ESSAYS ON FINANCIAL DEVELOPMENT AND GROWTH IN SUB-SAHARAN AFRICAN COUNTRIES

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ABSTRACT

This thesis investigates the relationship between financial development and economic growth in Sub Saharan Africa for the period 1970-2005. The first chapter assesses three growth theories using panel data. The study lends empirical credence to the endogenous growth theory, but finds weak evidence for growth-impact of financial development in the region. The study suggests that financial development is important for economic growth in the presence of highly developed human capital and other institutional factors. The first essay finds growth-complementarity feature between financial development and human capital in the region.

In the second empirical essay, the thesis investigates the determinants of financial development in the region. In particular, it analyses the impact of spatial externality on financial development in SSA for the period of 1970-2005 in a dynamic panel data framework that uses the Arellano and Bond GMM estimator. The findings of this chapter suggest that the financial system is geographically sensitive, and thus not immune to spatial externality. The findings suggest that spatial effects may include crowding-out of domestic credit market, enhancing competition among banks and promoting efficient resource allocation for overall economic growth.

Finally, the third empirical essay investigates the relationship between finance and growth in a panel data framework. It suggests another channel by which this nexus can be analysed. The study uses a panel cointegration test to assess the long run relationship between finance and growth in the presence of spatial externality. The study finds empirical support for the demand-following hypothesis. It also indicates that there is a long run impact of spatial externality on financial development in particular and economic growth in general for the sample countries in the study. This chapter suggests a regional framework for the relationship between finance and growth.

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CHAPTER ONE: INTRODUCTION

1.1 Background to the study

Africa's long-run growth performance has been referred to as "the economic tragedy of the twentieth century" with current real per-capita income approximately the same as in the mid-1970s.[1] Economic growth remains below the level required for these countries to meet the target established in the Millennium Development Goals (MDG) of halving poverty by the year 2015. Despite the latest modest improvement in the growth rate, the region is still with lowest per capita income and highest poverty rate in the world.

Africa as a continent has 52 countries. The continent is often divided into two regions, North Africa and Sub Saharan Africa. North African countries comprise of 5 countries namely Algeria, Egypt, Tunisia, Morocco, and Libya. All other countries are called the Sub-Saharan African (SSA) countries[2].

SSA has slightly above 700 million people in forty-seven countries. The region is home to thirty-four of the world's forty-eight poorest countries. The average income (excluding South Africa) is US $342 per person annually. Out of the 32 countries in the world with the least level of human development, 24 are in SSA. In contrast to other regions in which poverty levels have declined dramatically over the past four decades, the number of poor people in Africa has increased between 1981 and 2001 (World Bank, ADI 2005). During this period, the number of Africans living in poverty doubled from 164million to 314million. The region ranks high on the

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[1] IMF (2005), *Regional Economic Outlook Sub-Saharan Africa*. *World Economic and Financial Surveys.* Washington D.C

[2] SSA countries include: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo Democratic Republic, Congo Republic, Cote d'Ivorie, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal,, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia, and Zimbabwe

corruption index and low in development. Investment rating services rank Africa as the riskiest region in the world, which helps to explain low capital inflows into the region. Investors perceive Africa as "bad neighbourhood" (Collier and Gunning, 1999a). Global risk rating observes that Africa as a whole is significantly more risky than is warranted by economic fundamentals while private investment is also significantly low (Haque et al, 1999). The continent has high income differentials ranging from under $100 per head (Burundi) to over $7000 in Seychelles.

The SSA countries have different resource endowments. Some of them are resource rich (Oil-exporting and other minerals) countries and others are resource poor. The oil exporting countries include Equatorial Guinea, Angola, Chad, Sudan, Nigeria, Congo Republic and Gabon.

These countries also have different legal origin, based on their colonial history. Some of them have French origin, some English origin and some Portuguese origin. Furthermore, they are in different stages of development, most of them are low-income; few are medium–income while none is in the high income group (World Bank, 2007). Table 1.1 provides a short analysis of the structure of SSA economies. The region has lower per capita income therefore it could benefit from convergence with richer countries; it also has higher aid inflows so it is expected to benefit from aid-induced growth if good policies are implemented.

Despite the slight improvement in their growth partially due to a reduction in political conflict, promotion of good governance and more efforts at poverty reduction, SSA is still described as the slowest growing region in the world (Bosworth and Collins 2003, World Bank, 2007).

Table 1.1: Structure of SSA Economies

Country	Population(millions) (2004)	GDP per Capita($)	GDP Annual growth rate (%) (2000-04	Legal Origin	Life Expectancy at birth(Years) (2004)	% of Population below $1 a day	Adult literacy (%ages 15 and above)
SSA	**726**	**600**					
Angola	**15.5**	**930**	**4.6**	Britain	**41**	**NA**	**83**
Benin	**8.2**	**450**	**1.2**	France	**55**	**30.9**	**48**
Botswana	**1.8**	**4360**	**5.7**	Britain	**35**	**23.5**	**80**
Burkina faso	**12.8**	**350**	**0.3**	France	**48**	**27.2**	**29**
Burundi	**7.3**	**90**	**0.0**	France	**44**	**54.2**	**67**
Cameroon	**16.0**	**810**	**2.7**	France	**46**	**17.1**	**77**
Cape Verda	**0.5**	**1720**	**40.0**	Portugal	**70**	**NA**	**Na**
CAR	**4.0**	**310**	**0.3**	France	**39**	**66.6**	**65**
Chad	**9.4**	**250**	**3.6**	France	**44**	**NA**	**41**
Comoros	**0.6**	**560**	**-0.1**	France	**63**	**NA**	**Na**
Congo Dem Rep	**55.9**	**110**	**0.0**	France	**44**	**NA**	**81**
Congo Republic	**3.9**	**760**	**-0.5**	France	**52**	**NA**	**Na**
Cote D'Ivorie	**17.9**	**760**	**-2.4**	France	**46**	**14.8**	**61**
Djibouti	**0.8**	**950**	**0.0**	France	**53**	**NA**	**Na**
Eq. Guinea	**0.5**	**Na**	**0.0**	France	**43**	**NA**	**93**
Eriteria	**4.2**	**190**	**-3.4**	Britain	**54**	**NA**	**Na**
Ethiopia	**70.0**	**110**	**1.3**	NA	**42**	**23.0**	**Na**
Gabon	**1.4**	**4080**	**0.3**	France	**54**	**NA**	**Na**
Gambia	**1.5**	**280**	**0.8**	Britain	**56**	**59.3**	**Na**
Ghana	**21.7**	**380**	**2.4**	Britain	**57**	**44.8**	**66**
Guinea	**9.2**	**410**	**1.0**	France	**54**	**NA**	**43**
G.Bisssau	**1.5**	**160**	**3.8**	Portugal	**45**	**NA**	**Na**

Country	Population	GDP per Capita	GDP Annual growth rate (2000-04	Legal Origin	Life Expectancy (2004)	% of Population below $1 a day	Adult literacy (%ages 15 and above)
G.Bisssau	**1.5**	**160**	**3.8**	Portugal	**45**	**NA**	**Na**
Kenya	**33.5**	**480**	**0.3**	Britain	**48**	**22.6**	**78**
Lesotho	**1.8**	**730**	**1.9**	Britain	**36**	**36.4**	**74**
Liberia	**3.2**	**120**	**-2.8**	Britain	**42**	**NA**	**Na**
Madagascar	**18.1**	**290**	**-1.5**	France	**56**	**61.0**	**77**
Malawi	**12.6**	**160**	**-0.3**	Britain	**40**	**41.7**	**75**
Mali	**13.1**	**330**	**2.3**	France	**48**	**72.3**	**27**
Mauritania	**3.0**	**530**	**4.0**	NA	**53**	**25.9**	**60**
Mauritius	**1.2**	**4640**	**2.9**	France	**73**	**NA**	**88**
Mozambique	**19.4**	**270**	**6.2**	Portugal	**42**	**37.8**	**Na**
Namibia	**2.0**	**2380**	**3.2**	Britain	**47**	**34.9**	**87**
Niger	**13.5**	**210**	**0.0**	France	**45**	**60.6**	**43**
Nigeria	**128.7**	**430**	**2.7**	Britain	**44**	**70.6**	**Na**
Rwanda	**8.9**	**210**	**0.3**	France	**44**	**51.7**	**71**
Sao Tome and Principe	**0.2**	**390**	**2.3**	Portugal	**63**	**NA**	**Na**
Senegal	**11.4**	**630**	**1.6**	France	**56**	**22.3**	**51**
Seychelles	**0.1**	**8190**	**-2.3**	France	**NA**	**NA**	**91**
Sierra-Leone	**5.3**	**210**	**5.3**	**Britain**	**41**	**NA**	**47**
Somalia	**8.0**	**NA**	**0.0**	**NA**	**47**	**NA**	**Na**
South Africa	**45.5**	**3630**	**2.2**	**Britain**	**45**	**10.7**	**84**
Sudan	**35.5**	**530**	**7.5**	**NA**	**57**	**NA**	**71**
Swaziland	**1.1**	**1660**	**-0.7**	**Britain**	**42**	**NA**	**81**
Tanzania	**37.6**	**320**	**4.6**	**Britain**	**46**	**57.8**	**78**
Togo	**6.0**	**310**	**-0.7**	France	**55**	**NA**	**69**
Uganda	**27.8**	**250**	**1.8**	**Britain**	**49**	**NA**	**77**
Zambia	**11.5**	**400**	**0.3**	**Britain**	**38**	**75.8**	**76**
Zimbabwe	**12.9**	**620**	**-6.2**	**Britain**	**37**	**56.1**	**na**

Source: World Bank (2006). ***African Development Indicators***

Many researchers have attributed this dismal economic performance to factors such as poor economic policies and lack of openness to international markets (Sachs and Warner 1997). Others like Easterly and Levine (1997) suggest that the slow growth performance is associated with political instability, underdeveloped financial systems, distorted foreign exchange markets, high government deficits, insufficient infrastructure and ethnic fragmentation. Collier and Gunning (1999b), Collier (2007a) associate this trend with geographical and political factors, most of which can be categorised as endogenous (policy-induced) or exogenous factors.

The region has very low population density, high costs of transport, and poor market integration which hamper the use of trade for risk sharing (Collier and Gunning 1999b). The region also has relatively high natural resource endowments per capita. However these high natural resources may also increase loot-seeking (rent) activities and perhaps explain the high corruption profile in the region. This further exacerbates conflict due to ethnic diversity and, as argued by Collier and Hoeffler (1998), dependence on natural resources strongly increases the risk of civil war in the region (Lewis, 2007).

The region has much smaller countries in terms of population than other regions. SSA has a population slightly above half that of India, yet it is divided into 47 nation states. A considerable part of the population lives in countries that are landlocked. However, in contrast, Switzerland which is also a landlocked area, like many SSA countries, benefits from good infrastructure and low transport costs which enables it to direct its trade towards its neighbours. SSA countries direct their trade to Europe [3](see Table 1.2) due to poor infrastructure among the countries and high transport costs. Consequently, neighbouring countries are inaccessible and economically unattractive. The neighbourhood thus turns into an obstacle rather than a market (Collier and Gunning, 1999a).This trend is further strengthened with the loyalty to

[3] We can see from table 1.2 that not only does the region have the least share in world trade; also it fairs worst in terms of intra-trade within the region. Out of total value of world trade 11783($ Billion), the region has only 283($ Billion). This represents 2.4% of total world trade. In terms of intra-trade within the region, the region's total trade with Europe is 148.1($ Billion),, while its trade with other Africa countries is only 32.8($ Billion).

the colonial legacy or history. Most SSA countries concentrate on the production of narrow primary products for exports. The problems of functional distance and poor infrastructure in the region are made worse by political barriers resulting in many isolated small countries in the region.

The existence of numerous states with low levels of income makes Africa's national economies radically smaller and weaker than other regions. These small countries are often economically disadvantaged, as they cannot benefit from scale economies. They are also less competitive, and are sometimes perceived as more risky (Collier and Dollar 1999). They also usually have slower rate of technological innovation (Kremer 1993). Gallup and Sachs (1999) as well as Collier and Gunning (1999a) observe that since most of the population lives far from coast, the elasticity of growth to openness is lower and so the incentive for openness is reduced.

Table 1.2: Direction of Trade Flows

Destination / Origin	North America	South and Central America	Europe	CIS	Africa	Middle East	Asia	World
World	2355	378	5118	290	283	381	2839	11783
North America	905.3	107.3	279.3	8.3	21.7	42.1	314.1	1678.3
South and Central America	135.0	111.5	86.4	6.1	11.3	7.9	61.8	429.9
Europe	430.3	66.6	3851.5	141.6	120.2	128.9	366.4	4963.0
Common wealth of independent states (CIS)	24.2	7.6	246.5	80.3	5.7	13.3	45.6	425.6
Africa	79.8	11.3	148.1	1.4	32.8	6.3	72.6	363.3
Middle East	72.3	4.4	102.8	3.0	20.9	71.6	339.6	645.5
Asia	708.3	69.5	603.8	49.7	69.9	111.4	1638.5	3277.8

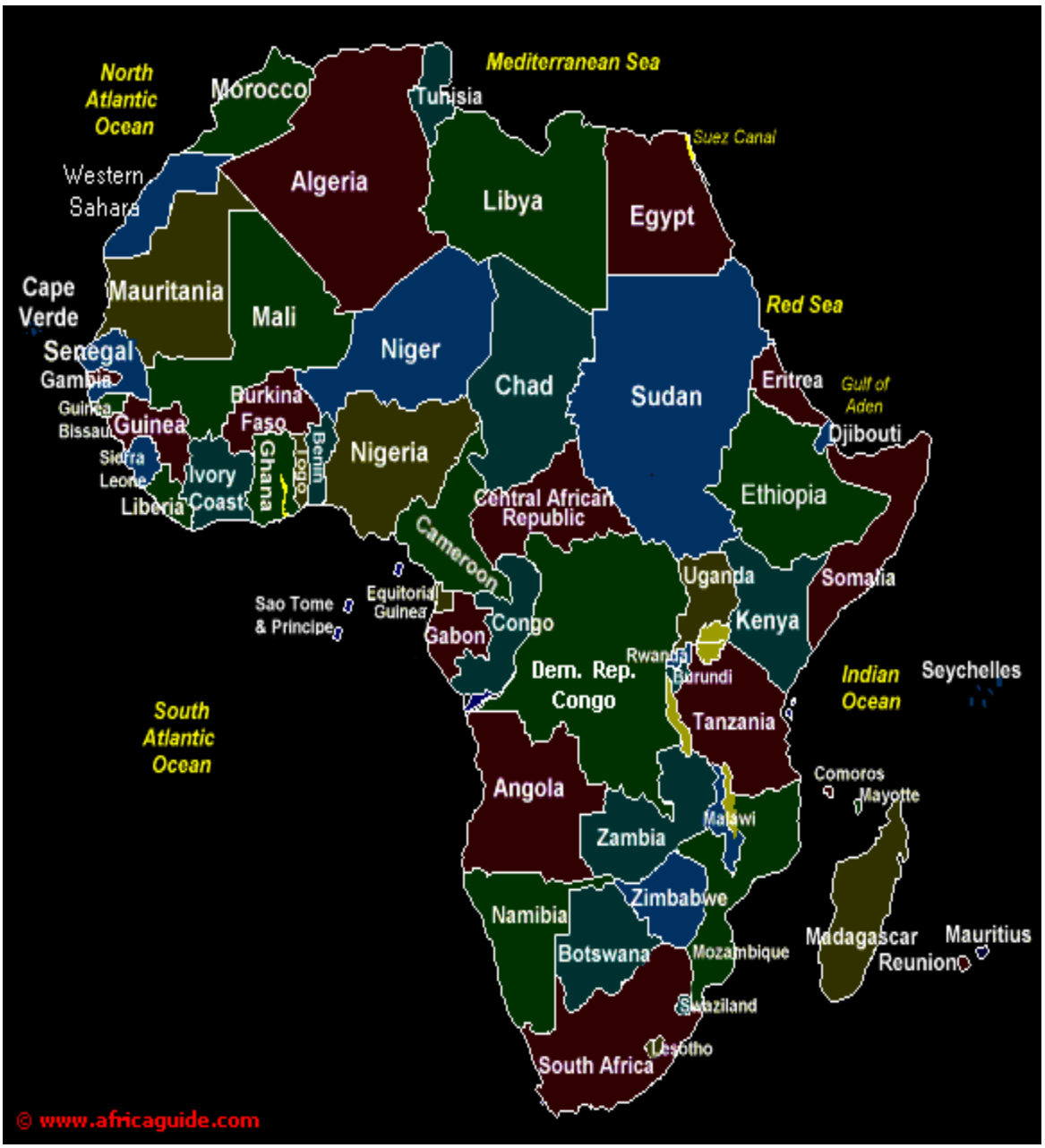
Source: World Trade Statistics, WTO 2007, (the unit is in Billion of Dollars)

Financial markets in the region are heavily regulated with bank lending often directed to the government, or priority sectors. There is very limited financial intermediation with little or no competition among banks. Weak economic growth explains a lower saving rate and higher capital flight from Africa (Collier 2007, Mobolaji and Ndako, 2008). This coupled with high poverty levels and underdeveloped financial systems make households use assets for purposes of consumption smoothing rather than investment. Thus households are trapped in low income, high liquidity equilibria (Dercon, 1997).

Collier (2007b) observes that in the last few years, growth has accelerated. However the concern is, whether, this is a transient or permanent trend? Is it not merely the result of high prices of commodity exports or rather, a pay-off of committed and geniune reform and improved policies? Especially with the backdrop of commodity boom in the 1970s which was followed by unparalleled economic disaster, this trend is particularly fragile to rely on, or draw conclusions from.

This thesis attempts to analyse the impact of *human capital*, and *financial development* on growth dynamics in SSA for the period 1970-2005. In particular, this study assesses how each of these factors impacts on the economy to stimulate growth as well as their transmission mechanisms.

MAP OF AFRICA



The study spans 1970-2005. This period can be divided into two sub-periods in terms of political and economic history of the region. Politically, 1970-1979 can be classified as the period of political independence and self rule, while 1980-2005 can be regarded as the period of democratic governance and rule of law. Economically, 1970-1979 can be regarded as an era of regulated economy with strong dominance of the public sector. The 1980-2005 is a period of financial liberalisation, economic reforms and privatisation.

Perhaps for the periods 1970-1979, SSA could be said to have pursued Keynesian macroeconomic policy with dominance of the public sector and financial repressionist framework. However there has been a paradigm shift in policy in the 1980-2005 to the classical framework with, more emphasis on openness, financial liberalisation and privatisation and a diminishing influence of the public sector.

1.2 Objectives of the Thesis

The thesis examines the impact of financial development on economic growth in SSA countries. It contributes to the literature and knowledge by empirically investigating the:

- Impact of financial development and human capital on economic growth in the region.
- Effect of spatial externality on financial development in the region.
- Long-run effect of spatial externality on financial development and economic growth in the region.

1:3 Motivations for the study

Despite the overwhelming theoretical proposition on the importance of finance to growth, starting with the work of Bagehot (1873), Schumpeter (1911), Gurley and Shaw (1955), Goldsmith (1969), McKinnon (1973), many economists still differ about the role of financial sector in economic growth, such that some pioneers of development economists (Meier and Seers, 1984; Lucas 1988) all dismiss finance as a determinant of growth (Levine 2004). Robinson (1952) argues that where enterprise leads finance follows; suggesting that finance passively responds to demand for economic growth, yet others like Merton (1987) and King and Levine

(1993) strongly argue that financial development impacts actively and positively on economic growth.

Over the last three decades, theoretical and empirical inquiry about the nexus between finance and growth has received considerable attention in the literature. Different empirical studies have reported contrasting conclusions. While some have found statistical evidence for uni-directional causality from financial development to growth, others have provided evidence for reverse causation from economic growth to financial development, and others reported bi-directional causality. While some studies report positive impacts of finance on growth (King and Levine 1993), others suggest negative effect (Calderon and Liu, 2003) and yet some do no find any significant impact. Others like Demetriades and Law (2006) find that financial development can only have significant positive effect on economic growth where there are highly developed institutions, while Patrick (1966) suggests that financial development impact separately on economies depending on the stage of economic development.

This suggests that the issue is inconclusive in the literature, and any study in this regard would further clarify our understanding of the relationship between the two, enhance the formulation of optimal policy and direct the priority of policy makers on financial sector reforms.

Several studies have attempted to explain the causes of differences in the performance of the financial system among countries, notable among these studies are Baltagi et al (2007a) and Acemoglu (2004) Levine (2003) that emphasised the quality of institutions, others like as Rajan and Zingales (2003) emphasised the simultaneous opening of the economies. However, none has empirically investigated the impact of spatial externality on financial development in SSA. This is a research vacuum which this study addresses in chapter three.

The fragmented nature of the region with small economies, high transport cost and political barriers exposes the region to economic hazard of marginalization. This and the predominance of primary products make neighbours unattractive trade partners

and render the possibility of spatial externality remote, if not completely ineffective. The elasticity of openness to growth is negative and thus incentives to open are low. However, recent efforts at regional union, challenges of globalisation and improved infrastructural developments make spatial economics a possible impetus for financial development in particular and economic growth in general in the region. Chapter three explores the impact of spatial externality of South Africa's financial development on the other neighbouring African countries. This is done to see whether this impact could lead to better development of financial sector in the region.

This impact is further investigated in the third empirical chapter to assess whether this impact has a long run effect on the financial sector in particular and the general economy in general. Thus, the thesis uses the recently developed technique of panel co integration which succinctly brings to the fore the possibility for establishing a long run relationship among variables in a panel of countries after taking into consideration their individual country specific characteristics. The chapter assesses how these countries react to this exogenous shock by conducting the impulse response analysis.

1:4 Contributions

This thesis contributes to the literature or knowledge in four ways. It analyses the impacts of financial development and human capital (HC) on economic growth equation in SSA using panel data analysis of 14 countries. Given that most of the countries in the sample have different legal origin, the study analyses this relationship accommodating the differences in the two major legal origins (English and French). By dividing the sample into these groups, the study further contributes by identifying the roles and importance of different HC at different policy regimes. This has strong policy implication on both short run adjustment policy and long run stabilisation programmes.

In the growth literature, three theories are popular with different policy implications, the neoclassical theory which emphasises the role of physical capital and technology, and the endogenous theory that stresses the importance of human capital

and the finance theory that highlights the importance of finance in the development process. In chapter two, this thesis contributes to the literature by assessing the relative importance of these theories in the region, which of them is most suitable to the region's growth path and what is the transmission mechanism towards facilitating the desired growth process.

Furthermore, Evans et al (2002) suggest a positive relationship between finance and human capital. They conclude that a developed financial system is an essential complement to a human resource or manpower development in the growth process. This position is further elucidated by Outreville (1999) when he observes that higher education leads to lower risk aversion, better access to financial information and higher savings. De Gregorio (1996) argues that if households borrow to finance accumulation of human capital, the effect of this liquidity constraint on growth is ambiguous. Human capital accumulation raises saving rate in the long run but lowers the productivity of investment in the short run. Low level of HC reduces overall savings in the economy and increases domestic credit to the private sector to cater for education matters. This was further confirmed by Papagni (2006) who used overlapping-generations model with endogenous growth.

From the foregoing, there appears to be a theoretical basis for interaction of human capital and financial development, therefore the study interacts human capital with financial development and assesses its impacts on growth in SSA. It also assesses the marginal effect of each variable in growth regression. Thus, a similar exercise was done for physical capital and financial development to assess the Mckinnon and Shaw hypotheses. With this, the thesis serves as a link between development economics and financial economics.

By examining this relationship, this thesis provides a framework for making an informed policy on the relationship. The study has strong policy implication for the prioritization of the development process in the region in the face of limited resources but unlimited development needs. The study could also provide a theoretical basis for sequencing of reform efforts and formulating developmental strategies in the region.

From the first empirical essay (chapter two), it was observed that finance does not perform very well in the growth equation, as previously observed by Demetriades and Law (2006), thus the thesis tries to further investigate what determines financial development in the region. Since in the literature, finance has been seen to act as a catalyst for growth, thus any policy that enhances financial development directly may have an indirect or multiplier effect on the economy by enhancing growth. Thus second empirical essay contributes to the literature on the determinants of financial development. The major novelty in this study is the consideration of the spatial variable into financial development analysis, since it has been observed that financial system exhibits contagious effects on its neighbours. Merton and Bodie (1995) argue that financial systems naturally influence the allocation of resources across space and time especially in this era of globalisation where finance seeks where it can attract maximum return with minimum risk. Further more, Honohan (2008) observes that in SSA, low access to credit and high cost of capital are some of the major obstacles inhibiting financial development. This study argues that allowing spatial externality in the financial sector would not only increase access to credit but also reduce the cost of credit in the region. Secondly spatial externality would also enhance regional financial cooperation, needed for the financial development in the region.

As SSA countries are involved in many regional cooperation, this thesis may suggest a theoretical framework for an enduring or stable economic union. The study uses dynamic panel data estimation of Arellano and Bond GMM, and finds statistical evidence of spatial effect on the financial development in the sample countries.

The third empirical essay further analyses the long run relationship between finance and growth and in particular further investigates the long run impact of South Africa's financial development on the other African countries. This is done, especially that there is an increasing focus on the financial development in both finance and development literatures because of the envisaged pivotal role that finance plays in enhancing growth in many countries. Among the recent works on this include (Demetriades 2008), Honohan (2008), Luintel et al (2008), Demirguc-

Kunt and Levine (2008), Ang (2008) to mention but a few. The share of financial services in the structure of world exports commercial services is 14%, next to business (World Trade Statistics 2007). This thesis also contributes to this growing field by examining the finance–growth nexus in a panel data framework.

There have been few studies on the relationship between finance and growth, some are cross sectional (King and Levine, 1993) and most are time series (Demetriades and Hussein, 1996; Gupta 1984; Jung 1986). The few that are available on SSA are time series studies (Joseph et al, 1998). The only panel work on this in SSA is by Venet and Hurlin (2001), but this study does not have consideration for the spatial externality, a novelty this study explores. Due to spatial proximity among SSA countries, the thesis investigates the long run impact of the spatial variable on the financial development in particular and on the growth in general in the region, by conducting the panel cointegration tests using both the Pedroni and Fisher (Johansen MLE) techniques. It examines the response to this exogenous spatial effect. This has an implication for addressing policy issues that can lead to financial development and regional cooperation in the region.

In summary, chapter two of this thesis analyses the impact of financial development and human capital on economic growth. The novelty here is the verification of the most suitable growth theory applicable to SSA. Thus, it tries to assess the relative importance of three major determinants of growth in SSA, the human capital, financial development and physical capital. It further tries to verify the appropriateness of the Mckinnon and Shaw hypotheses in the region. It assesses the impact of financial development in the presence of human capital, and verifies whether the relationship between human capital and financial development is indeed complementary or substitutable. The study further verifies the endogenous financial theory hypothesis by interacting the financial development and human capital in the growth equation. The study finds strong impact of human capital but weak evidence for the importance of financial development to the economic growth in the region. It suggests that the impact of financial development on growth can be enhanced by the presence of well developed human capital.

Chapter three tries to investigate the determinants of financial development in the region, especially against the poor performance of finance in the preceding chapter. The novelty in the chapter is that it explores neighbourhood effect on financial development in the region. The chapter assesses the impact of South Africa's financial development on the other African countries. The results suggest there are spatial cost and benefit of financial (under)development. This spatial impact is further investigated in chapter four to know whether it has any long run impact on the financial sector in particular and the economy in general, by conducting the panel co integration. It also assesses the reaction of these countries to this spatial exogenous shock by conducting the impulse response analysis. Finally, chapter four adds to the current debate on the relationship between finance and growth.

1.5 Organisation of the Thesis

This thesis studies the impact of FD on growth in some selected countries in SSA. It contains three substantive empirical analyses in chapters 2, 3, and 4. A review of relevant literature and theoretical framework of the thesis is provided in each of the chapters.

Chapter two analyses the role of finance and human capital on growth in SSA countries. Fourteen countries were studied for the period 1970-2000. The data set is from the Bosworth and Collins data available for 1960-2000 for 19 countries. The data set has been widely used in empirical studies (AERC study 2004, Bosworth and Collins 2003). This allows for the usage of panel estimation technique.

Chapter three provides an empirical analysis of the determinants of financial development in SSA. The primary focus of this chapter is the integration of the spatial variable in FD equation and tests its statistical significance. The chapter used the dynamic panel data (DPD) estimation technique by Arellano and Bond and further conducts some robustness tests. It is worth-noting that this thesis does not apply the general spatial econometric technique, but it focuses on the impact of South Africa's financial development on other neighbouring African Countries. This impact of South Africa's financial development is what is termed as the spatial variable in this thesis.

Chapter four further analyses the relationship between finance and growth in SSA. It also attempts to capture the long run effect of the spatial variable on economic growth in general and on financial development in particular. It applies the recently developed panel cointegration technique. It starts with the conventional bi-variate model of financial development and economic growth in SSA. This is then followed by introducing the spatial variable.

The long run effect is further analysed by conducting a weak exogeneity test on the variable. From the findings of the previous chapter which suggests that the spatial variable acts as a substitute, and thus crowds out the domestic financial development, this study then tries to verify whether this crowding-out effect has any longrun positive effect on the growth of these economies. This is followed by conducting the impulse response tests. The thesis confirms that the spatial variable is weakly exogenous, suggesting it really has a causal impact on both the financial development and the economic growth in the region. The study further finds that the spatial impacts include crowding-out effect on the credit market, but complementary effect on the monetary sector. However, it has an overall positive impact on economic growth.

The last chapter is the concluding chapter. It presents the summary and discussions of the overall findings of the study, and gives the policy implications and recommendations of the thesis. It also offers suggestions for further research.

CHAPTER TWO:
FINANCIAL DEVELOPMENT, HUMAN CAPITAL AND ECONOMIC GROWTH IN SSA

2.1 Introduction

Many SSA countries approached the 1960s with great hope and optimism, abundant resource endowments and growth potentials. Prospect for actualising these aspirations were brightened by the successful political independence from colonial rule. This political transition raised hopes for an economic transition that would transform the region to an economic giant. Enke (1963) ranked Africa's growth potential ahead of East Asia's, and Kamarck (1967) the Chief Economist of the World Bank listed seven African countries that had the potential to reach or surpass a seven percent annual growth rate. Despite all these myriads of hope, growth performance of Africa has been dismal and awful. Such that, Easterly and Levine (1997), summarised it as "Potentials unfulfilled with disastrous consequences".
In the literature, a number of causes were identified such as bad policies, poor education, (Soludo 1993), political instability, inadequate infrastructure (Collier and Gunning 1999b), and ethnic diversity (Easterly and Levine 1997)

Thus, very large and sustained increases in growth rates are necessary if SSA is to have a realistic prospect of halving income poverty by the year 2015. Some earlier studies highlight the importance of good macroeconomic policies, strong trade growth, political stability, efficient institutional framework and stable polity in growth equations, this study explores the impact of financial development and human capital in facilitating desired economic growth in SSA.

Human capital (HC) in the literature has been broadly defined to include education, health, training, migration and other investments in human beings and other factors that enhance an individual's productivity. HC has dominated the growth literature in the last decade with the emergence of the endogenous growth theorists popularised by Romer (1986), and Lucas (1988). Their preliminary findings are well documented in the literature especially in Barro and Sala-i-Martin (1999). They argued against the theoretical constructs of the neoclassical theories that postulate that there is a long run tendency for capital to experience diminishing returns.

Arguing that this notion is based on the restrictive definition of capital, and if capital is comprehensively defined to include human capital then, in the long run, capital may not have diminishing returns but constant returns to scale. Barro and Sala-i-Martin observe that the presence of HC may relax the constraint of diminishing returns to a broad concept of capital and lead to long term per capita growth in the absence of exogenous technological progress. Thus, the production of HC may be an alternative to improvements in technology as a mechanism to generate long term growth especially if the returns to capital were constant asymptotically. Furthermore, there are perceived positive externalities associated with human capital formation.

There are two major frameworks within the endogenous growth literature, the Lucas approach and the Nelson-Phelps approach. The former, based on Lucas (1988) and shared by neo-classical growth theory, assumes that growth is driven by the accumulation of human capital and that differences in growth rates across countries are assumed to be primarily due to differences in the rates of human capital accumulation. The second approach relates growth to the stock of human capital which affects a country's ability to innovate and catch-up with the more advanced countries.

2.2 Financial development and Economic Growth

Early twentieth century witnessed the upsurge of theoretical and empirical studies that document the relative importance of finance to growth. These efforts started with Schumpeter (1911), Gurley and Shaw (1955), Goldsmith (1969), McKinnon (1973), Shaw (1973), Fry (1977). All these efforts suggest a positive and significant relationship between financial development and growth. Other recent empirical works that suggest that financial development is a catalyst for economic growth includes Levine (2004), Demetriades and Andrianova (2004), Luintel et al (2008) and Ang (2008).

Though extensive empirical studies have documented the relationship between financial development and growth since 1969, however, strong analytical and theoretical foundation for this relationship only emerged in 1992 with the pioneering work of Marco Pagano (1993). He used the insights and techniques of the

endogenous growth models to establish an enduring theoretical foundation for the relationship between financial development and growth.

He formulates a simple endogenous growth model the "AK" model, where aggregate output is a linear function of the aggregate capital stock:

$$Y_t = AK_t \tag{2.1}$$

The AK model can be derived assuming that K_t is a composite of physical and human capital as in Lucas (1988) or a technology with a constant returns to scale but a productivity with an increasing function of the aggregate capital stock K_t

If the population is assumed to be stationary and the economy produces a single good that can be invested or consumed, and the invested good depreciates at the rate of δ per period. The gross investment at time t in the economy is

$$I_t = K_{t+1} - (1-\delta)K_t \tag{2.2}$$

In a closed economy with no government, capital market equilibrium requires that saving S_t equals gross investment I_t.

$$S_t = I_t \tag{2.3}$$

However, with the assumption of some savings loss (1- ϕ) due to financial intermediation,

$$\phi S_t = I_t \tag{2.4}$$

From (2.1), the growth rate at time t+1 is $g_{t+1} = \frac{Y_{t+1}}{Y_t - 1} = \frac{K_{t+1}}{K_t - 1}$

Using equation (2.4), and dropping the time indices, the steady –state growth rate is

$$g = A\frac{I}{Y} - \delta = A\varphi s - \delta \tag{2.5}$$

Equation (2.5) shows how financial development can affect growth. It can raise φ (The proportion of savings channelled to investment), increase A, (the social marginal productivity of capital), influence s (the private saving rate). Thus, the

financial development relates to economic growth through a number of channels such as reducing the resources lost in transforming saving into investment, this raises φ in eq (2.5) and increases the growth rate g.

Financial intermediaries enhance growth through its informational role (Greenwood and Jovanovic 1990). Savings are allocated more efficiently; hence higher productivity of capital is possible through financial intermediaries. The risk–sharing role of financial intermediaries also allows them to pool the liquidity risk of depositors and invest funds in more illiquid and productive projects (Diamond and Dybvig, 1983) Levine (2004).

Bencivenga and Smith (1991) argue that banks increase productivity of investment by directing funds to illiquid, high-yield technology. Financial intermediaries enable individuals and firms to spread liquidity risk by selling their shares on the stock market (Pagano, 1993; Saint-Paul, 1992; Levine, 1997). However, though financial development may lead to better resource allocation, it may also lower saving (income effect) and hence, may cause growth to fall (King and Levine 1993). In summary, Pagano (1993) suggests that financial development reduces information frictions and improves resource allocation thus enhances growth.

2.3 Financial development and Human capital (HC): Theoretical Framework

Human capital includes peoples' knowledge and skills, acquired through education but also the strength and vitality which depend on their health and nutrition. Well educated people have better access to information and are more likely to behave as less risk-averse people (Outreville, 1999). He concludes that higher education leads to lower risk aversion and higher savings.

In SSA, the low literacy level makes people prefer to hold their wealth in the form of physical assets as against financial asset thereby inhibiting the development of the financial sector. Some others prefer to hold their wealth and keep it out of the financial system, thus inhibiting the credit creation ability of banks. Low education

also leads to low development of the stock and money markets. Education leads to more banking patronage, more transactions passing through the financial system.

There have been some other efforts in establishing the relationships between financial development and human capital in the literature. Among them are, De Gregorio and Guidotti (1995), Pagano (1993), De Gregorio (1996) Outreville (1999), Evans et al (2002) and Papagni (2006). All of them except Evans et al (2002) and Outreville (1999) analysed the liquidity constraints on human capital accumulation, arguing that borrowing constraints increase aggregate savings but reduces human capital accumulation and thus have negative effects on growth. Papagni (2006) used overlapping-generations model with endogenous growth to analyse this relationship.

De Gregorio (1996) argues that if households borrow to finance accumulation of human capital, the effect of this liquidity constraint on growth is ambiguous, human capital accumulation raises saving rate in the long run but lowers the productivity of investment in the short run. Low level of HC reduces overall savings in the economy and increases domestic credit to the private sector to cater for education matters (Papagni 2006).

Evans et al (2002) suggest a positive relationship between finance and human capital by interacting the two in a growth equation, and they suggest that this provides evidence for complementarity between financial development (FD) and human capital (HC). They conclude that a developed financial system is an essential complement to a human resource or manpower development in the growth process. Mishkin (2007) observes that countries with highly developed human capital are likely to benefit more from financial globalisation.

Ang (2008) suggests two channels through which financial development can influence growth, the capital accumulation and the total factor productivity, also known as the quantitative and qualitative channels respectively. The former suggests that economic growth depends on capital accumulation through domestic credit and foreign capital investment. An efficient financial system is needed to mobilize

savings and channel it to productive ventures. The latter suggests that efficient financial system boosts economic development through provision of credit facilities to facilitate human capital accumulation and development of technology-intensive industries.

There is overwhelming empirical evidence in the literature on the growth impact of human capital at microeconomic level (Psacharopoulos, 1994). However empirical findings at macroeconomic level have been mixed. Benhabib and Spiegel (1994), Bils and Klenow (2000), Easterly and Levine (2001), Hojo (2003) do not find statistically robust relationship between economic growth and human capital while Barro and Lee (1994), Temple (1999a), De la Fuente and Domeneh (2000) all find macroeconomic evidence for the positive impact of human capital on growth. This suggests that the debate on the relationship between human capital and growth at the macroeconomic level is still inconclusive.

Demetriades and Law (2006) find that in low-income countries the influence of financial development on growth is weak; they therefore conclude that more finance without sound institutions may not succeed in delivering long run economic benefits in these countries. To examine whether the hypothesis is validated in SSA, the financial development indicator was included on the right hand side of the growth equation. This study tests the endogenous financial development hypothesis (Ang 2008, Evans et al 2002) by including an interaction term of both finance and human capital as a separate independent variable in the growth equation. The results are reported tables 2.3-2.8 below.

Evans et al (2002), Baliamoune-Lutz and Ndikumuma (2007), Ang (2008), all suggest that interacting financial development with other variables significantly impact on growth. However, Bosworth and Collins (2003) find that financial development does not seem to perform well in growth regression if combined with other factors. This study tries to empirically validate either of the two positions.

The objective of this study is to analyse the relative importance of HC and FD in economic growth. It also tries to evaluate three different growth theories with the

aim of analysing their relevance to the growth experience in SSA. This is similar to what Evans et al (2002) did. The first growth theory is the Solow's classical theory which suggests that output growth is exogenously determined by technological change, thus emphasising the accumulation of physical output. The second theory is endogenous growth theory by Romer (1986) and Lucas (1988) which postulates that output growth is endogenously determined through accumulation of HC and knowledge base. The last theory is the finance-growth nexus theory of Goldsmith (1969), Mckinnon (1973), Shaw (1973) and Fry (1978) that emphasises the importance of financial market in the growth process. They argue that adequate development of the financial system facilitates growth by enabling efficient intertemporal allocation of resources.

Though Evans et al (2002) did a similar study; this chapter however departs from their study in both methodology and analysis while complementing recent studies in three ways. Firstly, in their sample they have both developing and developed countries. This study is specially focussed on the SSA countries and it also evaluates these theories on countries with different legal origin. Secondly, their study uses a translog production function while this study uses the Cobb Douglas function. Finally, this study also considers the impact of institutional variables on the growth models. A vacuum in the literature which Evans et al (2002) study did not do.

Thus, we consider a production function with three factors: physical capital, human capital and a financial variable. The physical capital is included to assess the Solow-Swan growth model; the human capital represents the endogenous growth theory; and the financial variable factor captures the impact of financial development in the growth process.

This study also provides an insight into the general Mckinnon and Shaw hypotheses, by interacting the physical capital with financial variable, a positive effect of the interaction term provides evidence for the complementarity hypothesis of Mckinnon, while a negative sign suggests that the two variables are substitute in growth process and lends credence to the Shaw debt-intermediation hypothesis. Fry

(1978) however rationalises the differences by arguing that Mckinnon hypothesis is relevant to poor or developing countries where investments are mostly self-financed, and as the economy improves, more development of the capital market may lead to money being a substitute to physical capital. A positive coefficient is also consistent with the endogenous growth theory.

The general objective of this chapter is to assess the impact of human capital and financial development on growth in some SSA countries. The major research questions here thus include:

- Does human capital or financial development have any impact on the economic growth of these countries?
- Does simultaneous accumulation of both human capital and financial development necessary for economic growth?

The first hypothesis requires either or both the human capital and financial development to be statistically significant in the growth equation, to conclude that human capital or financial development has any impact on the economies in the sample. For the second hypothesis, we expect the interaction term of both human capital and financial development to be significant.

2.4 Methodology and Model

This study uses a neo-classical augmented Solow growth model in panel data framework. This is because many earlier studies used single cross-country regression, with an assumption of identical aggregate production function for all countries. However, in reality, production function may differ across countries (Islam 1995) and sometimes this assumption gives rise to omitted variable bias as the country specific aspect of the aggregate production function that is ignored in the single cross section regression may be correlated with the included explanatory variable and this creates variable bias. The panel data framework makes it possible to correct this bias.

Thus, the panel data framework makes it possible to allow for differences in the form of unobservable individual country effects. The advantages of panel data over a

cross-section study include the fact that a panel allows us to control properly for the heterogeneity of individual countries, both through the estimation procedure and model specification. It gives more informative data, more variability, less collinearity among variables, more degree of freedom and more efficiency particularly in diagnostic testing (Baltagi ,2005; Evans et al, 2002)

This study adopts the augmented Solow model first developed by Mankiw et al (1992) (MRW 1992) in a panel data framework (Islam 1995) but adjusted to explain the growth impact of financial development and human capital in SSA in consonance with the Demetriades and Law's (2006) model.

The study assumes that the output in each country is determined by the following Cobb-Douglas production function.

$$Y_{it} = K_{it}^{\alpha}(A_{it}L_{it})^{1-\alpha} \qquad (2.6)$$

Where Y_{it} is real output in country i at time t, K_{it} is the stock of physical capital in country i at time t, L_{it} is the stock of labour, A_{it} is a labour-augmenting factor reflecting technology and efficiency in a country at any given time.

It assumes that $\alpha < 1$, meaning that there are decreasing returns to all capital and possibility of steady state, as against assuming that $\alpha = 1$, implying constant returns to scale in the reproducible factors in line with the endogenous growth theorists. However, this forecloses the possibility of a steady state in the model.

In the original Solow model, saving rates, population growth and technological progress are taken as exogenous. L and A are assumed to grow exogenously at rates n and g.

$$L_{it} = L_i(0)e^{n_i t} \qquad (2.7)$$

$$A_{it} = A_i(0)e^{g_i t + P_{it}\theta_i} \qquad (2.8)$$

Let n_i be the exogenous rate of growth of the labour force, g_i is the exogenous technological progress in each country, p_i is a vector of financial development, human capital and other factors that may affect the level of technology and efficiency in each country, and θ_i is a vector of coefficients of other related variables.

This study conceives a labour-augmenting technology (A) which is not only exogenously determined by technological improvements, but also level of financial development and human capital. From eq (2.5) the Pagano framework, it can be observed that financial development can influence growth in a number of ways which include reduction of informational frictions (Greenwood and Jovanovic, 1990), risk sharing (Levine, 1997) and improvement in resource allocation efficiency (King and Levine, 1993). An efficient financial system boosts growth through provision of credit to facilitate human capital accumulation and technological advancement (Ang, 2008).

According to Demetriades and Law (2006), in a neoclassical framework like this, the impacts of financial development on economic growth is temporary, $\partial P_{it} / dt$ is assumed to be zero in the steady state, but can be either positive or negative in transition. The level of p_i can vary across countries in the steady state, suggesting different countries can converge to different steady states depending on their steady state level of financial development and human capital accumulation.

The output per effective worker $[Y / AL]$ is constant but output per worker $[Y / L]$ grows at the exogenous rate g. Output per effective worker evolves as:

$$\frac{Y_{it}}{A_{it}L_{it}} = (K_{it})^{\alpha} \tag{2.9}$$

While output per worker evolves as:

$$\frac{Y_{it}}{L_{it}} = A_{it}(K_{it})^{\alpha} \tag{2.10}$$

Where $y_{it} = (Y_{it} / L_{it})$, and taking the log transformation of the two sides of equation (2.10), we obtain

$$\ln y_{it} = \ln A_{it} + \alpha \ln K_{it} \tag{2.11}$$

Substituting equation 2.8 in 2.11, we obtain an equation for income per capita

$$\ln y_{it} = \ln A_{i0} + (1-\alpha)g_i t + (1-\alpha)\theta_i P_{it} + \alpha \ln K_{it} \tag{2.12}$$

The above shows how income per capita is determined by a vector of financial development, human capital variables, level of physical capital and the exogenous

rate of output. To estimate equation 2.12, we specify a linear functional form for the vector of P.

$$\ln y_{it} = \ln A_{i0} + (1-\alpha)g_i t + (1-\alpha)\theta_{1i} P_{1it} + (1-\alpha)\theta_{2i} P_{2it} + \alpha \ln K_{it} + \varepsilon_{it}$$

(2.13)

P_1 is a financial development indicator, P_2 is a human capital index,, k_{it} is the stock of physical capital and ε_{it} is the error term.

The second or alternative functional form for P is a non-linear specification, by including an interaction term which is captured by multiplying the financial development and human capital to capture the complementary role of both terms in growth equation.

$$\ln y_{it} = \ln A_{i0} + (1-\alpha)g_i t + (1-\alpha)\theta_{1i} P_{1it} + (1-\alpha)\theta_{2i} P_{2it} + (1-\alpha)\theta_{3i}(P_{1it} P_{2it}) + \alpha \ln K_{it} + \eta_{it}$$

(2.14).

Equations 2.13 and 2.14 are the basis for the empirical models, which can be written in the reduced form as follows.

$$\ln y_{it} = a_{i0} + a_{1it} + a_{2i} FD_{it} + a_{3i} HC + a_{4i} \ln K_{it} + \varepsilon_{it}$$

(2.15)

$$\ln y_{it} = a_{i0} + a_{1it} + a_{2i} FD_{it} + a_{3i} HC + a_{4i} \ln K_{it} + a_{5i}(FD_{it} * HC_{it}) + \varepsilon_{it} \qquad (2.16)$$

Where the $\alpha's$ are coefficients to be estimated, and FD and HC are financial development indicator and human capital index respectively. In line with the MRW (1992) augmented Solow model, the study includes net effect of the population growth rate in equation 2.17 (see MRW 1992, Islam 1995). It also assumes a 5% technological growth and depreciation rate in consonance with MRW (1992). Thus the models estimated in this chapter is

$$\ln y_{it} = a_{i0} + a_{1it} + a_{2i} \ln FD_{it} + a_{3i} \ln HC + a_{4i} \ln K_{it} + a_{5i} \ln(n+g+s)_{it} + \varepsilon_{it}$$

(2.17)

$$\ln y_{it} = a_{i0} + a_{1it} + a_{2i} FD_{it} + a_{3i} HC + a_{4i} \ln K_{it} + a_{5i} \ln(n+g+s)_{it} + a_{6i}(FD_{it} * HC_{it}) + \varepsilon_{it}$$

(2.18)

Where Y_{it} is the real GDP per capita in country i at time t, FD_{it} is the financial development indicator, HC_{it} is the stock of human capital index, K_{it} is the stock of physical capital, $(n+g+s)_{it}$ is the net effect of population growth rate and depreciation in each country for the period under review and ε is the error term. All variables are in logarithm form. The theoretical a priori expectation is a positive and significant impact of all variables except the net effect of population, which is expected to be negative as higher population growth rate impacts negatively on the growth. Though this is a Malthusian perspective, higher population may also reflect potential market size and may also lead to technological advancement as the potential stock of human capital is increased. Thus, it is expected that $\alpha_{2i}, \alpha_{3i}, \alpha_{4i}, \alpha_{6i} > 0, and \alpha_{5i} < 0$

Three panel estimation techniques were used to estimate equations 2.17 and 2.18, the fixed effect, random effects and maximum likelihood techniques. Hausman test based on the difference between fixed and random effects estimators was also conducted. The test revealed that the fixed effect is the better estimation method.
The study further uses robust cluster estimation to confirm the robustness of the model and to cater for heteroscedasticity of the error terms across periods in the model.

From equation 2.18, the study tries to assess the marginal effect of financial development in the presence of human capital accumulation, by having the partial derivative of equation 2.18 with respect to the financial development indicator. Also, a similar exercise was done by finding the marginal effect of human capital accumulation in the presence of a financial system. .

$$\frac{\partial \ln Y_{it}}{\partial \ln(HC)_{it}} = a_3 + a_5(FD)_{it} \qquad (2.19)$$

$$\frac{\partial \ln Y_{it}}{\partial \ln(FD)_{it}} = a_2 + a_5(HC)_{it} \qquad (2.20)$$

To enable comparability with the previous studies, this study also tests convergence in the usual way, by including initial income (initial GDP) as one of the regressors (See MRW, 1992; Temple, 1999b; Evans et al, 2002). Evans et al (2002) justify the inclusion of initial condition firstly to test for convergence and secondly to capture any relevant omitted variables which is an endemic problem associated with testing growth theories and finally to cater for the difficulty in measuring human capital and money in practice.

Also, this study explores the relevance of the physical capital stock in the presence of financial development and human capital in the region. This is done to verify the Mckinnon-Shaw debt-intermediation hypothesis. After this, a number of sensitivity analyses were done to assess growth dynamics in the presence of some other factors that have been identified in the literature.

2.4.1 Data Sources

Jappelli and Pagano (1992) observe that financial development is too generic a term, and suggest that to assess the impact of financial development on growth one must specify the particular financial market concerned (banking development or Stock market development) because they have different impacts on growth. However, due to the underdevelopment of the capital market in the region, the financial system in the region can be described as a bank-based rather than market-based. Pagano (1993) further suggests that bank lending to firms seems to be the first transmission mechanism through which financial development affects economic growth and then followed by stock and bond markets, and finally insurance markets. This rationalises the choice of banking development indicators as the appropriate financial development indicators in the region. However, Greenwood and Jovanovich (1990) observe that this trend changes over time, as the economy grows, incentive to participate in financial markets increases, and benefits from participation increase more than the participation cost.

This study uses four indicators of banking sector development that have been used in the literature. These indicators include liquid liabilities, broad money, private credit, and domestic credit, each taken as a ratio of the Gross Domestic Product (GDP) (King and Levine, 1993, Levine, 2003). The first two indicators examine the depth of financial intermediaries in the country, and measure the degree of monetization in an economy, and the overall size of the financial sector (King and Levine 1993; World Bank 1989; Gelb 1989) hence they are called financial deepening measures. The last two indicators measure the relative degree to which the financial system allocates credit for productive activities

Ang and Mckibbin (2007) argue that the financial deepening measures (M2/Y, M3/Y) only reflect the extent of transaction services provided by financial system rather than the ability of the financial system to channel funds from depositors to investment opportunities. They opine that bank credit to the private sector is a superior measure of financial development, since the private sector is able to utilise funds in a more efficient and productive manner (Demetriades and Hussein 1996).

However, they observe that the ratio (M2/Y) might be relevant in the developing countries where substantial component of the broad money is held outside the banking system; giving supports to the McKinnon's outside money model in which the accumulation of real money balances is necessary for self-financed investment (Evans et al, 2002).

This study also uses the ratio of domestic credit to GDP and specifically the ratio of domestic credit to the private sector to the GDP. This is in consonance with the inside money model of Mckinnon and Shaw. This ratio is responsible for the quantity and quality of investment and, in turn the economic growth. This ratio could also enhance the accumulation of HC in period of insufficient government support for education.

Due to the rudimentary stage of the capital market and the paucity of data-base in the region, the capital market development indicators namely the stock market capitalisation (% of GDP), total share value traded (% of market capitalisation) and number of companies listed (% of population in million) could not be used.

The data were mostly sourced from World Development Indicators (WDI) of the World Bank, the real GDP was from the WDI, the stock of physical capital[4] was from Bosworth and Collins which were calculated using the perpetuity method from the data set of Penn World Table, the stock of human capital was from Bosworth and Collins, and it is the average of the educational attainment from Barro and Lee (2001) and Cohen and Soto (2001), the financial development indicators were all from the WDI, the depreciation and technology rates were assumed to be 5% in line with MRW (1992), while the population growth rate were from the WDI and the labour force is the economically active population, from the International Labour Organisation

2.5 Econometric results

This section begins with the definition and sources of each variable in the study (Table 2.1), the descriptive statistics of the data used its unit of measurement, sample period and countries in the sample. The correlation matrix between the variables was conducted and reported in Table 2.2. This indicates high correlation among the financial development variables, the correlation between stock of physical capital and real GDP is positive and strong, the correlation between real GDP and stock of human capital is also positive, and also correlation between real GDP and financial development indictors are positive but weak. The value of the correlation between economic growth and financial development ranges from 0.015 (M3) to 0.10 (DC). This first gives a general overview of the relationship between finance and growth in the region. In all, the table (2.1) suggests that the data exhibits variation across countries; the heterogeneity trend supports the choice of the panel estimation method for the study. The diagnostic tests reveal the models are well specified and the appropriate techniques applied. The results are given in tables 2.3 - 2.8.

From Table 2.3.1, all the variables except the financial development variables confirm the a priori theoretical expectations and they are rightly signed. The human capital variable enters with a positive sign and it is statistically significant at one

[4] Capital stock is calculated using perpetual inventory measure as $K_t=K_{t-1}(1-\delta)+I_t$

percent level. This tends to lend empirical support to the endogenous growth theory. This is similar to the findings of Barro (1991, 2001) and Bosworth and Collins (2003). This tends to suggest that one unit increase in human capital accumulation may increase the output per worker by two units. Perhaps this may suggest that a high growth impact is often seen when an economy has been repressed for a long number of years due to war, famine etc thus this variable has great positive impact on growth. This is similar to what Bosworth and Collins (2003) obtained. The coefficient of the physical capital has been positive and the size is similar to what was obtained by MRW (0.33), Bosworth and Collins (0.35). The net effect of population growth rate has been negative as predicted in the literature in consonance with the Malthus's view and the size has been (0.05) in line with the literature.

The financial development indicators are all statistically insignificant except domestic credit to the economy which was significant but negatively signed. This is similar to what was obtained by Baliamoune-Lutz and Ndikumuma (2007) on SSA in particular and Demetriades and Law (2006) on developing countries in general. They rationalise this as suggesting that financial development in the developing countries may not enhance growth until there are well developed institutions. Another possible explanation is that in some of these countries, it is not finance but resource endowment (Oil, Gold and Diamonds) that is driving the economies. In some countries, Oil accounts for over 60% of their GDP (Nigeria, Gabon). This factor, coupled with long history of financial repression, may lead to low performance of financial indicators in growth equations. Also, Xu (2000) in a multivariate VAR model study of 41 countries finds that the long term effect of financial development on growth is negative 14 of his sample countries are in SSA. Calderon and Liu (2003) also find negative impact of financial development on growth. One explanation in the literature has been the dominance of the Keynesian financial repression regime (Fry 1978).

The F- statistics, Wald –Test statistics and Chibar^2 all indicate that the models have strong overall fitness, and the R-Square suggest that the independent variables can explain about 70% of the variations in the dependent variables.

The results from the robust estimation in Table (2.4) does not show any significant difference either in size or sign from the earlier reported results, thereby confirming the appropriateness of the estimation technique and that the model has been well specified.

Now turning to the model with the interaction term, the results are reported in Table 2.5.1-2.5.2. The stock of physical capital is positive and statistically significant at 1% level, and the value ranges from 0.38 - 0.48 which is slightly above the value 0.35 reported by MRW (1992), Bosworth and Collins (2003). This may be due to the stage of development of the countries as well as the underdevelopment of the financial sector which makes physical asset as alternative source of holding financial assets.

The net effect of population growth on the economy is still negative, and statistically significant, while the financial development indicators enter with negative sign, the human capital indicator is not statistically significant. However, the interaction term has been positive and statistically significant for all the measures of financial development used in the study. This gives credence to the endogenous financial theory of Ang (2008), and complementarity hypothesis of Evans et al (2002). Sequel to this finding, this study explores the marginal effects of financial development on economic growth in the presence of well developed human capital.

2.6 Marginal Effects of Human capital

To further analyse the quantitative importance of human capital and financial development on economic growth in the sample countries, the study also calculates the marginal effects of financial development (human capital) on economic growth in the presence of human capital (financial system). This implies finding the cross partial derivative of equations 2.21 and 2.22 using model 2 (i.e the model with the interaction term). The marginal effect is obtained by taking the coefficient of the interaction term where it is significant at conventional 5% level. In cases where the estimated parameter is not significant at the 5% level, zero value is assigned to the parameter.

The results from the robust estimation are used so as to be able to make valid inferences from the exercise. The maximum, minimum and mean are obtained from the summary statistics from Table 2.1. Results of this exercise are presented in Tables 2.6.1 and 2.6.2 below. This gives the short run effects of financial development on growth in the presence of human capital in the region and vice versa for Table 2.6.2.

The positive impact ranges from minimum value of 0.50 (private credit) to maximum value of 1.96 (liquid liabilities). This further suggests that in the region, substantial credit still goes to the public sector. This may indicate the presence of the Keynesian framework against the classical view that emphasises private sector development. The likely effect of this trend is crowding-out of the private sector in the development process.

A similar exercise was conducted to assess the marginal effect of human capital on growth in the presence of a financial system. This value ranges from minimum positive impact of 1.06 to maximum effect of about 92.76. This suggests that a well-developed financial system that facilitates the acquisition of human capital can have more positive impact on growth in the region. This further lends credence to the endogenous growth theory. The policy implication is that to elicit more positive impact of human capital on growth, there is a need for more policy attention on financial system development as well.

2.7 SENSITIVITY ANALYSIS

Ang and Mckbbin (2007) opine that bank credit to the private sector is a superior measure of financial development since the private sector is able to utilise funds in a more efficient and productive manner. Thus, for most of the analysis in this section, the study adopts private credit as the ratio of GDP as a measure of financial development. Model 1(i.e the model without the interaction term) is used as the benchmark model and robust cluster estimation is used. Column A relates to estimation of model 1 with the inclusion of legal origin dummy, column B relates to estimation of model 1 with the inclusion of oil dummy, column C includes the interaction term of financial development with stock of physical capital, Column D

includes the interaction of the stock of human capital with physical capital, Columns E and F include the quadratic terms of the financial development and human capital respectively to assess whether each variable of interest exhibits economies of scale. Columns G and H include the interaction term of the initial capital with the financial development and human capital respectively.

La Porta et al (1997), Easterly and Levine (1997) emphasised the importance of the differences in the legal origin and ethnic differences in growth equations respectively. Hence, the study accounts for this by using a dummy to capture differences in the legal origin in the region; the dummy assumes the value of 1, if the country is Anglo-phone and Zero, if the country is Francophone and others.

The result suggests that the Anglophone country has better economic growth performance for the period under review, it indicates that Anglophone SSA has better growth performance of 0.8 more than the Francophone, this can also be seen in the pattern of growth performance (World Bank 2007)[5] which shows that most of the high performing countries in the region are countries with English legal origin. Though Collier (2007) argues that Francophone African countries are better at managing civil conflicts because of their colonial history, however when there are less civil strifes, the Anglophone countries are better at managing resources and thus have better economic growth pattern.

The study further assesses the impact of resource endowment in the region. Countries with extractive and other natural resources like oil, diamond and gold are assigned the value of one, and others zero, this is basically to assess the popular Dutch Disease Syndrome (DDS) hypothesis, where it has been argued that countries with natural resources are consequently worse off, either due to inefficient utilisation of the net inflow from the resources due to wastages and corruption (Balassa 1986) or ethnic cleansing, and civil unrest associated with ownership struggle of the resources (Collier and Hoeffler 1998, Lewis 2007). However, World Bank (2007) actually suggested that most resource-rich countries have better growth performance. The result gives empirical support to the World Bank claim as against

[5] Bostwana, Mauritius, Ghana, Gambia, Nigeria, Equitoria Guinea and Angola

the Dutch Disease Syndrome hypothesis, the coefficient of the Oil dummy enters with a positive sign and statistically significant at 5% level, suggesting that resource rich countries out-perform the others for the period under review.

This study also explores the interaction of physical capital with financial development. This provides insight into the general Mckinnon and Shaw hypotheses, through the interaction of the physical capital with financial variable. A positive effect of the interaction term provides evidence for the complementarity hypothesis of Mckinnon, while a negative sign suggests that the two variables are substitute in growth process and lends credence to the Shaw debt-intermediation hypothesis. Fry (1978) suggests that Mckinnon hypothesis is relevant to poor or developing countries where investments are mostly self-financed, and as the economy improves, more development of the capital market may lead to money being a substitute to physical capital. A positive coefficient is also consistent with the endogenous growth theory. Financial institutions reduce costs and externalities from investment risk and thus enhance efficient capital accumulation (Bencinvenga and Smith 1991). The coefficient enters with a negative sign (-0.01), the result suggests substitution effect, though only significant at 10% level, and provides a weak empirical evidence to the debt-intermediation hypothesis of Shaw. This may reflect the stage of the economies and level of poverty in the region that makes physical capital a substitute for financial assets, especially in a period of decelerating income flow, or it may be a reflection of the underdevelopment of the financial market. However, this trend may change as the economy grows.

Further analysis was carried out by interacting physical capital with human capital and assessing its impact on the growth process. This is in line with Barro (1991), when he suggests that interaction between human capital and physical capital impacts more on the productive capacity of an economy. More HC may affect the rate of growth of physical capital (KS), if both are complements then increasing HC raises the rate of return on KC. He concludes that accumulation of human capital leads to high ratio of physical investment to GDP. Grier (2005) shows that both the HC and KC are jointly endogenous; the quantity of KS positively and significantly affects the quantity of HC and vice versa. An increase in the stock of physical

capital could have a positive effect on the accumulation of HC now and that HC will be more productive in the future in the presence of physical capital that can guarantee the productive employment of the human capital.

This proposition may be relevant to developed countries. However, in some developing countries where the return on education is low, with high unemployment rate and high poverty, the stock of physical capital often acts as a substitute for human capital accumulation. Households use physical assets as consumption–smoothing in an era of decelerating income. Thus households are trapped in low income, high liquidity equilibria (Dercon, 1997). The result suggests a substitution effect and lends credence to the consumption-smoothing impact of physical capital as against the complementary hypothesis. Though a positive coefficient of the interaction term between physical capital and human capital provides further evidence for the knowledge based theory, embodiment and learning by doing hypothesis. However this study cannot find empirical support for this hypothesis. It however suggests substitution effect in the sample countries. This finding may reflect the stage of development in some of the countries in the sample, however, as these countries develop more, the complementary effect may hold in the future. Thus, this trend may be a short run analysis, as the economy grows this may change.

Furthermore, this study attempts to analyse whether either of the two variables of interest exhibits increasing returns to scale, by including their squared terms in the equation. A positive coefficient of the variables suggests increasing returns to scale which is consistent with the endogenous growth theory. However, a negative coefficient suggests diminishing return which is in consonance with the Solow growth theory. The squared term of the financial development is negative while the squared term of the human capital is positive. The positive sign of the human capital provides more evidence for the endogenous growth theory and indicating increasing returns to scale. However, the negative sign of the financial development may reflect the underdevelopment of the sector in the region.

The inclusion of the initial income is to test the convergence theory (Barro, 1991; Temple, 1999b). The positive coefficient of this variable suggests divergence, while

a negative sign provides evidence for the condition convergence hypothesis (MRW 1992). The result shows possibility for conditional convergence, since the coefficient for Y70 is negative. This is in agreement with various empirical studies reported in the literature (Barro, 1991; MRW, 1992). The convergence is conditional in that it predicts higher growth in response to lower initial GDP. This suggests that the region's economic growth performance supports the catch-up hypothesis. Thus, with an appropriate policy regime, any developmental effort can translate into greater growth impact in the region.

Another interesting exploration in the study in line with Evans et al (2002), is the interaction of the initial income with each of the variables of interest, a negative coefficient suggests convergence while a positive sign suggests divergence, suggesting that each country reaches its own steady state in consonance with the Solow model or neoclassical growth theory and supported by MRW explanation. While a positive sign of the interaction term with financial variable suggests endogenous financial growth, a negative sign may suggest that for finance to enhance growth in developing countries, appropriate development of institutions and other factors may be necessary. Also, a divergence hypothesis in human capital may support endogenous theory, while a negative sign may signify that accumulation of qualitative education is as important as widening the access to education. Hence, an improvement in the quality and quantity of education would be needed to enhance economic growth in the future. The coefficients of the interaction terms for both variables enter with a negative sign but they are not statistically significant at 5% level.

The study also assesses the impact of corruption on economic growth. There are two popular theories that relate corruption to growth especially in developing countries. The Leff (1964) and Huntington (1968) suggest the efficient grease hypothesis, which opine that some level of bribery might be necessary to enhance firm's productivity and growth in countries with weak institutions and high government bureaucratic bottlenecks. However, Mauro (1995) suggests that corruption inhibits investment and impacts negatively on growth. The result suggests that corruption

has a negative impact on growth and support Mauro (1995) as against the efficient grease hypothesis of Leff (1964) and Huntington (1968).

Tables 2.9.1 and 2.9.2 present the estimation results for the growth equation in first difference; this is to give the short run dynamic impact of the determinants of economic growth in the region. For most of the estimation results, the human capital indicator has not been significant, may be in consonance with Hojo (2003) findings, however the financial development indicators enter with negative signs and statistically significant for most of the indicators. The stock of physical capital was also positive and statistically significant, and its values range from 0.34-0.39 which is in line with the theoretical postulates and several empirical studies. Thus, using the growth equation, the finding of this thesis suggests that the stock of physical capital is the most important determinant of growth in the region. This may only reflect the stage of development in the region, and may also indicate that both the financial sector and human resources are fairly underdeveloped in the region.

2.8 Policy implications

Human capital accumulation and financial development are both needed for acceleration of growth in SSA. A neglect of either could affect the pace of development in the region. Government investment on these could have strong positive impact on the economies. The finding from this study may however, suggest that human capital accumulation is relatively more important for growth than financial development, though simultaneous development of the two may lead to a greater positive impact on growth. Despite all these strong effects of human capital on growth, the policy prescription of 1980s was to reduce government spending and involvement economic activities while trying to encourage private sector development. This position needs to be reviewed, in order to meet some of the millennium development goals. This study advocates for more efficient and effective investment in human capital and financial development in the region.

2.9 Conclusion

This chapter provides a panel data study that uses the augmented Solow model to investigate the effect of financial development and human capital on the economic growth in SSA for the period of 1970-2000. The diagnostic test shows that the model is well specified, and the appropriate technique used.

The main findings that emerge from the study are summarized as follows. Firstly, human capital impacts positively on growth, which is in line with MRW (1992), Barro (2001), Bosworth and Collins (2003) but financial development does not have much impact on growth. This poor performance of the financial development indicators may be due to long history of financial repression in the region, with the dominance of the Keynesian framework and emphasis on government intervention through directed lending, credit rationing, and administratively-fixed interest rate regime. It may equally be due to poor development of the institutions in the region in line with the findings of Demetriades and Law (2006), poor infrastructural facilities and high transaction cost (Ajayi, 2003), weak property rights (De Soto, 2000) and inefficient legal system (Mishkin, 2007). The coefficient of physical capital was positive and significant under different specifications. These findings provide empirical support for endogenous growth theory and the Solow growth theory, and the size of the coefficient of the physical capital has been about 0.35 in line with the prediction of MRW. It also indicates that in the region, physical capital is a very important determinant of growth.

Since, human capital is found to be positive and significant; this lends credence to the endogenous theory. This provides macroeconomic evidence for the positive impacts of human capital on growth in SSA. It supports the findings of Barro (1991), MRW (1992) etc. The results tend to provide empirical support to the Shaw's debt intermediation as against McKinnon's complementarity hypothesis. This also supports the Solow and neoclassical growth that emphasises the substitution between the financial markets and capital accumulation in growth process.

There is evidence for conditional convergence. The study also finds positive impact of Finance-Human capital interaction term. The coefficient of the interaction variable has been positive and statistically significant through-out all the different specifications used, suggesting the complementarities of the two variables (FD and HC) in SSA.

Given the fact that these countries have poor initial condition, any adjustment program that leads to reduction on spending on education could be counterproductive. Hence, this study suggests a proper sequencing of reform efforts and a deeper consideration of the trade-off between short-term adjustment program and long term stabilisation policies.

Using this comprehensive data set from Bosworth and Collins[6] (2003), affords the study the ability to examine competing hypotheses in a panel framework. Other studies could explore analysing these effects while focusing more on institutional factors in the region.

[6] The author gracefully acknowledges the data set from Professors Bosworth and Collins, and Fedderke (South Africa).

APPENDIX:

Table 2.1 : SUMMARY OF DATA SET USED (ANNUAL DATA 1970-2000)

Variables	Definition of variables	Sources	Unit of Measurement	Mean	Standard Deviation	Minimum	Maximum
DCp	Private Credit	WDI	% of GDP	21.05	21.50	1.54	134.44
M3	Liquid Liabilities	WDI	% of GDP	25.24	10.50	9.92	60.00
M2	Broad Money	WDI	% of GDP	22.58	10.31	8.79	58.38
DC	Domestic Credit	WDI	% of GDP	32.24	17.57	-1.62	90.04
Y	Real GDP Per Capita	WDI	US Dollars at 2000 constant prices	813.43	1347.99	104.63	7714.23
HC	Stock Human Capital	(Barro and Lee 2001), (Bosworth and Collins2003)	Education Attainment	1.09	0.06	1.00	1.26
KS	Stock of Physical Capital	Penn World	Perpetual Inventory	2289772	33996969	8161	14900000
I/Y	Investment in Physical Capital	Penn World	% of GDP	17	10.90	4.15	68.27

Countries: Cameroon, Cote d'ivorie, Ghana, Kenya, Madagascar, Malawi, Mali, Nigeria, Niger, Rwanda, Senegal, Sierra-Leone, South Africa, and Zambia

CORRELATION MATRIX

Table 2.2: Correlation Matrix of Data used (ANNUAL DATA 1970-2000)

Variables	Y	HC	KS	DC	DCP	M3	M2	I/Y
Y	1.000							
HC	0.136	1.000						
KS	0.779	0.166	1.000					
DC	0.169	0.219	0.334	1.000				
DCP	0.100	-0.055	0.018	0.560	1.000			
M3	0.015	0.048	0.117	0.633	0.711	1.000		
M2	0.054	-0.026	0.096	0.613	0.850	0.934	1.000	
I/Y	-0.079	-0.312	0.147	-0.091	0.044	0.198	0.149	1.000

Countries: Cameroon, Cote d'ivorie, Ghana, Kenya, Madagascar, Malawi, Mali, Nigeria, Niger, Rwanda, Senegal, Sierra-Leone, South Africa, and Zambia

Table 2.3.1: Financial Development, Human Capital and Economic Growth in SSA (1970-2000)

$$LY_{it} = \alpha_0 + \beta_1 \ln HC_{it} + \beta_2 \ln KS_{it} + \beta_3 \ln(n+s+g)_{it} + \ln FD_{it} + \varepsilon_{it} \ldots.(1)$$

Independent Variables	**Private Credit**			**Domestic Credit**		
Estimator	FE	RE	MLE	FE	RE	MLE
Cons	7.48***	6.79***	7.31***	8.86***	6.52***	7.19***
	(0.35)	(0.38)	(0.23)	(0.63)	(0.35)	(0.46)
Ln HC_{it}	2.26***	1.91***	2.17***	1.63***	1.81***	2.12***
	(0.22)	(0.23)	(0.23)	(0.28)	(0.21)	(0.21)
Ln KS_{it}	0.36***	0.41***	0.38***	0.31***	0.46***	0.41***
	(0.03)	(0.03)	(0.03)	(0.48)	(0.03)	(0.03)
$Ln(n+s+g)_{it}$	-0.04**	-0.05**	-0.04	-0.05**	-0.05**	-0.05**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Ln FD_{it}	0.03	0.02	0.03*	-0.13***	-0.09**	-0.08***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
R-Squared	0.73	0.73		0.53	0.75	
FTest/Wald Test	343.66	1021.43	519.02	362.2	1119.89	984.67
(p-Value)	(0.000)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

1 ****, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively*

2 *Figures in the parentheses are the standard errors.*

3 *Panel estimation using fixed effect(FE), Random Effect (RE) and Maximum likelihood(MLE) estimation techniques N=14, T=31*

Table 2.3.2: Financial Development, Human Capital and Economic Growth in SSA (1970-2000)

$$LY_{it} = \alpha_0 + \beta_1 \ln HC_{it} + \beta_2 \ln KS_{it} + \beta_3 \ln(n+s+g)_{it} + \ln FD_{it} + \varepsilon_{it} \ldots.(1)$$

Independent Variables	**Liquid Liability**			**Broad Money**		
Estimator	FE	RE	MLE	FE	RE	MLE
Cons	7.36***	6.60***	7.20***	7.37***	6.64***	7.20***
	(0.32)	(0.36)	(0.47)	(0.33)	(0.00)	(0.47)
Ln HC_{it}	2.20***	1.79***	2.11***	2.18***	1.78***	2.08***
	(0.22)	(0.23)	(0.22)	(0.23)	(0.23)	(0.23)
Ln KS_{it}	0.36***	0.44***	0.38***	0.37***	0.43***	0.38***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
$Ln(n+s+g)_{it}$	-0.04**	-0.04**	-0.04**	-0.04**	-0.05**	-0.04**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Ln FD_{it}	0.04	0.01	0.04	0.03	-0.01	0.02
	(0.03)	(0.03)	(0.02)	(0.04)	(0.04)	(0.04)
R-Squared	0.73	0.72		0.73	0.73	
F/Wald /Chi bar^2	466.30	1011.54	973.89	488.51	1014.28	488.51
(p-Value)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Hausman Test	2199.94			367.64***		
	(0.00)			(0.00)		

4 ****, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively*

5 *Figures in the parentheses are the standard errors.*

6 *Panel estimation using fixed effect(FE), Random Effect (RE) and Maximum likelihood(MLE) estimation techniques N=14, T=31*

Table 2.4: Financial Development, Human Capital and Economic Growth in SSA (1970-2000)

With Robust Standard Error Estimation

$$LY_{it} = \alpha_0 + \beta_1 \ln HC_{it} + \beta_2 \ln KS_{it} + \beta_3 \ln(n+s+g)_{it} + \ln FD_{it} + \varepsilon_{it} \ldots.(1)$$

Independent Variables	**Private Credit**	**Domestic Credit**	**Liquid Liability**	**Broad Money**
Cons	7.48***	6.52***	7.36***	7.37***
	(0.35)	(0.35)	(0.35)	(0.33)
Ln HC_{it}	2.26***	1.81***	2.20***	2.18***
	(0.22)	(0.21)	(0.23)	(0.23)
Ln KS_{it}	0.36***	0.46***	0.36***	0.37***
	(0.03)	(0.03)	(0.03)	(0.03)
$Ln(n+s+g)_{it}$	-0.04**	-0.05**	-0.04*	-0.04**
	(0.02)	(0.02)	(0.02)	(0.02)
Ln FD_{it}	0.03	-0.09**	0.04	0.03
	(0.02)	(0.02)	(0.04)	(0.04)
R-Squared	0.73	0.75	0.73	0.73
F-Test	192.91	919.46	200.22	195.06
(p-Value)	(0.00)	(0.00)	(0.00)	(0.00)

7 ****, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively*

8 *Figures in the parentheses are the standard errors.*

9 *Panel estimation using fixed effect(FE), Random Effect (RE) and Maximum likelihood(MLE) estimation techniques N=14, T=31*

Table 2.5.1: Financial Development, Human Capital and Economic Growth in SSA (1970-2000) (with Interaction term)

$$LY_{it} = \alpha_0 + \beta_1 \ln HC_{it} + \beta_2 \ln KS_{it} + \beta_3 \ln(n+s+g)_{it} + \beta_4 \ln FD_{it} + \beta_5 \ln(FD_{it} * HC_{it}) + \varepsilon_{it} \ldots.(1)$$

Independent Variables	**Private Credit**			**Domestic Credit**		
Estimator	FE	RE	MLE	FE	RE	MLE
Cons	7.51***	6.93***	7.34***	7.18***	6.44***	7.01***
	(0.33)	(0.38)	(0.47)	(0.32)	(0.35)	(0.44)
Ln HC_{it}	0.23	-0.19	0.11	-0.02	-1.08	-0.25
	(0.54)	(0.56)	(0.54)	(0.86)	(0.91)	(0.86)
Ln KS_{it}	0.38***	0.42***	0.39***	0.42***	0.48***	0.43***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
$Ln(n+s+g)_{it}$	-0.04**	-0.05**	-0.04**	-0.04*	-0.04**	-0.04**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Ln FD_{it}	-0.05**	-0.06**	-0.06**	-0.13***	-0.14***	-0.13***
	(0.03)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)
$Ln(FD_{it}*HC_{it})$	0.69***	0.74***	0.71***	0.63***	0.83***	0.67***
	(0.17)	(0.18)	(0.17)	(0.24)	(0.25)	(0.24)
R-Squared	0.75	0.74		0.75	0.76	
F/Wald /Chi bar^2	535.25	1088.21	1026.20	491.92	1165.33	991.98
(p-Value)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Hausman Test	904.57***			431.83		
	(0.00)			(0.00)		

*10 ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively*

11 Figures in the parentheses are the standard errors.

12 Panel estimation using fixed effect(FE), Random Effect (RE) and Maximum likelihood(MLE) estimation techniques N=14, T=31

Table 2.5.2: Financial Development, Human Capital and Economic Growth in SSA (1970-2000) (with Interaction term)

$$LY_{it} = \alpha_0 + \beta_1 \ln HC_{it} + \beta_2 \ln KS_{it} + \beta_3 \ln(n+s+g)_{it} + \beta_4 \ln FD_{it} + \beta_5 \ln(FD_{it} * HC_{it}) + \varepsilon_{it} \ldots.(1)$$

Independent Variables	**Liquid Liability**			**Broad Money**		
Estimator	FE	RE	MLE	FE	RE	MLE
Cons	7.48***	6.87***	7.33***	7.46***	6.85***	7.28***
	(0.31)	(0.36)	(0.46)	(0.33)	(0.37)	(0.47)
Ln HC_{it}	-3.17***	-3.96***	-3.37***	-1.25	-2.01*	-1.47
	(1.03)	(1.08)	(1.03)	(1.01)	(1.04)	(1.00)
Ln KS_{it}	0.39***	0.45***	0.41***	0.39***	0.45***	0.41***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
$Ln(n+s+g)_{it}$	-0.05**	-0.05**	-0.05**	-0.04**	-0.05**	-0.04***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Ln FD_{it}	-0.11**	-0.15***	-0.12***	-0.08*	-0.13**	-0.10**
	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)
$Ln(FD_{it}*HC_{it})$	1.64***	1.78***	1.68***	1.08***	1.22***	1.12***
	(0.31)	(0.32)	(0.31)	(0.31)	(0.32)	(0.31)
R-Squared	0.75	0.75		0.74	0.74	
F/Wald /Chi bar^2	486.80***	1124.98***	991.14***	497.17***	1067.91***	999.33***
(p-Value)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Hausman Test	363.42***			173.10***		
	(0.00)			(0.00)		

Table 2.5.3: Financial Development, Human Capital and Economic Growth in SSA (1970-2000) (with Interaction term)

(With robust standard error estimation)

$$LY_{it} = \alpha_0 + \beta_1 \ln HC_{it} + \beta_2 \ln KS_{it} + \beta_3 \ln(n+s+g)_{it} + \beta_4 \ln FD_{it} + \beta_5 \ln(FD_{it} * HC_{it}) + \varepsilon_{it} \ldots.(1)$$

Independent Variables	**Private Credit**	**Domestic Credit**	**Liquid Liability**	**Broad Money**
Cons	7.51***	7.18***	7.48***	7.46***
	(0.34)	(0.33)	(0.31)	(0.33)
Ln HC_{it}	0.23	-0.17	-3.17***	-1.26
	(0.54)	(0.82)	(1.03)	(1.04)
Ln KS_{it}	0.38***	0.42***	0.39***	0.39***
	(0.03)	(0.03)	(0.03)	(0.03)
$Ln(n+s+g)_{it}$	-0.04**	-0.04**	-0.05**	-0.04*
	(0.02)	(0.02)	(0.02)	(0.02)
Ln FD_{it}	-0.05*	-0.13***	-0.11**	-0.09
	(0.03)	(0.02)	(0.04)	(0.05)
$Ln(FD_{it}*HC_{it})$	0.69***	0.63***	1.64***	1.09***
	(0.18)	(0.23)	(0.31)	(0.33)
R-Squared	0.75	0.75	0.75	0.74
F-Test /Wald Chi2	171.11***	188.95***	188.26***	172.44***
(p-Value)	(0.00)	(0.00)	(0.00)	(0.00)

Table 2.6.1: Marginal effects of financial development on economic growth (at various values of human-capital in SSA)

Financial Development Indicator	Domestic Credit	Private Credit	Liquid Liability	Broad Money	Model 2
Mean	0.70	0.56	1.68	1.18	$\frac{\partial \ln Y_{it}}{\partial \ln FD_{it}} = \beta_4 + \beta_5 \ln HC_{it}.$
Minimum	0.64	0.50	1.53	1.09	
Maximum	0.81	0.66	1.96	1.37	

Table 2.6.2: Marginal effects of human capital on economic growth (at various values of financial development in SSA)

Financial Development Indicator	Domestic Credit	Private Credit	Liquid Liability	Broad Money	Model 2
Mean	20.31	14.52	38.22	24.61	$\frac{\partial \ln Y_{it}}{\partial \ln HC_{it}} = \beta_1 + \beta_5 \ln FD_{it}.$
Minimum	-1.02	1.06	13.10	9.32	
Maximum	56.73	92.76	95.23	63.63	

Table 2.7.1: Financial Development, Health human Capital and Economic Growth in SSA (1970-2000)

With Robust Standard Error Estimation

$$LY_{it} = \alpha_0 + \beta_1 \ln HC_{it} + \beta_2 \ln KS_{it} + \beta_3 \ln(n+s+g)_{it} + \ln FD_{it} + \varepsilon_{it} \ldots.(1)$$

Independent Variables	**Private Credit**	**Domestic Credit**	**Liquid Liability**	**Broad Money**
Cons	6.76***	6.75***	6.69***	6.65***
	(0.41)	(0.39)	(0.42)	(0.43)
Ln HC_{it}	2.32***	2.25***	2.19***	2.17***
	(0.23)	(0.20)	(0.22)	(0.23)
Ln KS_{it}	0.32***	0.36***	0.34***	0.34***
	(0.03)	(0.03)	(0.03)	(0.03)
Ln LLE_{it}	0.31***	0.29***	0.29***	0.29***
	(0.09)	(0.09)	(0.09)	(0.09)
Ln FD_{it}	0.04**	-0.08***	0.02	0.01
	(0.02)	(0.01)	(0.03)	(0.04)
Y_{70}	-0.05	-0.09**	-0.05	-0.05
	(0.04)	(0.04)	(0.04)	(0.04)
$Ln(n+s+g)_{it}$	-0.04**	-0.04**	-0.04**	-0.04**
	(0.02)	(0.02)	(0.02)	(0.02)
R-Squared	0.74	0.76	0.74	0.74
F- statistics	528.48***	497.06***	446.72***	481.96
(p-Value)	(0.00)	(0.00)	(0.00)	(0.00)

13 ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively

14 Figures in the parentheses are the standard errors.

15 *Panel estimation using fixed effect(FE), Random Effect (RE) and Maximum likelihood(MLE) estimation techniques N=14, T=31*

SENSITIVITY ANALYSIS

Table 2.8.1: Financial Development, Human Capital and Economic Growth in SSA (1970-2000) With Robust Standard Error Estimation

$$LY_{it} = \alpha_0 + \beta_1 \ln HC_{it} + \beta_2 \ln KS_{it} + \beta_3 \ln(n+s+g)_{it} + \ln FD_{it} + \varepsilon_{it} \ldots.(1)$$

Independent Variables	**Model A**	**B**	**C**	**D**
Cons	6.62***	6.62***	7.14***	7.43***
	(0.39)	(0.39)	(0.43)	(0.32)
Ln HC_{it}	1.97***	1.98***	2.22***	8.39***
	(0.23)	(0.23)	(0.22)	(1.24)
Ln KS_{it}	0.41***	0.41***	0.39***	0.37***
	(0.03)	(0.03)	(0.03)	(0.03)
Ln FD_{it}	0.03	0.02	0.17*	0.02
	(0.02)	(0.02)	(0.09)	(0.02)
$Ln(n+s+g)_{it}$	-0.05**	-0.05**	-0.04*	-0.04**
	(0.02)	(0.02)	(0.02)	(0.02)
Legal Origin Dummy	0.83**			
	(0.38)			
LCOR	-0.12**			
	(0.05)			
Oil Dummy		1.08**		
		(0.39)		
$Ln(FD_{it}*KS_{it})$			-0.01*	
			(0.006)	
$Ln(HC_{it}*KS_{it})$				-0.43***
				(0.09)
R-Squared	0.73	0.73	0.74	0.75
F-Test /Wald Test	1040.52***	1049.38***	151.99***	228.10***
(p-Value)	(0.00)	(0.00)	(0.00)	(0.00)

Table 2.8.2: Financial Development, Human Capital and Economic Growth in SSA (1970-2000)

With Robust Standard Error Estimation

Independent Variables	**Model E**	**F**	**G**	**H**
Cons	7.55***	6.99***	7.58***	7.51***
	(0.36)	(0.37)	(0.35)	(0.35)
Ln HC_{it}	2.47***	0.22	2.21***	2.21***
	(0.22)	(0.54)	(0.22)	(0.22)
Ln KS_{it}	0.34***	0.40***	0.36***	0.36***
	(0.03)	(0.03)	(0.03)	(0.03)
Ln FD_{it}	0.23***	0.31	0.03	0.03
	(0.05)	(0.02)	(0.02)	(0.02)
$Ln(n+s+g)_{it}$	-0.04*	-0.03	-0.04*	-0.04*
	(0.02)	(0.02)	(0.02)	(0.02)
Ln FD^2_{it}	-0.04***			
	(0.01)			
$LnHC^2_{it}$		9.05***		
		(2.27)		
$Y70FD_{it}$			-0.03	
			(0.02)	
$Y70HC_{it}$				-1.24
				(1.13)
R-Squared	0.74	0.74	0.74	0.74
F-Test	151.92***	171.03***	160.30***	160.41***
(p-Value)	(0.00)	(0.00)	(0.00)	(0.00)

Table 2 .9.1: Financial Development, Human Capital and Economic Growth in SSA (in First Difference)

$$\Delta LY_{it} = \alpha_{i0} + \beta_1 \Delta \ln HC_{it} + \beta_2 \Delta \ln KS_{it} + \beta_3 \Delta \ln(n+s+g)_{it} + \Delta \ln FD_{it} + \varepsilon_{it} \ldots.(1)$$

Independent Variables	**Domestic Credit**			**Private Credit**		
Estimator	FE	RE	MLE	FE	RE	MLE
Cons	-0.01*	-0.02**	-0.02**	-0.01*	-0.01*	-0.01*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.005)	(0.005)
ΔLn HC_{it}	-0.22	-0.62	-0.62	-0.11	-0.58	-0.58
	(1.07)	(0.92)	(0.92)	(1.07)	(0.94)	(0.94)
ΔLn KS_{it}	0.39***	0.39***	0.39***	0.34***	0.35***	0.35***
	(0.08)	(0.06)	(0.06)	(0.08)	(0.07)	(0.07)
ΔLn$(n+s+g)_{it}$	-0.014	-0.02	-0.02	-0.014	-0.016	-0.016
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
ΔLn FD_{it}	-0.03**	-0.03**	-0.03**	-0.01	-0.01*	-0.01*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
R-Squared	0.59	0.61		0.56	0.58	
FTest/Wald Test	6.87	40.01	38.51	5.40	33.00	32.05
(p-Value)	(0.00)	(0.00)	(0.00)	(0.000)	(0.00)	(0.00)

1 ****, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively*

2 *Figures in the parentheses are the standard errors.*

3 *Panel estimation using fixed effect(FE), Random Effect (RE) and Maximum likelihood(MLE) estimation techniques N=14, T=31*

Table 2 .9.2: Financial Development, Human Capital and Economic Growth in SSA (in First Difference)

$$\Delta LY_{it} = \alpha_0 + \beta_1 \Delta \ln HC_{it} + \beta_2 \ln \Delta KS_{it} + \beta_3 \Delta \ln(n+s+g)_{it} + \ln \Delta FD_{it} + \varepsilon_{it} \ldots.(1)$$

Independent Variables	**Liquid Liabilities**			**Broad Money**		
Estimator	FE	RE	MLE	FE	RE	MLE
Cons	-0.01*	-0.01*	-0.01*	-0.01*	-0.01*	-0.01*
	(0.01)	(0.01)	(0.01)	(0.006)	(0.005)	(0.005)
ΔLn HC_{it}	-0.16	-0.62	-0.62	-0.13	-0.62	-0.62
	(1.07)	(0.92)	(0.92)	(1.07)	(0.92)	(0.92)
ΔLn KS_{it}	0.35***	0.36***	0.36***	0.34***	0.37***	0.37***
	(0.08)	(0.06)	(0.06)	(0.08)	(0.06)	(0.06)
ΔLn$(n+s+g)_{it}$	-0.013	-0.02	-0.02	-0.014	-0.02	-0.02
	(0.013)	(0.01)	(0.01)	(0.013)	(0.01)	(0.01)
ΔLn FD_{it}	-0.05**	-0.05**	-0.05**	-0.05**	-0.06**	-0.06**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
R-Squared	0.58	0.61		0.58	0.61	
FTest/Wald Test	6.75	39.21	37.80	6.68	38.84	37.45
(p-Value)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

1 ****, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively*

2 *Figures in the parentheses are the standard errors.*

3 *Panel estimation using fixed effect(FE), Random Effect (RE) and Maximum likelihood(MLE) estimation techniques N=14, T=31*

CHAPTER 3: SPATIAL PROXIMITY AND FINANCIAL DEVELOPMENT IN SSA

3.1 Introduction

Economic variables tend to exhibit variations not only over time but also across space. Merton and Bodie (1995) argue that financial systems naturally influence the allocation of resources across space and time. Thus, financial system is sensitive to geographical environment and not immuned from spatial externality. Integrating space into economics by the new economic geography is a very recent development. Macroeconomic role of spatial structure is not only an issue for theoretical and empirical research but has potentially high importance for economic policy making as well.

It is well documented in the literature from various works of Schumpeter (1911), Goldsmith (1969) and others that financial development acts as a catalyst for economic development. One of the salient features of a nation's financial development is its ability to generate positive spatial externality to neighbouring countries. Thus the financial sector often has a contagion effect not only within an economy but also with other economies.

Honohan (2008) observes that, not only is "Africa the region in which finance looms largest, but in Africa finance is the number one barrier". He further observes that after a decade of financial reforms, financial development in Africa is still constrained by four pervasive challenges: a lack of scale economies, dominance of the informal sector, governance problem and scale shocks to the system.

Baltagi et al (2007a) argue that the frontier of the literature in the field of financial development is shifting towards providing answers to the question of why some countries are more financially developed than others. Though they proffered four hypotheses to explain this trend, this study tries to explore the impact of spatial externality in enhancing financial development among neighbouring countries in SSA.

Several empirical works have identified other non-financial factors that have impact on financial development, these factors include technology (Merton, 1995), fiscal policies (Bencivenga and Smith 1991), legal system (La Porta et al 1997), institutional qualities (Acemoglu 2004, Demetriades and Law 2006), openness and political economy (Rajan and Zingales 2003). However, none has examined the impact of geographical factor on financial development especially in the SSA, a vacuum this study tries to fill. This study is the first to our knowledge to explore a spatial variable in analysing the determinants of financial development in SSA.

This study attempts to analyse the impact of South Africa's financial development on other neighbouring African countries and in particular tries to assess to what extent does closeness or proximity to a country with relatively developed financial sector impact on its neighbouring countries, and the transmission mechanisms of this link? Does financial development change across space?

This study examines two main hypotheses utilising annual panel data:

- Does financial development in SSA exhibit any spatial externality effect?
- Does openness of either trade or financial sectors, enhance the spatial effect or not? Does simultaneous opening of both trade and financial sectors facilitate financial development in SSA?

The chapter has five sections. Section 3.2 presents the empirical model and the econometric methodology. Section 3.3 explains the data employed in the study and section 3.4 reports and discusses the econometric results. Finally, section 3.5 summarises and concludes the chapter.

3.2 The Empirical Model

Klagge and Martin (2005) suggest that spatial consideration is justified in the financial markets due to imperfect competition, high transaction costs, asymmetric information between investors and savers and pervasive risk and uncertainty. It equally has developmental role by reducing uneven regional development due to greater access to developmental funds from neighbouring countries. This is more

important for SSA that has small but fragmented economies. Spatial dimension may play an important role in the finance-growth nexus through improvement in access to credit, reduction of cost of capital and knowledge spill over.

Geographical closeness to a more financially developed country may generate spatial externality to the neighbours in the form of technology transfer, information sharing, reduction of transaction cost, greater opportunities for sharing risk, trading shares and providing liquidity. Conversely, it could also impact negatively on the neighbouring countries by crowding-out domestic financial sector due to stiff competition, thus invoking negative spatial externality which is termed as the cost of financial underdevelopment in the host country. It becomes necessary to capture this spatial impact by including among the determinants of financial development the average distance of the neighbouring countries interacted with the financial development indicator of a country with most developed financial sector in the region (South Africa) in the equation. More so, Tobler's law of geography suggests "everything is related to everything else, but near things are more related than distant things"

The study starts with a standard financial development model specified in a dynamic panel approach as follows:

$$FD_{it} = \alpha_0 + \beta_1 \ln FD_{it-1} + \beta_2 \ln Y_{it} + \beta_3 (1-\lambda)_i * FDSA_{t-1} + \varepsilon_{it} \qquad (3.1)$$

Where FD is an indicator for financial development in country i in period t, Y is income which acts as a control variable for the demand for financial services and other economic factors, λ_i is the distance of country i from South Africa (SA) as a ratio of the farthest distance of all countries (in the sample) from South Africa, hence $(1-\lambda)_i$ is the degree of closeness to South Africa (SA). $FDSA_{t-1}$ is the level of financial development in South Africa in year t-1. A lagged dependent variable is included to allow for the partial adjustment of FD to its long run equilibrium value.

The theoretical apriori argument is that the closer the country to SA (South Africa, reference country with highly developed financial sector) the higher the expected

spatial effect on the host country's financial development. Thus, From Equation 3.1, we expect β_3 to be statistically significant with positive or negative sign, depending on whether it generates positive or negative externality. We include openness variables in equation 3.2 below in line with Chin and Ito (2006) and Baltagi et al (2007). We expect openness to enhance better trade, financial transaction and development, and to impact more on the spatial variable. This suggests also that neighbourhood effect can be enhanced with greater openness of the economies to trade and finance.

$$\ln FD_{it} = \beta_0 + \beta_1 \ln FD_{it-1} + \beta_2 \ln Y_{it} + \beta_3 (1-\lambda)_i * FDSA_{t-1} + \beta_4 \ln TO_{it} + \beta_5 \ln FO_{it} + \varepsilon_t \quad (3.2)$$

3.3 Data Sources

There has been a debate in the literature about the relative importance of bank-based and market-based financial systems over a century. Allen and Gale (2000) suggest that bank-based systems offer better inter-temporal risk sharing services than market based system. Banks can also exploit economies of scale and scope in information gathering and processing, they can also efficiently mobilize resources and manage risks (Levine, 2004). The bank-based system also effectively addresses the agency problems and short-termism (Stiglitz, 1985) Banks can ease the distortion from asymmetric information through long run relationships with firms, and finally it may improve resource allocation and corporate governance than market based system. (Luintel et al, 2008).

Some of the criticisms of the bank-based system includes that banks have an inherent bias toward prudence. Thus, bank-based system may impede corporate innovation and growth (Morck and Nakamura, 1999). Rajan and Zingales (2001) also observe that market-based systems respond faster to shocks and are more effective in identifying, isolating truly distressed firms and mitigating their negative impacts on the economy than bank-based systems. Also, banks sometimes constraint growth through their conservative, slow growth strategies. In the heat of this debate, another school of thought emerges that de-emphasises the importance of the distinction between the bank-based and market-based system. This financial service view argues that the crucial issue is whether an economy has a well functioning

financial system, and that its structure or composition is less important (Merton and Bodie 1995, 2004, Levine 1997, 2004). Others like Boyd and Smith (1998), Levine and Zervos (1998) all stress the complementary growth-enhancing role of the two systems. Finally, La Porta et al (1998) came with the fourth view, the law and finance hypothesis which suggests that it is the efficiency by which the national legal systems support financial transactions that is more important than the distinction between bank-based and market-based systems. Luintel et al, (2008) gives more detailed analysis of this debate.

Despite this debate, one of the key features of the financial system in SSA is the underdevelopment of the capital market[7]. There are large number of small firms that are privately owned, financed and managed (families have significant control), but they are usually not listed in the capital market, hence, the major source of finance is through the banks and not the capital market. Thus, the financial system in the region can be described as a bank-based system rather than market-based system. Furthermore, the developmental roles of banks have been identified in the literature, which suggests that banks can effectively finance development more than markets especially in the developing countries (Gerschenkron, 1962). Also, the relative importance of bank based system is further highlighted by Andrianova et al (2008) when they observe that banks, especially state-owned banks can effectively overcome market failures in allocating savings in countries with weak institutions and at early stage of development. These factors justify the use of bank-based financial proxies as appropriate financial development indicators in the region.

The study uses four indicators of banking sector development that have been used in the literature. These indicators include liquid liabilities, broad money, private credit, and domestic credit, each taken as a ratio of the Gross Domestic Product (GDP).

The trade openness is measured by the ratio of total trade to GDP. The financial openness is measured by the ratio of foreign direct investment to the GDP. Though

[7] As at 2007, it is only South Africa that has a highly developed capital market in the region, though there are some efforts in some other countries like Nigeria, Kenya, Zimbabwe etc (See ADI, World Bank 2007, See Table5.2 for a brief overview of the stock market in Africa).

the study recognises that this is a flow variable, and that Lane and Milesi-Feretti (2006) suggested using the volume of a country's financial assets and liabilities as a ratio of GDP. However, the study is constrained by inadequate data for the relevant period for this measure. Also, Abiad and Mody (2005) measure of financial liberalisation could not be used for the same reason stated above. This dataset is only available for 35 countries and only three countries are from the SSA (Ghana, South Africa and Zimbabwe).

The data for this study are mostly sourced from World Development Indicators (see Table 3 for data definitions and sources) , however, λ which is the ratio of each country to the farthest country in the sample, the farthest country being Mauritania which is 6856 kilometres from South Africa This country is assigned the value of zero, implying there is zero spatial externality due to the long distance, while South Africa is assigned 1, implying the maximum spatial externality. Thus the closer a country is to South Africa, the higher the potential of spatial externality (which could be positive or negative). Hence, the degree of proximity is determined by (1-λ).

The country of reference is South Africa, apart from the fact that South Africa is known to have a reliable data base for meaningful empirical work; it also plays a significant role in the region. South Africa is one of the strongest emerging economies in Africa. World Bank (2006) records that only Nigeria and South Africa are embracing financial reform programs and have banks with assets base of over $10 billion among the African countries. However, it is only South Africa that has a vibrant capital market development in SSA (World Bank, 2007) judging from the level of capital market development indicators which include the ratio of stock market turnover as a percentage of stock market capitalisations, volume of stock value traded as a ratio of GDP, or number of companies listed as a percentage of population among other indicators. Finally South Africa is at the centre of so many regional economic integration efforts, such that some countries like Lesotho, Namibia, and Swaziland all use South Africa currency as their legal tender in their respective countries as a preliminary step towards a full regional monetary union.

These moderate achievements of South African economy have made it one of the economies with great growth potentials and this justifies its choice as the reference country for the study.

3.4 METHODOLOGY

This study estimates the financial development equation with panel data from 24 SSA countries over a 36-year period from 1970-2005. These equations contain country fixed effects which are correlated with the regressors, hence orthogonality between the error term and the regressors is not likely to be met by either the Generalized Least Squares (GLS) or the Fixed Effect (FE)) estimator to produce consistent estimates. Orthogonality can only be achieved through appropriate differencing of the data. Hence, an Instrumental variable estimator that can correct for correlated fixed effects as well as account for endogeneity of regressors was proposed by Arellano and Bond (1991).

They proposed a dynamic panel data estimator (DPD) based on General Method of Moments (GMM) methodology which optimally exploits the linear restrictions implied by the dynamic panel model proposed in this study (See Baltagi, 2005). The study uses the two-step method, as this gives more efficient estimations.

The models (1 and 2) are thus estimated using the GMM estimator proposed by Arellano and Bond (1991). This estimation technique allows the financial development indicators to partially adjust to their long run equilibrium values within a year (Baltagi et al, 2007a). In estimating the model, all explanatory variables are lagged by one period to ensure that FD_{t-1} can be treated as predetermined in period t and that error terms are not serially correlated.

The consistency of the estimates is premised on the assumption of lack of autocorrelation of the error terms. Specifically, there should be the rejection of the null hypothesis of first order serial correlation and non rejection of the second order. Thus, the study tests for the existence of the first and second order serial correlation in line with Baltagi (2005). A sargan test which is a joint test of model specification and the appropriateness of the instrument was also conducted.

The study restricts the moment conditions to a maximum of two lags on the dependent variable to reduce the potential bias resulting from too many moment conditions while increasing the efficiency of the estimates (Baltagi, 2005). This

yields a Sargan statistic that is asymptotically distributed as Chi-squared with 22 degrees of freedom, i.e. 22 over-identification restrictions.

It is observed that as T tends to infinity, the persistence or state dependence in the dynamic model is reduced and hence, the model can be estimated using either the random effect or fixed effect estimation techniques (Nickell, 1981). Furthermore, Baltagi et al (2007b) argue that in spatial econometrics, where the error term is considered not serially correlated with the remainder error, when there is no spatial serial dependence of the error terms, then, the random effect estimation is more appropriate. Cameron and Trivedi (2005) also observe that fixed effects may be used to control for endogeneity in panel data where endogeneity arises owing to a time-invariant omitted variable. Due to the aforementioned, the study equally estimated the models using the fixed effect and Random effect and compared the results with the Arellano and Bond estimations.

This study recognises one of the weaknesses of Arellano and Bond estimation technique which is more appropriate for large N and small T, as T increases the estimates become relatively inconsistent. However, Nickell (1981) suggests that as T gets large, the fixed effects estimator becomes consistent (Baltagi, 2008). Thus, more emphasis is laid on the estimate from the fixed effect.

3.5 DISCUSSION OF THE ECONOMETRIC RESULTS

The descriptive statistics of the data sets is given in Table 3.1 which provides the definition and source of each variable, its measurement, summary statistics, sample period and countries for which these variables are available. The correlation matrix between the variables is also provided in Table 3.2.

All variables including the measure of spatial variable display considerable variation between countries justifying the use of panel estimation techniques. Moreover, correlations between various financial development indicators are positive and significant as expected from the literature. The correlation coefficient between trade openness and financial openness is positive 0.35. The correlation coefficient between spatial variable measure and all the financial development indicators are positive and ranges from 0.08 (with M2) to 0.28 (with private credit).

However, the coefficient of correlation between spatial variable and measures of trade and financial openness are negative.

Finally, the correlation between the real GDP and the other regressors ranges between 0.04 (with degree of proximity) to 0.59 (with M2). Thus, the summary statistics suggest that there is a reasonable degree of independent variation among the variables and countries in the dataset hence; this justifies the use of panel estimation technique.

The econometric results are presented in Tables 3.3 - 3.6. Table 3.3 corresponds to estimation of model 1, the baseline model, (model without the openness variables), Table 3.4 has the openness variables, Tables 3.5 and 3.6 estimate model 2, using other estimation techniques. The essence of this is to check the robustness of the estimation. Most of the coefficients are determined using statistical significance at 5%.

The three important diagnostic tests are satisfactory, especially for private credit and liquid liabilities. Specifically, the Sargan test does not reject the over-identification restrictions in all cases. The absence of first order serial correlation is rejected in all cases while the absence of second order serial correlation is not rejected in all cases except in Model 4a in (Table 3.4) where the broad money is used as a measure of financial development.

Moreover, the lagged dependent variables in all cases are positive and significant. This further lends credence to fact that the data confirms the appropriateness of the choice of dynamic GMM as the preferred panel estimator. This suggests that the estimates have some good statistical properties.

3.5.1 Private Credit

Focusing on Table 3.3, when using the private credit as a financial development indicator, the real GDP is positive and statistically significant. This further confirms the importance of the economic activity or real sector in driving the financial system. As the economy improves, there is more demand for financial services, and also it may suggest the potency of the monetary policy in the region. The lagged dependent variable has an estimated coefficient of 0.68, with a standard error of

0.05. This indicates a strong evidence of considerable persistence in the variable, implying that the size of private credit in a particular year has a strong dependence on last year value. This is in consonance with the findings of Baltagi et al (2007a). It however, indicates slower speed of adjustment to shock. The spatial variable is negative and statistically significant at 5% level. It suggests that allowing spatial externality crowds out domestic credit, since this improves access to credit facility to the customer, and reduces the cost of credit to investor through competition among the banks.

In Table 3.4, where the openness variables are included. The financial openness is statistically significant at 1%, and positively signed. This indicates that for the period under review, there are more evidence of financial liberalisation efforts in the region and more positive impact of financial globalisation on the financial sectors in SSA. However, strangely it is observed that the coefficient of real income is statistically insignificant. This is consistent with Chinn and Ito (2006) findings.

The spatial externality variable is negative and highly significant for all the different specifications when using private credit as an indicator for financial development. This implies that the closer an economy is to South Africa (SA), conditioned upon opening the financial sector may crowd out the domestic credit market, through lower cost of credit, better technology and service and more competition. An access to credit facility from South African banks may crowd out domestic credit market. A number of reasons could account for this. One reason might be the growing trend in financial globalisation that makes access to international fund possible. Moreso, some of these countries have a common economic and monetary union that facilitates this financial arrangement. Thirdly, in most of these countries, there are no exchange or credit restrictions. This suggests a firm is free to borrow from South African banks in their countries especially where they are neighbours. Finally, South Africa banks have branches in most of these countries, e.g. Standard Bank has branches in eighteen of the neighbouring countries (See Table 3. 7 in the Appendix).

Only financial openness is statistically significant and positively signed, while the interaction term between trade and financial openness is also significant and positive at 10% level. This lends empirical evidence to the Rajan Zingales' (2003) hypothesis that simultaneous opening of both the financial and trade sectors have positive impact on the financial development of these countries. This is in line with the findings of Baltagi et al (2007).

Focussing on the estimate from the fixed effect estimations in Table3.5.1, the results is not qualitatively different from the GMM estimation, there is high persistence, the real GDP has a positive impact on the financial development, and the spatial variable is statistically significant and negatively signed. However, when focussing on the model with the openness variables, there is still a considerable persistence of the financial variables, the real GDP is positive and statistically significant, and the trade openness is positive and statistically significant at 5%. The spatial variable is also statistically significant and negatively signed as previously observed with the GMM estimations.

3.5.2 Liquid Liabilities

From the baseline model, the result in Table 3.3, the lagged dependent variable is 0.73 with a standard error of 0.08. It is statistically significant, showing higher persistence rate and slower adjustment rate relative to domestic credit to the private sector. The real GDP is positive and statistically significant also, and the spatial variable is positive and statistically significant at 1% level. This suggests a complementary role of SA financial development on neighbouring countries.

In the second model, where the openness variables are included (Table 3.4), the results suggest that there is evidence of considerable persistence of financial development variable. The lagged dependent variable has an estimated coefficient that ranges from 0.49 to 0.51, and a standard error of 0.125 to 0.133, suggesting a much well behaved dynamics and considerable persistence, and possible faster adjustment than the private credit.

The real GDP is negative but insignificant in all the different specifications. The coefficient of the trade openness is positive but weakly significant at 10% level. This suggests a positive impact of trade openness on the financial development in the region. The financial openness measure is not significant in any of the specifications. Also, the interaction term is not significant. Thus, the study doe not have a statistically robust evidence for the R-Z hypothesis when using liquid liabilities as indicator for financial development.

The coefficient of the spatial variable (degree of proximity to South Africa) confirms the theoretical a-priori expectation. It is significant and positive in all the different specifications, suggesting possibility of positive spatial externality among the countries in the sample. It indicates possibility of information sharing, technology transfer and possibility of risk diversification among these countries. This implies that the closer a country to SA the more developed its financial sector. It further suggests that most of these countries are likely to reap benefits of spatial economies of scale in financial sector and positive spill over effects in their domestic economies. This is very important for the much envisaged common market area in the region.

Several reasons could account for this trend, some of these countries[8] have their national currencies directly convertible to South Africa's national currency (RAND), and thus any development (shock) in South Africa, is immediately transmitted to these neighbouring countries. More so, 14 of the SSA countries[9] have a common economic union with South Africa where common monetary policy and development goals are being pursued. Also, most of the countries that are close to South Africa have higher GDP per capita and better development of infrastructure as measured by the telephone line per head and road network per 1000 people which in these countries are higher than other SSA countries. Thus, this tends to reduce the transaction cost and hence, likely to enhance financial development in these countries.

[8] Lesotho, Namibia, and Swaziland all have their local currencies directly convertible to South Africa's RAND.

[9] Angola, Botswana, Democratic Republic of Congo, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe are all members of Southern Africa Development Community (SADC)

All the diagnostic tests are robustly significant. The study rejects the null hypothesis of first order serial correlation, but does not reject the null hypothesis of second order serial correlation, and Sargan test does not reject the over-identification restriction in line with Baltagi (2008).
Focussing on the estimate from the fixed effect estimations in Table3.5.1, the results suggest considerable persistence, the real GDP has a positive impact on the financial development, and however, the spatial variable is positive but not statistically significant. However, when focussing on the model with the openness variables, there is still a considerable persistence of the financial variables; the real GDP and trade openness variables are positive and statistically significant.

3.5.3 Domestic Credit

From table 3.3, the persistence rate is highest with 0.87 and a standard error of 0.04, the real GDP was positive and statistically significant at 5%. However, the spatial variable is negative and statistically significant similar to what was obtained when the private credit indicator was used.

In Table 3.4, when the openness variables are included, the lagged dependent variable is positive and statistically significant at 1% exhibiting evidence of considerable persistence. The coefficient of the financial openness is statistically significant at 5% but negatively signed. The coefficient of the trade openness is positive but statistically insignificant. The interaction term of both openness measures is also not statistically significant. Thus, we do not have empirical evidence for RZ hypothesis in the region when using domestic credit as proxy for financial development.

Real GDP per capita enters with positive coefficient and strongly significant at 1%. This suggests that the level of economic development is an important determinant of financial development in the region. This can be explained by the large size or proportion of domestic credit that goes to the government. This also reflects the

dominance of public sector in these economies, as substantial amount of domestic credit goes to the government. This could also indicate the level or stage of development in the region suggesting that as the economy grows, more finances are needed to meet the developmental goals. This may further lend credence to the demand-following hypothesis (Patrick 1966). Finally, some empirical findings on the relationship between growth and finance confirm this hypothesis (Demetriades and Hussein 1996; Robinson, 1952; and Goldsmith,1969).

Again, just like the private credit, the spatial variable is highly significant but negative for all the model specifications, buttressing the fact that there is a spatial externality on financial development. However, it is negative, perhaps the intuition here is that this may signify cost of financial underdevelopment in a country, suggesting that to reap the benefit of spatial financial externality the host country must equally have a developed financial sector and other institutional arrangements that can facilitate the development especially in this era where financial assets are so mobile and easily accessed.

Focussing on the estimate from the fixed effect estimations in Table3.5.1, the results suggest high persistence level of the financial variable, the real GDP has a positive impact on the financial development, and the spatial variable is statistically significant but negatively signed. However, when focussing on the model with the openness variables, there is still a considerable persistence of the financial variables; the real GDP is positive and statistically significant.

3.5.4 Broad Money

All variables are significant and positively signed when using broad money as a financial development indicator in the benchmark model (model 1). This suggests that all the independent variables, including the spatial variable all have positive impacts on the financial development in the region. When turning the attention to the second model where the openness variables are used, the result still indicate a considerable evidence of strong persistence and a lower speed of adjustment to financial development shock. The coefficient of the real GDP is statistically

significant but negative; the trade openness is positive and significant at 10% in model 3, but not significant in model 2. In contrast, the financial openness is positive and significant in model 2 but insignificant in model 3 though positive. There is no evidence to support the RZ hypothesis as the interaction term is not statistically significant.

The spatial effect is positive and significant just like the liquid liability. The spatial effect ranges from 0.14 to 0.20, suggesting that spatial externality may improve the financial development by 14-20% suggesting that the closer the country to SA, the higher spatial benefit to the development of its monetary sector.

From the fixed effect estimations in Table3.5.1, the results suggest considerable persistence, the real GDP has a positive impact on the financial development, and however, the spatial variable is statistically significant and positive. However, when focussing on the model with the openness variables, there is still a considerable persistence of the financial variables; the trade openness variable is positive and statistically significant. The spatial variable is positive and statistically significant at 5% level.

3.6 Comparison with earlier studies

The two main papers similar to this study are Chinn and Ito (2006) and Baltagi et al (2007a). Though these two papers analysed the determinants of financial development and emphasised the role of openness and institutions on financial development, their main focus is the political economy issues of financial development. The focus of this study, however, is to analyse the impact of spatial externality on financial development in SSA.

In our private credit equation, the lagged value of the private credit and our measure of financial openness are positive and statistically significant at the conventional level, similar to the findings of Chinn and Ito (2006) and Baltagi et al (2007a), while the measures of trade openness and Real GDP per capita in this study are statistically insignificant as similarly observed by Chinn and Ito (2006). The interaction term is positive and statistically significant in line with Baltagi et al (2007a).

Though Baltagi et al (2007a) suggest that an alternative channel of banking sector development may be particularly useful to low income countries that are already open which stand to benefit little in terms of additional openness, and interestingly all the mentioned countries are SSA[10] . We tried to evaluate this hypothesis, by asking a question. Does continuous opening of economies really have any impact on financial development? Thus we introduced the quadratic specification. The findings suggest that in three out of the four model specifications, the openness variables in quadratic specifications are not statistically significant at the conventional 5% significant level. This finding is in consonance with the findings of Baltagi et al (2007a) hypothesis. It is only significant in the broad money model. However, the broad money specification does not satisfactorily pass the diagnostic tests especially the non rejection of the second order serial correlation. Thus, we conclude that continuous opening of the trade and financial sectors may not impact much on the financial development in the region. Similar findings were obtained by (Demetriades and Law, 2006; Mobolaji and Ndako, 2008). Perhaps, continuous opening may be more effective in promoting capital market development than banking system development. Demetriades (2008) then suggest that financial development in low income countries with weak institutions may not enhance growth. He concludes "As a result, financial development may not offer a quick fix in promoting growth in those parts of the world that are in most need for more growth, such as Sub-Saharan Africa, unless it is accompanied by strengthening of institutions such as rule of law and property rights".

The major novelty and contribution of this study is the impact of the spatial externality on the financial development, which none of the earlier studies has explored. The study finds that the proxy for this variable is statistically significant though with mixed signs. When using liquid liabilities and broad money as indicators of financial development, the coefficient of the spatial variable is positive and statistically significant. This could indicate a positive spatial externality and positive spill over, evidence for information sharing, technology transfer and risk

[10] The countries mentioned are Cameroon, Ethiopia, Gabon, Ghana, Kenya, Malawi, Nigeria, Senegal, Togo and Zambia (Baltagi et al 2007, pg23). All the countries are in our sample data set except Ethiopia

diversification and potential gains from the monetary and economic cooperation among the SSA countries. When using the credit indicators, the sign is consistently negative, signalling cost of financial underdevelopment, crowding out effect, due to more competition and better services. However, this may have a long run impact on the economy, through investment opportunities, better credit facility and lower cost of capital.

3.7 Robustness Checks

The study also re-estimated the models using the fixed effects, random effects, fixed effect robust cluster and two-stage least square estimators. The fixed effect robust cluster and two-stage GMM estimation results are reported in Tables 3.5 and 3.6. These estimation techniques are less efficient when compared with the Arellano and Bond estimator. The estimation resulted in similar qualitative results as those reported using Arellano and Bond.

For the robust cluster estimation, using the bench mark model, all the variables have similar signs as reported by the Arellano and Bond, they are also statistically significant. In the second model, (where openness variables are included) and while using private credit as indicator of financial development, all the variables are significant except financial openness. The spatial effect is significant but negative, the trade openness is positive and significant and the interaction term is negative. Similar trend is observed for domestic credit, except that the trade openness becomes insignificant while the interaction term for openness is significant but negatively signed. For broad money, the spatial effect is positive and significant. Trade openness, and lagged endogenous variable are positive and significant for all the model specifications showing strong indication for state persistence (dependence), hence, the appropriateness of using the Arellano and Bond estimator.

For the GMM estimation, the spatial variable is significant in all the different specifications with negative sign for the credit indicators and positive with the monetary or financial deepening indicators. There is also evidence for a strong persistence and a slower speed of adjustment to financial development shocks.

To conclude, the variety of checks carried out confirms both the robustness of the empirical results as well as the appropriateness of the indicators and estimation techniques used.

3.8 POLICY IMPLICATIONS AND CONCLUSIONS

The study analyses the effect of spatial externality on financial development in SSA countries. It is a dynamic panel data study for 24 SSA countries covering a 36-year period. The diagnostic tests confirm the appropriateness of the technique used in the study.

The findings of the study suggest that there is a spatial externality effect on financial development in the region even though the literature has discussed more on contagion effect of the financial variables within an economy. Our finding suggests there is equally spatial externality among neighbouring countries (for example, a financial crisis in America mortgage finance industry has its impact not only on American economy but also on the economies of its neighbours and allies). Thus financial development among countries could exhibit spatial economies of scale. As each indicator elicits different spatial response, this also suggests that sometimes it might be inappropriate to use factor analysis (principal components index), by merely aggregating the indices, as each indicator may affect the economy differently.

The study also suggests that there is a spatial benefit (cost) for financial development (underdevelopment). The transmission mechanism of this effect depends on the indicator of financial development. While private credit and domestic credit to the economy respond negatively to spatial externality or spill over effect, liquid liabilities and broad money elicit positive spatial economies of scale.

This implies that allowing for spatial impact may improve credit availability in the domestic economy, though may crowd-out local banks' domestic credit. This development promotes healthy competition among banks to attract customers and leads to efficient credit allocation for productive investment and better banking services which could enhance the growth of the economy. Thus, spatial variable has substitution effect to the local credit market, and complementary effect on the

money market.

The study finds weak empirical evidence for the RZ hypothesis since the interaction term is positive and significant only when using private credit as an indicator of financial development. This suggests that simultaneous opening of both trade and financial sector may have a positive impact on financial development especially in relatively closed economies, but may not be a necessary condition for financial development to take place (Baltagi et al 2007a).

In SSA, the finding from this study suggests that trade openness offers greater scope for advancing financial development than financial openness, due to the underdevelopment of the financial system in the region. The study also suggests that continuous opening of the trade and financial system may have little or no impact on the financial development in the region. Hence, the study finds empirical support to Mckinnon (1991) hypothesis of cautious liberalisation while recommending proper sequencing of financial reforms, institutional and infrastructural development and macroeconomic stability.

Baltagi (2001) observes that panel data models that consider the spatial autocorrelation may lead to more reliable estimates of the parameters by controlling for the omitted variables and heterogeneity. However, this cannot be done in this study. Thus, necessary caution must be exercised in interpreting the findings of this study as they may only reflect the quality of data used or the appropriateness of some of the measures or indicators of financial development or neglect of the spatial dependence in the estimation. The weak empirical evidence of the openness variable could also be due to misspecification error in the models. Perhaps, openness may not have a contemporaneous but delayed effect on the financial sector, indicating that its effects may only be evident after some periods as suggested by the sequencing of reforms hypothesis. This may also be due to the way openness is measured, perhaps if openness is measured by the total export to GDP may possibly elicit different outcome. Also, due to the underdevelopment of the stock market in the region, this study could not assess the impact of openness on the stock market development in the region, an area that can be explored in the future.

This study provides an insight into the relationship between finance and regional development and adds to the current debate in the literature on the relevance of finance in development of SSA countries. It also provides a theoretical insight into the essence of economic and regional integration in a globalised world especially as African leaders prepare for the Africa Union.

This study contributes to the literature on finance, by addressing the impact of spatial externality on financial development in the region. Thus, it addresses one of the challenges identified by Honohan (2008) on scale economies and regional financial cooperation.

APPENDIX:

Table 3.1 : SUMMARY OF DATA SET USED (ANNUAL DATA 1970-2005)

Variables	Definition of variables	Sources	Unit of Measurement	Mean	Standard Deviation	Minimum	Maximum
DCp	Private Credit	WDI	% of GDP	18.32	18.16	1.54	146.81
M3	Liquid Liabilities	WDI	% of GDP	23.93	12.68	5.39	116.86
M2	Broad Money	WDI	% of GDP	21.97	12.27	5.24	114.63
DC	Domestic Credit	WDI	% of GDP	26.79	19.33	-7.24	145.38
Y	Real GDP Per Capita	WDI	US Dollars at 2000 constant prices	813.43	1347.99	104.63	7714.23
TO	Trade Openness	WDI	% of GDP	63.35	30.54	0	224.44
FO	Financial Openness proxied by FDI	WDI	% of GDP	1.53	3.65	-28.62	46.62
DSA	Degree of closeness to South Africa Index	Google Map	1=closest 0=farthest	0.397	0.265	0	1

Countries: Benin ,Burkina Faso, Burundi, Cameroon, CAR, Chad, Congo Republic, Cote d'ivorie, Gabon, Gambia, Ghana, Kenya, Madagascar, Malawi, Mali, Mauritania,, Nigeria, Niger, Rwanda, Senegal, Seychelles, Sierra-Leone, South Africa, Togo and Zambia

Table 3.2: Correlation Matrix of the Variables

Definition of variables	Domestic Credit	Private Credit	Liquid Liabilities	Broad Money	Degree of closeness to South Africa Index	Real GDP Per Capita	Financial Openness	Trade Openness
Domestic Credit	1.000							
Private Credit	0.533	1.000						
Liquid Liabilities	0.762	0.525	1.000					
Broad Money	0.752	0.609	0.973	1.000				
Degree of closeness to South Africa Index	0.155	0.287	0.089	0.081	1.000			
Real GDP Per Capita	0.453	0.431	0.549	0.598	0.039	1.000		
Financial Openness	0.015	-0.059	0.099	0.104	-0.131	0.157	1.000	
Trade Openness	0.279	0.074	0.372	0.363	-0.243	0.460	0.346	1.0000

Table 3.3: Financial Development and Spatial Effects in SSA (1970-2005)

$$FD_{it} = \alpha_0 + \beta_1 \ln FD_{it-1} + \beta_2 \ln Y_{it} + \beta_3 (1-\lambda)_i * FDSA_{t-1} + \varepsilon_{it} ....(1)$$

Model 1: without Openness Variables

Independent Variables	Private Credit	Domestic Credit	Liquid Liability	Broad Money
Cons	-0.006***	-0.007***	0.002***	0.001
	(0.004)	(0.002)	(0.001)	(0.001)
Ln FD_{it-1}	0.68***	0.87***	073***	0.79***
	(0.05)	(0.04)	(0.08)	(0.06)
Ln Y_{it}	0.34**	0.21**	0.20***	0.17***
	(0.09)	(0.09)	(0.003)	(0.07)
$LDSAFD_{it-1}$	-0.12**	-0.16**	0.09***	0.10**
	(0.05)	(0.04)	(0.04)	(0.05)
Sargan Test (p-Value)	20.11	20.16	24.56	21.11
	(1.00)	(1.00)	(1.00)	(1.00)
Autocovariance of Order 1	0.0001	0.0008	0.0001	0.0001
Autocovariance of Order 2	0.61	0.33	0.62	0.04

1 GMM estimations using a maximum of two lags of the dependent variable as instruments N=24, T=36

2 The variables are defined as follows FD_{it} = financial development; Y_{it}= real GDP per capita, TO_{it}= Trade openness defined as total exports plus imports/GDP, FO_{it}=Financial openness defined as the ratio of net foreign direct investment to GDP, DSA_{it}= distance of each country from South Africa as a ratio of the farthest country in the study.

3 Figures in the parentheses are the standard errors.

4 ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively

Table 3.4: Financial Development and Spatial Effects in SSA (1970-2005)

$$\ln FD_{it} = \beta_0 + \beta_1 \ln FD_{it-1} + \beta_2 \ln Y_{it} + \beta_3 (1-\lambda)_i * FDSA_{t-1} + \beta_4 \ln TO_{it} + \beta_5 \ln FO_{it} + \beta_6 (\ln FO_{it} * \ln TO_{it}) + \varepsilon_t \text{ .....(3)}$$

FD Proxied by	Model 1 Private Credit (% of GDP)		Model 2 Liquid Liabilities (% of GDP)		Model 3 Domestic Credit (% of GDP)		Model4 Broad Money (% of GDP)	
Specification	2	3	2	3	2	3	2	3
Constant	0.006***	0.007***	0.01***	0.01***	-0.003	0.004	0.009***	0.009***
	(0.002)	(0.002)	(0.003)	(0.005)	(0.004)	(0.004)	(0.003)	(0.001)
Ln FD_{it-1}	0.398***	0.618***	0.49***	0.51***	0.581***	0.568***	0.526***	0.506***
	(0.066)	(0.113)	(0.133)	(0.125)	(0.068)	(0.081)	(0.119)	(0.053)
Ln Y_{it}	0.812	-0.811*	-0.231	-0.263	1.079***	1.246***	-0.399**	-0.25***
	(0.223)	(0.458)	(0.085)	(0.274)	(0.323)	(0.381)	(0.184)	(0.064)
Ln TO_{it}	0.114	0.260***	0.171*	0.172	0.027	0.013	-0.011	0.051*
	(0.086)	(0.091)	(0.103)	(0.114)	(0.129)	(0.129)	(0.065)	(0.031)
Ln FO_{it}	0.007***	-0.271*	-0.001	-0.057	-0.007**	-0.119	0.004**	0.022
	(0.003)	(0.153)	(0.002)	(0.141)	(0.003)	(0.144)	(0.002)	(0.035)
Ln FO_{it}*ln TO_{it}		0.072*		0.015		0.009		-0.005
		(0.039)		(0.036)		(0.030)		(0.009)
LDS AFD_{it-1}	-0.135**	-0.21***	0.144*	0.200*	-0.41***	-0.44***	0.20***	0.147**
	(0.065)	(0.050)	(0.080)	(0.111)	(0.133)	(0.139)	(0.056)	(0.063)
Sargan Test	22.56	18.07	21.54	20.43	18.90	18.27	20.16	193.3
(p-Value)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(0.000)
Autocovariance of Order 1	0.016	0.0192	0.002	0.002	0.003	0.004	0.041	0.000
Autocovariance of Order 2	0.106	0.164	0.316	0.226	0.120	0.136	0.004	0.000

5 *GMM estimations using a maximum of two lags of the dependent variable as instruments N=24, T=36*

6 *The variables are defined as follows FD_{it} = financial development; Y_{it}= real GDP per capita, TO_{it}= Trade openness defined as total exports plus imports/GDP, FO_{it}=Financial openness defined as the ratio of net foreign direct investment to GDP, DSA_{it}= distance of each country from South Africa as a ratio of the farthest country in the study.*

7 *Figures in the parentheses are the standard errors.*

8 ****, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively*

Table 3.5.1: Robust Test with Fixed Effect Robust Cluster

$$FD_{it} = \alpha_0 + \beta_1 \ln FD_{it-1} + \beta_2 \ln Y_{it} + \beta_3 (1-\lambda)_i * FDSA_{t-1} + \varepsilon_{it} ....(1)$$

Model 1: without Openness Variables

Independent Variables	Private Credit	Domestic Credit	Liquid Liability	Broad Money
Cons	-1.03**	-0.46	-0.31	-0.57
	(0.47)	(0.61)	(0.001)	(0.35)
Ln FD_{it-1}	0.88***	0.85***	0.85***	0.89***
	(0.02)	(0.03)	(0.02)	(0.02)
Ln Y_{it}	0.14***	0.13**	0.06**	0.06**
	(0.04)	(0.09)	(0.03)	(0.03)
$LDSAFD_{it-1}$	-0.05**	-0.16**	0.03	0.10**
	(0.02)	(0.07)	(0.03)	(0.05)
F-Test (p-Value)	1058.53	424.62	721.52	1173.51
	(0.00)	(0.00)	(0.00)	(0.00)

9 Panel estimation using fixed effect robust cluster method N=24, T=36

10 The variables are defined as follows FD_{it} = financial development; Y_{it}= real GDP per capita, TO_{it}= Trade openness defined as total exports plus imports/GDP, FO_{it}=Financial openness defined as the ratio of net foreign direct investment to GDP, DSA_{it}= distance of each country from South Africa as a ratio of the farthest country in the study.

11 Figures in the parentheses are the standard errors.

*12 ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively*

Table 3.5.2: Robust Test with Fixed Effect Robust Cluster

$$\ln FD_{it} = \beta_0 + \beta_1 \ln FD_{it-1} + \beta_2 \ln Y_{it} + \beta_3 (1-\lambda)_i * FDSA_{t-1} + \beta_4 \ln TO_{it} + \beta_5 \ln FO_{it} + \beta_6 (\ln FO_{it} * \ln TO_{it}) + \varepsilon_t \text{ .....(3)}$$

FD Proxied by	Model 1 Private Credit (% of GDP)		Model 2 Liquid Liabilities (% of GDP)		Model 3 Domestic Credit (% of GDP)		Model4 Broad Money (% of GDP)	
Specification	2	3	2	3	2	3	2	3
Constant	-1.433**	-1.428**	0.987*	0.934*	-0.893	0.838**	-0.617	-0.357
	(0.634)	(0.611)	(0.467)	(0.424)	(0.846)	(0.021)	(0.432)	(0.443)
Ln FD_{it-1}	0.846***	0.841***	0.842***	0.831***	0.839***	0.839***	0.880***	0.881***
	(0.004)	(0.002)	(0.024)	(0.025)	(0.021)	(0.020)	(0.021\)	(0.023)
Ln Y_{it}	0.155***	0.155***	0.112**	0.109***	0.178***	0.171***	0.048	0.041
	(0.051)	(0.051)	(0.046)	(0.101)	(0.061)	(0.062)	(0.041)	(0.041)
Ln TO_{it}	0.109**	0.107**	0.053*	0.053**	0.036	-0.045	0.048*	0.046*
	(0.047)	(0.044)	(0.05)	(0.022)	(0.033)	(0.049)	(0.026)	(0.023)
Ln FO_{it}	-0.001	0.056	-0.001	0.043	-0.007	0.139	-0.002	0.076
	(0.006)	(0.071)	(0.004)	(0.056)	(0.007)	(0.071)	(0.003)	(0.054)
Ln FO* ln TO_{it}		-0.014		-0.115		-0.378*		-0.020
		(0.039)		(0.681)		(0.030)		(0.013)
LDS AFD_{it-1}	-0.08***	-0.08***	0.058	0.037	-0.123	-0.086	0.101**	0.115**
	(0.057)	(0.034)	(0.042)	(0.039)	(0.102)	(0.386)	(0.048)	(0.043)
R-Squared		0.823	0.769	0.769	0.762	0.759	0.832	0.833
within	0.823							

13 Panel estimation using fixed effect robust cluster method N=24, T=36

14 The variables are defined as follows FD_{it} = financial development; Y_{it}= real GDP per capita, TO_{it}= Trade openness defined as total exports plus imports/GDP, FO_{it}=Financial openness defined as the ratio of net foreign direct investment to GDP, DSA_{it}= distance of each country from South Africa as a ratio of the farthest country in the study.

15 Figures in the parentheses are the standard errors.

*16 ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively*

Table 3.6: Using 2SLS GMM Instrumental Variable

$$\ln FD_{it} = \beta_0 + \beta_1 \ln FD_{it-1} + \beta_2 \ln Y_{it} + \beta_3 (1-\lambda)_i * FDSA_{t-1} + \beta_4 \ln TO_{it} + \beta_5 \ln FO_{it} + \beta_6 (\ln FO_{it} * \ln TO_{it}) + \varepsilon_t \text{ ....(3)}$$

Model 1: GMM (INSTRUMENTAL VARIABLE ESTIMATION)

Independent Variables	Domestic Credit	Private Credit	Liquid Liability	**Broad Money**
Cons	0.527***	1.84***	0.527***	0.478***
	(0.001)	(0.451)	(0.117)	(0.126)
Ln FD_{it-1}	0.929***	0.926***	0.913***	0.923***
	(0.017)	(0.29)	(0.016)	(0.019)
Ln Y_{it}	-0.0002	-0.067**	-0.002	0.001
	(0.005)	(0.027)	(0.003)	(0.003)
LDS AFD_{it-1}	-0.091**	-0.382***	0.086***	0.0086***
	(0.045)	(0.095)	(0.027)	(0.029)
Ln (FO*ln TO_{it})	-0.011	-0.009***	-0.002**	-0.002**
	(0.002)	(0.003)	(0.001)	(0.001)
Anderson Canon (p-Value)	37.53	22.97	28.8	24.9
	(0.00)	(0.00)	(0.00)	(0.00)
Hansen J Test (P-Value)	76.2	27.99	0.00	0.0000
	(0.00)	(0.00)		

17 GMM estimations using two-stage least square instrumental variable

18 The variables are defined as follows FD_{it} = financial development; Y_{it}= real GDP per capita, TO_{it}= Trade openness defined as total exports plus imports/GDP, FO_{it}=Financial openness defined as the ratio of net foreign direct investment to GDP, DSA_{it}= distance of each country from South Africa as a ratio of the farthest country in the study.

19 Figures in the parentheses are the standard errors.

*20 ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively*

Table 3.7: SOUTH AFRICA TOP COMPANIES AND THEIR BRANCH NETWORKS

Company	Branch Networks/Ranking	Africa(Countries)	Nature of Business
Energy Africa	23 Countries One of the largest in Europe and largest in Africa	Mauritania, Angola, Cameroon, Cote d' Ivorie, Eq Guinea, Gabon, Madagascar, Namibia, Uganda, Senegal and Ghana	Oil Exploration, Distribution and production
ILLOVO	6 Countries	Swaziland,zambia,Mozambique,Malawi, Tanzania, and Mali	Sugar production and Distribution
NAMPAK	10 Countries, largest in Africa	Ethiopia, Malawi, Kenya, Mozambique, Nambia, Nigeria, Swaziland, Tanzania, Zimbabwe and Zambia	Packaging and non-packaging products
AVIS RENTAL	Second largest car rental in the world, 10 countries in Africa	Angola, Botswana, Lesotho, Malawi,Madagascar, Nambia, Mozambique, Swaziland, Zambia,Zimbabawe	Car Rental
Ango-America	3 countries,one of the world's largest mining firms	Namibia, Tanzania, and Botswana	Mining
Standard Bank Investment Corporations	17 countries in SSA, with over 1024 branches within Africa	Angola, Botswana, Congo, Ghana, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Nigeria, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe	Banking
M-Cell	15 countries in SSA	Botswana, Cameroon, Côte d'Ivoire, Nigeria, Republic of Congo (Congo-Brazzaville), Rwanda, South Africa, Swaziland, Uganda, Zambia, Benin, Ghana, Guinea Bissau, Guinea Republic, and Liberia,	Telecommunication
SAB MILLER	10 Countries in SSA	Angola, Botswana, Zambia,, Ghana,Tanzania,Uganda,Malawi, Mozambique,Swaziland, Lesotho, and Zimbabwe	Brewing firm, and one of the largest bottlers of Coca-cola products
Barloworld	7 Countries in SSA	Angola, Botswana, Namibia, Zambia,Zimbabawe, Malawi, Mozambique	Brand and Management Company
Investec	3 Countries	Mauritius, Namibia, Botswana	Financial Services

CHAPTER FOUR: FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH IN SSA

4.1 Introduction

Over the last three decades, theoretical and empirical inquiry about the nexus between finance and growth has had a considerable attention in the literature. This relationship has attracted several empirical researches with contrasting conclusion. While some have robust statistical evidence for uni-directional causality from financial development to growth (Gupta, 1984; Jung, 1986; King and Levine, 1993), others have evidence for reverse causation from economic growth to financial development Demetriades and Hussein (1996), while Calderon and Liu (2003) report bi-directional causality. Some justify the use of time series (Gupta 1984, Jung 1986) while others favour cross-section analysis (King and Levine 1993). This study however tries to assess the causality between financial development and growth in a panel data framework.

Patrick (1966) made a succinctly clear distinction between the directions of causality by referring to the causality from financial development to economic growth as supply-leading hypothesis, while causality from the economic growth to financial development was referred to as demand –following. Till date, the validity of these hypotheses are receiving contradicting empirical evidence. Demirguc-Kunt and Levine (2008) made a review of recent works on this issue, which suggests that the issue is inconclusive in the literature.

A cursory look at the pre-1970 or early work in the field reveals that while Bagehot (1873), Schumpeter (1911), and Mckinnon (1973) seem to find empirical support for the supply-leading hypothesis, Robinson (1952), and Goldsmith (1969) find justification for the demand-following proposition. Others have shown evidence of bi-directional causality between economic growth and financial development.

The Post -1970 or recent works also reveal conflicting findings. While King and Levine (1993) find empirical support for the supply-leading hypothesis, Demetriades and Hussein (1996), seem to support the demand-following hypothesis .Calderon and Liu (2003) find empirical support for bi-directional causality. Some pioneers of

development economists (Meier and Seers, 1984, Lucas 1988) dismiss finance as having any significant impact on growth (Levine 2004). In fact, Lucas (1988) considers the relationship as being over-stressed, yet others like Merton (1987) strongly argue that financial development leads to economic growth. This suggests that the issue is inconclusive in the literature and any study in this regard would further clarify our understanding of the relationship between the two, enhance the formulation of optimal policy and direct the priority of policy makers on financial sector reforms.

The theoretical basis of the relationship between the two suggests that financial instruments, markets and institutions reduce information, enforcement and transaction costs. Financial system influences saving rates, investment decisions, and technological innovation and long run growth rates.

Earlier studies that analyse the relationship between finance and growth have been mostly time series and cross section studies. Though, cross sectional studies provide useful insights into the relationship, they have been criticised in a number of ways. It has been observed that it is difficult to generalise the findings from such studies since the nature and operation of financial institutions and policies pursued in each country differ (Arestis and Demetriades, 1997; Demetriades and Andrianova 2004). They inadequately account for the complexity of the financial environments and economic histories of each individual country (Ang, 2008). The time series also has been criticised to be only country specific, limited predictive ability and difficult to generalise.

These weaknesses are addressed in a panel data framework study where the individual country specific characteristics are observed. Baltagi (2005) identifies a number of advantages of panel study over time series or cross-sectional studies. This includes ability to control for individual heterogeneity. Panel studies are able to control for state and time-invariant variables whereas time series or cross-section study cannot. It gives more informative data, more variability, less collinearity among variables, more degree of freedom and more efficiency. Panel study is better

to study the dynamics of adjustment; they can shed light on the speed of adjustments to economic policy changes (Deaton 1995).

This chapter contributes to the literature by empirically assessing the relationship between financial development and economic growth in SSA, using panel approach. In particular, it tries to analyse the long run impact of spatial variable in the finance-growth nexus with the view to providing policy makers with the necessary information on the relative impact of this spatial proximity on the financial development in the region in particular and economic growth in general. It is hoped that this analysis, would enhance our understanding of the impact of spatial proximity in the evolution of financial development and economic growth in the region. Finally, it further adds to the empirical literature about the direction of causality between financial development and economic growth in SSA.

This chapter has six sections, section two discusses the conceptual framework for the study, section three presents financial development and economic growth in SSA, section four discusses the methodology, section five has policy implication and section six concludes the study.

4.2 Conceptual Framework

In the literature, the main transmission mechanism of financial development to growth is through enhancing the functions of the financial system such as reduction of risk, facilitating efficient resource allocation, improving access to financial information on investments, increasing saving mobilization and monitoring compliance (Levine 1997). Vent and Hurlin (2001) observe that though there is a strong theoretical foundation for the relationship between finance and growth, however, the transmission mechanism has been different. While Goldsmith (1969), Mckinnon 1973, and Shaw (1973) suggest the channel is through the efficiency of investment. Greenwood and Jovanovic (1990) view financial intermediaries as processor of information by directing the flow of an economy's resources toward investment with the highest return. Bencinvenga and Smith (1991) observe that the

potential economic benefit of financial intermediation is only in the manner in which financial intermediaries allocate savings and not from volume of savings available.

Saint Paul (1992) also identifies another link between the two through technological choice. With his theoretical model, he shows that underdeveloped financial market can lead to agents investing in less specialized industries. He then concludes that this can lead to multiple equilibria, a low equilibrium with underdeveloped financial markets and unspecialized technology and a high equilibrium with developed financial markets with specialized technology.

Ang (2008) suggests two channels, which are the quantitative and qualitative channels. The quantitative channel suggests that economic growth depends on capital accumulation through domestic credit and foreign capital investment. Therefore, an efficient financial system is needed to mobilize savings and channel it to productive ventures. The qualitative channel suggests that efficient financial system boosts economic growth through provision of credit facilities to facilitate human capital accumulation and development of technology-intensive industries.

4.3 Review of Earlier Empirical studies in SSA

Saint Marc (1972) observes that the rich West African Economic and Monetary Union (WAEMU) countries also have high financial deepening ratios. Spears (1992) reports high correlation between financial deepening and growth in 9 of the 10 countries studied. Thus they conclude some forms of causality between the two.

Savvides (1995) using a sample of 28 African countries, find positive impact of financial sector on growth only when they control for political freedom in the region. Odedokun (1996) in a panel of 71 countries, including 21 SSA countries, find a positive and significant effect of financial sector on economic growth when using ratio of liquid assets to GDP. Joseph et al (1998), showed Granger causality from financial development to economic growth in 5 SSA countries (Benin, Cameroon, Cote d' Ivorie, Mali and Senegal), and reverse causality in 2 SSA countries (Burkina Faso, and Togo).

Venet and Hurlin (2001) using both ratio of broad money and credit to the private sector to GDP as financial development indicators, in a balanced panel study observe for 16 SSA countries (1968-1998) find that financial sector Granger causes economic growth in seven countries (Cameroon, Gabon, Niger, Burkina Faso, Cote d'Ivorie, Togo and Nigeria). In the other nine countries, they find that it is the economic growth that induces financial development, supporting the demand – following hypothesis suggesting that a decrease in economic growth could retard financial development by inducing massive withdrawal from the banking system for consumption smoothing. They conclude that economic activity drives financial sector development in the region.

In summary, the existing empirical works summarily suggest four types of relationship between financial development and growth depending on the econometric estimation technique used, data frequency and region studied. These relationships are finance causing growth, growth causing financial development, bi-directional causality and no causality. However, Xu (2000) in a multivariate VAR model study of 41 countries finds that the long run effect of financial development on growth is negative, 14 of his sample countries are in SSA. One of the striking findings in the work of Calderon and Liu (2003) is that though financial deepening and ratio of credit to the private sector have impact on growth, financial deepening has more impact on growth in developing countries. They report bi-directional causality between growth and finance.

4.4 Spatial Externality and Financial development

Different studies have identified a number of channels by which financial development relates to growth. Mckinnon (1973) identifies investment outlet, Greenwood and Jovanovic (1990) suggest information, while Bencivenga and Smith (1991) explores the channel of technology in the relationship between the two. Patrick (1966) stressed the importance of stages of development in the relationship between finance and growth. He observes that at the early stage of economic development finance causes growth, the creation of new financial services enhances intermediation, savings and investment and leads to higher growth (Supply leading

hypothesis). At later development stage, economic growth demands for more financial services, hence, growth leads to financial development (demand-following hypothesis), Demetriades and Law (2006), emphasise the role of institutional factors in the relationship. This study explores the spatial impact in explaining the relationship between finance and growth.

Market frictions exist that inhibit the role of financial development in growth dynamics. These frictions in terms of laws, institutions, regulations, and policies differ across space and over time. This tends to explain why some countries are more financially developed than others. Financial development influences resource allocation to enhance growth and productivity across time and space (Merton and Bodie, 1995). Hence, Levine (2004) suggests we need theories that describe how financial development influences resource allocation, a vacuum this study tries to fill. This study tries to assess the role of spatial externality in the relationship between finance and growth. This is particularly useful in building a framework for regional cooperation and economic union.

The waves of globalisation through technological advances and ease in transportation and communication have transformed the financial sectors in many economies by quickening financial innovation, transmission of information and reduction of transaction cost. This trend is further strengthened by a policy regime that lays strong emphasis on liberalisation and openness.

Globalization affects domestic financial markets and enhances financial development by increasing access to capital and lowering cost of capital for productive investments. Mishikin (2007) also highlights the indirect effect of globalization on financial development which includes promotion of reforms and healthy competition, evolution of best practices in the industry, and enhancement of manpower development (Kose et al 2006). Spatial externality may be a viable channel for actualising these potential benefits in an era of globalisation, especially as the region has not significantly benefited from globalization (See Ajayi, 2003, Mobolaji 2008a)

There is also an indirect effect of spatial externality on financial development. The increased interconnectedness among countries suggests that country whose

neighbour has high financial development, would also be forced to take necessary steps or build necessary institutions, policies and regulations to either improve its level of financial development or initiate policies to embark on financial development. With high capital mobility in the world, a financially underdeveloped country stands the risk of losing potential investment to a more financially developed neighbour. This exerts additional pressure on the host country to implement right policies towards financial development.

High interest rate differentials among countries translate to high differences in cost of capital with its attendant effect on investment and growth in the economy. This creates a competitive environment among countries and consequently may lead to implementing right policies for financial development or risk the potential loss of both domestic and foreign investments to the more financially developed neighbouring countries.

Also, another transmission mechanism of financial development with spatial consideration is that member countries of regional blocs or economic unions, stand to benefit from financial development of other member countries through risk sharing, sharing of records, transmitting of best practices among countries, and this can further accentuate regional development.

Another channel is through trade, Rajan and Zingales (2003) observe that simultaneous opening of trade and financial sector is important for financial development. However Mishkin (2007) shows that openness, developed financial sector and good institutions dictate where foreign capital finally resides. Thus, an open country with good institution and strong financial development is likely to attract foreign capital than a neighbouring country with weak financial sector. However, a close country neither attracts foreign capital nor have financial reforms to enhance financial development; hence openness is important in the spatial consideration of financial development.

Finally, this thesis may contribute to the literature on finance by suggesting a regional framework for understanding the relationship between finance and growth among SSA countries.

4.5 Methodology

Empirical studies with non stationary series often lead to spurious estimates and subsequent invalid inferences. However, cointegartion analysis suggests that even if underlying time series are non stationary, linear combination of these series may be stationary. Panel unit root tests and cointegration tests become attractive in the literature of macro panel because they lead to more powerful tests. Harris and Sollis (2003) observe that one of the advantages of panel data within the context of non-stationary data and cointegration analysis is that adding the cross-sectional dimension to time series dimension means that non-stationarity from the time series can be addressed by the increased data and power that the cross section brings. Furthermore, as N and T get large, panel test statistics and estimators converge to normally distributed random variables. They conclude that this makes testing and inference simpler, and leads to a stronger overall signal than the time series estimator. Thus panel unit root tests and panel cointegration tests are more powerful tests than those obtained when applying individual time series cointegration tests (Baltagi 2008).

Though several studies have tried to empirically analyse the relationship between finance and growth, most have used time series and cross section analysis. This study uses panel data approach. The initial step starts with the panel unit root to establish the stationarity status of each variable, where the variables are found to be integrated of order one, then a panel cointegration is conducted.

The study then imposed a weak exogeneity restriction on the variables of interest. This is done to make a preliminary decision on the direction of causality of the variables in the cointegrating vector. Also, a test of zero restriction on the parameters of the cointegrating vector is conducted to ascertain the relevance of each variable. A rejection of the null hypothesis signifies the importance of the

variable in the vector. Each of the vectors is then normalised based on the theoretical postulates on the relationship between finance and growth.

4.5.1.1 The Panel Unit Root

One of the major problems with macro panels[11] (large N with large T) is non stationarity of the series, as this often leads to spurious regressions and inferences made from such estimations are invalid (Baltagi 2008, Breitung and Pesaran 2007). Thus, it becomes expedient to establish the order of integration of the series through the panel-unit root tests.

The preliminary investigation commences with the confirmation of the order of integration of each variable. The study conducts panel unit root tests. There are six popular panel unit root tests with varying assumptions about the autoregressive (AR) process. However these six tests can conveniently be classified into two main groups based on the assumption of the AR process in the series. The first group assumes that the series have a common root. This group includes Levin, Lin and Chu test (LLC, 1992), Breitung (2000), and Hadri (2000). The second group assumes that the series have individual root. This group includes Im, Pesaran and Shin (IPS, 1997), Fisher-ADF, and Fisher-PP tests. All the tests in the two groups with the exception of Hadri (2000) take non-stationarity (presence of unit root) as the null.

The study conducts three tests to confirm the reliability of the tests and then compare the results to check the robustness of the exercise. These tests include LLC, Breitung and IPS. These three tests were chosen to check the robustness of the tests under varying assumptions. More importantly, Breitung (2000) observes that both LLC and IPS tests have size distortions as N gets large relative to T, and they suffer from dramatic loss of power if individual specific trends are included.

Furthermore, the series were estimated under three assumptions, (a) series were estimated with individual intercept so as to include the individual fixed effects, (b) series estimated with individual intercepts and individual trends, this is done to include both the fixed effects and trends, and (c) where none of the two options is included.

[11] Micro panels studies (large N and small T) are often free from this problem.

Consider the following AR (1) process for panel data:

$$y_{it} = \rho_i y_{it-1} + X_{it}\delta_j + \varepsilon_{it} \qquad 4.1$$

Where i= 1,2,…..N cross section units or series, that are observed over periods t= 1,2,…T. The X_{it} represent the exogenous variables in the model, including any fixed effects or individual trends, ρ_i are the autoregressive coefficients and ε_{it} are assumed to be mutually independent idiosyncratic disturbance. If $|\rho_i|$<1, y_i is weakly stationary, if it is equal to one, then y_i contains a unit root.

Thus the first group assumes that the persistence parameters ρ_i are common across cross-section, so that $\rho_i = \rho$ for all i. The second group allows ρ_i to vary across cross-section. This group allows for heterogeneity across members and residual serial correlation.

Both LLC and Breitung consider the following ADF specification:

$$\Delta y_{it} = \alpha y_{it-1} + \sum_{j=1}^{\rho_i} \beta_{ij}\Delta y_{it-j} + X'_{it}\delta + \in_{it} \qquad 4.2$$

Where a common $\alpha = \rho - 1$ is assumed. The null and the alternative hypotheses for the tests are:

$H_0 : \alpha = 0$

$H_1 : \alpha < 0$

The null hypothesis is the presence of a unit root in the series and the alternative is there is no unit root.

LLC show that under the null, a modified t-statistic for the $\ddot{\alpha}$ is asymptotically normally distributed:

$$t^*_\alpha = \frac{t_\alpha - (N\bar{T})S_N\hat{\sigma}^{-2}se(\hat{\alpha})\mu^*_{m\bar{T}}}{\sigma_{m\bar{T}^*}} \rightarrow N(0,1) \qquad 4.3$$

Where t_α is the standard t-statistic for $\ddot{\alpha}$=0, $\hat{\sigma}$ is the estimated variance of the error term η, $se(\ddot{\alpha})$ is the standard error of $\ddot{\alpha}$ and

$$\bar{T} = T - (\sum_i \rho_i / N) - 1 \qquad 4.4$$

Breitung differs slightly from LLC by removing the autoregressive portion of the standardized proxies, and then transform and de-trend the proxies. Thus the persistence parameter α is estimated from the pooled proxy equation

$$\Delta y_{it}^{*} = \alpha y^{*}_{it-1} + \upsilon_{it} \qquad 4.5$$

Breitung shows that under the null, the resulting estimator α^{*} is asymptotically distributed as a standard normal.

The third unit root that assumes common AR process is the Hadri panel unit root test which is similar to the KPSS unit root test, with a null hypothesis of no unit root in any of the series in the panel. The test is based on the residuals from the individual OLS regressions of y_{it} on a constant, or on a constant and a trend:

$$y_{it} = \delta_i + \eta_i t + \in_{it} \qquad 4.6$$

However Hlouskova and Wagner (2006) perform a large scale Monte Carlo simulation to assess the size and power of the panel unit root tests. They find that panel stationarity test of Hadri (2000) performs poorly. Thus they caution that Hadri's panel unit root test sometimes experiences significant size distortion in the presence of autocorrelation of either the moving average or first-order autoregressive (see also Baltagi 2008). In particular, the Hadri test appears to over-reject the null of stationarity, and may yield results that directly contradict those obtained using alternative test statistics. Thus this test was not used in this study.

4.5.1.2 Tests with Individual Unit Root Processes

The second group (IPS, Fisher-ADF and Fisher-PP) all allow for individual unit root processes so that ρ_i may vary across cross-sections. This study applies the Im Pesaran and Shin (IPS) which specifies a separate ADF for each cross section:

$$\Delta y_{it} = \alpha y_{it-1} + \sum_{j=1}^{\rho_i} \beta_{ij} \Delta y_{it-j} + X'_{it}\delta + \in_{it} \qquad 4.7$$

The null hypothesis is

$H_0 : \alpha_i = 0$, for all i

While the alternative hypothesis is

$$H_1 : \begin{cases} \alpha_i = 0 \\ \alpha_i < 0 \end{cases}$$

Where i is the non-zero fraction of the individual processes which is stationary.

After estimating the separate ADF regressions, the average of the t-statistics for α_i from the individual ADF regressions, $\tau_{iT}(\rho_i)$:

$$\tau_{NT} = \left(\sum_{i=1}^{N} \tau_{it}(\rho_i) \right) / N \qquad 4.8$$

This is then adjusted to arrive at the desired test statistics. IPS show that standardized τ_{NT} has an asymptotic standard normal distribution:

$$W_{\tau NT} = \frac{\sqrt{N}\left[\tau_{NT} - N^{-1} \sum_{i=1}^{N} \mathrm{E}(\tau_{iT}(\rho_i)) \right]}{\sqrt{N^{-1} \sum_{i=1}^{N} Var(\tau_{iT}(\rho_i))}} \rightarrow N(0,1) \qquad 4.9$$

Other tests include Fisher- ADF and Fisher-PP, in line with approach suggested by Maddala and Wu (1999) and Choi (1999). These tests are based on Fisher's (1932) approach, where tests combine the values from individual unit root tests. These tests were not used in this study; the study only adopts the IPS which is one of the most popular tests in the group of tests that assume heterogeneity of individual root in series.

Table 4.1 Summary of Panel unit root tests used in the thesis

Test	Null Hypothesis	Alternative Hypothesis	Deterministic Component	Autocorrelation Correction Method used by the test
Levin, Lin and Chu	Unit root	No Unit root	N, F, T	Lags
Breitung	Unit root	No Unit root	N, F, T	Lags
IPS	Unit root	Some cross-section without Unit root	F, T	Lags
Fisher-ADF	Unit root	Some cross-section without Unit root	N, F, T	Lags
Fisher-PP	Unit root	Some cross-section without Unit root	N, F, T	Kernel Density
Hadri	No Unit root	Unit root	F, T	Kernel Density

NB: N means no exogenous variables; F means models specified with Fixed effects; T means models with individual effect and trend

Table 4.2: PANEL UNIT ROOT TESTS

	LLC				Breitung		IPS			
Variables	Intercept	Intercept and Trend	Intercept	Intercept and Trend	Intercept and Trend	Intercept	Intercept and Trend	Intercept	Intercept and Trend	Order of Integration
	At Level	At Level	In First Difference	In First Difference	At level	At Level	At Level	In First Difference	In First Difference	
LDC/Y	-0.71	-1.77**	-8.93***	-8.83***	3.59	-0.61	1.68	-11.17***	-10.51***	I(1)
LDCp/Y	-0.46	2.69**	-13.22***	-11.98***	-0.26	0.18	-0.58	-13.75***	-11.96***	I(1)
LM3/Y	-1.36*	-1.84**	-12.52***	-10.85**	-1.12	-2.04**	-1.01	-15.93***	-14.39***	I(1)
LM2/Y	-1.12	-2.08**	13.30***	-12.45***	0.21	-1.17	-0.46	-14.16***	-12.53***	I(1)
LY	1.35	6.25	-1.25	1.52	1.09	-0.58	1.63	-14.37***	-12.81***	I(1)[12]
LDCSA	18.12	5.73	-12.49***	-18.71***	13.03	18.04	13.06	-10.66***	-18.16***	I(1)
LDCPSA	6.42	-4.64***	-7.09***	-3.72***	1.29	10.69	-1.04	-6.70***	-4.54***	I(1)
LM3SA	-1.87**	8.53	-11.88***	-12.26***	6.16	0.32	9.73	-12.52***	-13.39***	I(1)
LM2SA	1.89	4.66	-16.96***	-19.04***	6.24	-0.38	7.73	-12.30***	-13.45***	I(1)

[12] All other unit root tests indicate the variable is I(1) when both specifications (using either the intercept alone or intercept and trend) except LLC that indicates the variable is I(2). Thus we consider it as an I(1) in line with IPS and Breitung tests.

Table 4.2 above presents the panel unit root tests, these tests were reported with series with intercept and intercept and trend. This is done the individual fixed effects and both the individual fixed effects and trends respectively. The tests were also conducted both in levels and first difference. The results suggest that we do not reject the null hypothesis of unit root for most of the variables in levels especially when using the IPS and Breitung and when the fixed effects and trend are included. However, when the first differences are used, the null hypothesis of unit root (non-stationarity) is strongly rejected at the 1% statistical level, when both fixed effect and trends are assumed in the series. The only exception to this is the real GDP when using LLC, however this may be due to the size distortion and bias adjustment error that is often observed with LLC tests. However, since the other two tests and especially Breitung that also assumes common root in the series like LLC suggests rejects the null hypothesis. The study concludes that the variable is stationary at first difference.

Thus, it can be inferred from the table above that panel unit root test results suggest that all the variables are I(1) series, this suggests that the variables are only stationary in first difference, and thus it becomes econometrically reasonable to conduct the panel cointegration test.

Please note that, all the above tests are first generation unit root tests, because they assume cross sectional independence among variables. Other studies may explore using the second generation panel unit root tests (such as Pesaran, 2007; Moon and Perron 2004) which cater for cross sectional dependence among these groups. Another limitation of these panel unit root tests is that Karlsson and Lothgren (2000) compare both IPS and LLC and observe that for large T, panel unit root tests have high power and there is a potential risk of concluding that the whole panel is stationary, even when there is only a small proportion of stationary series in the panel, however for small T, the tests often have low power, with a potential risk of concluding that the whole panel is not stationary, even when there is a large proportion of stationary series. They suggest analysis of both individual and panel unit root results before concluding of the stationarity properties of the series.

4.5.2 Panel Cointegration

The second stage of the estimation is to verify whether the variables are cointegrated, after confirming the order of integration of the series. This is done by conducting the panel cointegration tests. This approach becomes much in use because of its inherent advantage of stronger power of the tests when pooling information across the i members of a panel. Three panel cointegration tests were used in this study. These are the Pedroni (1999) 1999), Kao (1999) and Johansen tests. The Pedroni and Kao tests are residual-based cointegration tests based on the Engle-Granger (1987) two-step approach and single-equation framework, while the Johansen test is a multivariate test.

Engel–Granger (1987) cointegration test is based on the examination of the residuals of a spurious regression. If the variables are cointegrated, then the residuals should be I(0), and if they are not cointegrated then the residuals will be I(1). Pedroni and Kao extend this framework to panel data. The null hypothesis is that there is no cointegration.

Pedroni(1999) proposes a panel cointegration tests for both homogeneous and heterogeneous panels with seven regressors based on seven residual-based statistics constructed to test the null hypothesis of no cointegration. Four of the tests are called panel statistics and they are based on pooling data along within dimension whereas three are group mean statistics constructed by pooling data along the between-dimension. Pedroni test is unique because considerable heterogeneity is allowed across individual members of the panel with regards to the associated cointegrating vectors and dynamics of the underlying error process. The panel test statistics is the homogeneous option, while the group statistics is the heterogeneous alternative. Baltagi (2008) observes that though the group statistics allows for heterogeneous elasticities, it also has less size distortion when compared with the panel statistics. Monte Carlo simulation shows that both panel-v and panel-p statistics tend to under reject the null hypothesis of no cointegration in panels with small N and T.

Pedroni proposes several tests that allow for heterogeneous intercepts and trend coefficients across cross sections.

$$y_{it} = \alpha_i + \delta_i t + \beta_{1i} X_{1i,t} + \beta_{2i} X_{2i,t} + ... + \beta_{Mi} X_{Mi,t} + \ell_{i,t} \quad 4.10$$

For t=1,….T;i=1,……,N m=1,…….M; where y and x are assumed to be integrated of order one. The parameters α_i and δ_i are individual and trend effects, these can assume the value of zero, if we do not desire these effects. Also α_i and β_i are allowed to vary across the i members, thus allowing for considerable long-run and short-run heterogeneity. Pedroni (1999) constructs three non-parametric tests to correct for serial correlation in panel model.

Under the null hypothesis of no cointegration, the residuals $\ell_{i,t}$ will be I(1). The general approach is to obtain the residuals from eq 4.10, and then test whether the residuals are I(1), by running the following regression:

$\ell_{it} = \rho_i \ell_{it-1} + \mu_{it}$ or

$$\ell_{it} = \rho_i \ell_{it-1} + \sum_{j=1}^{\rho_1} \psi_{ij} \Delta \ell_{it-j} + \upsilon_{it} \quad 4.11$$

The null hypothesis of no cointegration is

$H_0 : \rho_i = 1$

While there are two alternative hypotheses: the first is the homogenous alternative, $H_1 : \rho_i = \rho < 1$ for all i (pedroni calls this the within–dimension test or panel statistics test), the second is the heterogeneous alternative called the between-dimension or group statistics test

$H_{1b} : \rho_i < 1$ for all i.

Pedroni shows that the standardized statistic is asymptotically normally distributed

$$\frac{\aleph_{N,T} - \mu\sqrt{N}}{\sqrt{\upsilon}} \Rightarrow N(0,1) \quad 4.12$$

Where μ and υ are Monte Carlo generated adjustment terms.

Kao Test

This test adopts the basic approach of the Pedroni test, but the difference is that it specifies cross section specific intercepts and homogenous coefficients on the first stage regressors. Kao(1999) demonstrates in a bivariate model

$$y_{it} = \alpha_i + \beta x_{it} + e_{it} \quad 4.13$$

$$y_{it} = y_{it-1} + \mu_{i,t} \quad 4.14$$

$$x_{it} = x_{it-1} + \ell_{i,t} \quad 4.15$$

Kao runs the pooled auxillary regression

$$\ell_{it} = \rho_i \ell_{it-1} + \mu_{it} \quad 4.16$$

Or the augmented version of the pooled specification

$$\ell_{it} = \rho_i \ell_{it-1} + \sum_{j=1}^{\rho_1} \psi_{ij} \Delta \ell_{it-j} + \upsilon_{it} \quad 4.17$$

And then shows that under the null of no cointegration, the following statistics

$$DF_\rho = \frac{T\sqrt{N}(\hat{\rho}-1)+3\sqrt{N}}{\sqrt{10.2}} \quad 4.18$$

$$DF_t = \sqrt{1.25}t_\rho + \sqrt{1.875N} \quad 4.19$$

$$DF_\rho^* = \frac{\sqrt{N}(T(\hat{\rho}-1))+3\sqrt{N}\hat{\sigma}_\upsilon^2/\hat{\sigma}_{0\upsilon}^2}{\sqrt{3+36\hat{\sigma}_\upsilon^1/(5\hat{\sigma}_{0\upsilon}^1)}} \quad 4.20$$

$$DF_t^* = \frac{\tau_\rho + \sqrt{6N}\hat{\sigma}_\upsilon/(2\hat{\sigma}_{0\upsilon})}{\sqrt{\hat{\sigma}_{0\upsilon}^2/(2\hat{\sigma}_\upsilon^2)+3\hat{\sigma}_\upsilon^2/(10\hat{\sigma}_{0\upsilon}^2)}} \quad 4.21$$

And for p>0, then the augmented version would be

$$ADF_t^* = \frac{\tau_{\hat{\rho}} + \sqrt{6N}\hat{\sigma}_\upsilon/(2\hat{\sigma}_{0\upsilon})}{\sqrt{\hat{\sigma}_{0\upsilon}^2/(2\hat{\sigma}_\upsilon^2)+3\hat{\sigma}_\upsilon^2/(10\hat{\sigma}_{0\upsilon}^2)}} \quad 4.22$$

This converges to N (0, 1) asymptotically.

Johansen Tests

Larsson et al (2001) suggested a likelihood-based (LR) test in heterogeneous panel by averaging the rank and trace statistics of individual members in line with Johansen (1988, 1995) maximum likelihood estimator approach. It avoids using the unit root test on the residuals. The model allows for multiple cointegrating vectors (see Asteriou and Hall 2007). Their model assumes that data generating process for each cross section can be represented by an ECM specification as follows

$$\Delta Y_{it} = \Pi_i Y_{it-1} + \sum_{k=1}^{n} \Gamma_{ik} \Delta Y_{it-k} + u_{it} \qquad 4.23$$

The panel rank trace statistics is obtained as the average of the N cross sectional trace statistics. The null and alternative hypotheses for the test are:

$$\begin{aligned} H_0 &: rank(\Pi_i) = r_i \leq r \\ H_a &: rank(\Pi_i) = p \end{aligned} \qquad 4.24$$

For all i= 1…N, and p is the number of variables in the cointegration vector.

The larsson test is sometimes more preferable because it is a system approach, it allows for feedback between all variables in the system, the earlier single equation approach assumes that there is only one cointegrating relationship, which may not necessarily be true in case of multivariate models. However, it requires a large time series dimension, as Monte Carlo simulation reveals that the test suffers size distortion in small T panels (See Larsson et al, 2001). Thus, Groen and Kleibergen (2003) proposed an extension to Larsson et al test; they suggested co integrating analysing in panels of a fixed number of vector error correction models by allowing for cross sectional correlation.

Gutierrez (2003) in a Monte Carlo experiment, compared the results of panel cointegration tests proposed by Kao (1999), pedroni (2000) and Larsson et al (2001) and concludes that for large T panels when the power of these tests is high, there is high likelihood that the whole panel is considered as cointegrated when only a small fraction of the relationship is actually cointegrated, and for small T panels, when the power of the tests is low, there is the possibility that the whole panel is erroneously considered as not cointegrated when a large fraction is actually

cointegrated. For small T and large N, Kao's test outperforms others and shows higher power, but with large T, Pedroni test shows higher power than Kao's test. Both Pedroni and Kao's tests outperform the Larsson's et al test. A similar finding was observerved by Wagner and Hlouskova (2007). Thus, this study uses the three tests for the analysis, and only emphasis the result when all the three tests suggest same conclusion.

4.6 Discussion on the Panel Cointegration Tests

The availability of panel data has led to recent increase in empirical research on panel macroeconomic variables. The most popular panel cointegration tests include Pedroni(1999, 2004), Kao(1999), and a Fisher-type using an underlying Johansen methodology (Maddala and Wu 1999, Larsson et al 2001).

The critical value for the Pedroni tests is -1.64 (Pedroni 1999 table 2), with the exception of the v-statistic that has a critical value of 1.64. Thus, any statistical value greater than -1.64 (in absolute terms) implies the rejection of the null hypothesis of no cointegration (Asteriou and Hall, 2007, P376). Both Pedroni and Kao tests are all one-sided with a critical value of 1.64.

Sequel to the empirical finding that South Africa's financial development has exerted a significant impact on the financial development of neighbouring countries in SSA, this study seeks to find out whether this impact of spatial variable translates into any long run benefits to the financial sectors in particular and economic growth in general of these countries by conducting panel cointegration test for all the countries in the sample.

The panel unit root tests indicate that the variables are I(1) series, the result is shown in Tables 4:2 above. Thus the confirmation of the order of integration makes it econometrically reasonable to conduct the panel cointegration for all the countries as a group. The essence of this is to assess the long run impact of the spatial externality on the host financial development. If the variable is relevant, and has a long run impact on domestic financial development, then any omission of this variable in the formulation of financial development in the region may have serious consequence

on the model specified. This could also enhance our understanding on the channels by which finance relates to economic growth.

The thesis starts with a bivariate cointegration model, to establish the relationship between finance and growth as done by previous researchers, by conducting the panel cointegration between the real GDP and financial development indicators; this is then followed by testing the weak exogeneity between the two variables to ascertain the direction of causality between the two.

From the bivariate model, the cointegration results suggest rejection of the null hypothesis of no cointegration between the variables. All the three tests suggest that there is cointegration. The sufficient condition to conclude existence of causality is for the alpha (α) coefficients in the VECM to be weakly exogenous. Hence, the study conducts weak exogeneity test for each of the variables of interest. The null hypothesis is that the variable is weakly exogenous, and the alternative is that the variable is not. This is done by restricting the alpha coefficient of each variable of interest to zero, and then check the Langragian Multiplier (LM) and Chi square statistics.

The results (Table 4.5.1) suggest that the model does not reject the null hypothesis of weak exogeneity, for the real GDP for all different indicators used. the α coefficients are statistically insignificant at the conventional 5% level. This lends empirical support to the view that the direction of causality is from real sector to financial development in the region. This indicates that the relationship between finance and growth follows demand-following hypothesis (Patrick 1966) and exhibits reverse causality (Demetriades and Hussein 1996) in the region.

After this, the spatial variable was then included in the cointegrating vector. The relevance of this inclusion was tested to confirm its statistical importance in the cointegration vector. The study imposes a restriction on the coefficient of the β and then conducts the likelihood ratio test on the coefficient of the new variable. The null hypothesis is that the variable is not important in the cointegration vector, thus a rejection of the null hypothesis signifies the importance of the variable in the vector.

From Table 4.5.2, the results suggest that we do reject the null hypothesis, and conclude that the variable is important in the vector. The study further imposed restriction on the α to test the longrun impact and speed of adjustment to disequilibrium (the weak exogeneity restriction). The null hypothesis is that the variable is weakly exogenous, while the alternative hypothesis is that the variable is not weakly exogenous. In all, the study cannot reject the null hypothesis of the weak exogeneity of the spatial variable in 3 out of the four financial indicators; we do reject the null only when we use the domestic credit to the economy. However, the weak exogeneity tests for other variables are rejected, suggesting other variables are not weakly exogenous. The result is presented in table 4.5.2 below. Thus, we conclude that the spatial variable is an important determinant of financial development in the region. This further suggests that another possible transmission channel in the relationship between finance and growth in SSA, is the level of financial development in South Africa. The direction of causality is from financial development in South Africa to the financial sector in the other neighbouring countries. Some banks in South Africa have branches in 18 of the SSA countries in the sample, some big corporations in South Africa are equally the top largest companies in some Africa countries, for example, the MTN owned by SA is the largest Telecommunication firm in Nigeria, Stanbic (Standard-Charter Bank) is one of the biggest banks in Nigeria.

The result suggests that the spatial effect is significant in all cases, though it may crowd-out the domestic financial sector in the short-run, through exposure to competition from these SA banks, but it has a long run stable impact not only on the financial sector but also on the economy as a whole. The short run crowding-out effect could be due to availability of South African's banks in these countries, these banks employ best banking practices, provide credit facilities and because they have strong financial assets base, they possibly enjoy banking customers confidence as against local banks with relatively poor service delivery. The presence of these banks has potentials of increasing the competition among banks.

In summary, the results from the cointegration tests suggest that we reject the null hypothesis of no long run stable relationship among the variables (using all the four

indicators of financial development, since the hypothesis $H_o : \beta_{FdSA} = 0$ is rejected in all the specifications. Similar trends hold for financial development and economic growth, the hypotheses $H_o : \beta_{fd} = 0$. And $H_o : \beta_y = 0$ are rejected mostly at conventional 5% statistical level.

However, another unique finding is that the null hypothesis of weak exogeneity cannot be rejected for the spatial variable. This suggests that there is a unidirectional causality (of the spatial variable) from South Africa financial development to the other countries and not the reverse. This is justified with the policy regime in South Africa that allows no exchange restrictions from South Africa to other countries but an enforcement of this exchange restriction from other countries to South Africa.

In all, the study finds statistical evidence that financial development exhibits spatial externality among these countries, and thus consideration of spatial variable may be an important determinant of financial development in these countries. Non recognition of this important variable may lead to omitted variable bias and its subsequent econometric implications.

The study then investigates further, by conducting the impulse response analysis on the variables, to assess how the financial sector in particular and the domestic economies in general respond to this exogenous spatial shock.

Table 4.3.1: Panel Cointegration Test for Bivariate Models

Variables in Cointegration Vector	Test	intercept	Intercept and trend	None	Kao
Ldc, LY	$panel-\upsilon$	4.81***	1.32	7.42***	-0.85
	$panel-\rho$	-0.39	0.92	-2.26**	
	$panel-pp$	-0.62	-0.53	-2.23**	
	$panel-Adf$	0.22	0.72	-2.23**	
	$Group-\rho$	1.92*	3.15***	1.77*	
	$Group-pp$	0.23	0.37	-2.69**	
	$Group-Adf$	0.46	1.15	-2.22**	
LM2, LY	$panel-\upsilon$	1.48	--1.59	3.28***	-2.84***
	$panel-\rho$	-1.05	1.41	-4.36***	
	$panel-pp$	-2.12**	-0.22	-4.76***	
	$panel-Adf$	-1.86*	-0.25	-3.04***	
	$Group-\rho$	0.80	2.17**	-1.10	
	$Group-pp$	-0.94	0.18	-3.69***	
	$Group-Adf$	-1.03	-1.23	-2.77**	

Table 4.3.1.1: Panel Cointegration Test for Bivariate Models

Variables in Cointegration Vector	Test	intercept	Intercept trend	None	Kao
LM3, LY	$panel-\upsilon$	1.62	--1.65	3.52***	-2.55***
	$panel-\rho$	-2.28**	0.09	-5.92***	
	$panel-pp$	-3.26***	-1.86*	-5.97***	
	$panel-Adf$	-2.27**	-0.45	-3.42***	
	$Group-\rho$	-1.27	0.31	-2.69**	
	$Group-pp$	-3.46***	-2.53**	5.30***	
	$Group-Adf$	-2.48**	-1.48	-3.79***	
LDCp, LY	$panel-\upsilon$	8.19***	8.11***	-3.59**	-2.84***
	$panel-\rho$	-15.6***	-18.5***	-1.07	
	$panel-pp$	-27.5***	-30.3***	-1.69**	
	$panel-Adf$	-1.52	-3.12***	-1.59	
	$Group-\rho$	-0.29	0.13	2.01	
	$Group-pp$	-2.81***	-1.94**	-1.13	
	$Group-Adf$	-0.25	-0.14	-1.12	

Please note that a, b and c represent cointegration test using Pedroni test with individual intercept only, individual intercept and trend and no individual trend nor intercept..

Table 4.3.2: Panel Cointegration Test for Trivariate models

Variables in Cointegration Vector	Test	intercept	Intercept trend	None	Kao
LM2, LM2SA, LY	$panel-\upsilon$	0.27	-2.08**	0.88	-2.83***
	$panel-\rho$	0.33	2.46**	0.06	
	$panel-pp$	-0.67	0.99	-0.77	
	$panel-Adf$	-1.72*	-0.33	-0.91	
	$Group-\rho$	1.90*	3.17***	1.29	
	$Group-pp$	0.39	0.79	-0.03	
	$Group-Adf$	-0.76	-1.97*	-0.51	
LDC, LDCSA, LY	$panel-\upsilon$	2.16**	0.32	2.48**	-2.91***
	$panel-\rho$	-0.38	0.15	-1.10	
	$panel-pp$	-1.88***	-2.08**	-2.65**	
	$panel-Adf$	-1.51	-1.17	-2.17**	
	$Group-\rho$	-0.20	0.76	-0.33	
	$Group-pp$	-4.05*	-3.57*	-4.77*	
	$Group-Adf$	-2.75*	-1.50	-3.73*	

Table 4.3.2.1: Panel Cointegration Test for Trivariate models

Variables in Cointegration Vector	Test	intercept	Intercept trend	None	Kao
LDCP, LDCPSA, LY	$panel-\upsilon$	2.48**	0.23	2.64**	-1.64**
	$panel-\rho$	-2.06**	-0.03	-1.88*	
	$panel-pp$	-3.42***	-2.22**	-3.37***	
	$panel-Adf$	-4.28***	-2.99**	-3.92***	
	$Group-\rho$	-1.23	0.56	-0.84	
	$Group-pp$	-4.32***	-3.78***	-4.25***	
	$Group-Adf$	-4.33***	-3.06***	-4.75***	
LM3, LM3SA, LY	$panel-\upsilon$	0.73	-1.83*	1.75*	-2.89***
	$panel-\rho$	-0.77	1.35	-0.63	
	$panel-pp$	-2.26**	-1.38	-1.44	
	$panel-Adf$	-1.73*	-0.73	-0.88	
	$Group-\rho$	-0.33	1.05	-0.39	
	$Group-pp$	-3.06***	-3.68***	-2.13**	
	$Group-Adf$	-2.49**	-2.81***	-1.47	

Table 4:4:1: Johansen panel cointegration (Bivariate)Tests

Variables in cointegration vector	Trace Statistic (Fisher stat)		Maximal Eigenvalue (Fisher Stat)	
	r=0	r=1	r=0	r=1
LDC, LY	106.7***	109.2***	80.94***	109.2***
LDCp,, LY	96.72***	87.11***	81.70***	87.11***
LM2, LY	88.6***	102.3***	68.2**	102.3***
LM3, LY	100.3***	104.2***	76.3**	104.2***

Table 4:4:2: Johansen panel cointegration (Trivariate) Tests

Variables in cointegration vector	Trace Statistic (Fisher stat)			Maximal Eigenvalue (Fisher Stat)		
	r=0	r=1	r=2	r=0	r=1	r=2
LDC, LY,	141.2***	77.52***	66.60**	102.8***	68.83**	66.50**
LDSADC	(0.000)	(0.002)	(0.03)	(0.000)	(0.02)	(0.03)
LDCp,, LY,	139.2***	60.19*	41.88	121.1***	58.31	41.88
LDSADCp	(0.000)	(0.07)	(0.64)	(0.000)	(0.11)	(0.64)
LM2,	89.57***	62.28*	85.73***	59.80*	44.94	85.73***
LY,LDSAM2	(0.00)	(0.06)	(0.00)	(0.08)	(0.52)	(0.00)
LM3,	102.6***	62.14*	107.4	75.43***	36.20	107.4
LY,LDSAM3	(0.00)	(0.06)	(0.00)	(0.00)	(0.85)	(0.00)

χ^2 Value is based on Mackinnon-haug –Michelis (1999) p-value for Johansen's cointegration trace and maximum eigenvalue test.

Table 4.5.1: Test of Significance of the variables in the panel cointegration of the Bivariate models

	Null Hypothesis: $\beta_i = 0$		Null Hypothesis: $\alpha_i = 0$	
Variables	$H_o : \beta_{fd} = 0$	$H_o : \beta_y = 0$	$H_o : \alpha_{fd} = 0$	$H_o : \alpha_y = 0$
LDC, LY	17.89***	1.01	13.06***	2.45
LDCp, LY	8.34***	0.44	8.67***	0.37
Lm2, ,LY	12.66***	0.96	11.97***	0.01
Lm3, ,LY	17.69***	1.69	17.74***	0.02

Table 4.6: Test of Significance of the variables in the panel cointegration of the trivariate models

	Null Hypothesis: $\beta_i = 0$			Null Hypothesis: $\alpha_i = 0$		
Variables	$H_o : \beta_{fd} = 0$	$H_o : \beta_{FdSA} = 0$	$H_o : \beta_y = 0$	$H_o : \alpha_{fd} = 0$	$H_o : \alpha_{FDSA} = 0$	$H_o : \alpha_y = 0$
LDC, LY, LDCSA	29.02***	26.23***	16.72***	19.80***	0.40	5.08**
LDcp, LdcpSa,LY	9.03***	5.04*	8.11**	8.52***	0.01	1.14
Lm2,Lm2SA,LY	16.24***	17.42***	8.05**	12.12***	0.36	0.99
Lm3,lm3SA,LY	17.82***	18.46***	10.35**	16.88***	0.09	0.72

4.7 The Impulse Response

This further leads to an inquiry into how the financial development in these countries in particular as well as the overall economy responds to this exogenous shock, (spatial externality). Thus, the study conducts the impulse response test analysis. This was done by using the recursive model of the Choleski decomposition method. This method assumes that each variable does not have a contemporaneous effect. However this approach has been criticised, for being mechanical without any economic basis.

Enders (2004) observes that the innovations in Choleski decomposition do not have a direct economic interpretation. He suggests that although this may not pose many problems in case of forecasting, but if one is interested in impulse response function or variance decomposition for economic analysis, then the structural VAR model is better. Thus, this thesis conducts both structural VAR decomposition method and the Choleski method. Since the aim of the structural VAR is to use economic theory (rather than the Choleski decomposition). Sims (1986), Bernanke (1986) and Blanchard and Quah (1989) all suggest similar structural approach. Blanchard and Quah (1989) provide an alternative way to obtain a structural VAR, by reconsidering the Beveridge-Nelson decomposition (1981). They decompose pure shock into temporary (short run) and permanent (long run) component.

The results are presented in both pictorial and tabulated forms (see figures 4.1--4, and Table 4.6).

Table 4.6: Impulse response from Weakly Exogenous Spatial Variable

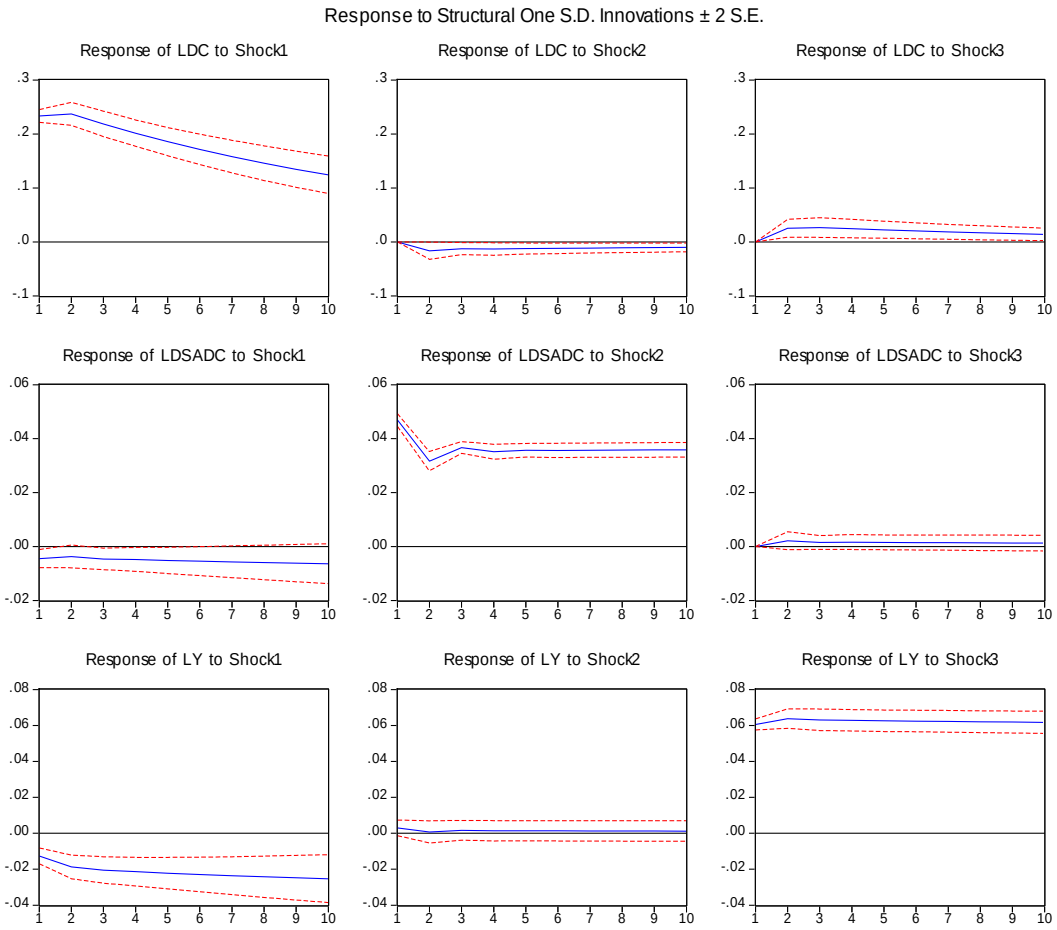
FD Proxy	Period	FD	LY
LDSADC	1	-0.001	0.00
	5	-0.01	0.04
	10	-0.01	0.04
LDSADCp	1	-0.01	0.00
	5	-0.01	-0.01
	10	-0.01	-0.01
LDSAM2	1	0.00	0.00
	5	0.00	0.00
	10	0.00	0.00
LDSAM3	1	0.003	0.01
	5	0.004	0.01
	10	0.004	0.01

It is striking to observe that the impulse response of spatial variable to FD and LY are different (though quite small) depending on the financial development indicator used. While for LDC and LDCp the signs are negative, but for LM2 and LM3 the signs are positive, this corroborates the earlier findings from the GMM estimations. The results suggest that the spatial variable has a substitution and crowding-out effect on the domestic credit market but a complementary effect on the money market in the region. However, it has overall positive growth effect on the economies (see Figures 4.1-4.4 for the impulse response graphs)

The finding further suggests that this spatial externality may lead to an improvement in the economic growth. The response of the real GDP (LY) has been positive for most periods even though its impact is very small in these economies.

The impulse response of the spatial variable on itself suggests how South Africa economy responds to shock in the financial sector of South Africa. The result indicates low persistence rate and high adjustment rate using all the financial indicators. This suggests that the exogenous shock in the financial sector dies off quickly. This is a reflection of how financially developed the country is, or perhaps an indication of potency of monetary and stabilisation policy in the country.

FIGURE 4:1: Impulse Response of the domestic credit to spatial externality



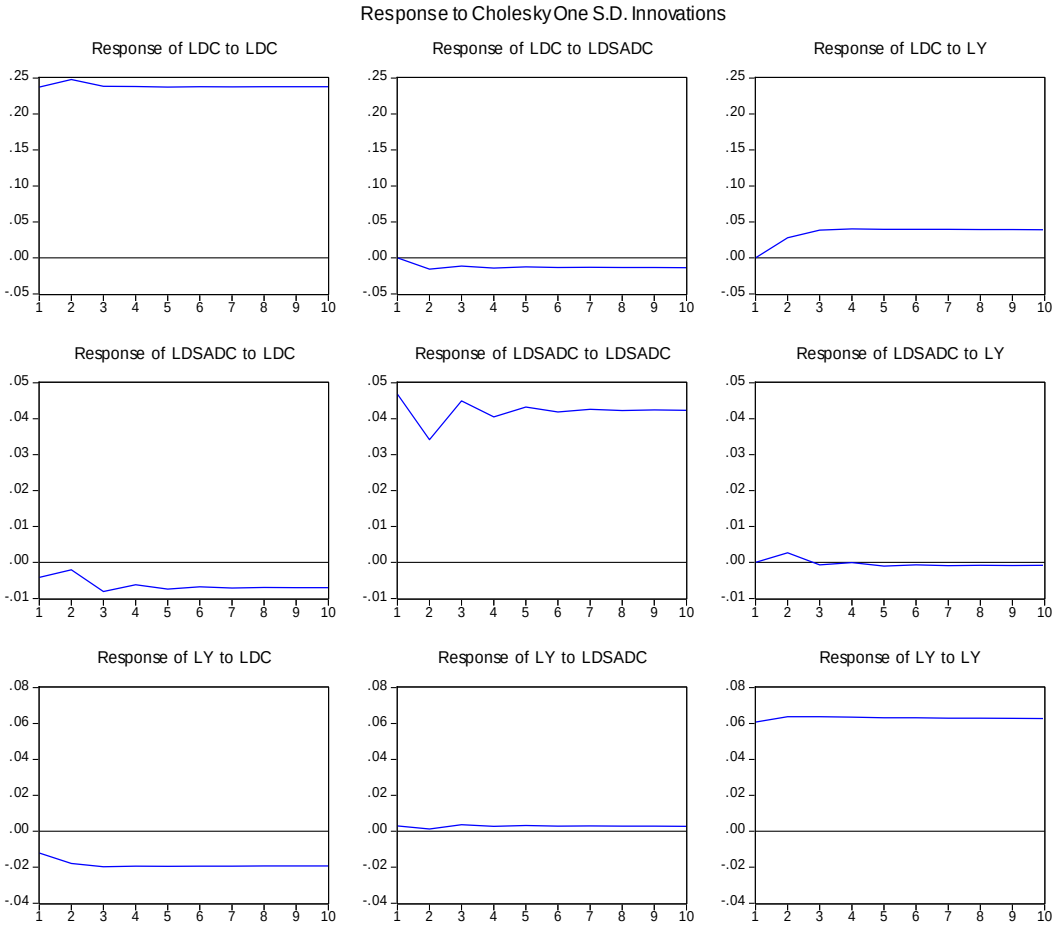
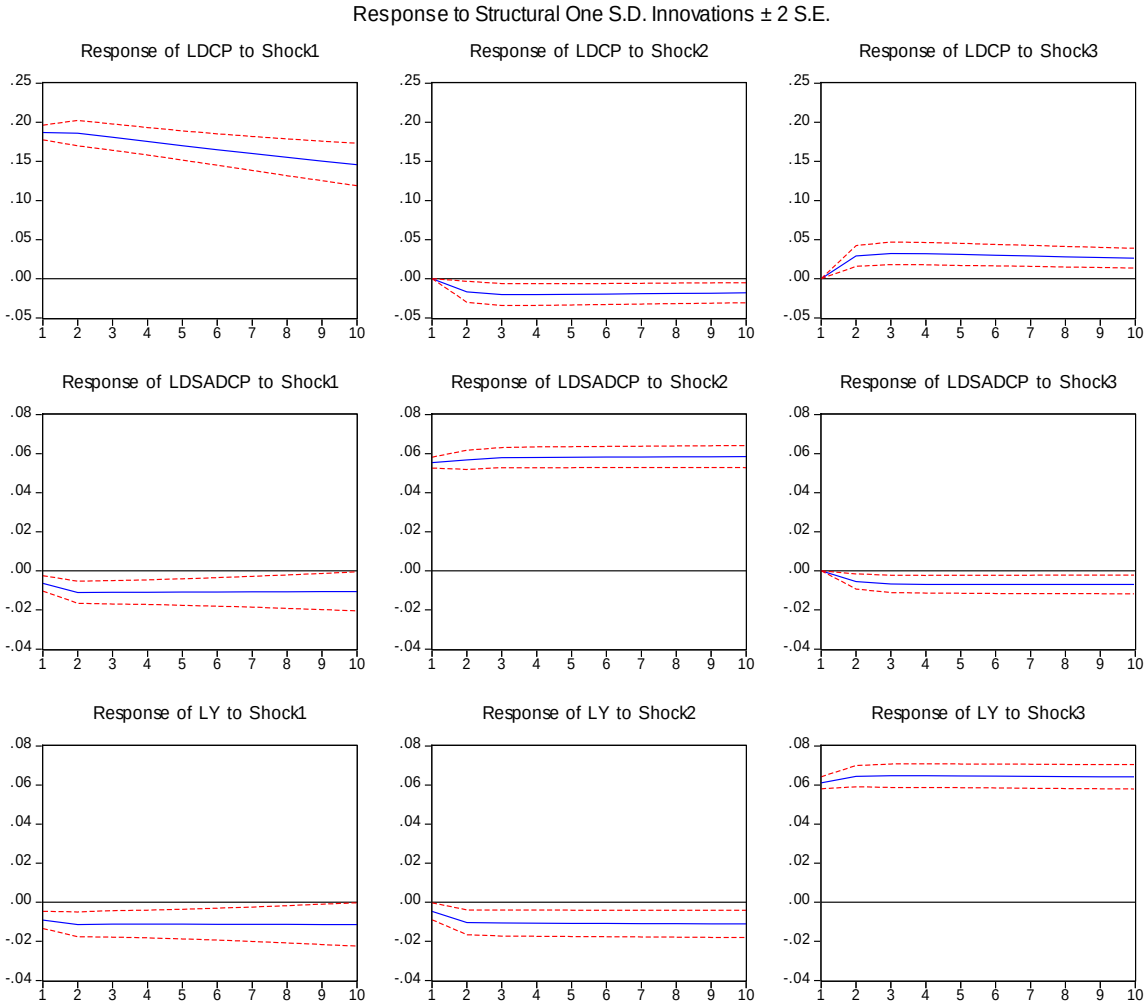

Response to Cholesky One S.D. Innovations
Response of LDC to LDC
Response of LDC to LDSADC
Response of LDC to LY
Response of LDSADC to LDC
Response of LDSADC to LDSADC
Response of LDSADC to LY
Response of LY to LDC
Response of LY to LDSADC
Response of LY to LY

FIGURE 4:2: Impulse Response of the private credit to spatial externality



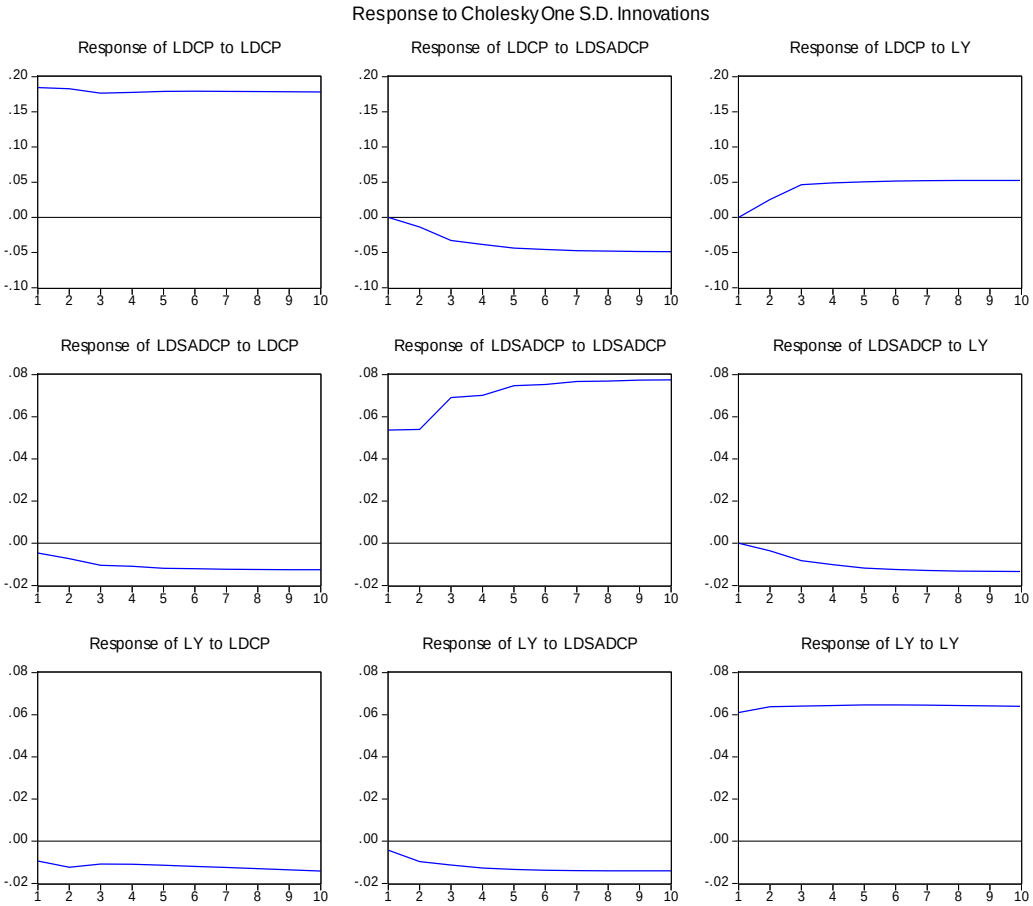
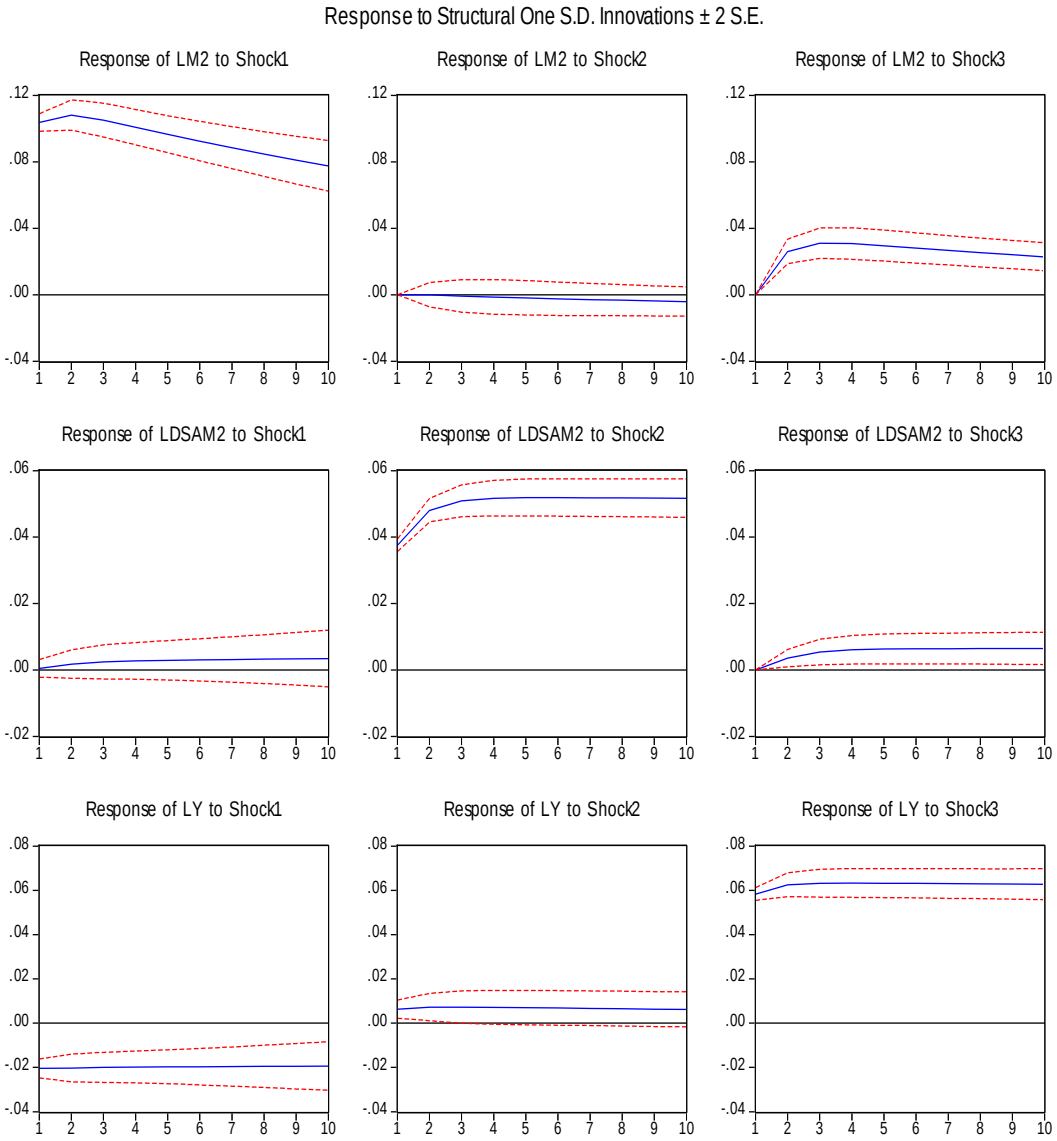

Response to Cholesky One S.D. Innovations
Response of LDCP to LDCP
Response of LDCP to LDSADCP
Response of LDCP to LY
Response of LDSADCP to LDCP
Response of LDSADCP to LDSADCP
Response of LDSADCP to LY
Response of LY to LDCP
Response of LY to LDSADCP
Response of LY to LY

Figure 4:3: Impulse Response of the broad money to spatial externality



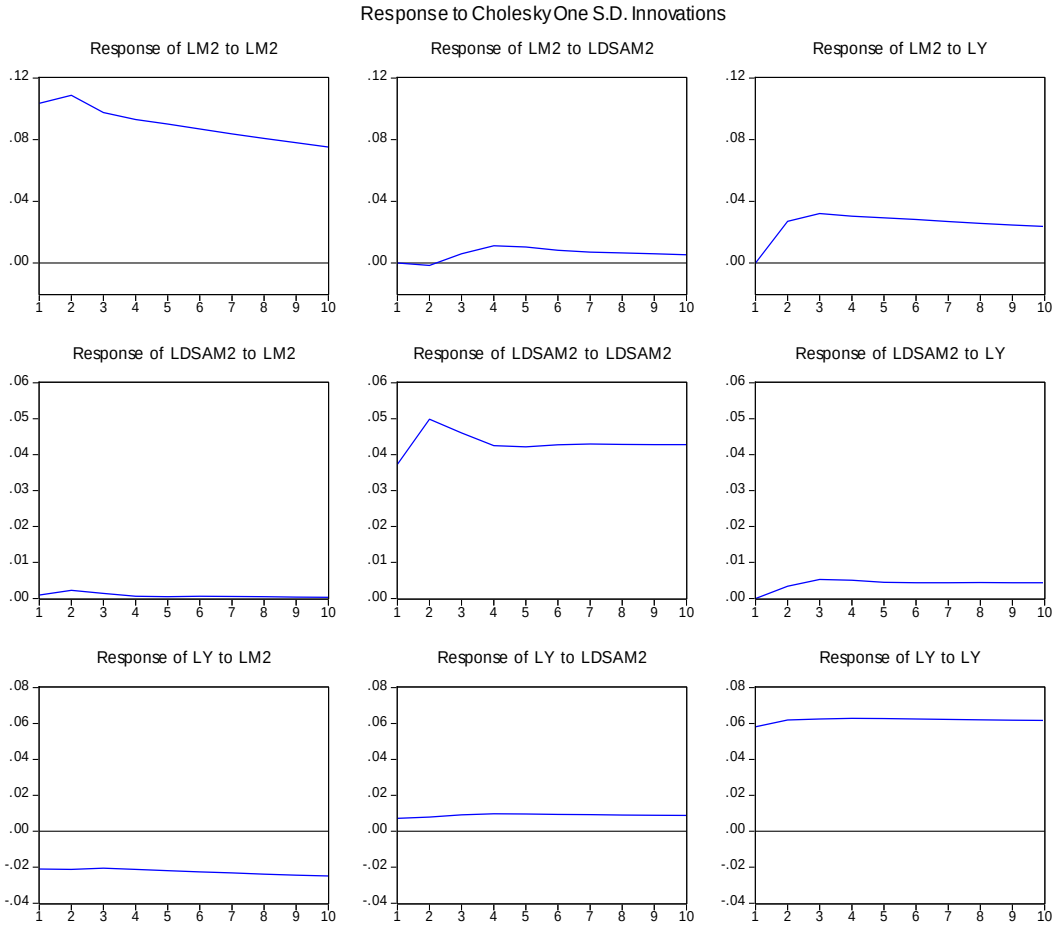
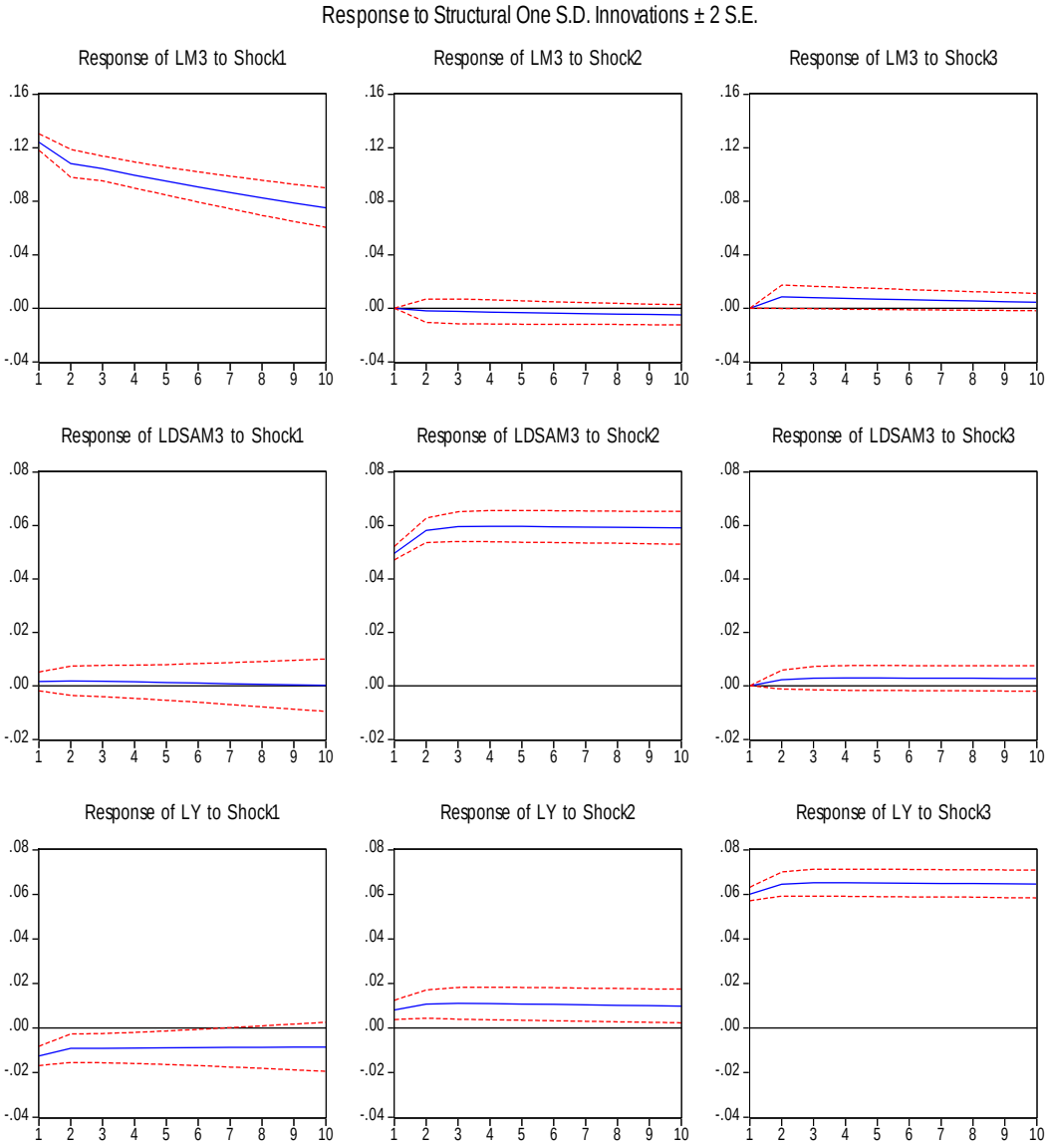
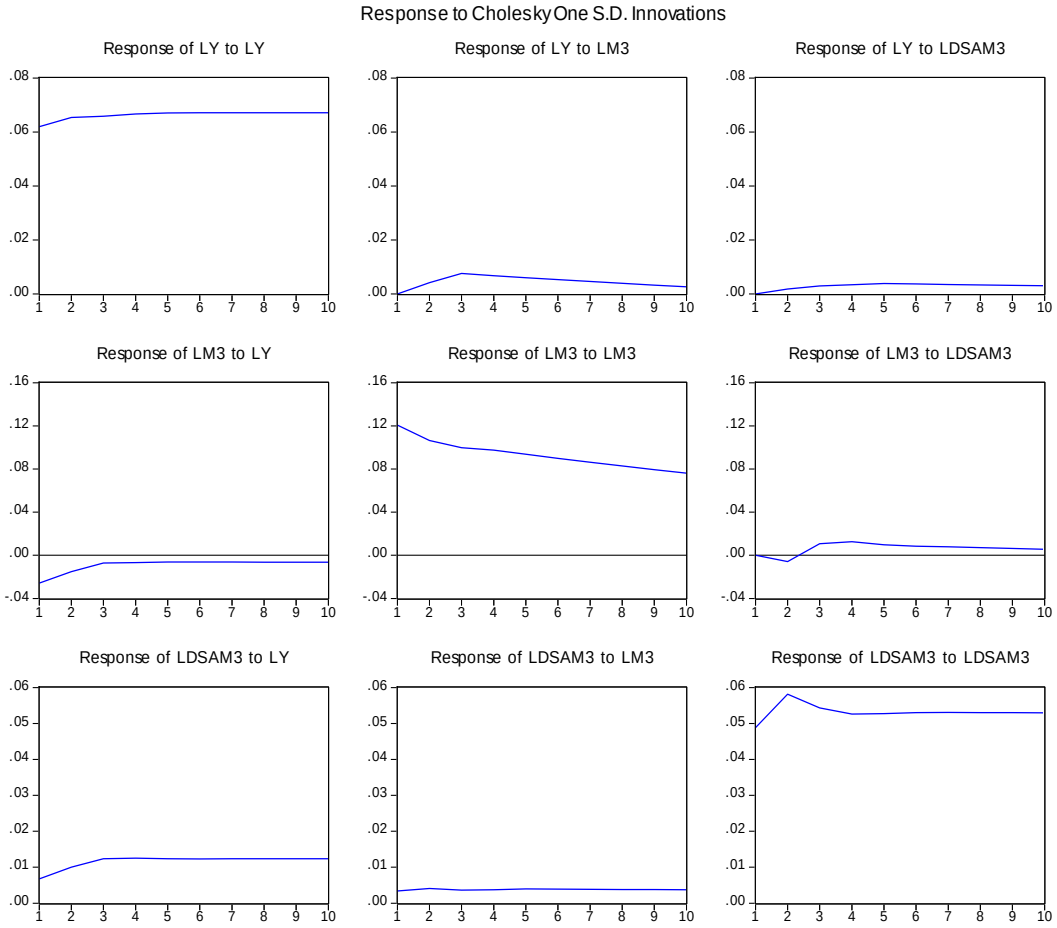

Response to Cholesky One S.D. Innovations
Response of LM2 to LM2
Response of LM2 to LDSAM2
Response of LM2 to LY
Response of LDSAM2 to LM2
Response of LDSAM2 to LDSAM2
Response of LDSAM2 to LY
Response of LY to LM2
Response of LY to LDSAM2
Response of LY to LY

Figure 4:4: Impulse Response of the liquid liabilities to spatial externality




Response to Cholesky One S.D. Innovations
Response of LY to LY
Response of LY to LM3
Response of LY to LDSAM3
Response of LM3 to LY
Response of LM3 to LM3
Response of LM3 to LDSAM3
Response of LDSAM3 to LY
Response of LDSAM3 to LM3
Response of LDSAM3 to LDSAM3

Sensitivity Analysis

We equally assess the long run impact of spatial variable on financial development and economic growth in 22 of the 24 countries in the panel, excluding both South Africa and Mauritania because of the extreme spatial weight. The results suggest that the spatial variable is significant in 19 countries, and it is weakly exogenous in 12 countries suggesting the variable is important in the region's financial development.

4.8 Conclusion

The study uses panel cointegration analysis to determine the long run stable relationship between the spatial variable, financial development and economic growth in SSA. The null hypothesis of no cointegration relationship among the variables is rejected for all the different financial development indicators used.

The study finds that real GDP causes economic growth in the region, and thus concludes that the relationship between finance and growth follows demand-following hypothesis. The study also finds statistical evidence for the relevance of the spatial variable. It also finds that spatial variable has a long run impact on both financial development and economic growth in the sample countries. The speed of adjustment to long-run changes in the spatial variables is slow, suggesting considerable persistence of spatial exogenous shock. Positive shock is observed with the monetary indicators suggesting a complementary effect on the domestic money market, while a negative shock is observed in terms of credit indicators, this may suggest substitution and crowding -out effect on the domestic credit market.

In the finance literature, most empirical works on SSA document a reverse causality, from economic growth to finance, supporting the demand-following hypothesis, this has largely been attributed to the level of financial underdevelopment, and the policy prescription has been improvement in factors inhibiting financial development, this study however suggests another possible channel for financial development in the region. It suggests that spatial consideration of financial development might be another channel, as can be seen from the study that the financial development in

South Africa does have impact not only on financial development in the neighbouring countries but also their economies.

Hence, the closer a country is to a more financially developed economy that generates spill-over, the better the relationship between finance and growth.
Thus, recognising the financial development of a dominant neighbouring country may help us understand the relationship between finance and growth in each country. The financial crisis in the mortgage-finance industry in US and its attendant spill over effects on other neighbouring countries provides a fresh memory of the importance of spatial externality in the financial sector. Thus, this study suggests careful consideration of spatial impact in our understanding of the finance-growth nexus.
The second implication is that spatial externality in the financial sector can positively enhance growth in these economies. Thus, this gives a theoretical basis for better regional cooperation, especially as Africa moves towards evolving policies that would help it reduce economic marginalisation of the region.

According to Honohan (2008), one of the major obstacles to financial development is high cost of credit and low access to credit in the region. He observes that only one out of every five adults in SSA has access to credit. The implication of this study therefore is that allowing spatial externality in the financial sector would increase access to credit while reducing the cost of credit in the region. Thus, it would enhance the quality and quantity of investment and overall economic growth in the region. The second implication is that the real economy positively responds to the spatial externality, suggesting a positive feedback mechanism on the economy.

Honohan 2008 also identifies the potential source of financial development in SSA, through regional financial cooperation, suggesting that this would enhance skill development, banking supervision and regulations, sharing financial credit history and best banking practices. Thus, this study, suggests that consideration of spatial financial effect could be a potential channel for actualising this regional financial cooperation and development.

Finally, the spatial proximity model has two major transmission mechanisms on domestic financial sectors in particular and the economy, the first is through increasing access to credit and reduction of cost of credit, and the second is through enhancing regional cooperation through sharing financial records, best banking practises and lower supervision costs.

CONCLUSION

5.1 Introduction

This final chapter summarises the major findings and policy implications from the empirical chapters in the thesis. This chapter is divided into four sections. Section 5.2 gives the overview of the earlier chapters and major findings from them. Section 5.3 gives the policy implications from the study and the last section presents limitations to the study and suggestions for further research.

5.2 Overview and Findings from the study

This thesis addresses general issues which include human capital, financial development and growth in SSA. The thesis attempts to explain determinants of economic growth in SSA. It employs a panel-data approach and in particular, it tries to analyse the impact of human capital and financial development on economic growth in the SSA countries. The study tries to assess which of the determinants has the most significant impact on the economies of the SSA that can immediately stimulate or retard growth in the region as well as the transmission mechanism of these factors on growth.

Specifically, the thesis examines three major issues. The first empirical chapter analyses the effects of financial development, human capital and physical capital on economic growth in SSA. It further explores the interaction of human capital with both financial development and physical capital and assesses its impacts on growth. The second empirical chapter investigates the impact of spatial variable on financial development in SSA and third chapter investigates the relationship between finance and growth in the presence of spatial exogenous shock. These issues were empirically examined using panel data framework for several countries.

Each of these empirical chapters has an embedded literature review and theoretical framework. The first empirical chapter suggests that both human capital and financial development have significant effects on growth and can positively stimulate growth. While the study finds strong and robust statistical evidence that

human capital can enhance growth in the region in line with Barro (1999) MRW (1992) and Bosworth and Collins (2003), the study finds weak evidence in support of financial development enhancing growth in the region. This finding is consistent with Demetriades and Law (2006), where they find that financial development does not stimulate growth in the low-income countries with poor institutions. However, an interaction term of both human capital and financial development enhances growth in the region. This finding is similar to the findings of Evans et al (2002), this suggests complementarity feature of the two variables, and thus the policy implication is that a well-developed financial system may be essential for human capital accumulation. This further lends credence to the endogenous financial theory (Ang 2008).

Baltagi et al (2007a) rightly observe that the frontier of the literature in the field of financial development is shifting towards providing answers to the question of why some countries are more financially developed than others. Four theories are popular in finance literature. These theories are the legal origin hypothesis (La Porta 1997) which suggests that historical differences in legal origin can explain cross country differences in finance and even growth. British Commonwealth colonies tend to emphasize private property rights and support market-based financial development in contrast to French colonies that emphasize civil law and are bank based. They conclude that there are differences in level of financial development as there are differences in legal origin. However, this position has been challenged by Lele and Siems (2007), when they find no significant differences in financial development or growth performance due to differences in legal origin. The endowment and institution theory by Acemoglu et al (2004) which emphasises differences in institutions and the initial endowment of each country accounts for the differences in level of financial development among countries. Rajan and Zingales (2003) hypothesis suggest the impact of simultaneous openness of both trade and financial sector on financial development. They conclude that openness promotes competition and threatens the rents of incumbents and therefore enhances financial development. The fourth theory stresses the prevalent of government ownership of financial institutions La Porta et al (2002). They opine that more government involvement in financial system of so many developing countries account for their level of financial

underdevelopment. However, Gerschenkron (1962), Andrianova et al (2008) suggest the importance of government ownership of financial institutions at the developmental stage of an economy as well as in countries that have weak institutions. Though the above theories try to explain the reasons for financial (under)development, however, this study explores another potential channel for financial development in the region.

The second empirical chapter specifically explores the impact of spatial externality in enhancing financial development among neighbouring countries in SSA especially against the backdrop of the region's dismal growth performance. Due to the unique nature of SSA with numerous small countries which are geographically close but economically far with strong commitment and culture of neighbourliness in the region the study investigates the impact of spatial externality on financial development in the region. The study examines this impact of spatial variable on financial development in the region, using GMM dynamic panel data approach. The findings suggest that financial sectors in the region respond to spatial externality. This indicates that financial development in the region is not immune to spatial externality. It finds that financial development indicators respond to spatial variable differently. While in the case of credit indicators, spatial variable crowds out domestic credit, but in case of financial deepening, it enhances it. The empirical result is robust to estimation method and sample period.

The relationship between finance and growth continues to attract empirical and theoretical inquiry and attention in the literature, yet with contrasting findings. Even, the recent studies on the issue have documented different conclusions and channels through which finance relates to economic growth (See Ang, 2008; Demirguc-Kunt and Levine, 2008; Honohan, 2008; Luintel et al, 2008 and Demetriades, 2008). This suggests that the issue is at best inconclusive.

The third empirical chapter contributes to the issue by investigating the relationship between finance and growth in a panel data framework. It also suggests another channel by which this nexus can be analysed. Chapter four specifically investigates the relationship between finance and growth in the presence of spatial externality.

This is done by verifying the long run effect of this spatial variable on financial development in particular and growth in general. A panel cointegration test was conducted, where the variables are cointegrated, weak exogeneity restriction was imposed conducted on the variables of interest especially the spatial variable. This was done, to confirm the long run effect and speed of adjustment of the variables. Finally an impulse response test using one standard deviation Choleski innovation test as well as the structural VAR decomposition was carried out.

The results from the bivariate model suggest that there is a reverse causality from economic growth to finance in the region, thus, the thesis provides additional empirical evidence to suggest demand following hypothesis in the region. In the trivariate model, the inclusion of the spatial variable, confirms the relevance of the spatial effect in the relationship between the two. The results validate the finding in chapter three (crowding-out of domestic FD but enhancing growth) and indicate uni-directional causality from South Africa (SA) to other SSA countries in the sample as the null hypothesis of the weak exogeneity cannot be rejected. This suggests that developments in the SA financial sector in particular and overall economy in general have spatial impact on its neighbouring countries. However, development or shocks in other countries do not have strong impact on SA economy.

5.3 Policy Implications

In light of the consequences of some earlier policies due to improper implementation or inappropriate prescriptions, this thesis carefully studies SSA economies and proffers suggestions for economic development in the region. This thesis assesses three competing growth theories, the endogenous, the neoclassical and finance-led theory with the view of analysing the appropriateness of the theories in the context of SSA countries.

Also as the region is working assiduously to harmonise not only its economic policies, institutions but also economic union, such that African leaders met in Lusaka, Zambia in 2000 to launch the African Union. This thesis offers a regional framework that supports the proposed African Union. It offers policy makers the opportunity of making appropriate policy mix that can enhance the financial development and economic growth in the region.

One of the basic findings in the literature is that human capital is characterized by intergenerational and non-reversibility effects, such that any delay in accumulating the appropriate level of human capital could retard growth and worsen the economic marginalisation in the region via reduction in foreign direct investment in flow and poor development of the financial sector. This study finds empirical support for the growth-enhancing impact of human capital. It suggests that the accumulation of human capital and development of the financial sector are both complementary and should be given the right attention.

Though, finance literatures document strong impact of finance on growth, this thesis finds weak impact of finance on growth in the region. This could be due to a number of reasons which could include the level of economic development, low access to bank credits, high cost of capital, and lack o scale economies in the financial sector. The region's financial system is bank based, however, banks' request for collateral to guarantee loan repayment, high poverty level, low literacy level, weak property right, and poor institutional quality are some factors identified in the literature that makes ownership of assets difficult, thus, bank credits are only accessible to few rich individuals. This further worsens the financial underdevelopment in the region, and also reduces the impact of financial development on growth. High cost of capital is further worsened by duality of financial sectors in some countries.

The thesis suggests that financial development in the region can have more positive impacts on economic growth, if human capital is also well developed. The study suggests that the financial sector is prone to spatial externality and there are benefits and costs associated with financial development and underdevelopment due to spatial externality. While spatial variable may crowd-out domestic credit market in some countries, it may however enhance growth in these countries through promotion of healthy banking competition, more access to credit facilities and promotion of efficient resource allocation for overall economic growth. Thus, efforts should be made at removing barriers to financial development.

This thesis suggests openness especially of trade sector and financial cooperation among countries may enhance financial development in particular and growth in general in the region. The thesis however, cautions over unguided deregulation or openness, and it suggests proper reform sequence and gradual liberalization, as Rioja and Valev (2004), Honohan (2008) observe "one size fits all" approach to policy, without due consideration to structure of economies may be counter productive.

Although, the thesis suggests that human capital and financial development can enhance growth; it also recommends that appropriate attention should also be given to institutional and infrastructural development, macroeconomic stability, credible political structures and removal of barriers to trade and finance if the region wants to be competitive within the global market.

5:4 Limitations to the study and Suggestions for further research

Most of the analysis in this thesis has been carried out using aggregate level data. The study adopts panel data approach. However, a number of studies have identified potential problems with panel approach. These include the fact that panel approach masks important cross country differences and sometimes suffer from measurement, statistical and conceptual problems (Levine and Zervos 1996). Sometimes panel data approach does not accurately account for country specific issues, and that generalisations based on panel results may proffer incorrect inferences for several countries or units (Luintel et al, 2008). Thus, it may be a useful exercise to conduct a country-specific study, in terms of the effect of human capital, financial development as well as the spatial externality.

The thesis has focused on the banking indicators; perhaps capital market indicators may have different relationship with growth. More importantly, as the region tries to develop its capital markets, another study can assess the impact of different financial structure on growth in the region; can growth be better enhanced with capital market development or more development of the banks in the region?

The study has mainly focussed on the formal financial sectors, however, it is known that SSA countries are characterised by dual financial sectors (formal and informal sectors), such that the development in the two sectors are different, and their impacts on growth may be different as well. Another study can analyse the role of the informal sector in the finance-growth nexus.

Another study can analyse the optimal mix of government-owned banks, private banks and foreign banks that can promote growth, especially in developing countries with weak institutions (like SSA).

Though Honohan (2008) observes that "Finance for growth is Finance for all" to what extent is imported policies, or practices relevant to SSA, the syndrome of "one size fits all" (Rioja 2004). Another study may analyse the environmental factors, which include differences in culture, value system in finance and growth nexus.

Appendix

Table 5.1: Definition and Sources of Data Used in the Thesis

Variable	Definition	Source
Liquid Liabilities/GDP (M3/Y) (1970-2005)	Liquid liability is the sum of currency and deposits in the central bank, plus transferable deposits and M1, plus time and savings deposits, foreign currency transferable deposits, certificates of deposits, plus travellers' cheque , foreign currency and time deposits, commercial paper and shares of mutual funds or market funds held by residents	World Development Indicators (2007)
Private Sector Credit/GDP (DCP/Y) (1965-2005)	Financial resources provided to the private sector such as through loans, purchase of non-equity securities, and trade credits and other account receivables that establish a claim for repayment	World Development Indicators (2007)
Domestic Credit provided by the Banking Sector/GDP (DC/Y) (1965-2005)	This includes all credit to various sectors on a gross basis. The banking sector includes monetary authorities and deposit money banks	World Development Indicators (2007)
Broad Money/GDP (M2/Y) (1966-2005)	Sum of Currency and deposits in the Central bank, plus time and savings deposits in banks	World Development Indicators (2007)
Life Expectancy at Birth (LE)	Life Expectancy at birth	World Development Indicators (2007)
Human Capital Index (HC)	Human Capital Index composed by Bosworth and Collin (2003) is the average educational attainment measure (average of Barro and Lee and Cohen and Soto educational attainment indices)	Bosworth and Collin (2003)

Variable	Definition	Source
Real GDP (Y)	Real GDP per Capita	World Development Indicators (2006)
Legal Origin Dummy	A Dummy variable to capture the colonial history of each country, it assumes the value of 1, for Anglophone countries and zero for Francophone Countries	
Stock of Physical capital (KS)	Stock of physical capital measure using perpetual Inventory method	Penn World, Bosworth and Collins
Oil Dummy	A Dummy variable to capture the resource endowment (especially Oil) of each country, it assumes the value of 1, if a country is an Oil exporting country, and zero otherwise.	
Corruption (COR)	Level of corruption of each country as measured by the International Country Risk Guide	ICRG of PRS
Trade Openness (TO)	Ratio of total trade to GDP	World Development Indicators (2007)
Financial Openness (TO)	Measured by the ratio of FDI to GDP	World Development Indicators (2007)
DSA	An index to measure the degree of proximity of each country in the sample to South Africa	Google Map (Distance by Kilometres)

Table 5.2: An Overview of Stock Exchange in Africa

Country	Year Established	Market cap % of GDP	Value Traded % of GDP	Turnover %	Population (Million)	Listed Firms	Listed firms % of population
Botswana	1989	27.2	0.6	2.1	8.2	25	0.0003
Cote d' Ivoire	1976	12.3	0.3	2.5	17.9	39	0.00002
Ghana	1989	23.7	0.8	3.2	21.7	30	0.00001
Kenya	1954	26.1	2.1	7.9	33.5	47	0.00001
Malawi	1996	9.2	1.3	14.1	12.6	8	0.0000006
Mauritius	1988	36.0	1.6	4.4	1.2	41	0.003
Mozambique	1999	3.0	0.0	0.0	19.4	1	0.0000005
Namibia	1992	6.9	0.3	4.7	2.0	13	0.0007
Nigeria	1960	16.7	2.3	13.9	128.7	207	0.00001
South Africa	1887	170.5	76.5	44.9	45.5	403	0.00008
Swaziland	1990	8.3	0.0	0.0	1.1	6	0.00005
Tanzania	1998	6.2	0.2	2.5	37.6	6	0.000001
Uganda	1998	1.4	0.0	0.2	27.8	5	0.000002
Zambia	1994	8.0	0.1	1.5	11.5	13	0.00001
Zimbabwe	1896	41.3	2.9	7.0	12.9	79	0.00006

References:

Abiad, A. and Mody, A (2005). Financial Reform: What Shakes it? What Shapes it? *American Economic Review*, 95, 66-88.

Acemoglu, D.; Johnson, S. and Robinson, J.A. (2001) "The Colonial Origins of Comparative Development: An Empirical Investigation". *American Economic Review*, 91, 1369-1401.

Acemoglu, D.; Johnson, S. and Robinson, J.. (2004) "Institutions as the Fundamental Cause of Long-Run Growth" *NBER Working Paper* 10481.

Aghion, P and Howitt, P (1998) *Endogenous growth Theory*. MIT Press, Cambridge, Mass.

Ainsworth, M and Over, M(1994) "Aids and African Development" *World Bank Research Observer*, The World Bank 9 (2) 203-240

Ajayi, S.I (2003) "Globalization and Africa" *Journal of African Economies*, Vol 12(1) Pp 120-150

Ajayi, S.I (2001) "What Africa Needs to Do to Benefit from Globalization" *Finance and Development* Vol 38(4), 1-5

Allen, F and Gale, D(2000) *Comparing Financial Systems*. Cambridge, MA: MIT Press

Andrianova, S, Demetriades, P and Shortland A.(2008). "Government Ownership of Banks, Institutions and Financial Development" *Journal of Development Economics*, 85, 218-252

Andersen, T B and Tarp, F (2003) "Financial liberalization, Financial Development and Economic Growth in LDCs". *Journal of International Development*, 15(2) 189-209

Ang, J.B (2008). "What are the Mechanisms linking Financial Development and Economic Growth in Malaysia" *Economic Modelling*, 25, 38-53

Ang, J.B.and Mckibbin, W.J (2007) "Financial liberalization , financial sector development and growth" *Journal of Development*, Vol 84(1), 215-233

Anselin, L (1988) *Spatial Econometrics:Methods and Models*. Kluwer Dordrecht

Anselin, L (2003) "Spatial Externalities" *International Regional science Review* 26(2), 147-152

Arbia, G, Basile, R and Piras, G (2005) "Using Spatial Panel data in Modelling Regional Growth and Convergence" *ISAE Working Paper*.

Arellano, M and Bond, S (1991). Some tests of specification for Panel data: Monte-

carlo evidence and an application to employment equations. *Review of Economic Studies* 58, 277-297

Arestis, P. and P. Demetriades (1997) "Financial Development and Economic Growth: Assessing the Evidence". *Economic Journal*, 107, 783-799.

Asteriou, D and Hall, S (2007) *Applied Econometrics: A Modern Approach*. Revised Edition. NY: Palgrave Macmillan.

Bagehot, W. (1873), Lombard Street, Homewood, IL: Richard D. Irwin, (1962 Edition).

Baliamoune-Lutz, M, and Ndikumana (2007). "The Growth Effects of Openness and the Role of Institutions: New Evidence from African Countries" *University of Massachusetts Working Paper NO 2007-05*.

Balassa, B (1986). "Policy Responses to Exogenous Shocks in Developing Countries". *The American Economic Review*, 76 (2), 75-78

Baltagi, B.(2005) *Econometric Analysis of Panel Data*, Chichester, UK: John Wiley

Baltagi, B.(2008) *Econometric Analysis of Panel Data*, Fourth edition Chichester, UK: John Wiley

Baltagi, B H, Demetriades,P.O, and Law,S.H (2007a) "Financial Development, Openness and Institutions:Evidence from Panel Data" Working Paper NO 07/05, Department of Economics, University of Leicester May.

Baltagi B H, Song S H, Jung B C and Koh W (2007b) "Testing For Serial Correlation, Spatial autocorrelation and random effects" *Journal of Econometrics*, 140(2), 5-51

Banerjee, A, Dolado, J W and Hendry, D F (1993). "Cointegration, Error Correction, and the econometric analysis of non-stationary data". *Oxford University Press*.

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

Barro, R.J and Lee, J (1994) "Sources of Economic Growth" *Carnegie-Rochester Conference Series on Public Policy*. 40, June 1-46

Barro, R.J (1999). "Human Capital and growth in cross-country regressions". *Swedish Economic Policy Review*, 6(2), 237-277.

Barro, R.J and Sala-i-martin, X.(1999). *Economic Growth*. Cambridge: The MIT Press.

Barro, R.J (2001). "Human Capital and growth". *American Economic Review*, May,91 (2), 12-17

Barro,R.J and Lee,J (2001). "International data on educational attainment: Updates and implications". *Oxford Economic Papers*, July 53(3), 541-63

Baumol, W.J (1986) "Productivity growth, Convergence and Welfare: What the long-run Data show"? *American Economic Review*, 76 , 1072-1085

Bernanke, B (1986). "Alternative Explanations of Money-Income Correlation" Carnegie-Rochester Conference Series On Public Policy 25, 49-100

Beck,. T. (2003) "Financial Development and International Trade. Is there a Link?" *The World Bank Group Working Paper*, no. 2608

Bencivenga, V R and Smith, B D (1991) "Financial Intermediation and Endogenous Growth": *Review of Economic Studies* 58, 195-209

Benhabib , J. and Spiegel, M,M. (1994). "The role of Human Capital in Economic Development: Evidence from aggregate cross-country data". *Journal of Monetary Economics*, 34, 143-173

Berthelemy, J and Varoudakis A (1997) "Economic growth, Convergence clubs and the role of Financial development", *Oxford Economic Papers*, 48, 300-328

Beveridge, S and Nelson, C (1981) "A New Approach to Decomposition of Economic Time Series into Permanent and Transitory components with Particular Attention to measurement of the Business cycle" *Journal of Monetary Economics*, 7,151-74

Bils, M. and Klenow, P.J (2000). "Does Schooling cause growth"? *American Economic Review*, Dec 90 (5), 1160-1183.

Blanchard, O and Quah, D (1989). "The Dynamic Effects of Aggregate Demand and Supply Disturbances" *American Economic Review*, 79, 655-673

Bloom, D and Sachs, J (1998). "Geography, demography and economic growth in Africa". *Brookings Papers on Economic activity*, 207-73

Bosworth, B.P and Collins, S.M (2003). The Empirics of Growth: *An Update. Brookings Papers on Economic Activity*, 91-178

Boyd, J and Smith, B (1998) "The Evolution of Debt and Equity Markets in Economic Development" *Economic Theory* 12, 519-60

Breitung, J (2000) "The Local Power of some Unit Root Tests for Panel Data" in Baltagi, (ed), Nonstationary Panels, Panel Cointegration and Dynamic Panels, *Advances in Econometrics*, Vol 15, 161-78

Calderon, C and Liu, L(2003) "The Direction of Causality between Financial Development and Economic Growth" *Journal of Development Economics,* 72(1), 321-334

Cameron, A.C and Trivedi, P K (2005) *Microeconometrics: Methods and Applications*. Cambridge Press.

Caprio, G.Jr, Atiyas, I and Hatson, J.A (eds) (1994). *Financial Reform: Theory and Experience*. Cambridge: Cambridge University Press

Caprio, G and Honohan, P (2001) Finance for Growth: Policy Choices for a volatile World (New York: Oxford University press)

Castello, A. and Domeneh, R (2002). "Human Capital inequality and economic growth: Some new evidence". *Economic Journal*, 112(478), 187-200

Centre for International Development and Conflict Management, *Polity data set:* University of Maryland

Cheung,Y W and Lai, K S (1993). "Finite –sample sizes of Johansen's likelihood ratio tests for cointegration". *Oxford Bulletin of Economics and Statistics*,55 313-328.

Chinn, M and Ito,H (2006). "What matters for financial development? Capital controls, institutions, and interactions" *Journal of Development Economics* Vol 81(1) October, Pp 163-192.

Cho, Y.J (1989). "Finance and Development: The Korean Approach" *Oxford Review of Economic Policy,* Vol 5(4) Pp 88-102

Cohen, D and Soto, M (2001) "Growth and Human Capital: Good Data, good Results" *OECD Technical Papers* 179.

Cohen, D and Soto, M (2007) "Growth and Human Capital: Good Data, good Results" *Journal of Economic Growth* 12(1), 51-76

Collier, P and Hoeffler, A (1998). "On Economic Causes of Civil War" *Oxford Economic Papers,* 50 , 563-573

Collier, P and Dollar, D (1999) "Aid, Risk and Special Concerns of Small States" *Policy Research* , World Bank.

Collier, P and Gunning, J (1999a). "Why has Africa grown slowly"? *Journal of Economic Perspectives*, Summer, 13(3), 3-22

Collier, P and Gunning, J (1999b). "Explaining African Economic performance". *Journal of economic Literature*, March, 37 (1), 64-111.

Collier, P (2007a). *The Bottom Billion: Why the Poorest Countries are Failing and What Can be Done about it*. New York: Oxford University Press.

Collier, P (2007b). *War and Peace: Futures for the Bottom Billion of Mankind*. New York: Oxford University Press.

David, P (2001). "Knowledge, Capabilities and Human Capital Formation in Economic Growth". *New Zealand Treasury Working Paper*, 01/13 June, 1-147

Deaton, A (1995) "Data and Econometric tools for Development Analysis", Chapter 33 in J.Behrman and T.Srinivasan, eds, *Handbook of Development Economics*, Elsevier science, Amsterdam.

De Gregorio, J and Guidotti, P (1995) " Financial Development and Economic Growth" *World Development* 23, 433-448. 37 49-71

De Gregorio, J (1996) "Borrowing Constraints, Human Capital accumulation and Growth" .*Journal of Monetary Economics* 37 49-71

De la Fuente, A and Domeneh, R (2000). "Human Capital in growth regressions: How much difference does data quality make"? *CEPR discussion paper* no 2466, May

Demetriades, P. and Andrianova, S. (2004) 'Finance and Growth: What We Know and We Need to Know' in C. Goodhart, (ed.), *Financial Development and Economic Growth: Explaining the Links*, 38-65. Palgrave Macmillan, Basingstoke.

Demetriades, P.O. and Hussein, K. (1996) "Does Financial Development Cause Economic Growth? Time Series Evidence from 16 Countries". *Journal of Development Economics,* 51, 387-411.

Demetriades, P.O and Luintel ,K.B (1997) "The Direct Costs of Financial Repression: Evidence from India" *The Review of Economics and Statistics* 311-320

Demetriades, P.O and Law, S.H (2006). "Finance, Institutions and Economic Development" *International Journal of Finance and Economics*, 11, 245-260.

Demetriades, P.O, Du, J, Girma, S. and Xu, C (2008) "Does the Chinese Banking System Promote the Growth of Firms?" *World Economy and Finance Working Paper* WEF0036

Demetriades, P.O (2008) "New Perspective on Finance and Growth" University of Leicester, *Department of Economics Working Paper* 08/14

Demirguc-Kunt, A. and Levine, R. (2001). *Financial Structure and Economic Growth: A Cross-Country Comparison of Banks, Markets, and Development*. Cambridge: Massachusetts: MIT Press

Demirguc-Kunt, A and Levine , R (2008) "Finance, Financial sector Policies and Long-Run Growth". *Policy Research Working Paper* , 4469 World Bank

Demirguc-Kunt, A, Beck, T and Honohan, P(2008). Finance for All: Policies and pitfalls in Expanding Access. Washington, DC: The World Bank

Dercon, S (1997) "Wealth , Risk and Activity Choice: cattle in Western Tanzania" *Journal of Development Economics*, 55(1), 1-42

De Soto, H (2000) *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else*. New York: Basic Books

Diamond, D W and Dybvig (1983), "Bank Runs, Deposit insurance and Liquidity" *Journal of Political Economy*, 91,401-419

Dickey,D.A and Fuller, W.A (1981). "Distribution of the estimators for autoregressive time series with a Unit root". *Econometrica* 49 1057-1072

Easterly, W and Levine, R (1997). "Africa's growth tragedy: Policies and ethnic divisions". *Quarterly Journal of Economics*,112, Nov, 1203-1250.

Easterly, W and Levine, R (2001). " It's Not Factor Accumulation: Stylized Facts and Growth" *World Bank Economic Review*, 15: 177-219.

Elhorst, P (2003). "Specification and Estimation of Spatial Panel data Models" *International Regional Science Review*, 26,244-268.

Enders, W (2004). *Applied Econometric Time series*. Hoboken:John Wiley and Sons,

Engelbrecht, H (2003). "Human Capital and Economic Growth: Cross-Section evidence for OECD Countries" *Economic Record*, 79, Special Issue, June 40-51

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

Enke, S (1963) *Economics for Development*. London: Dennis Dobson

Evans, D.A.; Green, C. J and Murinde, V. (2002). "Human Capital and Financial Development in Economic Growth: New Evidence Using the Translog Production Function". *International Journal of Finance and Economics*, 7,. 123-140

Fagerberg, J, Verspagen, B and Marjolen,C(1996) "Technology, Growth and Unemployment across European Regions", *Regional Studies*,31, 457-466

Feldman, D H and Gang, I N (1990) "Financial Development and the price of services" *Economic Development Cultural change* 38(2), Jan

Fingleton, B (2000) "Spatial Econometrics, Economic Geography, Dynamics and equilibrium: A third Way? *Environment and Planning* 21:1481-1498

Fisher, R.A (1932) *Statistical Methods for Research Workers*, Edinburgh: Oliver and Boyd

Fry, M.J (1978) "Money, and Capital or Financial Deepening in Economic Development". Journal of Money , Credit and Banking 10(4), 464-475

Fry, M.J (1997) " In Favour of Financial liberalisation" *Economic Journal*, Vol 107 (May) 754-770

Fry, M.J (1988) *Money, Interest and Banking in Economic Development*. John Hopkins Studies in Development Studies Series. Baltimore and London: John Hopkins University Press.

Gallup, J and Sachs, J (1999). "Geography and Economic Growth" in *Proceedings of the Annual World Bank Conference on Development Economics*. World Bank, Washington, D.C

Gelb, A.H (1989) Financial Policies, Growth and Efficiency. Policy Planning and Research Working Papers, No 202, World Bank

Gerschenkron, A (1962). *Economic backwradness in Historical Perspective. A Book of Essays*. Harvard University Press, Cambridge, MA

Gezici, F and Hewings, G(2001) "Regional Convergence and the Economic Performance of Peripheral areas in Turkey" *REAL Discussion Papers*, No:01-T-13

Goldsmith, R W (1969). Financial Structure and Development. New Haven. CT: Yale University Press.

Greenwood, J and Bruce, S (1997) "Financial markets in development, and the development of financial markets", *Journal of Economic Dynamics and Control*, 21 145-181

Greenwood, J and Jovanovic, B (1990) "Financial Developments, Growth and the Distribution of Income", *Journal of Political Economy*, 98, 1076-1107

Grier, R (2005). "The Interaction of Human and Physical Capital Accumulation: Evidence from SS" *Kyklos* Vol 58 (2), 195-211

Gundlach, E (1995). "The role of Human Capital in Economic growth: New results and alternative interpretations". *Weltwirtschaftliches Archiv*, 131, 383-402

Gupta, K (1984) *Finance and Economic Growth in Developing Countries*, Croom Helm, London

Gurley, J.G and Shaw, E.S (1955). "Financial Aspects of Economic Development". *American Economic Review*, Vol 45, 515-538

Gutierrez, L (2003) "On the Power of panel Cointegration tests: a Monte Carlo comparison" *Economics Letters* 80, 105-111

Hadri, K (2000) "Testing for Stationarity in Heterogeneous Panel Data" *Econometric Journal*, 3, 148-61

Hao, C(2006), "Development of Financial Intermediation and Economic Growth: The Chinese Experience" *China Economic Review*, 17(4), 347-362.

Hanushek, E. A and Kimko,D (2000). "Schooling, labor-force quality and the growth of nations". *American Economic review*, Dec, 90 (5), 1184-1206.

Haque, N, Nelson, M and Donald, M (1999) " Risk in Africa: its Causes and its Effects on Investment" in *Investment and Risk in Africa*, Collier, P and Catherine, P eds. London: Macmillan

Harris, R and Sollis, R (2003) *Applied Time Series Modelling and Forecasting, London*:. John Wiley and Sons Publisher

Hendricks,L (2002). "How important is Human capital for development? Evidence from immigrant earnings". *American Economic Review*, March, 92 (1).

Heston, A; Summers, R and Atten, B (2002) *Penn World Table Version 6.1*, Centre for International Comparisons at the University of Pennsylvania (CICUP).

Hicks, J.R (1969). *A Theory of Economic History*. Oxford: Oxford University Press

Hlouskova, J and Wagner, M (2006) "The Performance of Panel Unit Root and Stationarity tests: Results from a large scale Simulation study" *Econometric Reviews* 25, 85-116

Hoeffler, Anke E (2002). "The augmented Solow model and the African growth debate". *Oxford Bulletin of Economics and statistics*, May 64(2), 135-58.

Hojo, M. (2003). "An Indirect effect of Education on growth". *Economics Letters*, 80,31-34.

Honohan, P. (2004)' "Financial Development, Growth and Poverty: How Close are the Links?", in C. Goodhart (ed.), *Financial Development and Economic Growth: Explaining the Links*, (38-65). London: Palgrave Macmillan.

Honohan, P and Beck, T (2007) *Making Finance work in Africa*. Woshington, DC: The World Bank.

Honohan, p (2008): "Finance in Africa: A diagnosis". Paper presented at the IMF Seminar on African Finance for the 21st century, jointly organised by IMF and Joint Africa Institute, Tunisia. March

Huntington, S.P. (1968), *Political Order in Changing Societies*, New Haven CT: Yale University Press.

Im, k, Pesaran, H and Shin,Y(1997) "Testing for Unit roots in heterogeneous panels", *DAE Working Pape*r No 9526, University of Cambridge

IMF (2005), *Regional Economic Outlook Sub-Saharan Africa*. World Economic and Financial Surveys

Islam, N (1995). "Growth Empirics: A Panel Data Approach". *The Quarterly Journal of Economics,* 110 (4), 1127-1170

Islam, N (1998). "Growth Empirics: A Panel Data Approach…A Reply". *The Quarterly Journal of Economics,* 113 (1), 325-329

Jappelli, T and Pagano, M (1992) "Saving, Growth and Inequality Constraints". *Discussion Paper* No 662 CEPR, London

Johansen, S (1988). "Statistical Analysis of Cointegration Vectors" *Journal of Economic Dynamics and Control*. 12(2). 231-254

Johnson, S, Jonathan, O and Arvind, S (2007) The Prospects for sustained growth in Africa: Benchmarking the Constraints" IMF Working paper.

Joseph, A, Raffinot, M and Venet, B (1998) " Approfondissement Financier et croissance: Analyses empiriques en Afrique Subsaharienne" *Techniques Financiers and Developpment, Octobre,* 17-25

Jung, W.S (1986) "Financial Development and Economic Growth: International evidence" *Economic development and Cultural change* Vol 34(2), 333-346

Kamarck, A.M (1967) *The Economics of African Development*. New York, NY Praeger

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

Kapur, B.K (1976). "Alternative Stabilization Policies for Less-Developed Economies". *Journal of Political Economy*.Vol 84, Pp 777-795

Kevin, L. Pesaran, M.H, and Smith, R (1998). "Growth Empirics: A Panel Data Approach.. A Comment". *The Quarterly Journal of Economics*, 113 (1), 319-323

King, R.G. and Levine, R. (1993) "Finance and Growth: Schumpeter Might be Right". *Quarterly Journal of Economics*, 108, 717-737.

Klagge, B and Martin, R(2005) "Decentralised Versus Centralised Financial systems: Is there a case for Local capital Markets?" *Journal of Economic Geography*,5 387-421

Knack, S and Keefer, P(1995) "Institutions and Economic Performance: Cross Country tests Using Alternative Institutional Measures," *Journal of economics and Politics*, 207 – 227.

Kose, M.A., Prasad, E. Rogoff, K. and Wei, S-J.,(2006), "Financial Globalization: A Reappraisal", *IMF Working Paper* WP/06/189

Kramers, J.J.M, Ericson, N.R and Dolado, J(1992). "The Power of Cointegration Tests". *Oxford Bulletine of Economics and Statistics*, 54 Pp 325-348

Kremer, M (1993). "Population Growth and Technological Change: One Million BC to 1990" *Quarterly Journal of Economics*. 108 (3), 681-716

Krueger, A. and Lindahl, M (2001). "Education for Growth: Why and for Whom"? *Journal of Economic Literature*, Dec 39(4), 1101-36

Kwabena, G and Wilson, M (2004). "Health human Capital and Economic growth in SubSaharan African and OECD Countries". *The Quarterly Review of Economics and Finance*, 44, 296-320.

Laitner, J.(1993). "Long-run growth and human capital". *Canadian Journal of Economics*, 26, 796-814.

Landau, D (1986). "Government and Economic Growth in Less Developed Countries: An Empirical Study for 1960-1980". *Economic Development and Cultural Change*, 35(1) Oct. 35-75

Lane, P and Milesi-Ferretti,GM (2006) " Exchange Rates and External Adjustment : Does financial Globalization Matter? Institute for International Integration Studies Dublin, 1-26

La Porta, R.Lopez-de-Silanes, F, Shleifer, A and Vishny, R (1997). "Legal Determinants of External Finance", *Journal of Finance*, 52 (3), 1131-50

La Porta, R.Lopez-de-Silanes, F, Shleifer, A and Vishny, R (1998). "Law and Finance " *Journal of Political Economy*, 106(6) 1113-1155.

La Porta, R.Lopez-de-Silanes, F, Shleifer, A and Vishny, R (2002). "Government Ownership of Banks", *Journal of Finance*, 57 (1), 265-301

Larsson, R, Lyhagen, J and Lothgren, M (2001) "likelihood-based Cointegration Tests in Heterogeneous Panels" *Econometrics Journal*, 4, 109-142

Leff, N. (1964), "Economic Development through Bureaucratic Corruption", *American Behavioral Scientist*, 8 – 14.

Lele, P and Siems, M (2007). "Shareholder Protection: A Leximetric Approach" *Journal of Corporate Law Studies*, 7, 17-50

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

Levine. R (1997) "Financial Development and Economic Growth: Views and Agenda" *Journal of Economic literature*, 35 (2), 688-726

Levine, R. (2003) "More on Finance and Growth: More Finance, More Growth?" *Federal Reserve Bank of St. Louis Review*, 85 (4), 31-46.

Levine, R (2004), "Finance and Growth: Theory and Evidence" *NBER Working Paper* W10766 September

Levine, R and Zervos, S (1996) "Stock Market Development and Long-run Growth". *World Bank Economic Review* 10(2), 323-39

Levine, R and Zervos, S (1996) "Stock Markets, Banks and Economic Growth". *American Economic Review* 88(3), 537-558

Lewis, P.M (2007) *Growing Apart- Oil, Politics and Economic Change in Indonesia and Nigeria* University of Michigan Press ,245-255.

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

Lucas, R (1990). "Why doesn't capital flow from rich to poor countries"? *American economic Review, Papers and Proceedings*, 92-96

Luintel, K.B, Khan, M, Arestis, P and Theodoris, K (2008). "Financial Structure and Economic Growth". *Journal of Development Economics*, 86, 181-200.

Lutkepohl, H P and Trenkler, C (2001) "Maximum eigenvalue versus trace tests for the cointegrating rank of a VAR process". *Econometrics Journal*, 4, 287-310

Maddala, G.S and Wu, S (1999) "A Comparative Study of Unit Root Tests with Panel Data". *Econometric Review*, 17 Pp 57-84

Mankiw, N.G, Romer,D and Weil, D.N (1992). "A contribution to the empirics of economic growth". *Quarterly Journal of Economics*, 407-437

Mauro, P.(1995). **"**Corruption and Growth**"** *Quarterly Journal of Economics* 110: 681-712.

Mcdonald, S and Roberts, J (2002). "Growth and multiple forms of Human Capital in an augmented Solow model: a Panel data investigation". *Economics letters*, 74(2), 271-276

McKinnon, R.I. (1973) *Money and Capital in Economic Development*. Brookings Institution, Washington, DC.

Mckinnon, R I (1991). *The order of Economic Liberalization.* Johns Hopkins University Press Baltimore

Meier, G. M and Seers, D(1984). *Pioneers in Development*. New York: Oxford University Press.

Merton R C (1987). "A Simple Model of Capital Market Equilibrium with Incomplete Information" *Journal of Finance,* 42:483-510

Merton R C (1995)."A Functional Perspective of Financial intermediation" *Financial Management*, Vol. 24, No. 2, summer, 1995), pp. 23-41

Merton, R.C and Bodie, Z (1995): "A conceptual framework for analysing the financial Environment**"** in Crane et al., (Eds), *The Global Financial System: A Functional Perspective*. Harvard.

Merton, R.C and Bodie, Z (2004): "The Design of Financial systems: Towards a Synthesis of Function and Structure**"** *National Bureau of Economic Research Working Paper* No 10620.

Minsky, H.P (1991)**. "**The Financial Instability Hypothesis: A Clarification". In Feldstein, M.(Ed), *The Risk of Economic Crisis*, Chicago and London: University of Chicago Press. Pp 158-166

Mishkin, F.S (2007) "Globalization and Financial Development" Paper presented at the *New Perspective on Financial Globalization Conference*, International Monetary Fund, Washington DC, April 26.

Morck, R and Nakkamura, M (1999) "Banks and Corporate Control in Japan", *Journal of Finance* 54, 319-40

Mobolaji, H I (2008) " Spatial Externalities, Openness and Financial Development in SSA" A conference paper presented at 5th Annual Africa Finance Journal Conference held Lagoon Beach Hotel, Cape Town South Africa between 10th and 11th July.

Mobolaji, H I (2008a)**. "**Globalisation and Financial Development in SSA" A paper presented at the 13th Annual conference of African Econometric society, University of Pretoria, South Africa, July 2008

Mobolaji, H I (2008b) " Spatial Economics and Financial Development in SSA" A conference paper presented at the 9th Annual conference of the International Academy of Business and Development in Africa, held at University of Florida, USA on May 20-24

Mobolaji, H I and Ndako, U B (2008)**. "**Financial Development and Globalisation in Nigeria." *Icfai Journal of Financial Economics,* Vol 6 (1) Pp 25-39, March

Mobolaji, H.I (2006). "Human Capital and Growth Dynamics in SSA" Conference paper at the 3rd Annual PhD conference organised by the Department of Economics University of Leicester on 18th May.

Montana, L, Neumann, M, and Mishra, V (2007). "Spatial Modeling of HIV prevalence in Kenya" DHS Working Paper, 27, 1-29

Mulligan, C. and Sala-i-martin, X.(2000). "Measuring aggregate Human capital". *Journal of Economic Growth*, 5(3), 215-252

Nickell,S (1981), "Biases in Dynamic Models with Fixed effects", *Econometrica* 49,1417-1426

Odedokun, M O(1996) "Alternative Econometric Approaches for Analyzing the Role of the Financial sector in Economic Growth: Time series Evidence from LDCs" *Journal of Development Economics*, Vol 50, 119-146

Osterwald-Lenum, M (1992) "A note with quintiles of the asymptotic distribution of the ML cointegration rank test statistics", *Oxford Bulletin of Economics and Statistics*, 54, 461-472

Outreville, J F (1999) "Financial Development, Human Capital and Political Stability". *UNCTAD Discussion Paper* 142

Paelinck , J.H.P (2000) "On Aggregation in Spatial Econometric Modelling" *Journal of Geographical Systems*, 2, 157-165

Paelinck, J.H.P and Arbia, G. (2003). " Economic Convergence or Divergence? Modelling the Interregional dynamics of EU Regions 1985-1999" *Journal of Geographical Systems*, 5, 291-314

Pagano, M (1993), "Financial markets and Growth; An Overview". *European Economic Review*, 37 April 613-622

Papagni, E (2006) "Household borrowing Constraints, Fertility Dynamics and Economic Growth." *Journal of Economic Dynamics and Control*. Jan 27-54

Patrick, H (1966), "Financial Development and Economic Growth in Underdeveloped Countries" *Economic Development and Cultural Change*, Jan Vol 14(2), 174-189

Pedroni, P (1999) "Critical values for Cointegration Tests in Heterogenous Panels with Multiple Regressors" *Oxford Bulletin of Economics and Statistics*, Special Issue, November, 61, 653-70

Pesaran, M.H., Shin, Y. and Smith, R.P. (1999) "Pooled Mean Group Estimation of Dynamic Heterogeneous Panels". *Journal of American Statistical Association*, 94, 621-634.

Pesaran, M,H, Shin, Y and Smith R,J (2000) "Structural analysis of Vector error correction models with exogenous I(1) variables". *Journal of Econometrics*, 97, 293-343

Psacharopoulos, G (1994) "Returns to Education: A Global Update" *World Development*, Vol 22(9), Pp n1325-1343

Quintyn, M and Michael, W.T (2007) "Building Supervisory Structures in Sub-Saharan Africa- An Analytical Framework" IMF Working Paper 07/18

Rajan, R.G. and Zingales, L. (2001) "The Influence of the Financial Revolution on the Nature of Firms" *American Economic Review*, 91(2), 206-11

Rajan, R.G. and Zingales, L. (2003) "The Great Reversals: The Politics of Financial Development in the Twentieth Century". *Journal of Financial Economics*, 69,5– 50.

Rey, S J (2001) "Spatial Empirics for Economic Growth and Convergence" *Geographical Analysis* 33(3): 194-214

Rioja, F and Valev, N (2004) "Does One size Fit All? A Re-Examination of the Finance and Growth Relationship", *Journal of Development Economics*, 74, 429-447

Robinson, J (1952). *The Rate of Interest and other Essays*. London: Macmillan

Romer, P, (1986). "Increasing Returns and Long-Run growth" *Journal of Political Economy*, 94, 1002-1038

Romer, P (1989) " Human Capital and Growth: theory and Evidence," *NBER, Working Paper*. 3173, Nov.

Romer, P, M.(1990). "Human Capital and growth: theory and evidence". *Carnegie-Rochester Conference Series on Public Policy*, 32, 251-86

Sachs,J. and Warner, A.(1997). "Sources of slow growth in African economies". *Journal of African Economies*, Oct, 6(3), 335-76.

Saint-Marc, M (1972), "La monetarisation, condition de la croissance en Afrique occidentale" in Tremblay, R , Afrique et integration monetaire, HRW Montreal Toronto, 109-130

Saint-Paul, G (1992). "Technological Choice, Financial Markets and Economic Development". *European Economic Review*, 36, 763-781.

Savvides, A (1995), "Economic Growth in Africa" *World Development* Vol 23(3), 449-458

Schumpeter, J A (1911) *The Theory of Economic Development*. Harvard University Press, Cambridge MA.

Schultz, T.P (1999) "Health and Schooling Investment in Africa" *Journal of Economic Perspectives* 13(3), Summer 67-88

Shaw, E.S. (1973). *Financial Deepening in Economics Development*. Oxford University Press, New York

Soludo, C.C (1993) "Growth Performance in Africa. Further Evidence on the External Shocks Versus Domestic Policy Debate" *UNECA Development Research Paper* series No 6, United Nations.

Soto, M (2002). "Rediscovering Education in Growth Regressions". Technical Paper No 202, *OECD Development Centre,* November.

Spears, A(1992) " The Role of Financial Intermediation in Economic Growth in Sub-Saharan Africa" *Canadian Journal of Development Studies*, Vol 13(3), 361-379

Stiglitz, J. (1985) "Credit Markets and the control of Capital" *Journal of Money, Credit and Banking* 17(1), 133-52

Temple, J. (1999a). "A positive effect of Human capital on growth". *Economics Letters*, Oct 65(1), 131-134

Temple, S. (1999b) "The New Growth Evidence", *Journal of Economic Literature,* March. 37,112-156

Thirwall, A.P (2006) *Growth and Development* Palgrave Macmillan New York

Valverde,C and Fernandez, R (2004) "The Finance-Growth Nexus: A regional Perspective" *European Urban and Regional studies,*11(4):339-354

Venet, B and Hurlin, C (2001) " Granger Causality Tests in Panel data Models with Fixed Coefficients" *Working Paper Eurisco Universite paris dauphine,* July Pp 1-31

Wagner, M and Hlouskova, J (2007), "The Performance of Panel Cointegration methods: results from a large Scale Simulation study", *Working Paper*, Institute of Advanced Studies.

World Bank (1989). World Development Report, 1989. New York: Oxford University Press.

World Bank (1993). World Development Report, 1993 New York: Oxford University Press. New York

World Bank (1993). *The East Asian Miracle: Economic Growth and Public Policy*. Oxford University Press

World Bank (2001). *Finance for Growth: Policy Choices in a volatile World,* Oxford University Press.

World Bank (2005), *World Development Indicators*. Washington D.C.: World Bank

World Bank (2005), Africa *Development Indicators*. Washington D.C.: World Bank

World Bank (2006), *Africa Development Indicators*. Washington D.C.: World Bank.

World Bank (2007), *World Development Indicators*. Washington D.C.: World Bank.

World Bank (2007), *Making Finance Work for Africa*. Washington D.C.: World Bank.

Xu, Z (2000) "Financial Development, Investment and Growth" *Economic Inquiry*, 38, 331-344