712]	[1.937]	[-0.435]
PS	-0.310***		
	[-4.911]		
PR		-0.446***	
		[-6.669]	
PC			-0.542***
			[-7.399]
$EG * PS$	0.007***		
	[3.918]		
$EG * PR$		0.015***	
		[8.209]	
$EG * PC$			0.019***
			[9.392]

Note: Dependent variable $logY$. In parenthesis are t-ratios. ***(*) denote rejection of the null hypothesis at the 1%(10%) level

democracy is positive and statistically significant for all estimators and for all democracy indicators. This interaction effect makes the total impact of economic globalisation positive (although still marginal) whilst that of democracy still remains negative.

As a further robustness check we consider a general production function (Appendix A.1.1) that incorporate economic globalisation, democracy and their interaction term as additional explanatory variables to labour force and capital stock. The estimated results based on panel FMOLS are presented in Appendix A.4[17]. Generally speaking, the results clearly indicate that the total impact of economic globalisation is positive and statistically significant whilst that of democracy still remains negative and statistically significant. Overall the result suggests that, whilst the total impact of economic globalisation on income has been beneficial, the total impact of democracy has not been beneficial for economic performance in SSA countries over the study period considered.

[17] Although we have stated that the impact of EG on income is generally positive and statistically significant, this is not necessary the case for the FMOLS estimates of the production function model (Appendix A1.1; Table A7). This indicates that, although economic globalisation (taken in isolation) may be beneficial for the level of income, this is not necessarily the case for domestic output

Table 2.3: Panel WDOLS estimates

Models	I	II	III
EG	0.020***	0.025***	0.022***
	[7.84]	[9.86]	[7.88]
PS	-1.839***		
	[-12.40]		
PR		-0.894***	
		[-5.91]	
PC			-0.923***
			[-4.88]
$EG * PS$	0.041***		
	[10.33]		
$EG * PR$		0.027***	
		[6.60]	
$EG * PC$			0.030***
			[6.10]

Note: Dependent variable $logY$. In parenthesis are t-ratios. *** denote rejection of the null hypothesis at the 1% level

Table 2.4: Panel BDOLS estimates

Models	I	II	III
EG	0.003***	0.004***	-0.001
	[5.744]	[6.282]	[-1.117]
PS	-0.247***		
	[-6.379]		
PR		-0.517***	
		[-11.86]	
PC			-0.745***
			[-14.14]
$EG * PS$	0.005***		
	[5.568]		
$EG * PR$		0.018***	
		[16.264]	
$EG * PC$			0.021***
			[15.295]

Note: Dependent variable $logY$. In parenthesis are t-ratios. *** denote rejection of the null hypothesis at the 1% level

The results of a negative impact of democracy on income is not surprising as the level (and quality) of democracy in SSA countries over the study period is not only volatile, but that it remains too low for its potential positive impact to be felt on income as predicted by theory. In particular, the mean values of the democracy indicators of 0.3818, 0.3201 and 0.3419 (out of a maximum of 1) for PS, PR and PC are too low for their potential benefits to be realised. Moreover, one could think of what has happened to the level of income in Cote d'Ivoire, for example, between December 2010 and March 2011. This phenomenon has also characterised many other SSA countries for decades. Overall the result of the study indicates that, although the simultaneous adoption of both economic globalisation and democracy is crucial, greater democratic advancement (see Fosu, 2008) would be required for a better economic performance in SSA countries. Therefore, both economic globalisation and democracy do matter for the level of income in SSA countries.

2.5 Conclusions and Policy Implications

This study has analysed the long run relationship between economic globalisation, democracy and income for 31 SSA countries using panel cointegration techniques, over the 1980-2005 period. A model that considered a composite indicator for economic globalisation and several indicators of democracy was estimated. Different tests for unit roots and cointegration for panels were considered. The panel unit roots test results show that all series are stationary only after first differencing. The panel cointegration test establishes long run cointegration relationship between economic globalisation, democracy and income. The long run coefficients were estimated using several panel data estimators. The empirical results, clearly indicate that, whilst the total long run impact of economic globalisation on income has been beneficial, the total long run impact of democracy has been the bane of income in SSA countries.

The empirical results reveals important policy implications. The panel estimates suggest the essence of the simultaneous adoption of both economic globalisation and democracy for SSA countries. This implies that the recent adoption of economic and political liberalisation policies in these countries are in the right direction so far as economic performance is concerned. However, due to the negative impact of democracy on income, policy reforms should aim to improve democratic institutions in SSA countries for its potential benefits to be realised.

Chapter 3

On the Implications of Trade Openness, Foreign Aid and Democracy for Wagner's Law in Developing Countries: Panel Data Evidence from West African Monetary Zone (WAMZ)

3.1 Introduction

The Economic Community of West African States (ECOWAS)[1] - aiming at fostering economic growth through harmonisation of macroeconomic policies - has been working towards the adoption of a single currency by the year 2020 for decades. In 1994, for

[1] ECOWAS consist of 15 West African countries including Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, The Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo

example, the West African Economic and Monetary Union (WAEMU)[2] - which currently share the same currency, CFA Franc, was created as the first Monetary Zone in the sub-region. On December 15, 2000, five non-CFA ECOWAS countries, including The Gambia, Ghana, Guinea, Nigeria and Sierra Leone, initiated a second Monetary Zone in Bamako, Mali. This led to the signing of the Accra Declaration on April 20, 2002, that launched the West African Monetary Zone (WAMZ)[3] with the introduction of a single currency, the ECO, which was initially scheduled to commence in January 2003. However, due to member countries inability to meet all the necessary convergence criteria, the take-off has been postponed several times, and although it is currently aimed at 2015, a determinate commencement date for the ECO is yet to be decided[4].

One of the *sine qua non* convergence criteria for WAMZ member countries is not only the achievement of, but also the sustainability of fiscal discipline. Nonetheless, although WAMZ countries committed themselves to reduce fiscal deficits to 4% of GDP by 2003, this criteria is one that was missed by most member countries in 2010[5]. Udoh (2011), for example, note that fiscal deficits -usually financed through domestic and foreign borrowing - contribute immensely to the high inflation dynamics in WAMZ countries. Moreover, the lack of fiscal convergence and the fiscal behaviour of governments of WAMZ countries remain the most critical constraint on the convergence programme of the proposed monetary zone (Ojo, 2005; Debrun et al., 2005; Adam et al. 2010). Before the recent sovereign debt crisis that characterises the European Monetary Union (EMU), the introduction of the Euro in 1999 was seen as one of the greatest achievement of the EMU (De Grauwe,

[2]Eight ECOWAS member countries currently form WAEMU. These countries are Benin, Burkina Faso, Cote d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal and Togo

[3]The launch of WAMZ was to complement WAEMU so that the two Monetary Unions could be merged into one Monetary Zone with a single currency for the sub-region by the year 2020. On February 16, 2010, Liberia become a member of WAMZ after signing the necessary membership agreement

[4]The commencement of the ECO was initially deferred to 2005, and then to 2009. Adam et al. (2010) provide further justification for the recent postponement of the ECO to 2015. They note that inflation rates shows high degree of divergence amongst WAMZ countries and that meeting the 2015 deadline would require interventional policy measures

[5]The other primary convergence criteria for accession to WAMZ include the attainment of single digit inflation, central bank financing of fiscal deficits not exceeding 10% of the previous year's government tax revenue and external reserves to cover at least 3 months of imports. The single inflation criteria was also missed by most member countries in 2010

2011). To enable WAMZ countries avoid similar debt crisis, ensure fiscal discipline, and the sustainability of a single currency area, it becomes imperative that what matters for government expenditure and revenue in these countries are well understood.

The present paper deals only with the first one and, in particular contributes to the existing literature on Wagner's law (Adolph Wagner, 1835-1917) and the recent discussion on the need for fiscal discipline, fiscal policy coordination and innovative and efficient ways of revenue generation in WAMZ countries (see Guillaume and Stasavage, 2000; Debrun, 2000; Masson and Pattillo, 2003; Iyare et al., 2005, Debrun et al., 2005; Frimpong and Oteng-Abayie, 2009; Udoh, 2011) in several respects. Firstly, it extends this line of research by introducing the impact of trade openness, foreign aid and democracy on government expenditure to determine whether Wagner's law is fulfilled in these countries. This is reasonable considering the importance that these policy variables have for the overall size of government in developing countries in recent decades (See Rodrik, 1998; Sobhee and Joysuree, 2004; Remmer, 2004; Mosley, 2005; Stasavage, 2005; Vergne, 2009; Shonchoy, 2010). If this happens and government revenue cannot follow the same path as its expenditure would imply large fiscal deficits and public debt accumulation. Moreover, because of moral hazard problems and the potential pressures that might persist for a bail-out for countries with large fiscal deficits[6] (in excess of the stipulated 4% of GDP in the case of WAMZ), these countries inability to generate adequate domestic revenues and/or meet the fiscal convergence criteria would imply that they are unlikely to sustain a single currency. Secondly, many cross-country studies on the determinants of government expenditure include in their sample both developed and developing countries[7]. However, cross-country studies on Wagner's law that include both developed and developing countries are inappropriate and may yield misleading results as it is more likely that Wagner's law will operate in countries at low levels of income (see Abizadeh and Gray, 1985). This result is important as "the level and composition of government expenditures for developing economies differ substantially from those of industrialised

[6] See for example, Chari and Kehoe (1998) and Beetsma and Bovenberg (1998, 2001)

[7] See for example, Ram, 1987; Rodrik, 1998; Benaroch and Pandey, 2008

economies" (Lindauer, 1988). In this paper, we focus only on developing countries (in this case WAMZ countries) where the need for fiscal discipline has become crucial, not only for joining a monetary union, but most importantly to ensure the sustainability of a single currency. Thirdly, we investigate the issue using panel data techniques (including panel cointegration approaches) which allow us to address important econometric issues - parameter heterogeneity, non-stationarity and potential endogeneity of regressors, serial correlation problems and cross-section dependence - that have made most existing cross-country panel studies on Wagner's law unreliable. Last but not least, we highlight on the country-specific results for all six WAMZ countries in addition to the panel estimates.

The rest of the paper is organised as follows. The literature on Wagner's law and the relationship between trade openness, foreign aid, democracy and government expenditure are presented in Section 3.2. Section 3.3 discusses the empirical estimation methods. In section 3.4, we present and discuss the empirical results. Section 3.5 provides a summary of the main results of the paper and concludes with policy recommendations.

3.2 Literature Review

This section of the paper provides an overview of the theoretical and empirical literature on the determinants of government expenditure with special reference to Wagner's law and the impact of trade openness, foreign aid and democracy on government expenditure. The section is divided into three parts. In the first part we review the literature on Wagner's law. The second part considers the literature on the impact of trade openness, foreign aid and democracy on government expenditure. The last part concludes the section.

3.2.1 Wagner's Law

Wagner's law - basically understood as the increment of the public sector along with the economic development of a nation - has received extensive theoretical and empirical investigation in developing countries[8]. The law offers valuable theoretical and empirical

[8]In this way, we would expect for nations in the process of economic development (as in many developing countries) that the share of government expenditure in real GDP expands with per capita income.

explanation for a positive relationship between government expenditure and per capita income[9]. For this reason, one would expect that "the greater the increment in economic affluence of a nation during a given period, the greater the expansion of the public economy" (Cameron, 1978). In other words, the common exogenous variable to explain the expansion of the size of government is the national product (Mourao, 2007).

Many empirical studies have provided support for Wagner's law in developing countries. For example, Abizadeh and Gray (1985) provide evidence for Wagner's law for a group of poor, developing and developed countries. They argued that the positive relationship between several measures of economic development and government expenditure only hold for the developing group of countries. Ram (1987) provides further support for Wagner's law for about 60% of 115 countries investigated in an individual-country time series study, but found no evidence for Wagner's law from several cross-section results for the 115 countries over the 1950-1980 period. Iyare and Lorde (2004) in a cointegration and causality study of selected Caribbean countries found support for Wagner's law for a significant number of these countries. Akitoby et. al. (2006) in a cointegration and error-correction model analysis using individual-country time series data from 1970-2002 for 51 developing countries found support for Wagner's Law for about 70% of these countries. Torun and Arica (2011) employed panel cointegration techniques to test Wagner's law for a sample of 17 inflation targeting developing countries for the period 1995-2007, and concluded in support of Wagner's law for these countries.

However, the recent empirical results for Wagner's law in WAMZ countries remain mixed and inconclusive. For example, Olomola (2004) adopted cointegration techniques to study Wagner's law in Nigeria for the period 1970-2001, and found evidence in support of Wager's law. Ghartey (2007), using Granger causality, autoregressive distributed

Nonetheless, this relationship could as well be negative as advocated by Wildavsky for low-growth countries (Wildavsky 1975, cited in Cameron, 1978)

[9]Shelton (2007) has shown that the argument in favour of Wagner's law for developed countries (as opposed to developing countries) are mostly "driven by demographic factors that rich countries are older and spend more on social security". However, total spending less social security actually declines with income. In addition, there is the quest for politicians to satisfy the median voter and the need for redistribution which tend to spur growth in government expenditure

lag and the error correction model for the period 1965-2004, finds strong support for Wagner's law in Ghana. On the other hand, Babatunde (2008), Frimpong and Oteng-Abayie (2009) and Oteng-Abayie (2011) find no support for Wagner's law for a number of WAMZ countries. For example, Babatunde (2008) employed the bounds testing approach to cointegration (Pesaran et al., 2001) and the Granger non-causality test (Toda and Yamamoto, 1995) to tests Wagner's law for four WAMZ countries: The Gambia, Ghana, Nigeria and Sierra Leone for the period 1970-2005, but find no evidence for Wagner's law for all four countries. Frimpong and Oteng-Abayie (2009) investigated Wagner's law for three WAMZ countries: The Gambia, Ghana and Nigeria. The time periods considered were 1966-2004 for The Gambia, 1965-2003 for Ghana and 1965-2004 for Nigeria. Using cointegration and Granger causality tests they find no support for Wagner's law for all three countries. Finally, Oteng-Abayie (2011) employed panel cointegration estimation techniques to study Wagner's law in five WAMZ countries - The Gambia, Ghana, Guinea, Nigeria and Sierra Leone for the period 1965-2007 - but found no evidence of long run cointegration relationship for these countries (and hence no evidence for Wagner's law).

Notwithstanding this, it is important to note that empirical tests for Wagner's law for developing countries discussed above solely involves bivariate analysis of different measures of both government expenditure and national income[10]. Nonetheless, as Sobhee and Joysuree (2004) note, testing for Wagner's law without controlling for trade openness, for example, may lead to specification bias. Moreover, Shonchoy (2010) in a multivariate panel data study of the determinants of government expenditure in 111 developing countries over the 1984-2004 period found strong evidence in support of Wagner's law. The results further revealed significant positive impact of trade openness, foreign aid and political institutions on the relative size of government expenditure in these countries.

Based on the empirical results discussed so far, it is reasonable to think that some important determinants of government expenditure in WAMZ countries have not been

[10]For a comprehensive review and various formulation of Wagner's law readers are referred to (Mann, 1980; Abizadeh and Gray, 1985; Henrekson, 1993; Peacock and Scott, 2000; Iyare and Lorde, 2004; Ghartey, 2007)

considered for the study of Wagner's law. For this reason, we propose in this paper that, the study of Wagner's law in WAMZ countries should also take into consideration the implications that the recent patterns of trade openness, foreign aid inflows and democratisation have for government expenditure in these countries.

3.2.2 Trade Openness, Foreign Aid, Democracy and Government Expenditure

The relationship between trade openness and government expenditure has been discussed in line with two competing hypothesis: the efficiency hypothesis (or conventional wisdom) and the compensation hypothesis[11]. The efficiency hypothesis argues that trade openness is undermining governments' sovereignty in the implementation and financing of domestic policies beyond the provision of fundamental public goods. This proposition is further elaborated by Wolf (2001) who argues that openness is limiting governments' capacity to function effectively, particularly in key areas of taxation, public expenditure for income distribution and macroeconomic policy. Moreover, the competition associated with the promotion of trade leads to a reduction in corporate and capital taxation that restrains government expenditure patterns. This is the case as the competition associated with trade openness "reduces governments' abilities to provide goods and services to their citizens" (Mosley, 2005) particularly in welfare state generosity programmes including social transfers. The reason for this observation is that, because government expenditures must be funded, his intervention in more open economies (through short-term borrowing and higher taxes on income and wealth) are deemed wasteful and less effective as they reduce a country's competitiveness in the international market (Garrett, 2001). For these reasons that trade openness could lead to a general decline in government expenditures in more open economies.

On the other hand, the idea of a positive relationship between trade openness and government expenditure, which is in line with the compensation hypothesis, was initially

[11]See Garrett (2001) for details on these two competing hypothesis

proposed by Cameron (1978)[12]. Walter (2010) notes that, this hypothesis has two components: a demand side where internationalisation increases voters demand for social insurance and a supply side where generous welfare expenditure by government satisfies this demand. In the words of Cameron (1978), countries more open to trade are characterised by greater industrial concentration and strong unionised labour markets (through the formation of employees association), which through collective bargaining are able to demand more government expenditure in the form of social protection. However, Cameron's collective bargaining explanation for an expanding growth in government spending in OECD countries may not necessarily apply to many developing countries (particularly WAMZ countries) "due to the relative weakness of organised labour in developing countries" (Shelton, 2007).

In spite of this, Rodrik (1998), Alesina and Wacziarg (1998) and Alesina et al. (2005), provide further support for this observed positive relationship between trade openness and government expenditure. For example, in an influential paper, Rodrik (1998) documented a positive and robust relationship between trade openness and government expenditure for both low and high-income countries. Rodrik's explanation (as against Cameron's collective bargaining explanation) was that "government spending plays a risk-reducing role in economies exposed to a significant amount of external risk". For developed (developing) economies with (without) the necessary administrative capacity such external risk, which may include exchange rate, demand and supply fluctuations, is mitigated through the provision of social insurance (public work) programmes (Shonchoy, 2010). Benarroch and Pandey (2008) reconsidered the cross-sectional data of Rodrik (1998) using panel data estimation techniques, including country specific fixed-effects[13]. Their conclusion however, did not provide support for a positive link between trade openness and government expenditure as their Granger causality test show that higher lagged government expenditure rather reduces trade openness. Moreover, although the empirical evidence

[12]Cameron (1978) in addition to this external explanation, also offers economic (as discussed under Wagner's law), fiscal, political and institutional structure explanations to government expenditure for these countries

[13]They considered 96 countries for the 1970-2000 period

confirm that more open developing countries faces external risk, the possibility of government expenditure playing a risk-reducing role may not necessarily apply when most developing countries (particularly WAMZ countries) are considered. This is the case because as Wibbels and Ahlquist (2011) noted, government expenditure only provides social insurance for internationally exposed sectors in OECD countries, and has no part in social policies of developing countries. Moreover, although government expenditure grows with trade openness in ECOWAS (and WAMZ) countries, there is no reason to believe that government expenditure growth in these countries is the result of public insurance as advocated in Rodrik (Tirelli, 2010). For this reason, Rodrik's hypothesis that the expansion of expenditure could be explained by increases in trade openness might not necessarily hold in WAMZ countries.

Along with trade openness is the impact of foreign aid on government expenditure[14]. As noted by Edwards (1993), World Bank (1998) and Remmer (2004) developing countries' ability to receive financial assistance from bilateral and multilateral institutions routinely became conditional upon trade openness. The argument for foreign aid is that it would help developing countries augment inadequate domestic revenue, saving and investment constraints, promote trade, and poverty reduction programmes, and improve the efficiency of domestic institutions and governance. Nonetheless, because most of foreign aid channelled to these countries goes through the public sector, its impact depends crucially on how it affects the behaviour of the receiving government (McGillivray and Morrissey, 2000). For this reason, it is expected that a relationship exists between foreign aid inflows and the expenditure patterns of aid receiving governments and critics, for example, argue that it may increase public consumption rather than its intended purpose. On the other hand, foreign aid inflows to developing countries is rather considered as too volatile and for that matter should exert negative impact on government expenditure. Due to the perceived volatility and/or fungibility of foreign aid (Feyzioglu, 1998; Remmer, 2004; Hudson and Mosley, 2008) the argument for its impact on government ex-

[14]See for example (Heller, 1975; Boone, 1996; Feyzioglu, 1998; Remmer, 2004; and Hudson and Mosley, 2008)

penditure in developing countries is one that has not been straightforward. In particular, Hudson and Mosley (2008) note that, volatility of foreign aid reduces government expenditure, as it results in more volatile revenue inflows in developing countries. Moreover, overdependence on foreign aid has the potential to reduce domestic revenue generation (Remmer, 2004) and this effect combined with volatile foreign aid inflows should have negative impact on government expenditure.

In spite of the potential negative impact of foreign aid inflows, government expenditures in developing countries are often considered as driven by the availability of revenues, regardless of the source. For this reason, that availability of foreign aid is often considered an important determinant of government expenditure in many developing countries. Remmer (2004), for example, note that foreign aid has the potential of "systematically generating incentives and opportunities for the expansion of government spending". The argument here is that government expenditure, in many less developed countries, has been fuelled by foreign aid inflows from abroad (Heller, 1975) that increases the size of government by promoting rent-seeking behaviour of the political elites (Boone, 1996). Moreover, Ouattara (2006) argues that foreign aid although exert positive (negative) impact on developmental (non-developmental) government expenditure, does not in itself discourage domestic revenue generation effort of aid receiving governments. For these reasons, and to the extent that WAMZ countries continue to depend on foreign aid we hypothesise that a positive relationship exist between foreign aid and government expenditure of these countries.

The extent to which democratic institutions impact on government expenditure is well emphasised in the literature (see Wildavsky, 1985; Boone, 1996; Adsera and Boix, 2002; Knack, 2004; Stasavage, 2005; Mosley, 2005; Samiei and Jalilvand, 2011). As Wildavsky (1985) and Mosley (2005) note, democratic institutions have the potential to influence government consumption, government transfer payments, public employment and taxation. Moreover, "domestic politics and institutions continue to be the most important determinants of the overall size of government", with the effect been more pronounced in advanced democracies (Mosley, 2005). Blais et al. (2010), for example note that, government expenditure generally expand as the number of parties in government (through coalition government), cabinet officials, and parliamentary constituencies increase. Samiei and Jalilvand (2011) in an empirical investigation of the impact of political participation using several democracy indices for Asian and Pacific Ocean countries over the period 2000-2008, concluded that democracy increases government expenditure, although this effect is small in magnitude.

It is important, however, to note that democracy may not only have a direct impact on government expenditure (see, for example, Adsera and Boix, 2002; Plumper and Martin, 2003; Hausken et al., 2004), but may also influence the extent to which both trade openness and foreign aid impact on government expenditure. As Adsera and Boix (2002) note, the working of the compensation and efficiency hypothesis, for example, are both conditional on the level of democracy, with the compensation hypothesis been more pronounced in both intermediate and advanced democracies. This result is important as more democratic leaders may tend to spend more on public goods in order to attract political support (see Plumper and Martin, 2003). Moreover, it is more likely that the inflow of foreign aid may be more pronounced in developing countries more involved in the democratisation process. This is the case as foreign aid may serve to support the electoral process, in addition to strengthening the legislature and the judiciary (Knack, 2004). For this reason, it is hypothesised that a positive relationship exist between democracy and government expenditure.

3.2.3 Summary

The discussion above has provided an overview of the theoretical and empirical evidence on Wagner's law and the impact of trade openness, foreign aid and democracy on government expenditure in developing countries. The discussion clearly indicates that studies of Wagner's law that do not consider the recent patterns of trade openness, foreign aid inflows and democratisation in developing countries are likely to be biased. Moreover, although there has been some studies on Wagner's law in WAMZ countries there is virtually no evidence in the literature for all WAMZ countries that also considers the implications of these variables for Wagner's law. It is this empirical gap that this paper seeks to fill.

3.3 Empirical Methodology

3.3.1 Model Specification and The Data

The empirical analysis considers a model of the following specifications:

$$logGOV_{it} = \alpha_i + \delta_i t + \beta_1 logY_{it} + e_{it} \tag{3.1}$$

$$logGOV_{it} = \alpha_i + \delta_i t + \beta_1 logY_{it} + \beta_2 logOPEN_{it} + \beta_3 logAID_{it} + \beta_4 DEM_{it} + e_{it} \tag{3.2}$$

where $i = 1, 2, ..., N$ is the number of countries ($N = 6$), $t = 1, 2, ..., T$ is the time series dimension of the data ($T = 29$), GOV is the percentage share of government expenditures in real GDP, Y is real per capita GDP (i.e. per capita income), $OPEN$ is real openness, AID is the percentage share of net Official Development Assistance (ODA) in real GDP, and DEM is democracy, α_1 is the country-specific fixed effects, $\delta_i t$ is country-specific time trends[15], e_{it} is the error term, β_1 to β_2 are parameters to be estimated. Data on ODA is obtained from the World Bank (2010) - African Development Indicators 2010. Data on DEM is obtained from Polity IV Project (Marshall and Jaggers, 2009)[16]. The rest of the data are obtained from the United Nations (2010) - United Nations Statistics Database 2010[17]. Additional information on the data are presented in Appendix B.1.

3.3.2 Panel Cointegration Approach

The application of panel cointegration techniques means that the variables included in equations (3.1) and (3.2) must exhibit unit root properties and being cointegrated. For

[15]The inclusion of country-specific fixed-effects and time trends allow us to capture any country-specific omitted variables assumed to be stable in the long run

[16]We have used Polity2 which ranges from -10 (strongly autocratic) to +10 (strongly democratic). We normalise the data such that it ranges from 0 (strongly autocratic) to 1 (strongly democratic)

[17]All real data are measured in constant 2005 US dollars

this reason, and taken cognisance of the fact that our models are plagued by cross-section dependence (see Appendix B.2), we rely on several panel unit root and panel cointegration tests to treat this effect[18]. The panel unit root tests due to Breitung (2000) and Breitung and Das (2005), Pesaran (2007) and Hadri (2000) are considered. The panel unit root test results reported in Appendix B.3 show that all series can be treated as $I(1)$.

To establish panel cointegration we rely on two panel cointegration tests: the residual-based parametric panel t test statistic due to Pedroni (1999, 2004) and the standardised panel LR-bar test statistic due to Larsson et al. (2001). According to Orsal (2008) these two panel statistics have the best size and power properties (even in the presence of correlated errors) in heterogeneous panels if T increases faster than the N dimension of the panel. It is important to note that in implementing the two panel cointegration tests we have taken into consideration the existence of cross-section dependence in our models. The panel cointegration test results (Appendix B.4) suggest no evidence of cointegration when we consider equation (3.1). In particular, there is not enough evidence to reject the null hypothesis of no cointegration for all tests statistics. This result is consistent with previous studies that do not support Wagner's law in WAMZ countries as discussed in section 3.2. However, both Pedroni (1999, 2004) and Larsson et al. (2001) panel cointegration test statistics provide evidence of cointegration when we control for the impact of trade openness, foreign aid and democracy. The panel cointegration test results suggest that a long run cointegration relationship exists between government expenditure, per capita income, trade openness, foreign aid and democracy in WAMZ countries.

We estimate the long run coefficient of equation (3.2) using the group mean panel dynamic OLS (DOLS) estimator proposed in Pedroni (2001). The panel group mean DOLS estimator which is based on the between dimension of the panel has a number of advantages over other estimators (particularly those that are not based on the between-dimension of the panel). In particular, the estimator suffers less from small sample size

[18]Readers are referred to (Breitung, 2005; Breitung and Das, 2005; Pesaran, 2007; Hadri, 2000; Pedroni, 1999, 2004; Larsson et al., 2001; Orsal, 2008) for additional details on these tests. To mitigate any impact of cross-section dependence the test where appropriate is implemented on demeaned data as suggested in Levin et al. (2002)

distortions and appropriate in the presence of serial correlation and endogeneity of regressors. Moreover, the estimator is robust in the presence of either homogeneous or heterogeneous cointegration vectors and in the case of heterogeneous cointegration vectors, the point estimates can easily be interpreted as the mean values of the cointegration vectors (see Pedroni, 2001). In the presence of cross-section dependence, Pedroni (2001) suggest the inclusion of common time dummies to mitigate this effect. Based on equation (3.2) the Pedroni's panel group mean DOLS estimates

$$\begin{aligned} logGOV_{it} = \alpha_i + \delta_i t + \beta_1 logY_{it} + \beta_2 logOPEN_{it} + \beta_3 logAID_{it} + \beta_4 DEM_{it} + \\ \sum_{j=-k_i}^{k_i} \gamma_{1ij} \Delta logY_{i,t-j} + \sum_{j=-k_i}^{k_i} \gamma_{2ij} \Delta logOPEN_{i,t-j} + \\ + \sum_{j=-k_i}^{k_i} \gamma_{3ij} \Delta logAID_{i,t-j} + \sum_{j=-k_i}^{k_i} \gamma_{4ij} \Delta logDEM_{i,t-j} + e_{it} \end{aligned} \tag{3.3}$$

where γ_{1ij} to γ_{4ij} are the parameters of the augmented lag and lead differences, with $\hat{\beta} = N^{-1} \sum_{i=1}^{N} \hat{\beta}_{mi}$, $t_{\hat{\beta_m}} = N^{-\frac{1}{2}} \sum_{i=1}^{N} t_{\hat{\beta}_{mi}}$ and $\hat{\beta_{mi}}$ being the parameter estimate of the conventional time-series DOLS estimator for each member of the panel.

3.4 Empirical Results and Discussion

Table 3.1 presents the panel group mean DOLS results. As evident, the coefficient on per capita income is positive and statistically significant at the 1% level. The results clearly indicate that once trade openness, foreign aid and democracy have been catered for, Wagner's law becomes a reality for WAMZ countries. The coefficient on trade openness, though positive is statistically insignificant at any conventional level. This means that trade openness is not an important determinant of government expenditure in WAMZ countries (based on the panel estimates). For this reason, neither the compensation nor the efficiency hypothesis become important when these countries are considered.

However, not surprisingly, and considering the fact that foreign aid inflows to WAMZ

Table 3.1: Panel group mean DOLS estimates

Models	$logY$	$logOPEN$	$logAID$	DEM
WAMZ	0.30***	0.01	0.31***	0.36***
	[4.67]	[0.09]	[14.32]	[3.88]

Note: Dependent variable $logGOV$. In parenthesis are t-ratios. *** denote rejection of the null hypothesis at the 1% level.

countries average between 1-34% of real GDP, the coefficient on foreign aid is positive and statistically significant at the 1% level. The results, clearly indicate that, government expenditure in WAMZ countries strongly depends on foreign aid inflows. The coefficient on democracy enters positive and statistically significant (i.e. at the 1% level). The result indicates that recent democratic advances in WAMZ countries have been crucial for (and also the most important determinant of) the overall size of the public sector.

3.4.1 Robustness Issues

To check the robustness of the panel group mean DOLS estimates in Table 3.1 we resort to two alternative estimation approaches. In the first approach we use 5-year averages for the 1980-2004 period (i.e. 1980-1984, 1985-1989, 1990-1994, 1995-1999, 2000-2004) and 4 year average for the 2005-2008 period of all variables. This transformation reduces potential business cycle and non-stationarity effects that may be present in the annual data (see Islam, 1995). Thus we split the data into six-time periods (i.e. T=6) for all six WAMZ countries. Using the transformed dataset we estimate equation (3.2) by dynamic OLS and IV(2SLS) that uses the Newey and West method to adjust the standard error as well as a correction for any potential serial correlation and heteroskedasticity problems. In estimating equation (3.2) by IV(2SLS) we use the transformed $logY$, $logOPEN$, $logAID$ and DEM lag one period ago. This allows us to also control for any potential endogeneity problems as these may be expected. In column I and II (Table 3.2) we respectively report the dynamic OLS and IV(2SLS) regression results with Newey-West adjusted standard errors. In all cases, the results clearly confirms the panel group mean DOLS estimates

Table 3.2: Dynamic OLS and IV(2SLS) estimates

Variables	I	II
logY	0.451***	0.473*
	[0.106]	[0.245]
logOPEN	0.218	0.202
	[0.209]	[0.261]
logAID	0.484***	0.509***
	[0.045]	[0.077]
DEM	0.558***	1.081*
	[0.191]	[0.585]
Wu-Hausman test	N/A	1.700
		[0.1896]

Note: Dependent variable *logGOV*. *** and * denote rejection of the null hypothesis at the 1% and 10% level respectively. In parenthesis of regression coefficients are Newey-West heteroskedasticity and autocorrelation consistent standard errors. In parenthesis of Wu-Hausman test of exogeneity/validity of instruments is robust p-value

with democracy remaining the most important determinant of the public sector in WAMZ countries over the study period.

In the second approach we follow Kaufman and Segura-Ubiergo (2001) and Avelino et al. (2005) and use the panel error correction model (PECM). Specifically, we estimate equation (3.2) by Prais-Winsten regression using our original dataset (N=6 and T=29) with panel-corrected standard error (PCSE) in the framework of Beck and Katz (1995) in order to address econometric issues related to autocorrelation, heteroskedasticity and cross-section and/or spatial dependence. The estimated PECM result is summarised in Table 3.3. The coefficients on lagged dependent and lagged independent variables are correctly signed and consistent with the results reported in Table 3.1 and 3.2[19]. In the framework of Ericsson and MacKinnon (2002), a negative and statistically significant coefficient on the lagged dependent variable can be interpreted as evidence of cointegration.

[19]Within this framework the long run coefficients can be obtained by dividing the coefficients on the respective lagged independent variables by negative the coefficient on the lagged dependent variable (i.e. 0.137) (see Kaufman and Segura-Ubiergo, 2001; Ericsson and Mackinnon, 2002; Akitoby et al., 2006)

Table 3.3: Panel Error Correction Model

Variables	Coefficients
$logGOV$(-1)	-0.137***[0.045]
$logY$(-1)	0.064*[0.039]
$logOPEN$(-1)	0.041[0.038]
$logAID$(-1)	0.053**[0.025]
DEM(-1)	0.122**[0.062]
ΔY	0.240**[0.102]
$\Delta logOPEN$	-0.072[0.082]
$\Delta logADI$	0.096**[0.041]
ΔDEM	0.080[0.152]
$\Delta logGOV$(-1)	-0.117[0.113]

Note: Dependent variable $\Delta logGOV$. Symbol Δ is the first-difference operator. Symbol ***, ** and * denote rejection of the null hypothesis at the 1%, 5% and 10% level respectively. In parenthesis are panel-corrected standard errors

We observe that the lagged dependent variable is negative and statistically significant (i.e. at the 1% level). The result indicates that government expenditure, per capita income, trade openness, foreign aid and democracy can indeed be considered a long run relationship for WAMZ countries.

However, the result from the panel estimates does not necessarily mean that similar conclusions can be drawn for individual WAMZ countries. For this reason, we present in Table 3.4 the country-specific group mean estimates. As expected, the impact of per capita income, trade openness, foreign aid and democracy varies across countries. With the exception of Liberia where government expenditure and per capita income are not significantly related, per capita income has statistically significant negative impact on government expenditure in Guinea (consistent with Wildavsky's hypothesis), but statistically significant positive impact on government expenditure in all other countries. The result implies that Wagner's law has indeed happened in The Gambia, Ghana, Nigeria and Sierra Leone. The coefficient on trade openness enters negative for The Gambia, Ghana and Guinea, and positive for Liberia, Nigeria and Sierra Leone, but statistically insignificant for the case of Guinea and Liberia. The result implies that Rodrik's hypothesis is supported in Nigeria and Sierra Leone (but not all other WAMZ countries). We also find statistically significant positive impact of foreign aid on government expenditure in The Gambia, Ghana, Liberia and Nigeria, negative and statistically significant impact in Guinea, but no relationship in Sierra Leone. Democracy is the only variable that significantly explain government expenditure in all WAMZ countries. Democracy increases government expenditure in The Gambia, Guinea, Nigeria and Sierra Leone whilst it reduces government expenditure in Ghana and Liberia. This results is not surprising given the heterogeneity across countries in the indicators used (see Appendix B.1; Table B.1), and confirms the use of group mean estimator in this study. Overall, the country-level results reveals that per capita income, trade openness, foreign aid and democracy have important implications for government expenditure in WAMZ countries, although their magnitude and level of statistical significance varies across all six WAMZ countries.

Table 3.4: Panel group mean DOLS estimates (country-specific results)

Models	$logY$	$logOPEN$	$logAID$	DEM
The Gambia	2.96***	-0.49*	0.35**	0.94***
	[5.55]	[-1.66]	[2.40]	[4.46]
Ghana	3.30***	-1.46***	1.09***	-1.92***
	[5.65]	[-4.72]	[12.97]	[-3.25]
Guinea	-1.55***	-0.14	-0.17***	0.76***
	[-8.06]	[-0.60]	[-3.04]	[3.19]
Liberia	0.03	0.08	0.26***	-0.86***
	[0.53]	[0.97]	[14.72]	[-4.43]
Nigeria	0.66***	0.76*	0.53***	0.38***
	[3.50]	[1.69]	[7.58]	[2.85]
Sierra Leone	1.06***	1.24***	0.09	2.17***
	[4.29]	[4.54]	[0.45]	[6.67]

Note: Dependent variable $logGOV$. In parenthesis are t-ratios. ***, ** and * denote rejection of the null hypothesis at the 1%, 5% and 10% level.

3.5 Summary, Policy Implications and Conclusions

This study has analysed the implications of trade openness, foreign aid and democracy for Wagner's law in WAMZ countries. We have shown that no long run cointegration relationship exists between government expenditure and per capita income (and hence no support for Wagner's law). However, we have emphasised that the study of Wagner's law in developing countries (and in particular WAMZ countries) should incorporate into the analysis the potential impact of trade openness, foreign aid and democracy considering the implications that these variables have for government expenditure. Therefore, once we have controlled for the potential impact of these variables we find not only a long run cointegration relationship between government expenditure, per capita income, trade openness, foreign aid and democracy, but a relationship that also reveals that Wagner's law has indeed happened in WAMZ countries. Overall, the result reveals that, per capita income, foreign aid and democracy have the potential to increase the size of the public sector in WAMZ countries in the long run.

Based on these results, we believe that the immediate take-off of the ECO could induce fiscal indiscipline as member countries' willingness to ensure fiscal discipline is not guaranteed. Although, monetary union has the potential to provide an agency of restraint over fiscal policies by preventing "public expenditure from outpacing public revenue" (Collier, 1991) - due in part because the influence of any single national authority is weakened in a monetary union (De Grauwe, 1996) - and/or pave way for credible commitment to sound macroeconomic policies (Guillaume and Stasavage, 2000; Beetsma and Bovenberg, 2001), it may not be enough to ensure fiscal discipline in WAMZ countries. This will arise due to the possibility for excessive public debt accumulation (Beetsma and Bovenberg, 1999; 2002) and the incentives available for governments to undertake suboptimal expansionary macroeconomic policies, particularly during election years. This is important because, as it is currently the case, not enough institutional structures have been put in place to ensure innovative and efficient ways of domestic revenue generation to enable government revenue to keep pace with its expenditure. Udoh (2011), for example, note that government revenue generation still remain non-optimal in addressing fiscal deficit problems in WAMZ countries. However, as Iyare et al. (2005) note, if government expenditure expands but government revenue leads, then fiscal discipline will automatically follow. With WAMZ countries still characterised by weak monetary (coupled with their inability to satisfy the single digit inflation criteria) and fiscal institutions, it is recommended that institutional structures on innovative and efficient ways of domestic revenue generation are explicitly implemented in all WAMZ countries. These institutional structures if implemented would not only help reduce over-dependence on foreign aid inflows, but should also ensure fiscal policy coordination that would be necessary to complement what the monetary union could potentially provide so far as fiscal discipline is concerned.

Accordingly, we conclude the study by reiterating that, if WAMZ countries are to meet the fiscal convergence criteria and ensure the sustainability of a single currency area (and to the extent that per capita income, foreign aid and democracy have the potential to increase the size of the public sector in the long run), explicit sets of fiscal restraint on the national authorities and innovative and efficient ways of domestic revenue generation necessary to ensure that government revenue keep pace with its expenditure should be what policy reforms should target.

Chapter 4

On the Relationship between Democracy, Government Spending, and Economic Growth: The Case of Ghana, 1960 - 2008

4.1 Introduction

Research on the impact of democracy and government spending on economic growth and development has received a great deal of attention in the past few years. Nonetheless, the extent to which these policy variables contribute to economic performance of developing countries continues to be a subject of considerable and heated debate, as many countries all over the world and sub-Saharan Africa in particular, have embarked on democratisation of their political system[1]. Does democracy and government spending go hand in hand to impact positive on economic performance of developing countries? This paper sheds light on the hypothesis of high efficiency of government spending in democracies

[1] In sub-Saharan Africa, for example, while only two countries were considered free in 1972, this number increased to 11 by 2008, though the number decreased to nine in 2010 (Freedom House, 2008; 2011). The Freedom House (2011) report shows that 19% of countries in sub-Saharan Africa were rated as free, 45% as partly free, and 35% as not free. Most of the gains did occur in the 1990s

(see Plumper and Martin, 2003; Hausken et al., 2004), providing empirical evidence for Ghana over the period 1960-2008. The Autoregressive Distributed Lag (ARDL) bounds testing approach to cointegration proposed by Pesaran et al. (2001) is used for the estimation. The findings of the study, especially a positive complementary impact of democracy and government spending on economic growth could cement the democratic course the countries in sub-Saharan Africa, in particular, have decided to pursue and to convince the less democratic countries about the benefits of democracy in promoting economic growth through government spending.

The increasing drive towards democratisation can be attributed to the many advantages democratic institutions bestow upon a country. For example, democratic countries are more likely to foster an environment conducive for long run growth and development - as they are more prone to enhance the protection of property rights, promotes the rule of law, economic freedom and stable politics, promotes a more efficient use of resources, and an environment conducive for the inflows of foreign direct investment (Shen, 2002; Baum and Lake, 2003). A functioning democracy helps to legitimise government actions by limiting the power of the state to intervene arbitrarily in the economy thereby enhancing the functioning of a market economy that allows for the most efficient allocation and use of resources (Muller, 2007). Democracy helps to establish a more open political process that makes government more beholden to voters as it promotes economic prosperity by minimising social cost from rent-seeking (see Wittman, 1995; Heckelman, 2009). No wonder, ZackWilliams (2001) describes democracy as a *sine qua non* for economic development.

In spite of the potential benefits that democracy can have on economic growth of countries optimists claim that democracy hinders economic growth because it reduces the incentives for private investment. For instance, Hassett (2007) points out that there is nothing theoretically compelling that suggests that democracy is a better form of government that reflects the underlying preferences of citizens. This claim is supported by many recent studies that suggests that there is no systematic relation between democracy and economic growth in general and that country conditions may be more important as determinants of economic growth (Acemoglu et al., 2005; Heo and Tan, 2001). Hence, democracy would not always win (Hassett, 2007) as it would not necessarily outperform other types of mechanisms for preference aggregation as a route to economic prosperity. Sirowy and Inkles (1990), further note that, democratic regimes may have a negative effect on economic growth because they are incapable of pervasive state involvement in the development process in addition to their inability to implement the policies necessary for long run economic growth. This is consistent with the view of Quinn and Whooley (2001) that democratic politics impose costs or make economic adaptation more costly. This could be attributed to the fact that high inequality in democracies lead to policies that reallocate national income from investment to consumption, which slows economic growth (Alesina and Rodrik, 1994; Persson and Tabellini, 1994).

The empirical results on the impact of democracy on economic growth remain mixed and inconclusive as well. On the positive side, Grier and Munger (2006) investigated the democracy - economic growth relationship for 134 countries covering the period 1950-2003 and reported that autocracies grow almost one percentage point slower than democracies. Boko (2002) in a study of 27 African countries found that democracy has a significant positive effect on economic growth. Notwithstanding this, Narayan, Narayan, and Smyth (2011) in a study of 30 SSA countries between 1972 and 2001 found conflicting results for the countries studied. They found a positive effect of democracy on economic growth for Botswana, Madagascar, Rwanda, South Africa, and Swaziland, but a negative effect of democracy on economic growth for Gabon and Sierra Leone. There are many other studies which show that democracy may have a negative or at the most a non significant effect on economic growth (Helliwell, 1994; Acemoglu et al., 2005; Doucouliagos and Ulubasoglu, 2008; Aisen and Veiga, 2011). Helliwell (1994) investigated the effect of democracy for 125 countries over the period 1960-1985 and reported that democracy had a negative but insignificant effect on economic growth. Aisen and Veiga (2011) reports in a study of 169 countries using GMM estimation techniques for the period 1960-2004 that democracy has a slight negative effect on economic growth.

About a decade ago, Minier (1998) argued that the many divergent and inconsistent results of the democracy - economic growth relationship requires that attention be given to country specific studies and its agenda with a focus on mechanisms and attendant contingent events. Interestingly, other studies indicate that the effect of democracy on economic growth is not uniform; specifically, that the effect of democracy may be different for the developed and developing countries or may have regional effects (Narayan, Narayan, and Smyth, 2011; Tiruneh, 2006; Aghion et al., 2007; Doucouliagos and Ulubasoglu, 2008; Krieckhaus, 2006; Heo and Tan, 2001; Kurzman et al., 2002).

On the other hand, the impact of government spending on economic growth is not different as well. Not only is government spending important from the Keynesian perspective, especially during periods of economic recession, but the fact that government can succeed or fail depending on whether its growth performance ranks high or low. In endogenous growth models of (Lucas, 1988; Romer, 1990; Barro, 1990), for example, government spending can stimulate short- and long-term growth (not only through investment in physical capital and labour), but most importantly through investment in human and/or knowledge (technology) capital, innovations, technical development (including communications and provision of public infrastructure), expenditure on health, institutional quality and the protection of property rights.

Notwithstanding the theoretical support for government spending as a growth enhancing policy variable, the empirical evidence is one that still remain inconclusive on whether government spending is on average crucial for economic growth in both developed and developing countries. Many empirical studies that have investigated the relationship between government spending and economic growth find either negative or no effect (see, for example, Barro, 1991; Al-Faris, 2002; Atrayee, 2009; Nketiah-Amponsah, 2009). In an influential paper, Barro (1991) in a sample of 98 rich and poor countries found robust evidence in support of an inverse relationship between government spending and economic growth. In a time-series study of the United States over the period 1950-1998, Atrayee (2009) found a significant negative impact of government spending on economic growth.

The rational for this observed negative and/or no impact of government spending on economic growth is that although government spending on its core functions may enhance economic growth, there are good reasons to believe that, economic growth will be retarded if government spending goes beyond its core functions into low or non-productive activities[2](Gwartney et al., 1998). For this reason, an efficient government should keep its spending only up to the optimum of its core functions as "economies with large as well as small public sectors may grow slowly" (Agell et al., 1997). This result is important not only for developed economies, but most importantly for the developing world where government spending should be considered a priority for economic growth and development if government is to succeed.

Per the discussion above, it is reasonable to think that certain mechanisms are needed if democracy and/or government spending would impact positive on economic growth and development. One of such mechanisms identified in Plumber and Martin (2003) and Hausken et al. (2004) is the amount and quality of government spending that democratisation world foster. They note that, an increase in democracy tends to divert the attention of incumbent government from rent-seeking activities, and rather commit to the provision of efficient and productive public spending (including the provision of public goods) in order to attract political support. If this is the case, then one would expect that although democracy and government spending may have negative and/or no effect on economic growth individually - as the literature reviewed above may suggest-, their interaction or complementary effects should be growth enhancing, particularly in countries involved in the democratisation process. This result is important because as many studies have shown democracy does not have a direct effect on economic growth (see, for example, Doucouliagos and Ulubasoglu, 2008). Democracy, although may be associated with larger government will not produce a detrimental net effect on economic growth as it will keep government on focusing on its core functions. Therefore, with the growing democratisation in the developing world, in particular, government spending could play

[2]Al-Faris (2002), for example, note that such low or non-productive government spending includes expenditures on defense, subsidies, and socially and politically motivated recruitment in the public sector

a significant role in influencing economic growth through the provision of efficient and productive investments crucial for a better economic performance. Accordingly, and as already emphasised, this study contributes to the literature by investigating, in a rigorous systematic way, the extent to which democracy and government spending impact on economic growth in Ghana.

The rest of the study is structured as follows. The next section discusses the empirical strategy adopted for the study. The results are then presented and analysed, after which we offer the implications of the study, and concluding remarks.

4.2 Empirical Strategy

Several cointegration approaches are available in the literature to establish a long run relationship between cointegrated variables. In the framework of Engle and Granger (1987), Johansen and Juselius (1990), Gregory and Hansen (1996) among others, if two variables are integrated of order one (i.e. $I(1)$) and the associated error term is integrated of order zero (i.e. $I(0)$), then the two variables are said to be cointegrated. Nonetheless, the requirement of strictly $I(1)$ variables are often difficult to be met in empirical applications. Moreover, these approaches are particularly appropriate for large samples, which is not the case in this study. For this reason, we propose the ARDL bounds testing approach to cointegration and the error correction model (*ecm*) to determine the extent to which democracy and government spending impact on economic growth in Ghana in both the long - and the short-run over the period 1960-2008. The ARDL approach to cointegration is not only robust in the present of cointegration and potentially endogenous regressors, but it is particularly appropriate for small sample study and provided the underlying variables are not integrated of order two (i.e. $I(2)$) or even more yields valid results irrespective of whether the variables considered are purely $I(1)$, $I(0)$, or a combination of both (see Pesaran et al., 2001).

To define a long run relationship between two variables Y and X, the ARDL approach involves first estimating the conditional error correction model (*ecm*) of the following specification:

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^{p} \alpha_1 \Delta Y_{t-i} + \sum_{i=0}^{p} \alpha_m \Delta X_{t-i} + \delta_1 Y_{t-1} + \delta_m X_{t-1} + e_{it} \tag{4.1}$$

where Y is the dependent variable, X is the vector of the observations of included explanatory variables, Δ is the first difference operator, m is the number of regressors, and e is the error term. Following earlier researches we analyse the role of democracy and government spending on economic growth in Ghana in the framework of an augmented production function. For this reason, we define Y as the logarithm of real GDP ($logY$) and X to include the logarithm of the labour force ($logLAB$), capital stock (KAP), democracy (DEM), government spending (GOV), an interaction term for democracy and government spending ($DEM*GOV$), democracy squared ($DEMSQ$), trade openness ($OPEN$) and financial development (FD). We include $DEM*GOV$ and $DEMSQ$ in equation (4.1) to capture any interaction and/or non-linear effect that may exist between democracy, government spending, and economic growth (see Barro 1996; Plumper and Martin, 2003).

The second step test the null hypothesis of no cointegration by restricting the coefficients of the lagged level variables equal to zero (i.e. H_0: δ_1=δ_m=0 against the alternative hypothesis that H_0: δ_1=δ_m≠0) using an F-test by estimating equation (4.1) by OLS. The asymptotic distribution of the F-statistic follow a non-standard distribution under the null hypothesis of no cointegration and are computed by stochastic simulation irrespective of whether the variables are purely $I(0)$, $I(1)$, or a combination of both. Microfit 5.0 provide two sets of asymptotic critical value bounds. The lower and upper critical values assume that all variables are $I(0)$ and $I(1)$ respectively. If the computed F-statistic exceeds the upper critical values, the null hypothesis of no cointegration is rejected, if below the lower critical values, then we cannot reject the null hypothesis of no cointegration. However, the test is inconclusive if the calculated F-statistic falls within the two critical value bounds.

Following the existence of cointegration, the final step estimates the long - and short-run coefficients of the selected ARDL model. In selecting the optimal lag structure (p) for the ARDL model in equation (4.1) we use the Schwartz Information Criterion (SIC) as this provides more parsimonious model specification, particularly in small samples (see Pesaran and Pesaran, 2009).

4.2.1 The Data

The data for real GDP is obtained from the World Bank (2010) - African Development Indicators 2010. Data for democracy is based on Polity2 score[3] obtained from Polity IV project (Marshall and Jaggers, 2009). Government spending is measured as the share of government spending in GDP based on data obtained from World Bank (2010) - African Development Indicators 2010. The labour force and capital stock (which we proxy by the share of gross fixed capital in GDP) variables are based on data obtained from the World Bank (2004, 2010) - World Development Indicators 2004 and 2010. The trade openness variable is measured based on the trade share in GDP (i.e. $(EXPORTS{+}IMPORTS)/GDP$) and the data is obtained from World Bank (2010) - African Development Indicators 2010. Data for financial development (which we proxy by the share of credit to the private sector in GDP) is obtained from the World Bank (2010) - African Development Indicators 2010.

4.3 Empirical Findings and Discussion

In this section we present and discuss the empirical results on the relationship between democracy, government spending, and economic growth in Ghana, 1960-2008. We begin the presentation of empirical results and discussion with the time series properties of the data and the ARDL based cointegration test. We then follow it up with the long run and short-run estimates and the associated diagnostic and stability tests.

[3]This score combine various measures of the political system of countries. It ranges from -10 (strongly autocratic) to +10 (strongly democratic). To allow us control for any potential non-linear effects we have rescaled the data to range from 0 (strongly autocratic) to 10 (strongly democratic)

4.3.1 Unit Root and Cointegration Test Results

Since the validity of the ARDL approach to cointegration relies on either $I(0)$, $I(1)$ or a combination of both, it is important that we first determine the time series properties of individual series that enter equation (4.1). This will allow us to be sure that all included variables are not $I(2)$ or even more. We consider two alternative unit root testing procedures: the non-parametric Phillips-Perron (PP) test proposed by Phillip and Perron (1988) and the Zivot-Andrews (Zandrews) test due to Zivot and Andrews (1992) that takes into consideration the impact of structural break endogenously. The null hypothesis that the series have unit roots is tested against the alternative hypothesis that the series have no unit root for the PP test. On the other hand, the Zandrews test - which allows for one structural break in the series that may appear in the intercept, trend or both, and determined endogenously - test the null hypothesis that the series have unit roots without structural break, against the alternative hypothesis that the series are stationary with a structural break at an unknown break date. The PP and Zandrews unit roots test results are reported in Tables 4.1 and 4.2[4] respectively.

Table 4.1: Phillips-Perron (PP) unit root test results

	Level		First difference	
Variable	Trend	No Trend	Trend	No Trend
$logY$	-0.344	1.711	-5.148***	-4.788***
DEM	-2.713	-1.524	-5.569***	-5.635***
GOV	-2.421	-2.432	-5.920***	-5.984***
$DEM * GOV$	-2.430	-1.338	-5.682***	-5.727***
$DEMSQ$	-2.356	-1.187	-5.855***	-5.885***
$logLAB$	-1.118	-0.996	-5.611***	-5.617***
KAP	-2.679	-1.651	-7.780***	-7.607***
$OPEN$	-2.083	-1.201	-5.949***	-5.930***
FD	-0.971	-0.538	-7.956***	-7.746***

Note: *** indicate rejection of the null hypothesis of unit root at the 1% level.

[4]These tests have been implemented using the PP and Zandrews routine in STATA. The associated break date for the intercept, trend and both for Zandrews test in Table 4.2 are respectively reported in column 5 under Break dates

Table 4.2: Zivot-Andrews (Zandrews) unit root test results

Variable	Trend	No Trend	Both	Break Dates
$logY$	-3.384	-3.599	-4.212	1979; 1984; 1981
DEM	-4.598**	-5.814***	-5.857***	1981; 1990; 1981
GOV	-3.145	-3.274	-3.357	1978; 1993; 1981
$DEM * GOV$	-4.293	-5.386**	-5.626***	1981; 1990; 1981
$DEMSQ$	-4.928**	-5.217**	-5.457**	1981; 1994; 1981
$logLAB$	-2.516	-4.016	-2.940	2003; 1999; 2003
KAP	-2.532	-3.243	-2.789	1993; 1979; 1978
$OPEN$	-2.203	-2.923	-2.363	1993; 1978; 1976
FD	-3.923	-3.691	-3.753	1973; 1985; 1987

Note: ***(**) indicate rejection of the null hypothesis of unit root at the 1%(5%) level.

The results from the PP test reveals that all the variables are stationary only after first differencing (i.e. $I(1)$). The results are independent of whether we allow for deterministic trend or not. On the other hand, the Zandrews test results support the presence of unit root without structural break in all variables, except DEM, $DEM * GOV$ and $DEMSQ$, as the null hypothesis of unit root without structural break is not rejected. The Zandrews test reveals that DEM, $DEM*GOV$ and $DEMSQ$ can be treated as stationary variables, but with structural break. The PP and Zandrews test results confirm that all included variables in equation (4.1) can be treated as either $I(0)$ or $I(1)$. This justifies the rational for the adoption of ARDL bounds testing approach to cointegration in this study.

We present in Table 4.3 the results for the computed F-statistics[5]. In model I we report the results for equation (4.1). We drop $OPEN$ in model II, $DEMSQ$ in model III and $OPEN$ and $DEMSQ$ in model IV as both variables are insignificant at any conventional level[6]. The ARDL (1, 0, 0, 0, 0, 0, 0, 0, 2), ARDL (1, 0, 0, 0, 0, 0, 0, 2), ARDL (1, 0, 0, 0, 0, 0, 0, 2), ARDL (1, 0, 0, 0, 0, 0, 2) are selected for model I, II, III and IV

[5]We have computed the results summarised in Tables 4.3 - 4.6 using Microfit 5.0

[6]We have also estimated these models with other economic growth determinants for which data were available including inflation, foreign aid and terms of trade among others but all these variables were insignificant at any conventional level. Unfortunately, we could not find time series data on human capital for the period considered. However, this is not a limitation considering the fact that all estimated models are cointegrated which rules out the omitted variable problem

respectively by SIC. As evident, the F-statistic for all estimated models are significant at the 5% level. Therefore, we conclude based on this results that all estimated ARDL models are cointegrated. This means that a long run cointegration relationship exists between democracy, government spending, and economic growth in Ghana over the study period considered.

Table 4.3: ARDL bounds test for cointegration relationship

Models	I	II	III	IV
Test Statistics	3.937**	4.161**	4.324**	4.729**

Note: ** indicates rejection of the null hypothesis of no cointegration at the 5% significance level. The 95% lower and upper critical value bounds reported with the ARDL model I, II, III and IV are 2.515-3.904, 2.627-4.049, 2.627-4.049 and 2.739-4.051 respectively

4.3.2 Estimated Regression Results

In what follows we report the estimated long run (Table 4.4) and short-run (Table 4.5) results. Beginning with the variables of interest, the coefficient on DEM is negative and significant in both the long run and the short-run. This finding is not surprising because as noted by Aghion et al. (2007) democracy is conducive to economic growth in more advanced sectors of the economy. They report that democracy does not matter or may even have a negative effect on economic growth in sectors far away from the technological frontier. In an earlier study of South Africa and Ghana over the period 1960-1998, Guseh and Oritsejafor (2007) reported that democracy had a positive effect in South Africa but a negligible or even a negative effect in Ghana. This finding gives support to the view that democracy, by itself is unlikely to promote economic growth (Acemoglu, 2009). In poor developing countries for example, Stasavage (2005) note that, the formal adoption of democracy, in isolation, will have no effect on policy (and hence economic growth) because of the absence of strong institutions.

Table 4.4: Estimated long run coefficients using the ARDL approach

Variable	I	II	III	IV
DEM	-0.080**	-0.084***	-0.076**	-0.081***
	(0.036)	(0.026)	(0.034)	(0.025)
GOV	-0.126	-0.131	-0.138	-0.146*
	(0.099)	(0.093)	(0.094)	(0.085)
$DEM * GOV$	0.769**	0.797***	0.789**	0.830***
	(0.294)	(0.222)	(0.293)	(0.210)
$DEMSQ$	0.007	0.008		
	(0.020)	(0.020)		
$logLAB$	0.753***	0.749***	0.752***	0.745***
	(0.059)	(0.049)	(0.059)	(0.049)
KAP	0.076*	0.071**	0.079*	0.073**
	(0.043)	(0.026)	(0.042)	(0.026)
$OPEN$	-0.002		-0.003	
	(0.016)		(0.016)	
FD	0.298***	0.292***	0.308***	0.300***
	(0.064)	(0.047)	(0.058)	(0.043)
$INTERCEPT$	1.333**	1.380**	1.345**	1.415***
	(0.559)	(0.457)	(0.563)	(0.454)

Note: Dependent variable $logY$. In parenthesis are standard errors. ***(**)[*] indicates rejection of the null hypothesis at the 1%(5%)[10%] level

The most surprising result is that of the squared term of democracy ($DEMSQ$). Barro (1996) argued that for countries at low level of political freedom for example, more democracy could enhance growth. This result is further stressed by Fosu (2008) in a panel of 30 sub-Saharan African countries for the period 1970-2004, that increasing electoral competition in these countries would be growth enhancing. Unlike Barro (1996) and Fosu (2008) the coefficient on $DEMSQ$ though enters positive is not significant in both the long run and the short-run and therefore provides no evidence for a non-linear relationship between democracy and economic growth in Ghana for the study period considered. However, this result does not necessarily mean that increasing democracy would not be growth enhancing, but that its true impact depends also on country-level conditions. It is important also to note that the period 1960-2008 considered for the study is characterised by not just a smooth transition from autocracy to democracy, but by a series of political instability and dictatorship for most parts. This may explain to some extend the non-significant coefficient on the squared democracy term. With the increasing political democracy in Ghana in recent years, it is hoped this effect will be significant as well.

The coefficient on GOV enters negative in all estimated models in both the long run and the short-run, and statistically significant at the 10% level for model IV (although it has no explanatory power in models I, II and III). This negative and/or no impact of government spending on economic growth is not surprising, as it is consistent with previous studies on Ghana. For example, while the study of Ansari et al. (1997) and Ghartey (2007) for the periods 1963-1988 and 1965-2004 respectively have concluded that government spending did not play any crucial role in influencing economic growth and development in Ghana, the study of Nketiah-Amponsah (2009) and Sakyi (2011) for the periods 1970-2004 and 1984-2007 respectively concludes that government spending has been the bane of economic growth and development in the country. This result indicates that government spending by itself have no effect or even a detrimental effect on economic growth.

Notwithstanding this, the coefficient on the interaction term for democracy and government spending ($DEM * GOV$) is positive and statistically significant in both the long run and the short-run. This means that not only is the impact of the interaction effect positive but also that the total impact of government spending (democracy) remains positive as well. This result supports the hypothesis of high efficiency of government spending in democracies (see Plumber and Martin, 2003; Hausken et al., 2004) and the findings of Baum and Lake (2003) that democracy has an indirect effect on economic growth through government spending. Glaeser et al. (2004), for example, note that this indirect effect of democracy can be seen through its effect on increased government spending on education and health conducive for long run growth. In a related study of African countries, Stasavage (2005) reported that many African governments spend a lot more on education when they become democratic. Thus, in expanding its size, democratic institutions help

Table 4.5: Error Correction Representation for the selected ARDL Models

Variable	I	II	III	IV
ΔDEM	-0.038**	-0.040**	-0.035**	-0.037***
	(0.017)	(0.013)	(0.015)	(0.012)
ΔGOV	-0.060	-0.062	-0.064	-0.067*
	(0.045)	(0.042)	(0.042)	(0.039)
$\Delta(DEM * GOV)$	0.366**	0.377***	0.367***	0.384***
	(0.130)	(0.103)	(0.128)	(0.100)
$\Delta DEMSQ$	0.003	0.004		
	(0.010)	(0.010)		
$\Delta logLAB$	0.358***	0.354***	0.350***	0.343***
	(0.075)	(0.069)	(0.071)	(0.062)
ΔKAP	0.036*	0.033**	0.037*	0.034**
	(0.021)	(0.012)	(0.020)	(0.011)
$\Delta OPEN$	-0.001		-0.002	
	(0.008)		(0.007)	
ΔFD	0.012	0.010	0.013	0.010
	(0.034)	(0.031)	(0.033)	(0.031)
ΔFD(-1)	-0.111***	-0.110***	-0.112***	-0.111***
	(0.033)	(0.032)	(0.033)	(0.032)
ect(-1)	-0.475***	-0.473***	-0.466***	-0.461***
	(0.088)	(0.084)	(0.082)	(0.078)
$F - Statistic$	5.494***	6.272***	6.244***	7.205***
$R - bar^2$	0.489	0.502	0.501	0.514
$DW - Statistic$	1.900	1.901	1.879	1.879

Note: Dependent variable $\Delta logY$. In parenthesis are standard errors. ***(**)[*] indicates rejection of the null hypothesis at the 1%(5%)[10%] level

government to extend its horizons and consequently promote long term policies conducive to a better economic performance (Aisen and Veiga, 2011).

Consistent with neoclassical growth theory both the labour force and capital variables enter with the correct sign (positive) and statistically significant in both the long run and the short-run, and for all estimated models. Consistent with many other studies (Aisne and Veiga, 2011: Gries et al., 2009), the trade openness variable is not significantly related to economic growth over the study period. A tentative explanation for this result is that the period before 1983 was characterised by a trade policy regime that was inappropriate and inadequate (see Sakyi, 2011). Although many studies indicate that the relationship between financial depth and economic growth is not robust but that it depends on how financial depth is measured we find in this study that for Ghana, the financial depth (share of credit to the private sector in GDP) variable is positive but only significant in the long run, which suggests that financial deepening can play a facilitative role in promoting economic growth, although this effect will be delayed (as it has no positive effect in the short-run). This result implies that the government of Ghana has to focus on promoting policies conducive for financial deepening, particularly in the banking sector of the economy.

Table 4.6: Model Diagnostics and stability test for selected ARDL models

Diagnostic/Stability Test	I	II	III	IV
Serial Correlation	$0.3 * 10^{-5}$	$0.9 * 10^{-6}$	0.004	0.005
	(0.999)	(1.000)	(0.952)	(0.945)
Functional Form	$0.8 * 10^{-3}$	0.002	0.088	0.097
	(0.977)	(0.966)	(0.767)	[0.755]
Normality	1.476	1.501	1.342	1.359
	(0.478)	(0.472)	(0.511)	(0.507)
Heteroskedasticity	0.741	0.691	0.834	0.764
	(0.389)	(0.406)	(0.361)	(0.382)
CUSUM	Stable	Stable	Stable	Stable
CUSUMQ	Stable	Stable	Stable	Stable

Note: Probability values in parenthesis

Notwithstanding the discussion above, it is important to note that the adequacy and reliability of ARDL models crucially depends on their statistical properties as well (see Hendry et al., 1984). For this reason, we report a series of diagnostic and stability tests (see Table 4.6). The diagnostic and stability test reveals the statistical adequacy of the estimated ARDL models. In particular, all estimated ARDL models passes the test of functional form and normality of residuals and there is no evidence of serial correlation, heteroskedasticity, model misspecification, non-normality of residuals and coefficient instability. The results are not "spurious" given that all estimated models are cointegrated. Moreover, the coefficient on lagged error correction term ($ect(-1)$) is negative, reasonably high in absolute value and highly significant (at the 1% level). The *ect*(-1) result reveals a moderately high speed of long run equilibrium adjustment every year after a short-run shock. This confirms further the cointegration test results.

4.4 Policy Implications and Conclusions

This study has analysed the impact of democracy and government spending on economic growth in Ghana for the period 1960-2008. The findings of the study suggests that democracy and government spending, by themselves do not exert a positive long - and short-run effect on economic growth. However, as predicted by theory, the interaction of democracy and government spending led to a significant positive long - and short-run effect on economic growth. The labour force and capital variables were significantly related to economic growth, while trade openness did not in both the long-and short-run. Financial development variable had a positive long run effect on economic growth, but this effect was not captured in the short-run. The findings of the study and the literature reviewed provide important policy recommendations.

As this study has revealed, democracy by itself is unlikely to promote economic growth and development in Ghana. The rapid drive towards democratisation without productive government spending and other complementing reforms such as economic liberalisation, rule of law, macroeconomic stability, and regulatory reform will not succeed. Indeed, Barro (1996) observed that an African country in which democracy gets far ahead of economic development is unlikely to be sustainable. The way forward then is to promote overall institutional development. Obviously, this must be done with the focus on building human capital spearheaded by the government through investment in education and health conducive for long-term growth and economic development. This could potentially be achieved with further improvement in political institutions, in particular. As the debate rages on with respect to the relationship between democracy, government spending, and economic growth in developing countries, it may be easier or even wiser also to further promote fundamental reforms in terms of the free markets and the importance of securing private property rights (Hernandez-Murillo and Martinek, 2008), which is consistent with recent progress as witnessed in the Asian economies. In this sense, efforts at promoting trade and financial development and attracting foreign direct investment should be a priority for the government of Ghana as well.

It is important to note that, the findings of the study are limited by the fact that a broad concept of democracy was used. Other studies suggest that different components of democracy might have different effects and that some components may be more important than others (Heckelman, 2010). Consequently, further research could examine this in detail. Another key issue is to identify which type of democracy (regime type) is more growth enhancing, for example parliamentary versus presidential as noted by Persson (2005), Acemoglu (2009) and Pereira and Teles (2009). Finally, future research should seek to examine in detail other channels or indirect effects of democracy on economic growth as this study and others seem to suggest.

Altogether, the study has shown that to transform the policy environment to promote the welfare of the citizenry, democratic reforms are crucial if government spending must lead poor countries on to the growth trajectory necessary to promote long term growth and development. Looking ahead, political, economic and governance reforms must reinforce each other in order to promote the growth needed to reduce poverty in Ghana.

Chapter 5

Trade Openness, Growth and Development: Evidence from Heterogeneous Panel Cointegration Analysis for Middle-Income Countries

5.1 Introduction

According to economic analysis, one of the most important benefits associated to trade openness is the achievement of a faster and less volatile process of economic growth and development (Winters, 2004). For the developing countries to catch up with the more advanced ones, a higher and more sustained economic growth is required in the former (Mobarak, 2005). This implies that these countries require a huge amount of resources, which, to a certain extent, have to be acquired from advanced economies. The need for developing countries to get these resources led to their over-reliance on foreign aid, grants and loans. Nonetheless, the quantum, quality and timing of overseas aid, grants and loans are often not only dependent upon economic conditions of developing countries but also on conditions rich countries impose on them; in particular, on the high servicing charges and repayment obligations such aid, grants and loans carry with them. This is where trade arises as an alternative to enable these countries to obtain the needed resources. Trade openness has been considered as one of the main policies expected to allow developing countries to alter both the pace, pattern and structure of their participation in the international market scene, thereby overcoming balance-of-payments problems, accelerating technical progress and hence promoting economic growth and development. In sum, it is considered that openness to trade helps to improve economic performance by increasing competition and by giving domestic firms access to the best foreign technology, which is very helpful to raise domestic productivity, and to better finance.

Nonetheless, although trade openness has became an important policy variable for developing countries for the last few decades, its impact on economic growth and development has recently received a great deal of attention from academic researchers and policy makers alike, as many developing countries continue to embark on the liberalisation of their trading system and signing bilateral, regional and multilateral trade agreements with other countries all over the world. In spite of this phenomenal policy change, the precise effect of trade openness on economic growth and development, at least for developing countries, still remains an open question as both theoretical and empirical studies have not yet provided a definitive conclusion (see, for example, Lopez, 2005).

Many theoretical models have been proposed to explain how trade openness may, or may not, have a positive impact on economic growth and development (see Grossman and Helpman, 1990, 1991; Rivera-Batiz and Romer, 1991; Young, 1991; Romer, 1993; Mountford, 1998; Spilimbergo, 2000; Ben-David and Loewy, 1998, 2000, 2003; Perera-Tallo, 2003).

For many empirical studies, on the other hand, the strengh of the impact of trade openness on economic growth and development is often dependent on the econometric techniques used - time series, cross-section, or panel data -, how both economic growth and development and trade openness are measured[1], the treatment of potential endogeneity of trade openness (Sachs and Wagner, 1995; Harrisson, 1996; Srinivasan and Bhagwati, 1999; Dollar and Kraay, 2004; Rodriquez and Rodrik, 2001), the time period and the country samples under consideration. For example, Srinivasan and Bhagwati (1999) have criticised cross-sectional regression methodology for reasons of their inappropriateness and weak theoretical foundations. This methodology and other homogeneous panel data methods often do not take into consideration potential cross-country heterogeneity. Moreover, the problem of cross-section dependence that arises from unobserved common factors or shocks is often not addressed. For these reasons, cross-sectional regression and homogeneous panel data methods, when employed in cross-country economic growth and development studies that often tend to exhibit high degree of cross-country heterogeneity and cross-section dependence may produce potentially biased and inconsistent estimates (see Pesaran and Smith, 1995; Lee et al., 1997; Pesaran, 2006; Phillips and Sul, 2003; Pedroni, 2007; Costantini and Destefanis, 2009).

Bearing these considerations in mind, the main contribution of this paper to the existing literature lies in taking advantage of the recent development in non-stationary heterogeneous panel data techniques to examine the impact of trade openness on economic growth and development for a sample of 85 middle-income countries over the period 1970-2009; the idea is to determine whether these countries have benefited in terms of economic performance from international trade openness or otherwise. In addition, we go a step further to highlight on the result related to 20 middle-income sub-Saharan African countries included in our sample. Specifically, we employ the Common Correlated Effects Mean Group (CCEMG) estimator developed by Pesaran (2006) and applied by Holly et al. (2010) and Cavalcanti et al. (2011). We further check the robustness of our results with the Group Mean estimators developed by Pedroni (2000; 2001) - the Fully Modified Ordinary Least Squares (FMOLS) and the Dynamic Ordinary Least Squares

[1] In most recent studies the level of development is proxied by the level of per capita income (see Frankel and Romer, 1999, Irwin and Tervio, 2002; Dollar and Kraay, 2003; Freund and Bolaky, 2008) while economic growth is proxied by the rate of income growth (see Chang et al., 2009; Kim and Lin, 2009; Kim, 2011)

(DOLS). By using these estimators we are able to address econometric issues related to non-stationarity, parameter heterogeneity, endogeneity, omitted variable bias and cross-section dependence, with the implication that our conclusions are more robust than those in previous papers.

The rest of the study is organised as follows. In section 2 we review the theoretical and empirical literature on the impact of trade openness on economic growth and development. Section 3 explains the empirical methodology. Section 4 discusses the empirical results. In the final and last section of the study we offer our concluding remarks.

5.2 Literature Review

Theoretical economic growth and development models - extended standard neoclassical exogenous, and endogenous economic growth and development models (see, for example, Grossman and Helpman, 1990, 1991; Rivera-Batiz and Romer, 1991; Spilimbergo, 2000; Ben-David and Loewy, 1998, 2000, 2003 and Perera-Tallo, 2003) - suggest that trade openness may contribute to economic growth and development by fostering technological progress and international and domestic competition. Although quite general, these theories sometimes differentiated between which group of countries - developed or developing - benefits the most from trade openness.

Ben-David and Loewy (1998, 2000, 2003), for example, provide an extension of the standard neoclassical exogenous growth model to incorporate multi-country, open economy endogenous growth features. In these models economic growth depends on the rate of knowledge accumulation - which is facilitated through trade liberalisation policies. Focusing on the steady-state economic growth impact of trade openness, the authors show that all countries benefit positively from both unilateral and multilateral trade liberalisation. Ben-David and Loewy (1998), for example note that more open economies face competitive pressures, and for firms in these economies to compete with foreign firms they need to incorporate foreign knowledge into their production processes. This is possibly achieved if countries liberalise foreign trade as it facilitates the diffusion of knowledge. Moreover, in endogenous growth models (see for example, Grossman and Helpman, 1990, 1991; Romer, 1993), trade openness fosters the flow of knowledge and ideas between countries. Spilimbergo (2000) developed a Ricardian model of international trade with non-homothethic preferences and showed that a developing country liberalising its trade with a developed country can benefit more in terms of welfare gains. Therefore trade openness connects developing countries, in particular, to more advanced countries not only to acquire foreign exchange through exports, but most importantly through the access to intermediate and high-tech goods through imports, which facilitate the diffusion of knowledge and technology (see. Feder, 1982; Grossman and Helpman, 1990, 1991; Rodrik, 1999; Almeida and Fernandes, 2008).

Notwithstanding the theoretical support for trade openness as an economic growth and development enhancing policy variable, it must be admitted that trade openness can also potentially be detrimental to economic growth and development in the developing world through various channels. For example, as noted by Grossman and Helpman (1990, 1991), economic growth and development will be hampered if trade openness leads a country to specialise in sectors with comparative disadvantage in R&D activities. This is likely to be the case for countries at very low levels of development, due to human capital constraints and their inability to take advantage of international technology transfer (Kim, 2011). In addition, although in the context of an endogenous growth model, Perera-Tallo (2003) has shown that the level of income determines the degree of trade openness, so there are good reasons to believe that the degree of trade openness and the level of income are positively related as well, implying the possibility for long-run causality. Perera-Tallo (2003) however notes that, although trade openness may affect the level of income positively, it may not necessarily be robustly related to economic growth (and this effect may even be negative). The reason for this is that as trade openness increases over time - due to the expansion of the market base that leads to an increase in the level of income - the rate of income growth may decrease due to the fact that the economy converges towards a steady-state.

This potential no effect or even negative income growth effect of trade openness is in line with the endogenous growth model proposed by Young (1991). He notes that, under free trade, developing (developed) countries may experience income growth less than or equal (greater than or equal) to those experienced under autarky. Yet another important explanation for this potential low income growth effect of trade openness for developing countries - as compared to the developed countries - may be that there is an income level (or level of development) below which more trade openness has detrimental consequences for economic growth (see, for example, Kim and Lin, 2009; Kim, 2011). Therefore, although trade openness may have a positive affect on the level of income, it may not necessarily have a positive growth effect for developing countries.

Leaving aside theoretical reasoning, it is also important to note that the empirical evidence on the impact of trade openness on economic growth and development is also mixed and inconclusive. Several empirical studies support a positive impact of trade openness on economic growth and development. Harrison (1996) used alternative openness measures to investigate the relationship between trade openness and economic growth for developing countries for the periods 1960-1987 and 1978-1988. For most openness measures Harrison concluded that more trade openness is associated with higher economic growth. Frankel and Romer (1999), in an attempt to control for potential endogeneity of trade openness, used geographical components of trade to construct a measure for trade openness. Their results revealed that trade openness has a positive effect on income levels, although this effect is moderately statistically significant. Wacziarg (2001) studied the relationship between trade openness and economic growth for a panel of 57 countries over the period 1970-1989 and concluded that trade openness has a positive and significant impact on economic growth. Vamvakidis (2002) studied the same relationship using historical data for the period 1870-1990, and concluded that the positive openness-growth link is rather a recent phenomenon, mostly driven by the unprecedented expansion in world trade which began in the 1970s. While no significant positive relationship was found for periods before 1970, the period 1970-1990 showed a significant positive effect of trade openness on economic growth. Irwin and Tervio (2002) used data for the pre-World

War I, the interwar and the post-war periods to investigate the effect of trade openness on income, concluding that, even after controlling for endogeneity problem, trade openness affect levels of income positively. Brunner (2003) used a dynamic panel data model to study the impact of trade openness on the level of income and income growth for a sample of 125 countries for the period 1960-1992, and concluded that trade openness has a significant large effect on the level of income, but small and non-robust effect on income growth. Lee et al. (2004) investigated the relationship between trade openness and economic growth for a sample of 100 countries for the period 1961-2000. Using identification through heteroskedasticity to address potential endogeneity of trade openness, they concluded that trade openness has indeed increased economic growth for these countries, although this effect is small in magnitude. Salinas and Aksoy (2006) employed multivariate fixed effects estimations to assess the impact of trade openness on economic growth over pre- and post trade liberalisation periods and concluded that, the post-liberalisation period saw an increase in economic growth of about 1.2 percentage points higher than the pre-liberalisation period. Rassakh (2007) used the empirical model of Frankel and Romer for a sample of 150 countries to investigate the impact of trade openness on levels of income and the rate of income growth, and concluded that trade openness benefits the developing countries (i.e. low-income countries) more than the developed ones. Freund and Bolaky (2008) studied the relationship between trade openness and levels of income for a sample of 126 countries and found this effect to be positive, but only for well regulated economies. Chang et al (2009) investigated the effect of trade openness on economic growth for 82 countries (that included 22 developed and 60 developing countries) for the period 1960-2000, and concluded that, generally speaking, trade openness is positively related to economic growth. The study further revealed that this association can be enhanced significantly, particularly for developing countries, if trade reforms are combined with labour market flexibility, human capital formation, inflation stabilisation, financial development, public infrastructure and governance reforms. More recently, the study by Villaverde and Maza (2011) conducted for a sample of 101 countries and the period 1970-

Table 5.1: Summary Evidence on Trade Openness effects on Growth and Development

Source	Country	Period	Results	Methodology
Wacziarg (2001)	57	1970-1989	(+) effect on growth	Panel data
Vamvakidis (2002)	89	1870-1970 1970-1990	no effect on growth (+) effect on growth	OLS
Brunner (2003)	125	1960-1992	(+) large effect on income (+) small non-robust effect on growth	Panel data
Lee at al. (2004)	100	1961-2000	(+) effect on growth	Panel data
Salinas & Aksoy (2006)	39	1970-2004	(+) effect on growth	Panel data
Rassakh (2007)	150	1960-1985	(+) effect on income & growth	Panel data
Freund & Bolaky (2008)	126	2000-2005	(+) effect on income	OLS
Chang et al. (2009)	82	1960-2000	(+) effect on growth	Panel data
Kim (2011)	61	1960-2000	(+) effect on growth depends on level of development	OLS

Note: For most authors we show only the maximum number of countries considered

2005 also show that economic globalisation (for which trade openness is one of the main indicators) has conducted to a higher economic growth and, simultaneously, to worldwide income convergence.

On the contrary, there are also some empirical papers casting doubts about the relationship between trade openness, growth and development. In fact, recent empirical investigations by Dowrick and Golley (2004), Kim and Lin (2009) and Kim (2011) have shown that trade openness benefits rich countries more than poor countries due to poor countries inability to take advantage of knowledge accumulation and technology spillovers. This is also the case because as Kali et al. (2007) noted, not only does the volume of trade matters, but also the structure of international trade has significant implications for economic growth and development. They emphasised that the number of trading partners that a country is able to benefit from is crucial for the impact of trade openness on economic growth and development, and that less developed countries stand to lose from this advantage. In addition, what a country actually exports (i.e. either capital intensive, manufactured or primary products), for example, matters as well for its potential benefiting from international trade. These arguments imply that not all countries take advantage from trade openness, and that the level of development already attained by a country as well as the the structure of its international trade critically determine if trade openness impacts positively on economic growth and development.

As can be seen, there is a vast literature on the topic of the relationship between trade openness, growth and development. Then, to conclude this section with an attempt to offer a snapshot of the current state of knowledge on this issue, Table 5.1 reports a summary of the main papers devoted to it from 2000 onwards.

5.3 Methodology

5.3.1 Model Specification and The Data

Although both theoretical and empirical literature revised in the previous section is not conclusive, the existence of a long-run relationship between trade openness and development is mostly accepted except maybe in some cases when the development degree of the country under study is quite low. This being so, to investigate the long-run impact of trade openness on development, we follow the literature on panel cointegration analysis and first consider an empirical model with the following specification:

$$logY_{it} = \alpha_i + \beta_i logOPEN_{it} + e_{it}, i = 1, 2, ...N, t = 1, 2, ...T \tag{5.1}$$

where Y_{it} is real per capita income of country i in year t, $OPEN_{it}$ denotes trade openness, log is the logarithm operator, α_i is the country-specific fixed effects, e_{it} is the error term, and β_i the country parameters related to trade openness. An important feature of our model is that we do not impose a common coefficient among all the countries under analysis. As mentioned in the introduction of the paper, the parameter β is allowed to be heterogeneous between countries. This being so, we are interested in the average value of β_i, namely β. In other words, and following the methodology proposed by Pesaran

(2006), $\beta = N^{-1}\sum_{i=1}^{N} \beta_i$ is the parameter of interest to be estimated, reflecting the long-run relationship between trade openness and per capita income.

Regarding the short-run dynamics and their adjustment to the long-run, they are accommodated through the error term, which has a multi-factor error structure ($e_{it} = w_i' f_t + u_{it}$). The specification of the error term, as well as Pesaran's proposal, are throughly explained below when it comes to dealing with estimation issues.

To estimate Eq. (5.1) we have used a balanced panel data consisting of 85 middle-income countries for the period 1970-2009. Out of these, 20 are from Sub-Saharan Africa. Annual data on trade openness and real per capita income are obtained from Penn World Tables Version 7.0 (Heston et al., 2011). Although the World Bank classifies 110 countries as middle-income economies[2], the data is available for only 85 of these countries for the period considered. It is important to note that the trade share in GDP (i.e. *Exports* + *Import/GDP*) is the most commonly used proxy for trade openness as the trade performance of countries capture the most important dimension of openness in general. However, we define trade openness in real terms (i.e. trade openness based on constant 2005 PPP dollars). In like manner, real per capita income is measured based on constant 2005 PPP dollars. The list of countries considered are presented in Appendix C.1.

5.3.2 Econometric Issues

To obtained consistent estimates for Eq. (5.1) we need to address several econometric issues that arise. Firstly, as noted in the introduction, an important issue of cross-section dependence - that results from unobserved common shocks or factors - needs to be taken into consideration. If there is a problem of cross-section dependence and it is not properly accounted, the estimated β and its associated standard error will be biased and inconsistent (see Driscoll and Kraay, 1998; De Hoyos and Sarafidis, 2006, Costantini and Destefanis, 2009, Holly et al., 2010). For this reason, we first determine whether the error

[2] We have combined the countries in the upper-middle-income and lower-middle-income groups (see World Bank (2011) - Classification of economies July 2011. $< http://data.worldbank.org/about/country-classifications/country-and-lending-groups >$

term e_{it} in Eq. (5.1) and the OLS residuals from $ADF(p)$ regressions of the $logY_{it}$ and $logOPEN_{it}$ across all the 85 countries in the panel over the period 1970-2009 are not plagued by cross-section dependence. The cross-section dependence (CD) test (Appendix C.2) clearly indicate that the $logY_{it}$ and $logOPEN_{it}$, as well as the error term e_{it} in Eq. (5.1), are plagued by cross-section dependence. Secondly, by the application of panel cointegration techniques to establish a long-run relationship in Eq. (5.1), we are assuming that both $logY_{it}$ and $logOPEN_{it}$ are integrated of order one, or $I(1)$ stationary, and cointegrated. The existence of cointegration between $logY_{it}$ and $logOPEN_{it}$ means that the error term, e_{it} is stationary or $I(0)$, implying that Eq. (5.1) is also not plagued by the omitted variable problem (see Herzer, 2010; Cavalcanti et al., 2011). For these reasons, if these conditions are satisfied inference based on the long-run relationship in Eq. (5.1) would not be spurious, and the short-run dynamics, and their adjustment to equilibrium in the long-run across countries can easily be captured, as we mentioned in the model specification, through the error term, e_{it} (see Holly et al., 2010). To determine whether the variables in Eq. (5.1) exhibit unit root properties and are cointegrated, and taken into consideration the problem of cross-section dependence, we make use of panel unit root and cointegration tests that treat this effect. The panel unit root (Appendix C.3) and cointegration (Appendix C.4) tests show that all variables exhibit unit root properties and are cointegrated[3].

5.4 Empirical Results and Discussion

We have established in the previous section that the variables in Eq. (5.1) exhibit unit root properties and are cointegrated. This section, devoted to the empirical results and discussion, begins with the long-run panel estimates. We then follow it up with the robustness of the results and conclude the section with causality issues. The causality analysis will not only allow us to capture the long-run direction of causality between trade

[3]For presentation purpose we do not report the results related to the 20 middle-income Sub-Saharan African countries, since similar conclusions are drawn in all cases, but are available upon request

openness and levels of income (levels of development), but most importantly, the short-run (growth) effects.

5.4.1 Estimation of Long-run Relationship

As we indicate before, we estimate the long-run relationship in Eq. (5.1) using the common correlated effects mean group (CCEMG) estimator proposed by Pesaran (2006). The CCEMG estimator, which augment the OLS regression in Eq. (5.1) with the cross-sectional averages of the dependent variable ($\overline{logY_t}$) and the regressor ($\overline{logOPEN_t}$), has been shown as the way to properly eliminate both strong and weak common factors in large cross-sectionally dependent panel data models, and is consistent even when the associated errors are weakly cross-sectionally dependent (see Pesaran, 2006; Holly et al., 2010; Pesaran and Tosetti, 2011). In the application of the CCEMG estimator, Pesaran (2006) assume that the error term e_{it} follow a multi-factor structure defined by

$$e_{it} = w_i' f_t + u_{it} \tag{5.2}$$

where f_t, which is allowed to be stationary or nonstationary (see. Kapetanios et al., 2011) and also allowed to be serially correlated and possibly correlated with $logOPEN_{it}$ (see. Holly et al., 2010; Cavalcanti et al., 2011), is a vector of unobserved common shocks, while the individual-specific error term u_{it} is assumed to be distributed independently of f_t and $logOPEN_{it}$ and allowed to be weekly dependent across i and serially correlated over t. The CCEMG estimator is based on OLS regression of the following specification

$$logY_{it} = \alpha_i + \beta_i logOPEN_{it} + \beta_{i0}\overline{logY_t} + \beta_{i1}\overline{logOPEN_t} + e_{it} \tag{5.3}$$

where the included cross-sectional averages ($\overline{logY_t}$) and ($\overline{logOPEN_t}$) only serve as proxies for the common factors and may not have any interpretable meaning (see Pesaran, 2006). The coefficient of interest is computed as the simple average of the N countries (i.e.

$\hat{\beta}=N^{-1}\sum_{i=1}^{N}\hat{\beta}_i$). To enable comparison of the results, we also compute the traditional mean group (MG) estimates of Eq. (5.1), which does not take account of cross-section dependence by assuming independent errors. Aside the results we present for all the 85 middle-income, we also present the results for the 20 Sub-Saharan African countries included in our sample. In this way, we also determine whether the the middle-income countries from this region has also benefited from international trade openness or not. The estimated MG and CCEMG results are reported in Table 5.2[4].

Table 5.2: Estimated Long-run MG and CCEMG results

Estimator	MG	CCEMG
	85 Middle-Income Countries	
$logOPEN_{it}$	0.317***	0.091**
	(0.098)	(0.042)
CD test statistics	79.90***	-1.28
	20 Sub-Saharan Africa Middle-Income Countries	
$logOPEN_{it}$	0.476*	0.235**
	(0.266)	(0.102)
CD test statistics	11.18***	-1.06

Note: Dependent variable $logY_{it}$. Standard errors are reported in parenthesis. Symbol ***(**)[*] denote rejection of the null hypothesis at the 1%(5%)[10%] significance level. The CD test statistics are Pesaran (2004) CD test on the residuals of MG and CCEMG estimates

As evident, the long-run relationship between trade openness and the level of income is positive and highly significant in both estimators (at least at the 5% level). However, we observe, on the one hand, that the mean coefficient β is much bigger in the MG estimate than in the CCEMG and, on the other, that the MG estimate is biased given the high degree of cross-section dependence unveiled by the CD test statistic. These results reveal that neglecting the impact of cross-section dependence can bias upwards the coefficient of the estimated long-run relationship; the difference between estimates, furthermore, is significant enough to assert that researchers should not overlook this issue, as has been

[4]XTMG routine in STATA was used to implement the MG and CCEMG results while XTCD routine in STATA was used for the CD statistics

common practice so far. In addition, the CCEMG estimator has led to a significant reduction of cross-section dependence inherent in Eq. (5.1) and thus provides us with the true mean coefficient β.

5.4.2 Robustness Issues

To check the robustness of Pesaran's CCEMG results presented in Table 5.2, we use the group mean Fully Modified OLS (FMOLS) and the group mean Dynamic OLS (DOLS) proposed by Pedroni, where the impact of cross-section dependence is captured through common time effects (Pedroni, 2000, 2001). According to Pedroni (2001), these two estimators - which are based on the between dimension of the panel - are promising in estimating the true mean value of β in Eq. (5.1) in heterogeneous cointegrated panels. This author suggests that, by using FMOLS and DOLS estimators, a consistent and efficient estimation of cointegration vector is achieved, in particular where non-stationarity, endogeneity of regressors and serial correlation problems are suspected.

The FMOLS estimator considers the following cointegrated system

$$logY_{it} = \alpha_i + \beta_i logOPEN_{it} + e_{it}, \tag{5.4}$$

$$logOPEN_{it} = \alpha_i + \beta_i logOPEN_{i,t-1} + v_{it} \tag{5.5}$$

where z_{it}=(e_{it}, v_{it})' is $I(0)$ with a long-run asymptotic covariance matrix Ω_i, and $logY_{it}$ and $logOPEN_{it}$ are assumed $I(1)$ and being cointegrated. Pedroni (2000), following the Phillips and Hansen (1990) time series approach (but in this case allowing for heterogeneity in the fixed effects and the short-run dynamics), makes a semi-parametric correction to the OLS estimator to account for potential endogeneity and other econometric problems inherent in Eq. (5.1). The group mean FMOLS estimator for β compute $\hat{\beta} = N^{-1}\sum_{i=1}^{N}\left(\sum_{t=1}^{T} x_{it} - \bar{x}_i)^2\right)^{-1}\left(\sum_{t=1}^{T} x_{it} - \bar{x}_i)\right)Y_{it}^{*} - T\tau_i$, where y_{it}=$logY_{it}$, x_{it}=$logOPEN_{it}$, $\hat{\tau}_i \equiv \hat{\Gamma}_{21i} + \hat{\Omega}^{o}_{21i}$-$\frac{\hat{L}_{21i}}{\hat{L}_{22i}}(\hat{\Gamma}_{22i} - \Omega^{o}_{22i})$, $y^{*}_{it} = (y_{it} - \bar{y}_i)$-$\frac{\hat{L}_{21i}}{\hat{L}_{22i}}\Delta x_{it}$, $\hat{L}_i$ denote lower triangular decomposition of $\hat{\Omega}_i$.

On the other hand, Pedroni's DOLS is based on the estimation of the following equation

$$logY_{it} = \alpha_i + \beta_i logOPEN_{it} + \sum_{j=-k}^{k} \lambda_{ij} \Delta logOPEN_{i,t-j} + e_{it} \tag{5.6}$$

where λ_{ij} denote the coefficients of the augmented lag and lead differences, which account for any potential endogeneity and serial correlation problems. The estimated β is computed as the simple average of the long-run DOLS estimates for each N in the panel (i.e. $\hat{\beta}$=$N^{-1}\sum_{i=1}^{N} \hat{\beta}_i$).

Table 5.3: Estimated Long-run FMOLS results

	Raw data	Demeaned data
	85 Middle-Income Countries	
$logOPEN_{it}$	0.318***	0.078**
	(0.013)	(0.011)
	20 Sub-Saharan Africa Middle-Income Countries	
$logOPEN_{it}$	0.581***	0.138***
	(0.070)	(0.032)

Note: Dependent variable $logY_{it}$. Standard errors are reported in parenthesis. Symbol *** denote rejection of the null hypothesis at the 1% significance level

The estimated long-run results using group mean FMOLS and DOLS (implemented using Pedroni's procedure available in RATS) with and without the inclusion of common time effects are reported in Table 5.3 and 5.4 respectively. Consistent with the MG and CCEMG results (Table 5.2), we observe a positive and significant relationship between trade openness and the level of income in all cases. In addition, the mean coefficient β is bigger for both estimators if we use the raw data that do not account for cross-section dependence. However, the estimated β is much small and comparable to the CCEMG result in estimates with common time effects. The result clearly shows that although trade

Table 5.4: Estimated Long-run DOLS results

	Raw data	Demeaned data
	85 Middle-Income Countries	
$logOPEN_{it}$	0.266***	0.084***
	(0.010)	(0.010)
	20 Sub-Saharan Africa Middle-Income Countries	
$logOPEN_{it}$	0.629***	0.173***
	(0.079)	(0.040)

Note: Dependent variable $logY_{it}$. Standard errors are reported in parenthesis. Symbol *** denote rejection of the null hypothesis at the 1% significance level

openness has significant positive impact on the level of income, this effect is much smaller once econometric issues are well addressed. More importantly, middle-income countries in SSA have benefited even more from trade openness as our results indicate.

5.4.3 Causality, Short-run Dynamics and Adjustment to the Long-run

Our panel results have pointed out that, as expected, a positive long-run relationship between trade openness and the level of income exists. Another important issue is to determine the short- and long-run causal relationship between the two variables and, in particular, whether trade openness has economic growth (or income growth) effect as well. To deal with this issue, we estimate a panel error correction model given by

$$\Delta logY_{it} = c_{1i} + \sum_{j=1}^{p} \gamma_{11j} \Delta logY_{i,t-j} + \sum_{j=1}^{p} \gamma_{12j} \Delta logOPEN_{i,t-j} + k_1 ect_{i,t-1} \tag{5.7}$$

$$\Delta logOPEN_{it} = c_{2i} + \sum_{j=1}^{p} \gamma_{21j} \Delta logY_{i,t-j} + \sum_{j=1}^{p} \gamma_{22j} \Delta logOPEN_{i,t-j} + k_2 ect_{i,t-1} \tag{5.8}$$

where Δ is the first-difference operator, $\Delta logY_{it}$ is the rate of economic growth, $ect_{i,t-1}$ is the lagged error correction term computed from the long-run cointegrating relationship of Eq. (5.1), in which ect_{it}=$logY_{it}$-$\hat{\alpha}_i$-$\hat{\beta}_i logOPEN_{it}$. We first determine whether the coefficients on the lagged error correction terms are different from zero (i.e. $k_1 \neq 0$ and $k_1 \neq 0$). If this was not the case for at least one of them, we would not be able to rely on the panel cointegration results which establish a long-run cointegrating relationship between trade openness and the level of income, and hence there would not be any evidence for long-run Granger causality. On the contrary, if at least one of the adjustment coefficients was non-zero, we would be able to determine the direction of long-run Granger causality by implementing a χ^2-test for the null hypothesis of long-run Granger non-causality on the coefficients on $ect_{i,t-1}$. Secondly, we determine whether there is any evidence of short-run Granger causality by implementing a χ^2-test for the null hypothesis of short-run Granger non-causality on the lags of the short-run coefficients (γ). To implement the short- and long-run Granger causality we estimate Eqs. (5.7) and (5.8) by the CCEMG which account for cross-section dependence. The results are reported in Table 5.5. Based on the CCEMG results, it can be seen that the adjustment coefficient is negative and highly significant (at the 1% level) in all cases, indicating that the long-run cointegrating relationship between trade openness and the level of income truly holds. The rejection of the χ^2-test for the null hypothesis of long-run Granger non-causality on the coefficients of $ect_{i,t-1}$ indicates a long-run bi-directional Granger causality between trade openness and the level of income. Nonetheless, there is not enough evidence to reject the null hypothesis of short-run Granger non-causality between trade openness and economic growth in both directions. Summing up, we are thus able to conclude that, although the hypothesis of short-run non-causality cannot be rejected, the long-run causality for middle-income countries is bi-directional, suggesting that trade openness is both a cause and a consequence of development, that is, higher development degrees (and associated productivity gains) encourage firms to explore external market opportunities.

5.5 Concluding Remarks

This study has investigated the impact of trade openness on economic growth and development of 85 middle-income economies over the period 1970-2009. In order to do so, it has

Table 5.5: Causality tests - CCEMG results

85 Middle-Income Countries		
	$logY_{it}$	$logOPEN_{it}$
Coefficient on $ect_{i,t-1}$	-0.266***	-0.444***
$\chi^2(1)$	202.11***	300.25***
$\Delta logY_{i,t-1}[\chi^2(1)]$		2.40
$\Delta logOPEN_{i,t-1}[\chi^2(1)]$	1.59	
20 Sub-Saharan Africa Middle-Income Countries		
Coefficient on $ect_{i,t-1}$	-0.263***	-0.407***
$\chi^2(1)$	74.71***	84.59***
$\Delta logY_{i,t-1}[\chi^2(1)]$		0.39
$\Delta logOPEN_{i,t-1}[\chi^2(1)]$	0.21	

Note: Symbol *** denote rejection of the null hypothesis at the 1% significance level

made use of several heterogeneous panel cointegration techniques that are robust in the presence of non-stationarity, endogeneity and cross-section dependence and which offer more reliable results than conventional approaches. The main conclusions of the study are that there is a significant long-run relationship between trade openness and development, and that this is bi-directional, this implying that higher development tends to increase trade openness and vice-versa. The existence of a short-run interaction between these two variables is not, however, supported by our empirical investigation. This conclusions are consistent also for the 20 middle-income sub-Saharan African countries included in the sample. The short-run results is on a priori basis quite surprising, but it is convenient to note that it is in line with the theoretical model by Perera-Tallo (2003). A tentative explanation of this result is that the effect of trade openness will lead to a reallocation of resources, in favour of economic activities in which developing countries are more competitive, only in the medium/long-run. Accordingly, and although in the short-run policies devoted to foster openness can not have the desired effects, these prove to be very fruitful in the long-run and, therefore, they should be implemented by developing countries.

Appendix A

Appendix of Chapter 2

A.1 Model Specification and The Data

A.1.1 Augmented Production Function Model

To further check the robustness of the empirical results we estimate the impact of economic globalisation and democracy on income using alternative model specification. For this reason, we define m (see equation (2.1)) by considering a general production function that incorporate economic globalisation, democracy and their interaction term as additional explanatory variables to labour force and capital stock. Therefore, based on equation (2.1) the following specific equation is estimated:

$$logY_{it}^{*} = \alpha_i + \beta_1 logL_{it} + \beta_2 K_{it} + \beta_3 EG_{it} + \beta_4 DM_{it} + \beta_5 (EG * DM)_{it} + e_{it} \tag{A.1}$$

where Y_{it}^{*} is real GDP, L_{it} is labour force, K_{it} is the capital stock (which we proxy by the share of gross fixed capital in real GDP), EG_{it}, DM_{it}, $(EG * DM)_{it}$, log, α_i and e_{it} are as previously defined and β_1 to β_5 are the parameters to be estimated with β_3 to β_5 the parameters of interest.

A.1.2 Data Definition and Sources

Y: Real GDP per capita; World Bank (2010) - African Development Indicators (2010)

Y^*: Real GDP; World Bank (2010) - African Development Indicators (2010)

L: Labour Force; World Bank (2010) - African Development Indicators (2010)

K: Gross fixed capital formation (% of GDP); United Nations (2010)

PS: Polity2; Marshall and Jaggers (2009)

PR/PC: Heritage Foundation; Freedom House (2006)

EG: Economic Globalisation; KOF Index of Globalisation (2010)

Table A.1: Components of KOF's economic globalisation index

Indices and Variables	Weights
i) Actual Flows	(50%)
Trade (% of GDP)	19%
Foreign Direct Investment, Flows (% of GDP)	22%
Foreign Direct Investment, Stock (% of GDP)	24%
Portfolio Investment (% of GDP)	17%
Income Payments to Foreign Nationals (% of GDP)	20%
ii) Restrictions	(50%)
Hidden Import Barriers	22%
Mean Tariff Rate	28%
Taxes on International Trade (% of current revenue)	27%
Capital Account Restrictions	22%

Source: KOF's Index of Globalisation (2010)

A.2 Cross-section Dependence in Panel Data Models

To compute the three statistics we estimate equation (2.2) and/or (A.1) and then compute the following:

i) Frees' statistic compute

$$R^2 = \frac{2}{N(N-1)} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{r}_{ij}^2 \tag{A.2}$$

ii) Friedman's statistic compute

$$R = \frac{2}{N(N-1)} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{r}_{ij} \tag{A.3}$$

where $\hat{r}_{ij}$ is the estimate of spearman's rank correlation coefficient $r_{ij} = r_{ji} = \frac{\sum_{i=1}^{T}\left(r_{it}-(T+\frac{1}{2})\right)\left(r_{jt}-(T+\frac{1}{2})\right)}{\sum_{i=1}^{T}\left(r_{it}-(T+\frac{1}{2})\right)^2}$ of the residuals

iii) Pesaran's statistic compute

$$CD = \sqrt{\frac{2T}{N(N-1)}} \left(\sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij} \right) \tag{A.4}$$

where $\hat{\rho_{ij}}$ is the estimate of ρ_{ij}. The null hypothesis tests $\rho_{ij} = \rho_{ji} = corr(e_{ij}, e_{ji}) = 0$ for $i \neq j$ versus the alternative hypothesis that $\rho_{ij} = \rho_{ji} \neq 0$ for some $i \neq j$ where $\rho_{ij} = \rho_{ji} = \frac{\sum_{i=1}^{T} e_{it}e_{jt}}{\left(\sum_{i=1}^{T}\hat{e}_{it}^2\right)^{\frac{1}{2}}\left(\sum_{i=1}^{T}\hat{e}_{jt}^2\right)^{\frac{1}{2}}}$. The test results are reported in Tables A.2 and A.3.

Table A.2: Tests for cross-section dependence (equation 2.2)

Test statistics	I	II	III
Frees	9.281***	9.230***	9.607***
Friedman	35.908	46.683**	46.683**
Pesaran	1.790*	3.751***	3.716***
ABS	0.512	0.521	0.540

Note: *ABS* is the average absolute value of the off-diagonal elements of the residuals. Critical values from Frees' Q distribution are 0.1870, 0.1297 and 0.0996 for the 1%, 5% and 10% significance level respectively. ***(**)(*) denote statistical significance at the 1%(5%)(10%) level

The results suggest that there is enough evidence to reject the null hypothesis of cross-section independence for the case of Frees' R^2 and Pesaran's CD tests for all estimated models. There is also enough evidence to reject the null hypothesis of cross-section independence for the case of Friedman's R for models II and III. Nonetheless, not enough evidence exists to reject the null hypothesis of cross-section independence for the case of Friedman's R for model I. It is important to note that both Friedman's R and Pesaran's CD tests are known to lack power when the error structure alternate in sign (see De Hoyos and Sarafidis, 2006). This is the case as both tests compute the sum of the pair-wise coefficients of the residual matrix that may cancel out when averaging. However, since Frees' R^2 compute the sum of the squared rank correlation coefficients it is not subject to this drawback. For this reason, De Hoyos and Sarafidis (2006) have argued that if there is not enough evidence to reject the null hypothesis of cross-section independence for Friedman's R and/or Pesaran's CD (but not the case for Frees' R^2), but there is enough evidence to believe that the correlation coefficient of the errors alternate in sign (for which the average absolute value of the off-diagonal elements of the correlated residuals is large)[1] then inference should be based on Frees' R^2. This result is exactly the case in model I and suggest that there is enough evidence to reject the null hypothesis of cross-section independence.

Table A.3: Tests for cross-section independence (equation A.1)

Test statistics	I	II	II
Frees	8.170***	8.807***	8.861***
Friedman	38.056	48.982**	45.988**
Pesaran	2.214**	3.592***	3.694***
ABS	0.467	0.496	0.497

Note: See Table A.2

[1]Not reported, the correlation coefficients of the errors are available upon request

A.3 Panel Unit Roots and Cointegration Testing Procedures

A.3.1 Panel Unit Roots

The LLC test is based on the following regression

$$\Delta y_{it} = \delta y_{i,t-1} + \sum_{L=1}^{p_i} \theta_{iL} \Delta y_{i,t-L} + \alpha_{mi} d_{mt} + e_{it} \tag{A.5}$$

where m=1, 2, 3, and α_{mi} and d_{mt} are used to indicate the vector of deterministic variables and the corresponding vector of coefficients for a particular model m=1, 2, 3 respectively. LLC suggest three-step procedure that implements the test, since the lag order p_i(which is allowed to vary across individuals in the panel) is unknown. The three-steps involves the estimation of a separate Augmented Dickey-Fuller (ADF) regression for each N, the estimation of the long run to short-run standard deviations and the estimation of the panel test statistics.

On the other hand, Pesaran considers the following CADF regression

$$\Delta y_{it} = \alpha_i + \rho_i y_{i,t-1} + d_0 \bar{y}_{t-1} + d_1 \Delta \bar{y}_t + e_{it} \tag{A.6}$$

where $\bar{y}_t$ is the average of y_{it} at time t for the cross-section dimension of the panel. The presence of cross-sectional averages of lagged levels ($\bar{y}_{t-1}$) and first differences $\Delta \bar{y}_t$ of the individual series capture the cross-section dependence through a factor structure (see Baltagi, 2008). In the presence of serial correlation in the error term, Pesaran suggest augmenting (A.6) with appropriate lags. Pesaran obtains the $CADF(CIPSZ_t - bar)$ statistic by averaging the t-statistics on the lagged value for each unit i ($CADF_i$). $CADF = \frac{1}{N}\sum_{i=1}^{N} CADF_i$. The asymptotic distribution of $CADF(CIPSZ_t - bar)$ is non-standard and asymptotic critical values are provided for different values of both N and T. The panel unit roots test results are presented in Tables A.4[2]

Table A.4: Panel unit root test results

Variable	Levels		First-differences	
	LLC	*CADF*	*LLC*	*CADF*
logY	3.753	-2.335	-13.053***	-3.891***
EG	1.629	-2.305	-7.737***	-2.721**
PS	1.326	-2.254	12.161***	-4.158***
PR	1.326	-2.114	-13.791***	-3.534***
PC	3.483	-2.267	-15.621***	-3.878***
$EG * PS$	2.300	-1.583	-13.258***	-2.842***
$EG * PR$	2.928	-2.239	-12.936***	-3.565***
$EG * PC$	2.802	-2.339	-12.057***	-3.737***
$logY^*$	2.909	-2.166	-12.689***	-3.893***
logL	0.788	-2.284	-9.824***	-3.991***
K	-0.616	-2.019	-11.828***	-2.998***

Note: We include a linear time trend in the deterministic component in all tests since the series are trended. Issues related to the choice of optimal lag length are settled with the Akaike Information Criterion (AIC). The critical values for LLC and CADF are based on Levin and Lin (1992) and Pesaran (2007) respectively. *** denote rejection of the null hypothesis of unit root at the 1% level.

A.3.2 Panel Cointegration

The procedure involved in computing Pedroni's seven test statistics first estimate and stores the residuals from equation (2.1). The second step uses kernel estimator to compute the long run variance ($\hat{L}^2_{11i}$) from the residuals ($\hat{\eta}_{it}$) of the differenced regression of the form $\Delta y_{it} = \sigma_{1i}\Delta x_{1it} + ... + \sigma_{Mi}\Delta x_{Mit} + \eta_{it}$. This long run variance is required to compute the panel statistics. In the third step, we use the estimated residuals ($\hat{e}_{it}$) from equation (2.1) to compute the appropriate autoregressive models. For the non-parametric statistics we estimate $\hat{e}_{it} = \hat{\rho}_i \hat{e}_{i,t-1} + \hat{\varphi}_{it}$ and compute the long-run variance ($\hat{\sigma}^2_i$) and

[2] The *LLC* and *CADF* statistics have been implemented using the routine "XTUNITROOT" and "PESCADF" in STATA respectively. Not reported, we also performed the Fisher-type panel unit root test due to Choi (2001) using the routine "XTUNITROOT" in STATA that provides additional support to our results

the simple variance ($\hat{s}_i^2$) from the residuals ($\hat{\eta}_i$). Then the terms ($\hat{\lambda}_i$) and ($\tilde{\sigma}^2$) can be computed as $\hat{\lambda}_i = \frac{1}{2}(\hat{\sigma}_i^2 - \hat{s}_i^2)$ and $\tilde{\sigma}^2 \equiv \frac{1}{N}\sum_{i=1}^{N} \hat{L}_{11i}^{-2}\hat{\sigma}_i^2$ respectively. For the parametric statistics we estimate $\hat{e}_{it} = \hat{\rho}_i\hat{e}_{i,t-1} + \sum_{k=1}^{K_i} \Delta\hat{e}_{i,t-1} + \hat{\varphi}_{it}^*$ and compute the simple variance ($\hat{s}_i^{*2}$) from the residuals ($\hat{\varphi}_{it}^*$). In this expression K denotes the truncation lag permitted to vary by individual countries. The term ($\tilde{s}_i^{*2}$) is computed as ($\tilde{s}_i^{*2}$) $\equiv \frac{1}{N}\sum_{i=1}^{N} \hat{s}_i^{*2}$. The seven panel statistics expressed in equations (A.7) to (A.13) are then computed with the appropriate mean and variance adjustment terms as in Pedroni (1999).

Panel v-statistic:

$$Z_v \equiv T^2 N^{\frac{3}{2}} \left(\sum_{i=1}^{N}\sum_{t=1}^{T} \hat{L}_{11i}^{-2}\hat{e}_{i,t-1}^2 \right)^{-1} \tag{A.7}$$

Panel ρ-statistic:

$$Z_\rho \equiv T\sqrt{N} \left(\sum_{i=1}^{N}\sum_{t=1}^{T} \hat{L}_{11i}^{-2}\hat{e}_{i,t-1}^2 \right)^{-1} \sum_{i=1}^{N}\sum_{t=1}^{T} \hat{L}_{11i}^{-2}(\hat{e}_{i,t-1}\Delta\hat{e}_{it} - \hat{\lambda}_i) \tag{A.8}$$

Panel t-statistic (non-parametric):

$$Z_{pp} \equiv \left(\tilde{\sigma}^2 \sum_{i=1}^{N}\sum_{t=1}^{T} \hat{L}_{11i}^{-2}\hat{e}_{i,t-1}^2 \right)^{-\frac{1}{2}} \sum_{i=1}^{N}\sum_{t=1}^{T} \hat{L}_{11i}^{-2}(\hat{e}_{i,t-1}\Delta\hat{e}_{it} - \hat{\lambda}_i) \tag{A.9}$$

Panel t-statistic (parametric):

$$Z_t^* \equiv \left(\tilde{S}^{*2} \sum_{i=1}^{N}\sum_{t=1}^{T} \hat{L}_{11i}^{-2}\hat{e}_{i,t-1}^{*2} \right)^{-\frac{1}{2}} \sum_{i=1}^{N}\sum_{t=1}^{T} \hat{L}_{11i}^{-2}\hat{e}_{i,t-1}^{*}\Delta\hat{e}_{it}^{*} \tag{A.10}$$

Group ρ-statistic:

$$\tilde{Z}_{\rho} \equiv TN^{-\frac{1}{2}} \sum_{i=1}^{N} \left(\sum_{t=1}^{T} \hat{e}_{i,t-1}^{2} \right)^{-1} \sum_{t=1}^{T} (\hat{e}_{i,t-1} \Delta \hat{e}_{it} - \hat{\lambda}_i) \tag{A.11}$$

Group t-statistic (non-parametric):

$$\tilde{Z}_{pp} \equiv N^{-\frac{1}{2}} \sum_{i=1}^{N} \left(\hat{\sigma_i}^2 \sum_{t=1}^{T} \hat{e}_{i,t-1}^{2} \right)^{-\frac{1}{2}} \sum_{t=1}^{T} (\hat{e}_{i,t-1} \Delta \hat{e}_{it} - \hat{\lambda}_i) \tag{A.12}$$

Group t-statistic (parametric):

$$\tilde{Z}_{t} \equiv N^{-\frac{1}{2}} \sum_{i=1}^{N} \left(\sum_{t=1}^{T} \tilde{S}_i^{*2} \hat{e}_{i,t-1}^{*2} \right)^{-\frac{1}{2}} \sum_{t=1}^{T} (\hat{e}_{i,t-1}^{*2} \Delta \hat{e}_{it}^{*}) \tag{A.13}$$

All statistics test the null hypothesis of no cointegration against the alternative hypothesis of cointegration. The distinction rests on the treatment of ρ_i in the formulation of the alternative hypothesis. The panel cointegration statistics test the null hypothesis that $\rho_i = 1$ for all i, versus the alternative hypothesis that $\rho_i = \rho < 1$ for all i. While the group mean panel cointegration statistics test the null hypothesis that $\rho_i = 1$ for all i, versus the alternative hypothesis that $\rho_i < 1$ for all i. Thus, whilst under the alternative hypothesis the former assumes a common value for ρ_i (i.e. $\rho_i = \rho$), the later does not. The estimated results of Pedroni's seven panel cointegration test statistics are reported in Tables A.5 and A.6[3]

[3]The tests include deterministic time trend and common time dummies and are implemented using Pedroni's procedure available in RATS. Not reported, we also considered the panel cointegration test due to Kao (1999) that assumes slope homogeneity across the cross-sectional units of the panel. Kao's test result provides additional support to Pedroni's test results

Table A.5: Pedoni's panel cointegration test results (equation 2.2)

Models	I	II	III
		Panel statistics	
Panel v-statistic	-0.977	-0.881	-0.919
Panel ρ-statistic	-1.261	-1.505	-1.783*
Panel pp-statistic	-9.487***	-10.162***	-10.913***
Panel adf-statistic	-9.674***	-11.165***	-11.124***
		Group mean statistics	
Group ρ-statistic	3.011***	2.499**	2.122**
Group pp-statistic	-2.689***	-3.998***	-4.416***
Group adf-statistic	-3.747***	-5.404***	-4.935***

Note: All test statistics are asymptotically normally distributed. However, for the panel v-statistic only the right tail of the normal distribution is used to reject the null hypothesis as it diverges to positive infinity under the null hypothesis of no cointegration. ***(**)(*) denote rejection of the null hypothesis of no cointegration at 1%(5%)(10%) level

Table A.6: Pedroni's panel cointegration test results (equation A.1)

Models	I	II	III
		Panel statistics	
Panel v-statistic	-1.801	-1.631	-1.744
Panel ρ-statistic	1.934*	1.595	1.953*
Panel pp-statistic	-7.646***	-9.529***	-8.356***
Panel adf-statistic	-7.444***	-8.872***	-7.984***
		Group mean statistics	
Group ρ-statistic	4.601***	4.641***	4.617***
Group pp-statistic	-4.154***	-4.093***	-4.010***
Group adf-statistic	-3.480***	-3.124***	-4.224***

Note: See Table A.5

A.4 Panel Group Mean FMOLS Estimator

The panel group mean FMOLS estimate equation (2.1) and $x_{it} = x_{i,t-1} + u_{it}$. The innovation vector $\omega_{it} = (e_{it}, u_{it})'$ is $I(0)$ with asymptotic long run covariance matrix

$$\Omega_i = \begin{vmatrix} \Omega_{11i} & \Omega_{12i} \\ \Omega_{21i} & \Omega_{22i} \end{vmatrix}$$

and autocovariances (Γ_i), and $z_{it} = (y_{it}, x_{it})$ is $I(1)$ and y_{it} and x_{it} are cointegrated. The panel group mean FMOLS estimator for β gives:

$$\hat{\beta} = N^{-1} \sum_{i=1}^{N} \left(\sum_{t=1}^{T} x_{it} - \bar{x}_i)^2 \right)^{-1} \left(\sum_{t=1}^{T} x_{it} - \bar{x}_i) \right) y_{it}^{*} - T\tau_i \tag{A.14}$$

where $y_{it}^{*} = (y_{it} - \bar{y}_i)$-$\frac{\hat{L}_{21i}}{\hat{L}_{22i}} \Delta x_{it}$, $\hat{\tau}_i \equiv \hat{\Gamma}_{21i} + \hat{\Omega}_{21i}^{o}$-$\frac{\hat{L}_{21i}}{\hat{L}_{22i}} (\hat{\Gamma}_{22i} - \Omega_{22i}^{o})$ and $\hat{L}_i$ is the a lower triangular decomposition of $\hat{\Omega}_i$. The associated t-statistic gives: $t_{\hat{\beta}^{*}} = N^{-\frac{1}{2}} \sum_{i=1}^{N} t_{\hat{\beta}_i}^{*}$ where $t_{\hat{\beta}_i}^{*} = (\hat{\beta}_i^{*} - \beta_o) \left(\hat{\Omega}_{11i}^{-1} \sum_{t=1}^{T} (x_{it} - \bar{x}_i)^2 \right)^{\frac{1}{2}}$.

Table A.7: Panel FMOLS estimates (equation A.1)

Variable	I	II	III
$logL$	0.605***	0.616***	0.560***
	[8.206]	[8.051]	[8.164]
K	0.004***	0.004***	0.003***
	[9.305]	[7.971]	[7.496]
EG	-0.0005	-0.0003	-0.0016*
	[-0.665]	[-0.384]	[-1.883]
PS	-0.131**		
	[-2.556]		
PR		-0.213***	
		[-3.649]	
PC			-0.242***
			[-3.96]
$EG * PS$	0.0031**		
	[2.108]		
$EG * PR$		0.0072***	
		[4.447]	
$EG * PC$			0.0095***
			[5.356]

Note: Dependent variable $logY^*$. ***(**)[*] denote statistical significance at the 1% (5%)[10%] level.

Appendix B

Appendix of Chapter 3

B.1 Averages of Country-specific Indicators

Table B.1 presents the list of WAMZ countries and their respective averages (1980-2008) of government expenditure share in real GDP, real per capita GDP, trade openness ratio, foreign aid share in real GDP and democracy index. As evident, the averages of these indicators varies across countries. For instance, the richest economy in WAMZ (also evident by its real per capita GDP)[1], Nigeria has the smallest public sector as well as the share of aid in real GDP. On the other hand, the public sector is biggest in Ghana, followed by the Gambia. Liberia has the highest trade openness ratio and aid share in real GDP while democracy index is highest in the Gambia with the poorest economy Guinea having the lowest democracy index. Overall, the share of government expenditure in real GDP of WAMZ countries average between 3-17%.

B.2 Test for Cross-section Dependence

In estimating equation (3.1) and (3.2) particular attention regarding the presence of cross-section dependence, that results from unobserved common shocks, need to be taken into account as this provides some indication of model misspecification (see Phillips and Sul,

[1]Based on World Bank (2011) - Classification of economies January 2011, Nigeria was classified as a lower-middle income economy. The rest of WAMZ countries were classified as lower-income economies

Table B.1: Country-specific indicators (Averages, 1980-2008)

Countries	Government	Income	Openness	Aid	Democracy
The Gambia	0.16	447.705	0.43	0.10	0.54
Ghana	0.17	405.950	0.80	0.09	0.49
Guinea	0.09	281.538	0.71	0.08	0.29
Liberia	0.14	350.627	0.83	0.34	0.44
Nigeria	0.03	620.111	0.60	0.01	0.46
Sierra Leone	0.09	341.403	0.47	0.14	0.39
WAMZ	0.11	407.889	0.63	0.13	0.44

Note: Government = Government share in real GDP, Income = Real per capita GDP, Openness = Trade openness ratio, Aid = Aid share in real GDP, Democracy = Democracy index. *Source*: Polity IV Project (Marshall and Jaggers, 2009), World Bank (2010) -African Development Indicators 2010 and United Nations (2011).

Table B.2: Test for cross-section dependence

Equation	(1)	(2)
Test statistic	89.274***	60.766***

Note: *** denote statistical significance at the 1% level.

2003; De Hoyos and Sarafidis, 2006; Sarafidis and Robertson, 2006; Sarafidis and Wansbeek, 2010). This is important because as Driscoll and Kraay (1998) note, the standard errors associated with panel data models with cross-section dependence are inconsistent, although the estimated parameters may be consistent (Driscoll and Kraay, 1998). For this reason, we first determine if equation (3.1) and (3.2) are plagued by cross-section dependence. The Breusch-Pagan Lagrange multiplier test statistic proposed by Breusch and Pagan (1980) appropriate for $T > N$ panels is employed. The test statistic follow a chi-squared(q), where q is computed as $N * (N - 1)/2$, under the null hypothesis of cross-section independence. The test results reported in Table B.2 suggest that there is enough evidence to reject the null hypothesis of cross-section independence for both equations.

B.3 Panel Unit Root Tests

All panel unit root test results reported in Table B.3 include deterministic time trend and are robust in the presence of cross-section dependence. The null hypothesis of both Breitung and Pesaran tests is that the series have unit root against the alternative hypothesis that the series are stationary. Hadri test reverses the null and the alternative hypothesis where the null hypothesis assumes that all panels are stationary against the alternative hypothesis that some panels have unit roots. This allows us to further confirm the Breitung and Pesaran test that the series are indeed non-stationary.

Table B.3: Panel unit root test results

Variables	Levels			First Difference	
	Breitung	Pesaran	Hadri	Breitung	Pesaran
$logGOV$	2.001	-1.754	4.865***	-3.359***	-4.202***
$logY$	-0.373	-2.019	5.147***	-2.141**	-3.790***
$logOPEN$	1.598	-2.552	5.781***	-4.302***	-3.272***
$logAID$	-0.277	-2.069	2.169**	-3.251***	-4.185***
DEM	-1.023	-1.213	5.436***	-5.709***	-3.200***

Note: ***, ** indicate statistical significance at the 1%, 5% level

B.4 Panel Cointegration Tests

Pedroni's parametric panel t-statistic is appropriate as it corrects for bias introduced by potentially endogenous regressors. Specifically, we compute the parametric panel t-statistic as:

Panel t-statistic (parametric):

$$Z_t^* \equiv \left(\tilde{S}^{*2} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^{*2} \right)^{-\frac{1}{2}} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^{*} \Delta \hat{e}_{it}^{*} \tag{B.1}$$

where $(\hat{L}_{11i})$ is the long run variance, $(\hat{e}_{it})$ is the residuals from equation (3.1) or (3.2). The term $(\tilde{s}_i^{*2})$ is computed as $(\tilde{s}_i^{*2}) \equiv \frac{1}{N}\sum_{i=1}^{N}\hat{s}_i^{*2}$, where $\hat{s}_i^{*2}$ is the simple variance computed from the residual $(\hat{\varphi}_{it}^{*})$ of the expression $\hat{e}_{it} = \hat{\rho}_i\hat{e}_{i,t-1} + \sum_{k=1}^{K_i}\Delta\hat{e}_{i,t-1} + \hat{\varphi}_{it}^{*}$, with K denoting the truncation lag permitted to vary by individual countries

Larsson et al. (2001) uses the maximum likelihood procedure to implement a standardised LR-bar statistic to test the existence of common panel cointegrating rank for panels. Specifically, the test compute:

$$\Upsilon_{\overline{LR}} = \frac{\sqrt{N}\Big(\overline{LR} - E(Z_k)\Big)}{\sqrt{Var(Z_k)}} \tag{B.2}$$

where $\Upsilon_{\overline{LR}}$ is the standardised LR-bar, $\overline{LR}$ is the average of the individual cointegrating rank trace test statistics for each country of the panel, $E(Z_k)$ and $Var(Z_k)$ are the mean and variance of the asymptotic trace statistic respectively. The asymptotic values of $E(Z_k)$ and $Var(Z_k)$ are based on Hlouskova and Wagner (2009a, 2009b). The null hypothesis is that all N countries in the panel have a common cointegrating rank, against the alternative that all N countries in the panel have a higher rank. The right tail of the standard normal distribution is used to reject the null hypothesis of no cointegration. However, because Johansen trace statistics often rejects the null hypothesis in small samples, we also report results based on adjusted country-specific trace statistics using small-sample correction factor suggested in Reinsel and Ahn (1992) and applied by Herzer (2010). The panel cointegration tests result is summarised in Table B.4.

Table B.4: Panel cointegration test results

Equation	(1)	(2)
Pedroni and Larsson et al. test statistics		
Panel t	1.059	2.535**
Stand. LR-bar (A)	0.388	10.245***
Stand. LR-bar (B)	-0.352	5.941***

Note: *** and ** denote rejection of the null hypothesis of no cointegration at 1% and 5% level. Standardised LR-bar (B) are based on small-sample adjusted trace statistics. The optimal lags are based on Schwarz information criterion

Appendix C

Appendix of Chapter 5

C.1 List of Countries Considered in the Analysis

Table C.1: List of Countries Considered in the Analysis

Albania	Dominica Republic	Maldives	Solomon Islands
Algeria	Ecuador	Marshall Islands	South Africa*
Angola*	Egypt	Mauritania*	Sri Lanka
Antigua & Bar.	El Salvador	Mauritius*	St. Kitts & Nevis
Argentina	Fiji	Mexico	St. Lucia
Belize	Gabon*	Microsenia, FS.	St. Vinc. & Gre.
Bhutan	Ghana*	Mongolia	Sudan*
Bolivia	Grenada	Morocco	Suriname
Botswana*	Guatemala	Namibia*	Swaziland*
Brazil	Guyana	Nicaragua	Syria
Bulgaria	Honduras	Nigeria*	Thailand
Cameroon*	India	Pakistan	Tongo
Cape Verde*	Indonesia	Panama	Tunesia
Chile	Iran	Papua New Gui.	Turkey
China	Iraq	Paraguay	Uruguay
Colombia	Jamaica	Peru	Vanuatu
Congo, Rep.*	Jordan	Philippines	Venezuela
Costa Rica	Kiribati	Romania	Vietnam
Cote d'Ivoire*	Laos	Samoa	Zambia*
Cuba	Lebanon	Sao Tome & Pri.*	
Djibouti	Lesotho*	Senegal*	
Dominica	Malaysia	Seychelles*	

Note: Sub-Saharan African countries are marked with *

C.2 Testing for Cross-section Dependence

Before we proceed to test for panel unit root in $logY_{it}$ and $logOPEN_{it}$, we first determine whether these series are plagued by cross-section dependence. This will allows us to employ an appropriate panel unit root test, as traditional tests are not valid in the presence of this type of dependence. The CD test we use is the one proposed by Pesaran (2004), which is robust in the presence of structural breaks and appropriate for $T < N$ heterogeneous panels. The CD test, which tends to $N(0,1)$ under the null hypothesis of no cross-section dependence as N tends to infinity, is based on the average of the pair-wise correlations of the OLS residuals from the individual regressions in the panel (i.e. $CD{=}\sqrt{2T/N(N-1)}\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{\rho}_{ij}$) (see Pesaran, 2004). The CD test statistics (Table C.2) show strong evidence of cross-section dependence regardless of the pth-order Augmented Dickey-Fuller $ADF(p)$ used.

Table C.2: CD test statistics

Variable	$ADF(1)$	$ADF(2)$	$ADF(3)$	$ADF(4)$
		Intercept only		
$logY_{it}$	22.62***	21.69***	20.32***	18.48***
$logOPEN_{it}$	18.93***	18.12***	16.83***	16.85***
		Intercept and a linear trend		
$logY_{it}$	19.47***	17.60***	15.65***	14.11***
$logOPEN_{it}$	18.27***	17.90***	17.09***	17.24***

Note: Symbol *** denote rejection of the null hypothesis at the 1% level. pth-order Augmented Dickey-Fuller ($ADF(p)$) test statistics are computed for each cross-section unit separately with an intercept only, and with an intercept and a linear trend.

Following the procedure proposed by De Hoyos and Sarafidis (2006), we also test for the null hypothesis of no cross-section dependence in the error term e_{it} in Eq. (5.1). The computed CD test statistic (i.e. 83.823) on the residuals in Eq. (5.1), clearly show the presence of considerable cross-section dependence as the null hypothesis of no cross-section dependence is strongly rejected (i.e. at the 1% level).

Table C.3: IPS panel unit root test results

Variable	$ADF(1)$	$ADF(2)$	$ADF(3)$	$ADF(4)$
Intercept only				
$logY_{it}$	-1.387	-1.347	-1.363	-1.339
$logOPEN_{it}$	-1.428	-1.350	-1.297	-1.266
$\Delta logY_{it}$	-4.210***	-3.390***	-3.107***	-2.674***
$\Delta logOPEN_{it}$	-4.597***	-3.623***	-3.149***	-2.830***
Intercept and a linear trend				
$logY_{it}$	-2.241	-2.122	-2.120	-1.963
$logOPEN_{it}$	-2.266	-2.238	-2.178	-2.147

Note: The critical values at the 1%(5%)[10%] level for IPS test statistics are -1.73(-1.67)[-1.64] with an intercept case, and -2.36(-2.31)[-2.28] with an intercept and a linear trend case. Symbol *** indicate rejection of the null hypothesis of non-stationary variable at the 1% significance level

C.3 Testing for Panel Unit Roots

The presence of cross-section dependence implies that we are unable to rely on panel unit root tests that do not control for this effect. For this reason, we make use of two panel unit root tests adapted to the case of cross-section dependence: namely, the Im, Pesaran and Shin (IPS) test and the cross-sectionally augmented IPS (CIPS) test, proposed by Im, Pesaran and Shin (2003) and Pesaran (2007) respectively. The IPS test does not control for cross-section dependence, but we implement this test based on demeaned data as suggested by Levin et al. (2002). Both test incorporates cross-sectional heterogeneity. The panel unit root test statistics, reported in Tables C.3 and C.4, allow us to treat both $logY_{it}$ and $logOPEN_{it}$ as $I(1)$ variables.

C.4 Testing for Panel Cointegration

Once it has been proved that all the variables are $I(1)$, the next step is to determine whether the series are cointegrated to avoid spurious regressions problems. In order to do this we applied several tests (Table C.5), all of them suggesting that the series are indeed

Table C.4: CIPS panel unit root test results

Variable	$ADF(1)$	$ADF(2)$	$ADF(3)$	$ADF(4)$
		Intercept only		
$logY_{it}$	-2.004	-1.881	-1.897	-1.787
$logOPEN_{it}$	-2.053*	-1.931	-2.031*	-1.827
$\Delta logY_{it}$	-4.114***	-3.302***	-2.916***	-2.427***
$\Delta logOPEN_{it}$	-4.331***	-3.279***	-2.960***	-2.572***
		Intercept and a linear trend		
$logY_{it}$	-2.473	-2.350	-2.322	-2.216
$logOPEN_{it}$	-2.318	-2.204	-2.355	-2.091

Note: The critical values at the 1%(5%)[10%] level for CIPS test statistics are -2.17(-2.08)[-2.02] with an intercept case, and -2.65(-2.56)[-2.51] with an intercept and a linear trend case. Symbol ***(**)[*] indicate rejection of the null hypothesis of non-stationary variable at the 1%(5%)[10%] significance level

cointegrated.

Table C.5: CIPS and IPS based panel cointegration test results

		CIPS test statistics	
$CADF(1)$	$CADF(2)$	$CADF(3)$	$CADF(4)$
-2.238***	-2.126**	-2.050*	-2.029*
		IPS test statistics	
$ADF(1)$	$ADF(2)$	$ADF(3)$	$ADF(4)$
-2.597***	-2.455***	-2.289***	-2.194

Note: CIPS and IPS test statistics are based on the residuals of MG and CCEMG respectively. The critical values at the 1%(5%)[10%] level for the IPS and CIPS test statistics are -1.73(-1.67)[-1.64] and -2.17(-2.08)[-2.02] respectively. Symbol ***(**)[*] indicate rejection of the null hypothesis of no cointegration at the 1%(5%)[10%] significance level

Table C.6: Pedroni's cointegration test results

	Raw data		
	Rho	*PP*	*ADF*
(i)	3.685***	1.771*	12.311***
(ii)	4.234***	1.969*	17.786***
	Demeaned data		
(i)	2.244***	-1.037	8.764***
(ii)	2.683***	-0.246	11.334***

Note: *Rho*, *PP* and *ADF* are the group mean test statistics of Pedroni (1999, 2004), which tends to $N(0, 1)$ under the null hypothesis of no cointegration. The test statistic labelled (i) include fixed effects only (ii) includes both fixed effects and heterogeneous trends. Symbol ***(**)[*] indicate rejection of the null hypothesis of no cointegration at the 1%(5%)[10%] significance level

Bibliography

Abizadeh, S. and J. Gray (1985),“Wagner’s Law: A Pooled Time-Series, Cross-Section Comparison”, *National Tax Journal*, 38: 209-218

Abual-Foul, B. (2004), “Testing the Export-led Growth Hypothesis: Evidence from Jordan”, *Applied Economics Letters*, 11: 393-396

Acemoglu, D., and Johnson, S., and J. Robinson (2005), “The Rise of Europe: Atlantic Trade, Institutional Change, and Economic Growth”, *American Economic Review*, 95: 546-579

Acemogku, D., Johnson, S., Robinson, J., and P. Yared (2008), “Income and Democracy”, *American Economic Review*, 98: 808-842

Acemoglu, D. (2009), *Introduction to Modern Economic Growth*, Princeton University Press

Acemoglu, D. (2009), “When Does Labor Scarcity Encourage Innovation?”, *Working Paper* No. 14809, National Bureau of Economic Research

Adam, A. M., Agyapong, D. and E. N. Gyamfi (2010), "Dynamic Macroeconomic Convergence in West African Monetary Zone (WAMZ)", *International Business and Management*, 1: 31-40

Adsera, A. and C. Boix (2002), "Trade, Democracy, and the Size of the Public Sector: The Political Underpinnings of Openness". *International Organization*, 56, 229-262

Agell, J., Lindh, T., and H. Ohlsson (1997), "Growth and the Public Sector: A Critical Review Essay", *European Journal of Political Economy*, 13: 33-52

Aghion, P., Alesina, A., and F. Trebbbi (2007), "Democracy, Technology, and Growth", *Working Paper* No. 13180. National Bureau of Economic Research

Aghion, P., and P. Howitt (2009), *The Economics of Growth*, Massachusetts Institute of Technology (MIT)

Aisen, A., and F. Veiga (2011), "How Does Political Instability Affect Economic Growth?", *Working Paper* No. 11/12. International Monetary Fund

Alam, M. I., and R. M. Quazi (2003), "Determinants of Capital Flight: An Econometric Case Study of Bangladesh", *International Review of Applied Economics*, 17: 85-103

Alesina, A., and D. Rodrik (1994), "Distributive Politics and Economic Growth", *The Quarterly Journal of Economics*, 109: 465-490

Alesina A., and D. Dollar (2000), "Who gives Foreign Aid to Whom and Why?", *Journal of Economic Growth*, 5: 33-63

Alesina, A., and R. Wacziarg (1998), "Openness, Country Size, and Government", *Journal of Political Economics*, 69: 305-321

Alesina, A., Spolaore, E., and R, Wacziarg (2005), "Trade, Growth and the Size of Countries". *In Aghion, P., and S. N. Durlauf (Eds.), Handbook of Economic Growth*, Volume 1B. pp 1499-1542

Alfaro, L., Kalemli-Ozcan, S., and V. Volosovych (2005), "Capital Flows in a Globalized World: The Role of Policies and Institutions", *NBER Working Paper*, No. 11696, Cambridge

Al-Faris, A. F. (2002), "Public Expenditure and Economic Growth in the Gulf Cooperation Council Countries", *Applied Economics*, 34: 1187-1193

Almeida, R., and A. M. Fernandes (2008), "Openness and Technological Innovations in Developing Countries: Evidence from Firm-Level Surveys", *Journal of Development Studies*, 44: 701-727

Akitoby, B., Clements, B., Gupta, S. and G. Inschauste (2006), "Public Spending, Voracity and Wagner's Law in Developing Countries", *European Journal of Political Economy*, 22: 908-924

Ansari, M. I., Gordon, D. V., and C. Akuamoah (1997), "Keynes versus Wagner: Public Expenditure and National Income for three African countries", *Applied Economics*, 29: 543-550

Aryeetey, E., and J. Harrigan (2000), "Macroeconomic and Sectoral Development since 1970", *In Aryeetey, E., Harrigan, J., and M. Nissanke (eds.), Economic Reforms in Ghana, The Miracle and the Mirage*, Oxford: James Currey and Woeli Publishers

Aryeetey, E. (2005), "Globalisation, Employment and Poverty in Ghana", *WIDER Thinking Ahead: The Future of Development Economics*, Marina Congress Center, Helsinki, 17-18, June 2005

Aryeetey, E., and A. K. Fosu (2005), "Economic Growth in Ghana: 1960-2000". *AERC Growth Project Workshop*, Cambridge, March 2005

Ashitey, E. Z (2007), "Ghana Trade Policy Monitoring", *Global Agricultural Information Report* No. GH7001. < *http* : *//www.fas.usda.gov/gainfiles*/200703/146280481.*pdf* >

Asteriou, D., and S. G. Hall (2007), *Applied Econometrics: A Modern Approach using EViews and Microfit*, New York: Palgrave Macmillan, Revised Edition

Atrayee, G. R. (2009), "Evidence on Economic Growth and Government Size", *Applied Economics*, 41: 607-614

Avelino, G., Brown, D. S., and W. Hunter (2005), "The Effects of Capital Mobility, Trade Openness, and Democracy on Social Spending in Latin America, 1980-1999", *American Journal of Political Science*, 49: 625-641

Babatunde, M. A. (2008), “Establishing Wagner’s Law in the West Africa Monetary Zone (WAMZ): Investigating Using the Bounds Test”, *Indian Economic Journal*, 56: 109-123

Balassa, B. (1978), “Exports and Economic Growth: Further Evidence”, *Journal of Development Economics*, 5: 181-189

Balassa, B. (1985), “Exports, Policy Choices, and Economic Growth in Developing Countries after the 1973 Oil Shock”, *Journal of Development Economics*, 18: 23-35

Baltagi, B. H. (2008), *Econometric Analysis of Panel Data*, 4th Edition, John Willey & Sons Press

Banerjee, A., Dolado, J. J., and R. Mestre (1998), “Error Correction Mechanism Tests for Cointegration in a Single-Equation Framework”, *Journal of Time Series Analysis*, 19: 267-283

Barro, R. J. (1990), “Government Spending in a Simple Model of Endogenous Growth”, *Journal of Political Economy*, 98: S103-S125

Barro, R. J. (1991), “Economic Growth in a Cross Section of Countries”, *The Quarterly Journal of Economics*, 106: 407-443

Barro, R. J. (1996), “Democracy and Growth”, *Journal of Economic Growth*, 1: 1-27

Barro, R. J. and X. Sala-i-Martin (2004), *Economic Growth*, Cambridge (Massachusetts): MIT Press, Second Edition

Baulch, B. (2006), "Aid Distribution and the MDGs", *World Development*, 34: 933-950

Baum, M., and D. Lake (2003), "The Political Economy of Growth: Democracy and Human Capital". *American Journal of Political Science*, 47: 333-347

Beetsma, R. and A. L. Bovenberg (1998), "Monetary Union without Fiscal Coordination may Discipline Policymakers", *Journal of International Economics*, 45: 239-258

Beetsma, R. And A. L. Bovenberg (1999), "Does Monetary Unification Lead to Excessive Debt Accumulation?", *Journal of Public Economics*, 74: 299-325

Beetsma, R. and A. L. Bovenberg (2001), "The Optimality of a Monetary Union without a Fiscal Union", *Journal of Money, Credit and Banking*, 33: 179-204

Beetsma, R. And A. L. Bovenberg (2002), "Strategic Debt Accumulation in a Heterogeneous Monetary Union", *European Journal of Political Economy*, 19: 1-15

Benarroch, M., and M. Pandey (2008), "Trade Openness and Government Size", *Economic Letters*, 101: 157-159

Ben-David, D., and M. Loewy (1998), "Free Trade, Growth, and Convergence", *Journal of Economic Growth*, 3: 143-170

Ben-David, D., and M. Loewy (2000), "Knowledge Dissemination, Capital Accumulation, Trade, and Endogeneous Growth", *Oxford Economic Papers*, 52: 637-650

Ben-David, D., and M. Loewy (2003), “Trade and the Neoclassical Growth Model”, *Journal of Economic Integration*, 18: 1-16

Blais, A., Kim, J., and M. Foucault (2010), “Public Spending, Public Deficits and Government Coalitions”, *Political Studies*, 58: 829-846

Boko, S. H. (2002), “Economic Reform, Democracy, and Economic Growth in Africa: An Institutional Approach”, *International Advances in Economic Research*, 8: 264, DOI: 10.1007/BF02297972

Boone, P. (1996), “Politics and the Effectiveness of Foreign Aid”, *European Economic Review*, 40: 289-329

Bourguignon, F., and D. Leipziger (2006), “Aid, Growth and Poverty Reduction: Towards a New Partnership Model”, World Bank, $< http : //siteresources.worldbank.org/DEC/Resources/84797 - 1104785060319/FB_DL - Aid - 18Apr.pdf >$

Bairoch, P. (2000), “The Constituent Economic Principles of Globalisation in Historical Perspective: Myths and Realities”, translated by Michelle Kendall and Stuart Kendall, *International Sociology*, 15: 197-214

Breitung, J. (2000), “The Local Power of Some Unit Root Tests for Panel Data”, *In Baltagi, B. H. (ed.), Advances in Econometrics, Nonstationary Panels, Panel Cointegration, and Dynamic Panels*, 15: 161-178. Amsterdam: JAI Press

Breitung, J., and S. Das (2005), “Panel Unit Root Tests under Cross-sectional Dependence”. *Statistica Neerlandica*, 59: 414-433

Breusch, T. S., And A. R. Pagan (1980), "The Lagrange Multiplier Test and its Applications to Model Specification in Econometrics", *The Review of Economic Studies*, 47: 239-253

Brown, S. (2005), "Foreign Aid and Democracy Promotion: Lessons from Africa", *The European Journal of Development Research*, 17: 179-198

Brunner, A. D. (2003), "The Long-Run Effects of Trade on Income and Income Growth", *IMF Working Paper* No. WP/03/37, IMF Institute

Burkhart, R. E., and M. S. Lewis-Beck (1994), "Comparative Democracy: The Economic Development Thesis", *American Political Science Review*", 88: 903-910

Burnside, C. and D. Dollar (2000), "Aid, Policies and Growth", *American Economic Review*, 90: 847-868

Cameron, D. R. (1978), "The Expansion of the Public Economy: A Comparative Analysis", *American Political Science Review*, 72: 1243-1261

Cavalcanti, T. V. de. V., Mohaddes, K., and M. Raissi (2011), "Growth, Development and Natural Resources: New Evidence Using a Heterogeneous Panel Analysis", *The Quarterly Review of Economics and Finance*, 51: 305-318

Chang, C., and C. Lee (2010), "Globalisation and Economic Growth: A Political Economy Analysis for OECD Countries", *Global Economic Review*, 39: 151-173

Chang, R., Kaltani, L., and N. V. Loayza (2009), "Openness can be Good for Growth: The role of Policy Complementarities", *Journal of Development Economics*, 90: 33-49

Chari, V. V., And P. Kehoe (1998), "On the Need for Fiscal Constraints in a Monetary Union", *Working Paper* No. 589, Minneapolis MN: Federal Reserve Bank of Minneapolis.

Chenery, H. B., and A. M. Strout (1966), "Foreign Assistance and Economic Development", *The American Economic Review*, 56: 679-733

Clemens, M. A., Kenny, C. J., and T. J. Moss (2004), "The Trouble with the MDGs: Confronting Expectations of Aid and Development Success", *Working Paper* No. 40, Center for Global Development, Washington DC

Collier, P. (1991), "Africa's External Economic Relations, 1960-90", *African Affairs*, 90: 339-56

Collier, P., and J. Dehn (2001), "Aid, Shocks and Growth". *Policy Research Working Paper* No. 2688, World Bank, Washington, DC

Collier, P., and D. Dollar (2002), "Aid Allocation and Poverty Reduction", *European Economic Review*, 45:1-26

Collier, P., and A. Hoeffler (2004), "Aid, Policy and Growth in Post-Conflict Societies", *European Economic Review*, 48: 1125-1145

Costantini, M., and S. Destefanis (2009), "Cointegration Analysis for Cross-sectionally Dependent Panels: The Case of Regional Production Functions", *Economic Modelling*, 26: 320-327

Dalgaard, C. J., Hansen, H., and F. Tarp (2004), "On the Empirics of Foreign Aid and Growth", *Economic Journal*, 114: 191-216

Debrun, X. (2000), "Fiscal Rules in a Monetary Union: A Short-Run Analysis", *Open Economies Review*, 11: 323-358

Debrun, X., Masson, P. and C. Pattillo (2005), "Monetary Union in West Africa: Who Might Gain, Who Might Lose, and Why?", *Canadian Journal of Economics*, 38: 454-481

De Grauwe, P. (1996), "Discussion", *In Siebert, H. (ed.), Monetary Policy in an Integrated World Economy: Symposium 1995*, Tubingen: J.C.B. Mohr

De Grauwe, P. (2011), "European Monetary Union", *In Durlauf, S. N., and L. E. Blume (Eds.), The New Palgrave Dictionary of Economics*, Online Edition, Palgrave Macmillan

De Hoyos, R. E. and Y. Sarafidis (2006), "Testing for cross-sectional dependence in panel-data models", *The Stata Journal*, 6: 482-496

DeJong, D. N., Nankervis, J. C., Savin, N. E. and C. H. Whiteman (1992), "The Power Problem of Unit Root Tests in Time Series with Autoregressive Errors", *Journal of Econometrics*, 53: 323-343

Dollar, D., and A. Kraay (2001), “Trade, Growth, and Poverty”, *The World Bank Policy Research Working Paper* No. 2615. Washington DC

Dollar, D., and A. Kraay (2003), “Institutions, Trade, and Growth”, *Journal of Monetary Economics*, 50: 133-162

Dollar, D., and A. Kraay (2004), “Trade, Growth, and Poverty”, The Economic Journal, 114: F22-F49

Doucouliagos, H., and M. Ulubasoglu (2008), “Democracy and Economic Growth: A Meta-Analysis”, *American Journal of Political Science*, 52: 61-83

Dowrick, S., and J. Golley (2004), “Trade Openness and Growth: Who Benefits?”, *Oxford Review of Economic Policy*, 20: 38-56

Dreher, A. (2006), “Does Globalisation affect Growth? Evidence from a New Index of Globalisation”, *Applied Economics*, 38: 1091-1110

Driscoll, J. C. and A. C. Kraay (1998), “Consistent Covariance Matrix Estimation with Spatially Dependent Panel Data”, *The Review of Economics and Statistics*, 80: 549-560

Easterly, W. (2003), “Can Foreign Aid buy Growth?”, *Journal of Economic Perspectives*, 17: 23-48

Easterly, W., Levine, R., and D. Roodman (2004), “Aid, Policies, and Growth: Comment”, *American Economic Review*, 94: 774-780

Edwards, S. (1993), "Openness, Trade Liberalization, and Growth in Developing Countries", *Journal of Economic Literature*, 31: 1358-1393

Edwards, S. (1998), "Openness, Productivity and Growth: What do We Really Know?", *Economic Journal*, 108: 383-398

Edwards, S. (2001), "Capital Mobility and Economic Growth Performance: Are Emerging Economies Different?", *NBER Working Paper* No. 8076. Cambridge

Eichengreen, B. and D. Leblang (2008), "Democracy and Globalisation", *Economics and Politics*, 20: 289-334

Elliott, G., Rothenberg, T. J. and J.H. Stock (1996), "Efficient Tests for an Autoregressive Unit Root", *Econometrica*, 64: 813-836

Engle, R. and C. W. J. Granger (1987), "Cointegration and Error Correction: Representation, Estimation and Testing", *Econometrica*, 55: 251-276

Feder, G. (1982), "On Exports and Economic Growth", *Journal of Development Economics*, 12: 59-73

Freedom House (2006), *Freedom in the World Country Ratings*, 1972-2006, Heritage Foundation

Feyzioglu, T., Swaroop, V. and M. Zhu (1998), "A Panel Data Analysis of the Fungibility of Foreign Aid", *The World Bank Economic Review*, 12: 29-58

Fosu, A. K (2008), “Democracy and Growth in Africa: Implications of Increasing Electoral Competitiveness”, *Economics Letters*, 100: 442-444

Frankel, J. A., and D. Romer (1999), “Does Trade Cause Growth?”, *The American Economic Review*, 89: 379-399

Frees, E. W. (1995), “Assessing Cross-sectional Correlation in Panel Data”, *Journal of Econometrics*, 69: 393-414

Freund, C., and B. Bolaky (2008), “Trade, Regulations, and Income”, *Journal of Development Economics*, 87: 309-321

Friedman, M. (1937), “The Use of Ranks to Avoid the Assumption of Normality Implicit in the Analysis of Variance”, *Journal of the American Statistical Association*, 32: 675-701

Frimpong. J. M. and E. F. Oteng-Abayie (2009), “Does the Wagner’s Hypothesis Matter in Developing Economies? Evidence from Three West African Monetary Zone (WAMZ) Countries”, *American Journal of Economics and Business Administration*, 1: 141-147

Garrett, G. (2001), “Globalisation and Government Spending around the World”, *Studies in Comparative International Development*, 35: 3-29

Ghana Trade Policy (2004), Ministry of Trade and Industry, Government of Ghana, Accra, Ghana

Ghartey, E. E. (2007), "An Empirical Study of Economic Growth and Expanding Role of Government in Ghana: 1965-2004", *The Journal of Economic Asymmetries*, 4: 133-148

Giavazzi, F. and G. Tabellini (2005), "Economic and Political Liberalisations", *Journal of Monetary Economics*, 52: 1297-1330

Glaeser, E. L., La Porta, R., Lopez-de-Silanes, F., and A. Shleifer (2004), "Do Institutions Cause Growth?", *Journal of Economic Growth*, 9: 271-303

Glasure, Y. U., Lee, A., and J. Norris (1999), "Level of Economic Development and Political Democracy Revisited", *International Advances in Economic Research*, 5: 466-477

Gomanee, K., Girma, S. and O. Morrissey (2005), "Aid and Growth in Sub-Saharan Africa: Accounting for Transmission Mechanisms", *Journal of International Development*, 17: 1055-1075

Gordon, D. F. (1996), "Sustaining Economic Reforms Under Political Liberalisation in Africa: Issues and Implications", *World Development*, 24: 1527-1537

Granger, C. W. J. (1981), "Some Properties of Time Series Data and Their use in Econometric Model Specification", *Journal of Econometrics*, 16: 121-130

Granger, C. W. J. and P. Newbold (1974), "Spurious Regressions in Econometrics", *Journal of Econometrics*, 2: 111-120

Greenaway, D., Morgan, W. and P. Wright (2002), “Trade Liberalisation and Growth in Developing Countries”, *Journal of Development Economics*, 67: 229-244

Gregory, A. W., and B. E Hansen (1996), “Tests for Cointegration in Models with Regime and Trend Shifts”, *Oxford Bulletin of Economics and Statistics*, 58: 555-560

Grier, K., and M. C. Munger (2006), “On Democracy, Regime Duration, and Economic Growth”, $< http://faculty-staff.ou.edu/G/Kevin.B.Grier-1/demdurgro.pdf >$

Gries, T., Kraft, M., and D. Meierrieks (2009), “Linkages between Financial Deepening, Trade Openness, and Economic Development: Causality Evidence from Sub-Saharan Africa”, *World Development*, 37: 1849-1860

Grossman, G. M., and E. Helpman (1990), “Comparative Advantage and Long-run Growth”, *American Economic Review*, 80: 796-815

Grossman, G. M., and E. Helpman (1991), *Innovations and Growth in the Global Economy*, Cambridge: MIT Press

Guillaume, D., and D. Stasavage (2000), “Improving Policy Credibility: Is there a Case for African Monetary Union?”, *World Development*, 28: 1391-1407

Guillaumont, P., and L. Chauvet. (2001), “Aid and Performance: A Reassessment”, *Journal of Development Studies*, 37: 66-92

Gupta, K. L., and M. A. Islam (1983), *Foreign Capital, Savings and Growth: An International Cross-section Study*. Dordrecht, Reidel Publishing Company

Guseh, J. S., and E. Oritsejafor (2007), "Government Size, Political Freedom, and Economic Growth in Nigeria, 1960-2000", *Journal of Third World Studies*, 24: 139-165

Gwartney, J., Holcombe, R., and R. Lawson (1998), "The Scope of Government and the Wealth of Nations", *Cato Journal*, 18: 163-190

Hadri, K. (2000), "Testing for Stationarity in Heterogeneous Panel Data", *Econometrics Journal*, 3: 148-161

Hansen, H., and F. Tarp (2001), "Aid and Growth Regressions", *Journal of Development Economics*, 64: 547-70

Harrison, A. (1996), "Openness and Growth: A Time-series, Cross-country Analysis for Developing Countries", *Journal of Development Economics*, 48: 419-447

Hassett, K. (2007), "Does Economic Success Require Democracy", *The American: Journal of the American Enterprise Institute*, May/June 2007 Issue

Hausken, K., Martin, C. W., and T. Plumper (2004), "Government Spending and Taxation in Democracies and Autocracies", *Constitutional Political Economy*, 15, 239-259

Heckelman, J. (2010), "The Connection between Democratic Freedoms and Growth in Transition Economies", *Applied Economics Quarterly*, 56: 121-146

Heller, P. S. (1975), "A Model of Public Fiscal Behaviour in Developing Countries: Aid, Investment, and Taxation", *The American Economic Review*, 65: 429-445

Helliwell, J. F. (1994), "Empirical Linkages between Democracy and Economic Growth", *British Journal of Political Science*, 24: 225-248

Heo, U., and A. C. Tan (2001), "Democracy and Economic Growth: A Causal Analysis", *Comparative Politics*, 33: 463-473

Hendry, D. F., Pagan, A. R. and Sargan, J. D. (1984), "Dynamic Specification", *In Griliches, Z., and M. D. Intriligator (eds.), Handbook of Econometrics*, Elsevier, Amsterdam, Vol. II: 1023-1100

Henrekson, M. (1993), "Wagner's Law - A Spurious Relationship?", *Public Finance*, 48: 406-415

Henry, P. (2000), "Stock Market Liberalisation, Economic Reform, and Emerging Market Equity Prices", *Journal of Finance*, 55: 529-564

Hernandez-Murillo, R., and C. Martinek (2008), "Which Came First - Democracy or Growth?", *The Regional Economist*, pp 4-6, April 2008

Herzer, D. (2010), "The Long-Run Relationship between Outward FDI and Total Factor Productivity: Evidence for Developing Countries", *Discussion Paper* No. 199, Ibero-America Institute for Economic Research (IAI), George-August University, Gottingen

Heston, A., Summers, R., and B. Aten (2011), *Penn World Table Version 7.0*, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, May 2011

Hlouskova, J. And M. Wagner (2009a), "Finite Sample Correction Factor for Panel Cointegration Tests", *Economics Series* No. 244, Institute for Advanced Studies, Vienna

Hlouskova, J. And M. Wagner (2009b), "Finite Sample Correction Factor for Panel Cointegration Tests'", *Oxford Bulletin of Economics and Statistics*, 71: 851-881

Holden, K. and J. Thompson (1992), "Co-Integration: An Introductory Survey", British Review of Economic Issues, 14: 1-55

Holly, S., Pesaran, M. H., and T. Yamagata (2010), "A Spatio-temporal Model of House Prices in the USA", *Journal of Econometrics*, 158: 160-173

Hudson, J. (2004), "Aid and Development", *The Economic Journal*, 114: 185-190

Hudson, J., and P. Mosley (2008), "The Macroeconomic Impact of Aid Volatility", *Economics Letters*, 99: 486-489

Ibrahim, I. and C. R. MacPhee (2003), "Export Externalities and Economic Growth", *The Journal of International Trade and Economic Development*, 12: 257-283

Im, K., Pesaran, M. H., and Y. Shin (2003), "Testing for Unit Roots in Heterogeneous Panels", *Journal of Econometrics*, 115: 53-74

Irwin, D. A., and M. Tervio (2002), "Does Trade Raise Income: Evidence from the Twentieth Century", *Journal of International Economics*, 58: 1-18

Islam, N. (1995), "Growth Empirics: A Panel Data Approach", *The Quarterly Journal of Economics*, 110: 1127-1170

Iyare, S. O. and T. Lorde (2004), "Co-integration, Causality and Wagner's Law: Tests for Selected Caribbean Countries", *Applied Economics Letters*, 11: 815-825

Iyare, S. O., T. Lorde and B. Francis (2005), "Does Sustainability of Currency Union Critically Depend on Fiscal Discipline Among its Members? Evidence of Wagner's Law in West Africa", *West African Journal of Monetary and Economic Integration*, 5: 81-116

Johansen, S. and K. Juselius (1990), "Maximum Likelihood Estimation and Inference on Cointegration-With Application to the Demand for Money", *Oxford Bulletin of Economics and Statistics*, 52: 169-210

Kali, R., Mendez, F., and J. Reyes (2007), "Trade Structure and Economic Growth", *The Journal of International Trade and Economic Development*, 16: 245-269

Kao, C. (1999), "Spurious Regression and Residual-based Tests for Cointegration in Panel Data", *Journal of Econometrics*, 90: 1-44

Kao, C., and M. H. Chiang (2000), "On the Estimation and Inference of a Cointegrated Regression in Panel Data", *In Baltagi, B. (ed.) Nonstationary Panels, Panel Cointegration and Dynamic Panels, Advances in Econometrics*, 15: 161-178

Kapetanios, G., Pesaran, M. H., and T. Yamagata (2011), "Panels with Nonstationary Multifactor Error Structures", *Journal of Econometrics*, 160: 326-348

Kaplan, M. and A. Aslan (2006), "Quantifying International Openness in Turkey (19965-1995)", *Dogus Universitesi*, 7: 86-98

Karras, G. (2006), "Foreign Aid and Long-Run Economic Growth: Empirical Evidence for a Panel of Developing Countries", *Journal of International Development*, 18: 15-28

Kim, D., and S. Lin (2009), "Trade and Growth at Different Stages of Economic Growth", *Journal of Development Studies*, 45: 1211-1224

Kim, D. (2011), "Trade, Growth and Income", *The Journal of International Trade and Economic Development*, 20: 677-709

Knack, S. (2004), "Does Foreign Aid Promote Democracy", *International Studies Quarterly*, 48: 251-266

KOF Index of Globalisation (2010), Swiss Federal Institute of Technology, Zurich. < *http://globalization.kof.ethz.ch/* >

Krieckhaus, J. (2006), "Democracy and Economic Growth: How Regional Context Influences Regime Effects", *British Journal of Political Science*, 36: 317-340

Kurzman, C., Werum, R., and R. E. Burkhart (2002), "Democracy's Effect on Economic Growth: A Pooled Time-Series Analysis, 1951-1980", *Studies in Comparative International Development*, 37: 3-33

Kwiatkowski, D., Phillips, P. C. B., Schmidt, P., and Y. Shin (1992), "Testing the Null Hypothesis of Stationarity Against the Alternative of a Unit Root: How sure are we that Economic Time Series have a Unit Root?", *Journal of Econometrics*, 73: 159-178

Lee, K., Pesaran, M. H., and R. Smith (1997), "Growth and Convergence in a Multi-Country Empirical Stochastic Solow Model", *Journal of Applied Econometrics*, 12: 357-392

Lee, H. Y., Ricci, L. A. and R. Rigobon (2004), "Once Again, is Openness good for Growth", *Journal of Development Economics*, 75: 451-472

Lee, J. and M. C. Strazicich (2001), "Testing the Null of Stationarity in the Presence of Structural Break", *Applied Economics Letters*, 8: 377-382

Lee, J. and M. C. Strazicich (2003), "Minimum Lagrange Multiplier Unit Root Test with Two Structural Breaks", *The Review of Economics and Statistics*, 85: 1082-1089

Lensink, R., and H. White (2001), "Are there Negative Returns to Aid?", *Journal of Development Studies*, 37: 42-65

Levin, A., and C.F. Lin (1992), "Unit Root Test in Panel Data: Asymptotic and Finite-Sample Properties", *Working Paper* No. 92-23, UC San Diego

Levin, A., Lin, C. and C. J. Chu (2002), "Unit Root test in Panel Data: Asymptotic and Finite Sample Properties", *Journal of Econometrics*, 108: 1-24

Levine, R. (1996), "Foreign Banks, Financial Development, and Economic Growth", *In Barfied, C. E (ed.), International Financial Markets: Harmonization versus Competition*, pp. 224-254, AIE Press

Lindauer, D. L. (1988), "The Size and Growth of Government Spending", *The World Bank Working Paper Series* No. WPS-0044, Washington DC

Lopez, R. A. (2005), "Trade and Growth: Reconciling the Macroeconomic and Microeconomic Evidence", *Journal of Economic Surveys*, 19: 623-648

Lucas, R. E. (1988), "On the Mechanics of Economic Development", *Journal of Monetary Economic*, 22: 3-42

Lutkepohl, H. and M. Kratziq (2004), *Applied Time Series Econometrics (Themes in Modern Econometrics)*, Cambridge, Cambridge University Press

Mann, A. J. (1980), "Wagner's law: An Econometric Test for Mexico", *National Tax Journal*, 33, 189-201

Manning, R. (2005), "Development Co-operation Report 2005", *OECD Journal on Development*, OECD Publishing, Paris

Marin, D. (1992), "Is the Export-Led Growth Hypothesis Valid for Industrialised Countries?", *The Review of Economics and Statistics*, 74: 678-688

Marquardt, M. J. (2007), "Globalisation: Fight It, or Embrace and Purify It?", *Human Resource Development Quarterly*, 18: 285-291

Marshall, M. G., Jaggers, K. (2009), *Polity IV Project: Political Regime Characteristics and Transitions, 1800-2009*, Center for Systemic Peace and Colorado State University. < *http : //www.systemicpeace.org/polity/polity4.htm* >

Masson, P and C. Pattillo (2003), “Monetary Union in West Africa: An Agency of Restraint for Fiscal Policies?”, *Journal of African Economies*, 11: 387-412

McGillivray, M. and O. Morrissey (2000), “Aid Fungibility in Assessing Aid: Red Herring or True Concern?”, *Journal of International Development*, 12: 413-428

Minier, J. A. (1998), “Democracy and Growth: Alternative Approaches”, *Journal of Economic Growth*, 3: 241-266

Mishkin, F. S. (2007), “Is Financial Globalisation Beneficial?’”, *Journal of Money, Credit and Banking*, 39:259-294

Mobarak, A. M. (2005), “Democracy, Volatility, and Economic Development”, *The Review of Economics and Statistics*, 87: 348-361

Mountford, A. (1998), “Trade, Convergence and Overtaking”, *Journal of International Economics*, 46: 167-182

Mourao, P. R. (2007), “Long-Term Determinants of Portuguese Public Expenditures”, *International Research Journal of Finance and Economics*, 7: 153-167

Mosley, L. (2005), “Globalisation and the State: Still Room to Move?”, *New Political Economy*, 10: 356-362

Mosley, P. (1980), "Aid, Savings, and Growth Revisited", *Oxford Bulletin of Economics and Statistics*, 42: 79-95

Muller J. M. (2007), "Democracy and Economic Growth", Remarks Prepared for the Roundtable The Enemies from Without at the *4th Conference of The Centre on Capitalism and Society*, November 15, 2007

Narayan, P. K., Narayan, S., and R. Smyth (2011), "Does Democracy facilitate Economic Growth or Does Economic Growth facilitate Democracy?, An Empirical Study of Sub-Saharan Africa", *Economic Modelling*, 28: 900-910

Nasstrom, S. (2003), "What Globalisation Overshadows", *Political Theory*, 31: 808-834

Ndulu, B. J., and S. A. O'Connell (1999), "Governance and Growth in Sub-Saharan Africa", *Journal of Economic Perspectives*, 13: 41-66

Ng, S., and P. Perron (1995), "Unit Root Tests in ARMA Models with Data Dependent Methods for the Selection of the Truncation Lag", *Journal of the American Statistical Association*, 90: 268-281

Ng, S., and P. Perron (1996), "Useful Modifications to Unit Root Tests with Dependent Errors and their Local Asymptotic Properties", *Review of Economic Studies*, 63: 435-465

Ng. S., and P. Perron (2001), "Lag length Selection and the Construction of Unit Root Tests with Good Size and Power", *Econometrica*, 69: 1519-1554

Nketiah-Amponsah, E. (2009), "Public Spending and Economic Growth: Evidence from Ghana (1970-2004)", *Development Southern Africa*, 26: 477-497

Olomola, P. A. (2004), "Cointegration Analysis - Causality Testing and Wagner's Law: The case of Nigeria, 1970-2001", *Journal of Social and Economic Development*, 6: 76-90

Ojo, M. O. (2005), "Towards a Common Currency in West Africa: Progress, Lessons and Prospects", *West African Journal of Monetary and Economic Integration*, 5: 35-58

Oosterbaan, M. S. and N., Van Der Windt (2000), *The Determinants of Economic Growth*, Oosterbaan, M. S., De Ruyter Van Steveninck, T., and N. Van Der Windt (eds.): Kluwer Academic Publishers

Oteng-Abayie, E. F. and J. M. Frimpong (2006), "Bounds Testing Approach to Cointegration: An Examination of Foreign Direct Investment, Trade and Growth Relationships", *American Journal of Applied Sciences*, 3: 2079-2085

Oteng-Abayie (2011), "Government Expenditure and Economic Growth in Five ECOWAS Countries: A Panel Econometric Estimation", *Journal of Economics Theory*, 5: 11-14

Orsal, D. K. (2008), "Comparison of Panel Cointegration Tests", *Economics Bulletin*, 3: 1-20

Ouattara, B. (2006), "Foreign Aid and Government Fiscal Behaviour in Developing Countries: Panel Data Evidence", *Economic Modelling*, 23: 506-514

Papanek, G. F. (1972), “The Effects of Aid and other Resource Transfers on Saving and Growth in Less Developed Countries”, *The Economic Journal*, 82: 934-950

Papanek, G. F. (1973), “Aid, Foreign Private Investment, Savings, and Growth in Less Developed Countries”, *Journal of Political Economy*, 81: 120-30

Pattichis, C. A. (1999), “Price and Income Elasticities of Disaggregated Import Demand: Results from UECMs and Application”, *Journal of Applied Econometrics*, 31, 1061-1071

Peacock, A. and A. Scott (2000), “The Curious Attraction of Wagner’s Law”, *Public Choice*, 102: 1-17

Pedroni, P. (1999), “Critical Values for Cointegration Tests in Heterogeneous Panels with Multiple Regressors”, *Oxford Bulletin of Economics and Statistics*, Special Issue, 61: 653-670

Pedroni, P. (2000), “Fully-Modified OLS for Heterogeneous Cointegration Panel”, *Advances in Econometrics*, 15, 93-130

Pedroni, P. (2001), “Purchasing Power Parity Tests in Cointegrated Panels”, *The Review of Economics and Statistics*, 83: 727-731

Pedroni, P. (2004), “Panel Cointegration: Asymptotic and Finite Samples Properties of Pooled Time Series Tests with an Application to the PPP Hypothesis”, *Econometric Theory*, 20: 597-625

Pedroni, P. (2007), “Social Capital, Barriers to Production and Capital Shares: Implications for the Importance of Parameter Heterogeneity from a Nonstationary Panel Approach”, *Journal of Applied Econometrics*, 22: 429-451

Pereira, C., and V. K. Teles (2009), “Political Institutions as Substitute for Democracy: A Political Economy Analysis of Economic Growth”, *Discussion Paper* No. 196. School of Economics, Sao Paulo

Perera-Tallo, F. (2003), “Growth Due to Globalisation”, *International Economic Review*, 44: 651-676

Persson, T. (2005), “Forms of Democracy, Policy and Economic Development”, *Working Paper* No. 11171. National Bureau of Economic Research

Pesaran, M. H., and R. Smith (1995), “Estimating Long-Run Relationships from Dynamic Heterogeneous Panels”, *Journal of Econometrics*, 68: 79-113

Pesaran, M. H., Shin, Y. and R. J. Smith (2001), “Bounds Testing Approaches to the Analysis of Level Relationships”, *Journal of Applied Econometrics*, 16: 289-326

Pesaran, M. H. (2004), “General Diagnostic Tests for Cross Section Dependence in Panel”, *Working Paper* No. 1233, CESifo

Pesaran, M. H. (2006), “Estimation and Inference in Large Heterogeneous Panels with a Multifactor Error Structure”, *Econometrica*, 74: 967-1012

Pesaran, M. H. (2007), “A Simple Panel Unit Root Test in the Presence of Cross-Sectional Dependence”, *Journal of Applied Econometrics*, 27: 265-312

Pesaran, B. and M. H. Pesaran (2009), *Time Series Econometrics, Using Microfit 5.0*, Oxford: Oxford University Press

Pesaran, M. H., and E. Tosetti (2011), "Large Panels with Common Factors and Spatial Correlations", *Journal of Econometrics*, 161: 182-202

Phillips, P.C. B., and P. Perron (1988), "Testing for a Unit Root in Time Series Regression", *Biometrika*, 75: 335-346

Phillips, P. C. B., and B. E. Hansen (1990), "Statistical Inference in Instrumental Variables Regression with I(1) Processes", *Review of Economic Studies*, 57: 99-125

Phillips, P., and D. Sul (2003), "Dynamic Panel Estimation and Homogeneity Testing Under Cross Section Dependence", *The Econometrics Journal*, 6: 217-259

Plumper, T. and C. W. Martin (2003), "Democracy, Government Spending, and Economic Growth: A Political-Economic Explanation of the Barro-Effect", *Public Choice*, 117:27-50

Prasad, E., S., Rogoff, K., Wei, S., and M. A. Kose (2003), "Effects of Financial Globalisation on Developing Countries: Some Empirical Evidence", *Occasional Paper* No. 220, International Monetary Fund (IMF), Washington DC

Quah, T. D. (1997), "Empirics for Growth and Distribution: Stratification, Polarization, and Convergence Clubs", *Discussion Paper* No. 324, Centre for Economic Performance, LSE

Quinn, D. P., and J. T. Woolley (2001), "Democracy and National Economic Performance: The Preference for Stability", *American Journal of Political Science*, 45: 634-657

Rajan, R. G. and A. Subramanian (2005), "Aid and Growth: What Does the Cross-Country Evidence Really Show?", *IMF Working Paper* No. WP/05/127

Ram, R. (1985), "Exports and Economic Growth: Some Additional Evidence", *Economic Development and Cultural Change*, 33: 415-25

Ram, R. (1987), "Exports and Economic Growth in Developing Countries: Evidence from Time-Series and Cross-Sectional Data", *Economic Development and Cultural Change*, 36: 51-72

Ram, R. (1987), "Wagner's Hypothesis in Time-series and Cross-section Perspectives: Evidence from 'Real' Data for 115 Countries", *Review of Economics and Statistics*, 69, 194-204

Rassekh, F. (2007), "Is International Trade More Beneficial to Lower Income Economies? An Empirical Inquiry", *Review of Development Economics*, 11: 159-169

Reinsel, G. C., and S. K. Ahn (1992), "Vector Autoregressive Models with Unit Roots and Reduced Rank Structure: Estimation, Likelihood Ratio Test and Forecasting", *Journal of Time Series Analysis*, 13: 353-375

Remmer, K. L. (2004), "Does Foreign Aid Promote the Expansion of Government?", *American Journal of Political Science*, 48: 77-92

Rigobon, R. and D. Rodrik (2005), "Rule of Law, Democracy, Openness, and Income: Estimating the Interrelationships", *Economics of Transition*, 13: 533-564

Rivera-Batiz, L. A., and P. M. Romer (1991), "International Trade with Endogenous Technological Change", *European Economic Review*, 35: 971-1001

Rodrik, D. (1998), "Why Do More Open Economies Have Bigger Governments?", *Journal of Political Economy*, 106: 997-1032

Rodrik, D. (1999), *The New Global Economy and Developing Countries: Making Openness Work*, Policy Essay No. 24, Overseas Development Council, Washington DC

Rodrik, D. (2002), "Feasible Globalisation", *Working Papers* No. 9129, National Bureau of Economic Research

Rodriguez, F. and D. Rodrik (2001), "Trade Policy and Economic Growth: A Skeptic's Guide to the Cross-National Evidence", *In Bernanke, B and K. S. Rogoff. (eds.), NBER Macroeconomics Annual 2000*, 15: 261-338. Cambridge: MIT Press for NBER.

Roll, R., and J. R. Talbott (2003), "Political Freedom, Economic Liberty, and Prosperity", *Journal of Democracy*, 14: 75-89

Romer, D. (2001), *Advanced Macroeconomics*. New York: McGraw-Hill/Irwin. Second edition

Romer, P. (1990), "Endogenous Technological Change", *The Journal of Political Economy*, 98: 71-102

Romer, P. (1993), "Ideas Gaps and Object Gaps in Economic Development", *Journal of Monetary Economics*, 32: 543-573

Roodman, D. (2007), "The Anarchy of Numbers: Aid, Development, and Cross-Country Empirics", *The World Bank Economic Review*, 1-23

Rudra, N. (2005), "Globalisation and Strengthening of Democracy in the Developing World", *American Journal of Political Science*, 49: 704-730

Sachs, J. D., and A. Warner (1995), "Economic Reform and the Process of Global Integration", *Brookings Papers on Economic Activity*, 26:1-118

Sachs, J. D. (2005), *The End of Poverty: Economic Possibilities for Our Time*, The Penguin Press: New York

Sakyi, D. (2011), "Trade Openness, Foreign Aid and Economic Growth in Post-Liberalisation Ghana: An Application of ARDL Bounds Test", *Journal of Economics and International Finance*, 3: 146-156

Sala-i-Martin, X. (1997), "I Just Ran Four Million Regressions", *Working Paper* No. 6252, National Bureau of Economic Research

Sala-i-Martin, X. (2006), "The World Distribution of Income: Falling Poverty and Convergence, Period", *The Quarterly Journal of Economics*, 121: 351-397

Salinas, G., and A. Aksoy (2006), "Growth Before and After Trade Liberalisation", *Policy Research Paper* No. 4062. The World Bank

Samiei, N., and M. R. Jalilvand (2011), "The Political Participation and Government Size", *Canadian Social Science*, 7: 224-235

Sarafidis, V., and D. Robertson (2006), "On the Impact of Cross section Dependence is Short Dynamic Panel Estimation", *mimeo*, University of Cambridge

Sarafidis, V., and T. Wansbeek (2010), "Cross-sectional Dependence in Panel Data Analysis", *MPRA Paper* No. 20367

Schwert, G. W. (1989), "Tests for Unit Roots: A Monte Carlo Investigation", *Journal of Business and Economic Statistics*, 7: 147-160

Shelton, C. A. (2007), "The Size and Composition of Government Expenditure", *Journal of Public Economics*, 91: 2230-2260

Shen, J. (2002), "Democracy and Growth: An Alternative Empirical Approach", *Discussion Paper* No. 13, Institute for Economies in Transition, Bank of Finland

Shonchoy, A. S. (2010), "Determinants of Government Consumption Expenditure in Developing Countries: A Panel Data Analysis", *Discussion Paper* No. 266, Institute of Development Economies (IDE), Japan External Trade Organisation

Sirowy, L., and A. Inkeles (1990), "The Effects of Democracy on Economic Growth and Inequality: A Review", *Studies in Comparative International Development*, 25: 126-157

Sorensen, G. (2010), "Democracy and Democratisation", *Handbooks of Sociology and Social Research*, Part II, 441-458

Sobhee, S. K. and V. Joysuree (2004), "The Implications of Openness for Wagner's Law. An International Comparison of 20 Countries, 1971-2000", *Applied Econometrics and International Development*, 4: 47-58

Spilimbergo, A. (2000), "Growth and Trade: The North Can Lose", *Journal of Economic Growth*, 5: 131-146

Srinivasan, T. N., and J. Bhagwati (1999), "Outward-Orientation and Development: Are Revisionists Right?", *Centre Discussion Paper* No. 806, Economic Growth Center, Yale University

Stasavage, D. (2005), "Democracy and Education Spending in Africa", *American Journal of Political Science*, 49: 343-358

Thornton, J. (1996), "Cointegration, Causality and Export-Led Growth in Mexico, 1895-1992", *Economics Letters*, 50: 413-416

Tirelli, P. (2010), "Growth and Macroeconomic Convergence in West Africa: Factor Endowments, Policies and Institutions", Economic Commission for Africa, < *http://www.uneca.org/ednd/documents/macro/TirelliPaper.pdf* >

Tiruneh, G. (2006), "Regime Type and Economic Growth in Africa: A Cross-national Analysis", *The Social Science Journal*, 43: 3-18

Torun, M., and F. Arica (2011), "Testing the Validity of Wagners Law in Inflation Targeting Developing Countries", *I.I.B.F Dergisi (Marmara Universitesi)*, 30: 193-208

Udoh, E. (2011), "Optimal Seigniorage and Tax-Smoothing in West African Monetary Zone (WAMZ): An Econometric Assessment", *Journal of Developing Areas*, 45: 251-277

UNCTAD (2005), *Developing Countries in International Trade 2005: Trade and Development Index*, 1817-1214; UNCTAD/DITC/TAB/2005/1, United Nations, New York and Geneva

United Nations (2010), *United Nations Statistical Division Dataset*, 2010, New York

Vamvakidis, A. (2002), "How Robust is the Growth-Openness Connection? Historical Evidence", *Journal of Economic Growth*, 7: 57-80

Vergne, C. (2009), "Democracy, Elections and Allocation of Public Expenditures in Developing Countries", *European Journal of Political Economy*, 25: 63-77

Villaverde, J., and A. Maza (2011), "Globalisation, Growth and Convergence", *The World Economy*, 34: 952 - 971

Wacziarg, R. (2001), "Measuring the Dynamic Gains from Trade", *The World Bank Economic Review*, 15: 393-429

Walter, S. (2010), "Globalization and the Welfare State: Testing the Microfoundations of the Compensation Hypothesis", *International Studies Quarterly*, 54: 403-426

Wibbels, E., and J. S. Ahlquist (2011), “Development, Trade, and Social Insurance”, *International Studies Quarterly*, 55: 125-149

Wildavsky, A. (1985), “A Cultural Theory of Expenditure Growth and (Un)balanced Budgets”, *Journal of Public Economics*, 28: 349-357

Winters, L. A. (2004), “Trade Liberalisation and Economic Performance: An Overview”, *The Economic Journal*, 114: F4-F21

Wittman, D. (1995), *The Myth of Democratic Failure: Why Political Institutions Are Efficient*. American Politics and Political Economy Series, Chicago: University of Chicago Press

White, H. (1992), “The Macroeconomic Impact of Development Aid: A Critical Survey”. *Journal of Development Studies*, 28: 163-240

Wolf, M (2001), “Will the Nation-State Survive Globalisation?”, *Foreign Affairs*, 80: 178-190

World Bank (1995), “Ghana: Growth, Private Sector and Poverty Reduction - A country Economic Memorandum”, *Report* No. 1411 - GH. Country Operations Division, Washington

World Bank (1998), *Assessing Aid: What Works, What Doesn’t and Why*, Oxford: Oxford University Press

World Bank (2004), *World Development Indicators*, 2004. Washington

World Bank (2010), *African Development Indicators*, 2010. Washington

World Bank (2010), *World Development Indicators*, 2010. Washington

World Bank (2011), *Classification of Economies*, 2011. Washington, $< http : //data.worldbank.org/about/country - classifications/country - and - lending - groups >$

Yanikkaya, H. (2003), "Trade Openness and Economic Growth: A Cross-country Empirical Investigation", *Journal of Development Economics*, 72: 57-89

Young, A. (1991), "Learning by Doing and the Dynamic Effects of International Trade", *The Quarterly Journal of Economics*, 106: 369-405

Zack-Williams, A. B. (2001), "No Democracy, No Development: Reflections on Democracy and Development in Africa", *Review of African Political Economy*, 28: 213-223

Zipfel, J (2004), "Determinants of Economic Growth", *Social Sciences - Political Science*, 20: 1-84

Zivot, E., and W. K. Andrews (1992), "Further Evidence on the Great Crash, the Oil-Price Shock, and the Unit-Root Hypothesis", *Journal of Business and Economic Statistics*, 10: 251-270