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FINANCIAL DEVELOPMENT AND INCOME IN DEVELOPING COUNTRIES

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Financial Development and Income in Developing Countries

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Abstract

This paper presents an empirical analysis of the controversial relationship between financial system development and economic development. Using cointegration and VAR estimations on annual data from Africa, we examine the nature of the relationship between financial development and income. We find mixed results on both the short and the long-run relationships between the two variables. We find finance causing income, income causing finance, and bi-directional causality. The results indicate that neither the short-run effects nor the long-run relationship seem to linearly depend on the level of financial development or the stage of development.

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1. Introduction

A large number of studies have emphasized the important role of the financial sector in economic growth, including some early work (for example, Bagehot, 1873 and Schumpeter, 1911; and later on the work of Gurley and Shaw, 1955; Goldsmith, 1969; McKinnon, 1973; and Shaw, 1973) and more recent work such as Levine (1997), Beck et al. (2000), Benhabib and Spiegel (2000), and Levine et al. (2000). Yet, a good number of scholars have maintained that finance may not be a significant determinant of economic growth and development and may in fact be caused by development or growth (Robinson, 1952; Lucas, 1988; Stern 1989).

Patrick (1966) referred to the causality from financial development to economic growth and the causality from growth to financial development as the supply-leading hypothesis and demand-following hypothesis, respectively. Many studies have tried to test the validity of these hypotheses. In the early literature, the supply-leading hypothesis finds support in the work of, for example, Schumpeter (1912) and McKinnon (1973); while the demand-following proposition seems to have support in Robinson (1952), Goldsmith (1969), and Lucas (1988). It is important to note that some scholars have shown that there may be bi-directional causality between economic growth and financial development (Lewis, 1955; Gupta, 1984; Jung, 1986).

More recent empirical literature reports conflicting findings. For example, King and Levine (1993a) argue that “finance seems importantly to lead economic growth.” The authors show that the level of financial development is a predictor of productivity improvement and economic development. On the other hand, Demetriades and Hussein (1996) find little empirical evidence that finance causes growth, while Luintel and Khan (1999), and Calderón and Liu (2003) show that there is bi-directional causality between growth and financial development. Moreover, some studies argue that financial development may have a negative influence on growth. Improved financial development that leads to better resource allocation increases returns and may lower saving (income effect) and thus may cause growth to fall (Bencivenga and Smith, 1991; King and Levine, 1993b; Balamoune and Chowdhury, 2003).

This paper addresses an important empirical question in the context of a set of 18 sub-Saharan African (SSA) economies. More specifically, we estimate bivariate vector autoregressive (VAR) equations and perform Granger-causality tests to explore the nature of the relationship between economic development (income per capita) and financial development (banking sector development), using two indicators of financial development.

We perform *bivariate* (instead of multivariate) VAR estimations primarily to be consistent with the Demetriades and Hussein's study, to which we compare our results. The goal of the present study is not the study of the determinants of income. Rather, we explore whether there exists a long-run stable relationship between two time series (financial development and income), and we examine Granger causality (whether financial development Granger causes income or vice versa) between them. Granger causality tests provide evidence on *weak* exogeneity, which is a necessary (but not sufficient) condition for *strong* exogeneity.

Our interest in African countries is motivated mainly by the following considerations. First, some recent empirical studies have found that the relationship between financial development and growth (or income) in African countries (using panel data) is negative or non-existent (see, for example, Balamoune-Lutz and Ndikumana, 2007). Second, some African countries have somewhat liberalized the financial sector, while others still maintain financial repression. It would thus be useful to examine the differences in the finance-income nexus in countries at different levels of financial liberalization. Third, the institutional environment that is relevant to a good functioning of the financial system is at various levels of quality; with South Africa, Gabon and Mauritius having a strong institutional environment, while the remaining countries are between very weak to somewhat good institutional environment. Given these considerations, a significant contribution of this paper is to shed additional light on the finance-growth relationship by focusing on a sample of African countries that offer a broader range of stages of financial development as well as a broader range (in terms of quality) of financial-system supporting institutions.

We begin our investigation by conducting Phillips-Perron unit root-tests to determine whether the variables are stationary (in levels). Second, for non-stationary variables we test for the presence of cointegration (using Johansen's cointegration rank test) between our measure of financial development and income. Cointegration tests allow us to explore whether there is a long-run stable relationship between economic and financial development. Third, we perform Zivot-Andrews tests to examine the presence of unit root with unknown structural break, and the Gregory-Hansen cointegration test which is a more appropriate test when there is structural change in the data. Indeed, in contrast to the results based on the Johansen's cointegration test, the Gregory-Hansen test results suggest that there is no cointegration between income and financial development in any of the 18 countries. Finally, we estimate VAR models and test for the direction of causality between financial development and growth and we make inferences on short-run and long-run effects based on the impulse response functions associated with the VAR equations. We obtain three

important findings. First, the time series properties of per-capita real GDP and the indicators of financial development differ across countries and across financial development indicators. Second, the short-run relationship may differ from the long-run relationship between financial development and income. Third, neither the long-run nor the short-run effects seem to linearly depend on the level of economic or financial development. However, we find no evidence of a short or long-run effect from financial development to income in most countries in the middle range of financial development (and institutional quality). The policy implications of this finding are important, as many developing countries have undertaken partial institutional and financial sector reforms.

The remainder of the paper is structured as follows. In the next section, we review the literature with emphasis on the empirical studies on the direction of causality between economic growth and financial development. Section 3 provides a description of the data and methodology. Section 4 reports and discusses the empirical results. Concluding remarks are included in section 5.

2. Literature review

It has been widely argued in the literature¹ that the main effects of financial development on growth (or economic development) operate through enhancing the functions of the financial system, including enhancing risk amelioration, improving the allocation of resources, allowing a better access to information about investments, improving monitoring and increasing saving mobilization (See Levine, 1997). Another important source of effects stems from the interaction between technology diversification and financial markets. Saint-Paul (1992) emphasizes the effects of financial markets on technological choice. Using a theoretical model, he shows that underdeveloped financial markets can lead to agents investing in less specialized industries. In turn, technological choices have an impact on financial markets. Saint-Paul shows that this interaction can result in multiple equilibria; a low equilibrium with underdeveloped financial markets and unspecialized technology and a high equilibrium with specialized technology and extensive division of labor.

Recent empirical literature on the relationship between financial development and growth includes Bencivenga and Smith (1991), King and Levine (1993a and 1993b), Demetriades and Hussein (1996), Luintel and Khan (1999), Beck *et al.* (2000), Xu (2000), Calderón and Liu (2003) and Ang and McKibbin (2007). Interestingly, this literature contains findings that point to the possibility of several types of relationships. Depending on the

econometric model, data frequency and the country or region studied, finance is causing growth, growth is causing finance, there is bi-directional causality, and there is no causality. The link between finance and growth may also depend on the level of the country's economic development or the level of financial sector development (Rioja and Valev, 2004). For example, King and Levine (1993a) argue that finance causes economic growth. On the other hand, Demetriades and Hussein (1996) find little empirical evidence in support of the supply-leading proposition (the hypothesis that finance causes growth). Ang and McKibbin (2007) use Malaysian time series data from 1960 to 2001 and perform cointegration and causality tests of the finance-growth link. They find that "removing the repressionist policies has a favorable effect in stimulating financial sector development". The authors find a positive relationship between financial depth and economic development but the evidence they derive shows that it is output growth that leads to financial depth in the long-run. Calderón and Liu (2003) use data for 109 developing and industrial countries from 1960 to 1994 and report that there is bi-directional causality between financial development and growth. They also show that financial deepening contributes more to the causality link between growth and financial development in developing countries than in industrial countries. Other studies, including Demetriades and Hussein (1996), and Gregorio and Guidotti (1995) have derived mixed results. In addition, there is theoretical and empirical evidence that the relationship between financial development and growth (or development) can be nonlinear. For example, Allen and Gale (1997) develop a theoretical model that accounts for the presence of financial intermediaries and financial markets in an economy and show that "economies that are intermediary-based may be worse off by allowing access to financial markets." Deidda and Fattouh (2008) derive a similar conclusion in their theoretical model and obtain empirical evidence (based on cross-sectional analysis covering more than 100 countries) suggesting nonlinearity in the finance-growth relationship. The authors find that while both bank and stock market development have a positive impact on growth, the growth effect of bank development is weaker the higher the level of stock market development.

Finally, some scholars have emphasized the importance of considering the stages of development (Patrick, 1966; Calderón and Liu, 2003; Osborne, 2006). It seems that the direction of causality between finance and growth may invert itself as development proceeds; finance causes growth at low levels of development, and growth causes financial development at high levels of economic development. The stage-of-development proposition (Patrick, 1966) implies that the supply-leading hypothesis holds in the early stages of development and the demand-following hypothesis tends to hold in later stages of

development. In the early stages of development, the creation of new financial services enhances intermediation, saving, and investment which leads to higher growth (supply-leading proposition). At higher levels of financial and economic development, economic growth creates need for new financial services and so the demand-following proposition tends to prevail.

Perhaps with the exception of Gupta (1984) and Jung (1986), focus on the *direction* of causality between financial development and growth is quite recent and began only since the mid-1990s (Demetriades and Hussein, 1996; Luintel and Khan, 1999; Levine et al., 2000; Balamoune-Lutz, 2003; Calderón and Liu, 2003). It is important to note that Gupta (1984) and Jung (1986) both ignore the long-run properties (unit-root and cointegration) of the time series used. In addition, Gupta uses only the level of broad money as a measure of financial development. In fact, many studies use the ratio of broad money to GDP (M2) as indicator of financial development. However, as pointed out by Demetriades and Hussein (1996), since the ratio of M2 to GDP is the inverse of M2 velocity, the positive relationship between real GDP and financial development may reflect the effect of GDP on the velocity of circulation. This would occur if the income elasticity of money demand exceeds unity. In this case, causality will be from economic development to financial development.

Luintel and Khan (1999) estimate cointegration and vector-error correction (VEC) models and find bi-directional causality between financial development—proxied by the ratio of total deposit liabilities of deposit banks to nominal GDP—and economic growth using a sample of ten countries. This measure, however, has been criticized by Demetriades and Hussein (1996) who justly argue that a rise in this indicator may reflect the increase in savings and not necessarily a rise in the supply of credit to the private sector. The latter is more in line with the McKinnon-Shaw proposition that the supply of credit to the private sector is crucial to the quantity and quality of investment (Demetriades and Hussein, 1996).

In their influential empirical study, Demetriades and Hussein (1996) employ cointegration and VEC techniques and two measures of financial development; the ratio of total deposit liabilities to nominal GDP and the ratio of bank claims on the private sector to nominal GDP. The authors focus on a sample of 16 developing countries and report that they could not find evidence that financial development unequivocally promotes growth. On the other hand, their results indicate that growth causes financial development.²

It is worth noting that seven of the countries included in Demetriades and Hussein (1996) were also included in Luintel and Khan (1999) but the findings in the two studies were quite different. When the measure of financial development is the ratio of total deposit

liabilities of deposit banks to nominal GDP, Demetriades and Hussein find that growth and financial development are cointegrated in India, Greece, Costa Rica, Korea, South Africa, and Thailand. They find no cointegration between the two variables in Sri-Lanka. Luintel and Khan find evidence of cointegration in all seven countries. Furthermore, while Luintel and Khan find bi-directional Granger causality between financial development and economic growth in all these countries (based on multivariate VAR), Demetriades and Hussein use a bivariate VAR and show that there is no causality between the two variables in Sri Lanka and South Africa, and reverse causality (from income to financial development) in Costa Rica and Greece. The only countries where they find bi-directional causality are India, Korea, and Thailand. Thus, in spite of using the same measure of financial development, the two studies obtain significantly different results for Sri Lanka, South Africa, Greece, and Costa Rica. This clearly indicates that the issue of cointegration and the direction of causality question remain unsettled and warrant more empirical studies.

3. Empirical estimation

3.1 Data and methodology

We use annual data from 18 African countries, namely Botswana, Côte d'Ivoire, Cameroon, Ethiopia, Gabon, Ghana, the Gambia, Kenya, Madagascar, Malawi, Mauritius, Niger, Nigeria, Senegal, Swaziland, Togo, South Africa, and Zimbabwe. The data are for the period 1960-2001 (some countries are missing data for some years at the beginning of the period). We use two indicators of financial development:³ the ratio of liquid liabilities (currency plus demand and interest-bearing liabilities of banks and nonbank financial intermediaries) to GDP, a measure of the size of financial intermediaries (labeled LIQ); and the ratio of private credit by deposit money banks and other financial institutions to GDP (labeled PRIVCR). In general, the extent of financial deepening may be best measured by the ratio of liquid liabilities of financial institutions to GDP (see Benhabib and Spiegel, 2000). However, some studies (see for example, Demetriades and Hussein, 1996) have stressed that credit to the private sector may be a better proxy for financial development. The use of credit to the private sector is based on the assumption, as noted by Levine (2005), that “financial systems that allocate more credit to private firms are more engaged in researching firms, exerting corporate control, providing risk management services, mobilizing savings, and facilitating transactions than financial systems that simply funnel credit to the government or state owned

enterprises.” Data on financial development indicators used in the present study are from the World Bank Financial Structure Database.

It is important to note that bank-based measures of financial development are more appropriate when analyzing data from developing countries because their stock markets tend to have low activity and the bulk of private saving and borrowing (in the formal market) takes place in the banking sector. Thus, as argued in Balamoune-Lutz (2003), financial development in developing countries tends to center on the development of money and financial intermediation not the development of capital markets which is more prevalent in developed countries.

Following some influential work in this area (such as King and Levine, 1993a,b; Demetriades and Hussein, 1996; Luintel and Khan, 1999), our measure of economic development is real per-capita gross domestic product (GDP) in natural logarithm. However, we specifically follow Demetriades and Hussein (1996) and measure real GDP in domestic currency (not US dollars). As pointed out by Demetriades and Hussein, this would minimize the problems associated with exchange rate conversions. The source of data on real GDP is the World Development Indicators Database (World Bank, 2003).

Since the data are time series, we need to explore their long-run properties by performing unit-root and cointegration tests. First, we use the Phillips-Perron unit-root test (Phillips and Perron 1988) to test the stationarity of each variable. The Phillips-Perron (PP) test tends to be more reliable than the augmented Dickey-Fuller (ADF) test if the presence of structural breaks is suspected. The results of unit-root tests are summarized in Table 1. Second, to explore the nature of the long-run relationship between financial development and economic development, we perform Johansen’s cointegration tests for those variables that are integrated of order 1 [I(1)] and report the results in Table 2. This type of analysis is in general straightforward and includes (1) testing for unit root; (2) if both series are I(1) then we proceed to cointegration; (3) if no cointegration (or if the degree of integration is mixed—I(0) and I(1))—we run the standard Granger causality test by using variables in first differences to test for causality; and (4) if the variables are cointegrated, we estimate VEC models in order to explore the long-run relationship and short-run dynamics.⁴ The results in Table 1 indicate that all the variables have unit root and are difference-stationary or I(1) except for the variable LIQ in Ghana. Johansen’s cointegration test results (Table 2) indicate that all variable are cointegrated, except LIQ in Côte d’Ivoire and Togo, and PRIVCR in Côte d’Ivoire

However, Phillips-Perron test assumes a known structural break. If the break point is determined endogenously (unknown), as is the case here, then we need to use the more refined test provided by Zivot and Andrews (1992). The results from the Zivot-Andrews test of unit root with unknown structural break are reported in Table 3. The Zivot-Andrews test statistic values indicate that, once we account for a shift in the intercept, a change in the slope of the trend function, or a change in both six countries (Ethiopia, Niger, Senegal, Swaziland, Togo, and Zimbabwe) have at least one variable that is stationary in level or I (0). Variables in all other countries remain nonstationary in their levels.

Furthermore, since the time period covered in the analysis is forty years and most of the countries included introduced reform measures at different periods of time, the Gregory-Hansen cointegration test with structural change (Gregory and Hansen, 1996) is more appropriate. The Gregory-Hansen test results reported in Table 4 indicate that the hypothesis of no cointegration cannot be rejected in any of the 12 countries (where all the variables have unit root) regardless of the financial development indicator used.

3.2 *Estimation results*

Taking into account the results from Zivot-Andrews and Gregory-Hansen tests (accounting for structural breaks), we perform Granger causality tests (tests of *weak* exogeneity) and estimate bi-variate VAR equations. We also generate impulse response functions (see Figure 1). The results shown in Table 5 suggest that the evidence on causality is quite mixed. When financial development is measured by the ratio of liquid liabilities to GDP (LIQ), the statistical evidence indicates that income causes financial development (at the 5-percent level of significance or better) in seven countries: Gabon, the Gambia, Mauritius, Nigeria, Senegal, Swaziland and Togo. On the other hand, finance seems to cause income only in three countries (Botswana, Côte d'Ivoire and Niger), while there is evidence of bi-directional causality in two countries (South Africa and Zimbabwe). When financial development is measured by the ratio of private credit by deposit money banks and other financial institutions to GDP (PRIVCR), the statistical evidence suggests that income causes financial development in six cases (The Gambia, Kenya, Madagascar, Niger, Senegal, and Togo), while finance causes income in two countries only, Botswana and Mauritius. On the other hand, the results suggest that there is bi-directional causality in Côte d'Ivoire, Ethiopia, Nigeria, South Africa and Zimbabwe. Thus, South Africa and Zimbabwe seem to have bi-directional causality in the case of both financial development indicators, The Gambia,

Senegal and Togo have unidirectional causality from income for both financial development indicators, whereas only Botswana shows unidirectional causality from finance to income for both indicators.

However, liquid liabilities measure the ability of banks to mobilize funds or the size of the banking system relative to the economy, as well as the extent of monetization rather than the extent of financial development. Demetriades and Hussein (1996) and Luintel and Khan (1999), among others, have argued that monetization can be increasing without financial development occurring in developing economies. In addition, in the literature, the private sector credit is probably the most relevant measure of financial development. Thus, we will focus more on PRIVC results to make inference and conclusions.

Bivariate VAR estimates provide support for the supply-leading hypothesis in only two countries (Botswana and Mauritius), while there is support for the demand-following hypothesis (income causes financial development) in six countries. On the other hand five countries have bi-directional causality, while there is no Granger causality between the two variables in either direction in five countries (Cameroon, Gabon, Ghana, Malawi and Swaziland).

In order to make inference on the effects of financial development on income (and income on financial development), we use impulse-response functions based the VAR specifications associated with the results reported in Table 5 (the 13 countries that show evidence of Granger-causality in at least one direction). The impulse response functions in Figure 1 indicate that the effects vary from country to country and there are significant differences between the short-run (1-3 years) and long-run (4-10 years) effects.

4. Discussion of the findings and policy implications

This study is in the spirit of the work by Demetriades and Hussein (1996) in that we use a bivariate VAR and include the same measures of financial development that the authors use, namely the variables LIQ and PRIVCR. Our results are similar to the ones derived in Demetriades and Hussein (1996) in that we find causality from financial development to income, bi-directional causality, and reverse causality. However, our findings for South Africa differ from theirs in that we show that there is bi-directional causality between income and financial development in the case of both indicators of financial development, while Demetriades and Hussein find uni-directional causality from income to financial development. This difference may be due primarily to the fact that we use a longer time

period and a more appropriate lag length, and we also account for structural breaks. We show that causality between financial development and economic development may differ even across countries with comparable levels of development and located within the same region. This is an important finding that casts doubt on the validity of the stage-of-development hypothesis formulated in Patrick (1966) and empirically validated in Calderón and Liu, 2003. The 18 countries in our sample have all been included (along with countries from other regions) in the study by Calderón and Liu (2003). Except for Mauritius, all these countries were included in their low-and middle-income group of countries. They find that financial development (financial depth and the ratio of credit to the private sector to GDP) has an impact on growth and that there is bi-directional (Granger) causality between the two variables. Another important finding in their study is that financial deepening has a stronger impact on growth in developing countries. This result is consistent with the proposition arguing that the direction of causality between financial development and income (or growth) may depend on the stages of development (Patrick 1966). However, the present study does not find any evidence to support this proposition.

Clearly, the results we derive are mixed. Nonetheless, it may be more useful to analyze them while taking into account the different aspects of the institutional environment and financial systems in individual countries. To do so, we refer to the study by Gelbard and Leite (1999) and use the indexes they developed (see Table 6). The index of financial development (and the indicators used to generate it) is for 1997. However, given that financial development and institutional factors generally work with significant lags and change only slowly, we believe using these indices is appropriate.

Table 6 summarizes the values of the financial development index and sub-indices from Gelbard and Leite (1999). Financial systems in two countries, South Africa and Mauritius (with an index equal to 91 and 84, respectively), can be considered developed. However, we obtain different empirical evidence on both the long-run and the short-run relationships between financial development (PRIVCR) and income. In South Africa we find bi-directional causality, while in Mauritius we find unidirectional causality from PRIVCR to income. Furthermore, the evidence (impulse response function) points to a negative impact of PRIVCR on income both in the short-run and the long run. On the other hand, there is a positive long-run effect of financial development on income in Mauritius.

It is interesting to note that we obtain mixed results for countries with developed financial systems (South Africa and Mauritius) and for countries with significantly underdeveloped financial systems (with an index lower than 50), such as Ethiopia, Malawi,

and Togo. In Ethiopia, we find bi-directional causality with a positive short-run impact and an ambiguous long-run effect from income to PRIVCR, while as there is a negative short-run effect from financial development to income and a long-run effect that is negative for the first few years and turns positive in the sixth year, suggesting that the positive effect of financial development has a significant lag. On the other hand, in Malawi we did not find evidence of Granger causality in either direction, whereas in Togo income causes financial development with a negative immediate effect but a significant positive long-run impact. Similarly, we find mixed evidence for the countries that have a somewhat developed financial sector and above average values for the index of monetary policy instruments, such as Botswana, Gabon, Ghana and Kenya. In Botswana the short-run impact of financial development is positive in the short run but mostly negative in the long run. In Gabon and Ghana there is no evidence of causality between financial development and income. On the other hand, in Kenya, income has a positive effect on financial development both in the short and long run, providing support for the demand-following hypothesis.

A recent but growing body of empirical literature focuses on the effects of institutional quality and legal origin (Levine et al., 2000; Andrianova et al., 2008; Chinn and Ito, 2006; Demetriades and Law, 2006) on the effectiveness of financial development. Using a panel of 108 countries over the period 1980-2000, Chinn and Ito (2006) find that financial openness fosters equity market development conditional on a threshold level of legal development. The authors also find that trade openness is a prerequisite of the liberalization of capital accounts whereas the development of the banking sector is a prerequisite for the development of equity markets. In addition to their direct effects on financial development, institutional factors, such as deposit contract enforcement, could influence the ownership structure of the banking sector. Andrianova et al. (2008) find that institutions could be more important in explaining the share of state banks than political or historical factors.

Demetriades and Law (2006) perform OLS and panel estimations on data from 72 countries covering the period 1978-2000 and find that institutional quality has an important role in enhancing the positive effects of financial development on per capita income. In addition, the authors show that the impact of financial development is strongest in middle-income countries. The results outlined in Demetriades and Law (2006) also indicate that in low-income countries, in the absence of sound institutions, higher financial development may not have any effect on long-term development (income level). The sample in Demetriades and Law includes ten of the countries that are also in our sample: Cameroon, Gambia, Ghana, Kenya, Malawi, Niger, Senegal, Togo, Zimbabwe, and South Africa. They include South

Africa in the middle-income group and the other nine countries in the low-income group. However, our results show that in South Africa the long-run effect of financial development (PRIVCR) and income is negative and statistically significant, while in Zimbabwe there is a positive short-run impact and an ambiguous long-run effect. On the other, there is no evidence of causality from financial development in the other countries.

Finally, It is important to note that the institutional environment should affect both financial development and growth (and their interplay) more in the long run than in the short run, mainly because institutions are considered deep determinants of growth and development (Acemoglu et al., 2001). Table 7 shows the institutional indicator (relevant to financial development) and the summarized results on the short and long-term effects of financial development on income. We note that in countries with very good institutional environment (90-100)—South Africa, Gabon, and Mauritius—and in countries with poor institutions (index lower than 50) the results are mixed. However, in countries in the middle range (50-90), and with the exception of Botswana, the statistical evidence indicates that financial development does not affect income.

There are at least two important policy implications of the empirical results. First, countries undertaking institutional and policy reform—as do many of the countries in sub-Saharan Africa—should create and enforce sound regulation of the banking system. The results suggest that in countries that have undertaken partial institutional and policy reform, financial development may not be income enhancing. This result seems consistent with the arguments in Stiglitz (2000) on the importance of sound regulation of the banking system. The liberalization of the financial sector without good regulatory institutions may produce adverse effects that could negate the positive effects of financial development on income.

Second, the results obtained in this paper imply, as also noted by Ang (2010) in the case of India, that for financial development to enhance income and growth policymakers should aim at broadening financial inclusion and improving access to finance for the poor. In addition, policy reforms such as those aimed at increasing trade openness or financial liberalization may have adverse effects on the effectiveness of financial development. For example, Ang (2008b) finds that greater trade openness seems to have negative effects on the financial system in Malaysia. One channel through which partial reforms may affect the interplay between income and financial development is income distribution. Often, short-term winners tend to prevent the reform efforts from moving forward while at the same time preferring not to go back to a no-reform economy. This situation would be more plausible in countries with high income inequality and/or a very small middle-class group. While many

studies have maintained that financial development reduces income inequality⁵ (see for example, Galor and Zeira, 1993; Banerjee and Newman, 1993; Clarke et al., 2006) it is very likely that a persistent state of partial reforms could actually exacerbate inequality, particularly if the middle class—which would normally gain better access to credit in the presence of financial reform, since the poor in many developing countries tend to use the informal sector and hence may not be significantly affected by the reform, especially in the early stages—is small. This would be consistent with the predictions of the theoretical model in Greenwood and Jovanovic (1990), where the process of development includes a range (transition) within which income inequality increases with initial increases in financial development. Interestingly, Ang (2010) finds that while financial development helps reduce income inequality in India, financial liberalization seems to exacerbate it.

5. Concluding remarks

This paper examines causality between income and two indicators of financial development using time series data from 18 SSA countries. VAR estimates show that the evidence on the link between financial development and income is quite mixed. Impulse response functions suggest that the evidence on the nature of the short and long-run effects is also mixed but most of the countries show a negative effect. Only in Mauritius do we find a positive long-run impact of financial development (credit to the private sector) on income.

In general, the empirical results are consistent with the findings in Demetriades and Hussein (1996). Similar to their results, we fail to find strong evidence that finance leads economic development and we find evidence of bi-directional causality and reverse causation. An important implication of these findings is that given the mixed results and the disparities among countries, cross-sectional models do not seem to be suitable for the study of the relationship between financial and economic development. The present study is, however, different from Demetriades and Hussein (1996) in an important way; it includes a sample of countries at fairly comparable levels of development (in the wider sense) for most of the time period under examination. This allows us to test the validity of the dependence of the relationship between financial development and income on the stage of development. Demetriades and Hussein (1996) include countries at different stages of development (for example, Spain versus India or Pakistan). A major finding in this paper is the negative long-run relationship between financial development and income in countries within what we call the ‘range of partial reform.’ We outline the policy implications of this finding in section 4.

Our results also highlight the need to explore additional channels through which financial development could affect economic development, such as income inequality, the quality (and extent) of institutional and policy reforms, as well as the choice of optimal policy. For example, Berthelemy and Varoukadis (1996) show that in the presence of underdeveloped financial markets, openness to trade may be ineffective while government expenditure has a positive impact on growth. Similarly, Njuguna and Ngugi (1999) report that liberalization of the financial system and exchange rate market in Kenya in the 1990s created a policy dilemma and complicated macroeconomic management. This is because the inflation profile changed with exchange rate policy, so Kenya was unable to target low inflation with interest rate as the sole instrument.

REFERENCES

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

Allen, F. and D. Gale (1997). "Financial Markets, Intermediaries and Intertemporal Smoothing." *Journal of Political Economy*, 105(3): 523-546.

Andrianova, S., P. Demetriades, and S. Anja (2008). "Government Ownership of Banks, Institutions, and Financial Development," *Journal of Development Economics*, 85(1-2): 218-252.

Ang, J. B. (2008a). "A Survey of Recent Developments in the Literature of Finance and Growth." *Journal of Economic Surveys*, 22 (3): 536-576.

Ang, J. B. (2008b). "Are Financial Sector Policies Effective in Deepening the Malaysia Financial System?" *Contemporary Economic Policy*, 26(4): 623-635.

Ang, J. B. (2010). "Finance and Inequality: The Case of India." *Southern Economic Journal*, 76(3): 738-761.

Ang, J. B. and W. J. McKibbin (2007). "Financial liberalization, financial sector development and growth: Evidence from Malaysia." *Journal of Development Economics*, 84(1): 215-233.

Arestis, P and P. Demetriades (1997). "Financial Development and Economic Growth: Assessing the Evidence." *The Economic Journal*, 107(442): 783-799.

Bagehot, Walter (1873). *Lombard Street: A Description of the Money Market with' the Currency Monopoly*, Homewood, IL: Richard D. Irwin, 1962 edition, 1873.

Baliamoune-Lutz, Mina (2003). "Financial Liberalization and Economic Growth in Morocco: A Test of the Supply-Leading Hypothesis." *Journal of Business in Developing Nations*, 7: 31-50

Baliamoune-Lutz, M (2005). "Institutions, Social Capital, and Economic Development in Africa: An Empirical Study." International Centre for Economic Research, Working Paper No. 18.

Baliamoune-Lutz, Mina (2007). "Financial Reform and the Mobilization of Domestic Savings: The Experience of Morocco." In George Mavrotas (Ed.), *Domestic Resource Mobilization and Financial Development*. Palgrave Macmillan.

Baliamoune-Lutz, Mina (2008). "Financial Development and Income in North Africa." *International Advances in Economic Research*, 14: 422-432.

Baliamoune-Lutz, Mina (2010). "Human Well-Being Effects of Institutions and Social Capital." *Contemporary Economic Policy*, 27(1): 54-66.

- Baliamoune, M. N. and Chowdhury, A. R. (2003). "The long-Run Behavior and Short-Run Dynamics of Private Savings in Morocco." *Savings and Development*, 27(2): 135-160.
- Baliamoune-Lutz, Mina and Léonce Ndikumana (2007). "The Growth Effects of Openness to Trade and the Role of Institutions: New Evidence from African Countries" Policy Paper no. 6, Institute for Economic Development, Department of Economics, Boston University.
- Banerjee, Abhijit V., and Andrew F. Newman (1993). "Occupational Choice and the Process of Development." *Journal of Political Economy*, 101:274–98.
- Beck, T., Levine, R. and Loayza, N. (2000). "Finance and the Sources of Growth." *Journal of Financial Economics*, 58 (1/2): 261-300.
- Bencivenga, Valerie R. and Smith, Bruce D. (1991). "Financial Intermediation and Endogenous Growth." *Review of Economic Studies*, 58: 195-209.
- Benhabib, J and Spiegel, M. (2000). "The Role of Financial Development in Growth and Investment." *Journal of Economic Growth*, 5: 341-360.
- Berthelemy, J. C., and A. Varoukadis (1996). "Economic Growth, Convergence Clubs, and the Role of Financial Development." *Oxford Economic Papers*, 48: 300-328.
- Calderón, C., A. Chong, and A. Galindo (2002). "Development and Efficiency of the Financial Sector and Links with Trust: Cross-Country Evidence." *Economic Development and Cultural Change*, 51(1): 189-204.
- Calderón, Cesar and Lin Liu (2003). "The Direction of Causality between Financial Development and Economic Growth ". *Journal of Development Economics*, 72: 321-334.
- Chinn M. D. and H. Ito (2006): "What matters for Financial Development? Capital Controls, Institutions, and Interactions." *Journal of Development Economics*, 81: 163-192.
- Clarke, George R. G., Lixin Colin Xu, and Heng-fu Zou (2006). "Finance and Income Inequality: What Do the Data Tell Us?" *Southern Economic Journal*, 72(3): 578–596.
- Deidda, L. and B. Fattouh (2008). "Banks, Financial Markets and Growth." *Journal of Financial Intermediation*, 17(1): 6-36.
- Demetriades P. O. and K. A. Hussein (1996). "Does Financial Development Cause Economic Growth? Time-Series Evidence from 16 Countries." *Journal of Development Economics*, 51: 387-411.
- Demetriades P. and S. H. Law (2006). "Finance, Institutions, and Economic Development." *International Journal of Finance and Economics*, 11: 245-260.
- Galor, Oded, and Joseph Zeira (1993). "Income Distribution and Macroeconomics." *Review of Economic Studies*, 60:35–52.
- Gelbard, E.A. and S.P. Leite (1999). "Measuring Financial Development in Sub-Saharan Africa." IMF Working Paper 99/105, Washington: International Monetary Fund

- Goldsmith, R.W. (1969). *Financial Structure and Development*, Yale University Press, New Haven, Connecticut.
- Greenwood, Jeremy, and Boyan Jovanovic (1990). "Financial Development, Growth, and the Distribution of Income." *Journal of Political Economy*, 98: 1076–107.
- Gregorio, Jose De and Pablo E. Guidotti (1995). "Financial development and Economic Growth." *World Development*, 23(3): 433-448.
- Gregory, A.W and B.E. Hansen (1996). "Residual-based Tests for Cointegration in Models with Regime Shifts." *Journal of Econometrics*, 70:90-126.
- Gupta, K. L. (1984). *Finance and Economic Growth in Developing Countries*. London: Croom Helm.
- Gurley J.G. and E.S Shaw (1955). "Financial Aspects of Economic Development." *American Economic Review*, 45: 515-538.
- Jung, Woo S.(1986). "Financial Development and Economic Growth: International Evidence." *Economic Development and Cultural Change* 34(2): 333-346.
- King, R.G. and R. Levine (1993a). "Finance and Growth: Schumpeter Might Be Right." *Quarterly Journal of Economics*, 108: 717-37.
- King, R.G. and R. Levine (1993b). "Finance, Entrepreneurship and Growth: Theory and Evidence." *Journal of Monetary Economics*, 32: 1-30.
- Levine, Ross (1997). "Financial Development and Economic Growth: Views and Agenda." *Journal of Economic Literature*, 35: 688-726.
- Levine, Ross (2005). "Finance and Growth: Theory and Evidence." In *Handbook of Economic Growth*, Eds: Philippe Aghion and Steven Durlauf, The Netherlands: Elsevier Science.
- Levine, R., N. Loayza, and T. Beck (2000). "Financial Intermediation and Growth: Causality and Causes." *Journal of Monetary Economics*, 46: 31-77.
- Lewis, Arthur (1955). *The Theory of Economic Growth*. London: George Allen and Unwin.
- Lucas, Robert E. (1988). "On the Mechanics of Economic Development." *Journal of Monetary Economics*, 22: 3-42.
- Luintel, Kul B., and Mosahid Khan (1999). "A Quantitative Reassessment of the Finance-Growth Nexus: Evidence from a Multivariate VAR." *Journal of Development Economics*, 60: 381-405.
- Lütkepohl, Helmut , Pentti Saikkonen, and Carsten Trenkler (2001). "Maximum Eigenvalue Versus Trace Tests for the Cointegrating Rank of a VAR Process." *Econometrics Journal*, 4(2): 287-310.

- MacKinnon, James G. (1996). "Numerical Distribution Functions for Unit Root and Cointegration Tests," *Journal of Applied Econometrics*, 11, 601-618.
- MacKinnon, James G., Alfred A. Haug, and Leo Michelis (1999). "Numerical Distribution Functions of Likelihood Ratio Tests For Cointegration," *Journal of Applied Econometrics*, 14, 563-577.
- McKinnon, R. (1973). *Money and Capital in Economic Development*, Washington, DC: Brookings Institution.
- Osborne, Evan (2006). "The Sources of Growth at Different Stages of Development." *Contemporary Economic Policy*, 24(4): 536-547,
- Patrick, H. T. (1966). "Financial Development and Economic Growth in Underdeveloped Countries." *Economic Development and Cultural Change*, 14: 174-189.
- Rioja, Félix and Neven Valev (2004). "Does One Size Fit All? A Reexamination of the Finance and Growth Relationship." *Journal of Development Economics*, 74(2): 429-447.
- Robinson, Joan (1952). "The Generalization of the General Theory." in *the Rate of Interest, and Other Essays*. London: Macmillan, 67-142.
- Saint-Paul, Gilles (1992). "Technological Choice, Financial Markets, and Economic Development." *European Economic Review*, 36: 763-781.
- Schumpeter, Joseph A. (1934). *The Theory of Economic Development*, Leipzig: Dunker & Humblot, 1911. Translated by Redvers Opie. Cambridge, MA: Harvard University Press.
- Shaw, E. (1973). *Financial Deepening in Economic Development*, New York: Oxford University Press.
- Sims, C.A. (1980). "Macroeconomics and Reality." *Econometrica*, 48: 1-48.
- Stern, Nicholas (1989). "The Economics of Development: A survey." *Economic Journal*, 99: 597-685.
- Stiglitz, Joseph, E. (2000). "Market Liberalization, Economic Growth, and Instability." *World Development*, 28(6): 1075-1086.
- Xu, Zhenhui (2000). "Financial Development, Investment, and Economic Growth." *Economic Inquiry*, 38(2): 331-344.
- Zivot, E. and K. Andrews (1992). "Further Evidence on the Great Crash, the Oil Price Shock and the Unit Root Hypothesis." *Journal of Business and Economic Statistics*, 10(10): 251-270.

Table 1: Phillips-Perron test results

	Adj. t-Stat					
	<i>Income</i>		<i>LIQ</i>		<i>PRIVCR</i>	
	Level	First difference	Level	First difference	Level	First difference
Botswana	-1.290	-3.163**	-2.399	-4.500***	-2.081	-3.379***
Côte d'Ivoire	-1.986	-5.253***	-2.830	-5.262***	-0.670	-4.314***
Cameroon	-1.371	-4.554***	-1.998	-7.232***	-1.028	-6.254***
Ethiopia	-1.926	-4.039***	-2.355	-6.013***	-1.975	-3.165***
Gabon	-2.539	-4.449***	-2.573	-4.819***	-2.092	-5.004***
Ghana	-1.369	-4.696***	-3.445**	--	-0.734	-5.480***
The Gambia	-1.864	-5.697***	-3.491	-7.690***	-1.701	-5.471***
Kenya	-1.837	-6.411***	-2.213	-4.421***	-1.675	-4.174***
Madagascar	-0.655	-4.853***	-2.764	-7.458***	-1.639	-4.501***
Malawi	-2.187	-6.904***	-2.804	-5.131***	-1.776	-2.894***
Mauritius	-0.249	-3.255**	-1.902	-7.055***	1.182	-4.784***
Niger	-3.193	-5.494***	-0.727	-3.598***	-1.026	-3.969***
Nigeria	-2.078	-4.519***	-1.624	-5.545***	-1.518	-5.1347
Senegal	-2.234	-8.002***	-2.182	-4.111***	-1.506	-3.254***
Swaziland	-2.542	-7.014***	-3.468	-3.363***	-2.323	-3.654***
Togo	-2.635	-6.209***	-1.713	-5.907***	-2.127	-5.783***
South Africa	-2.917	-4.485***	-1.340	-4.394***	1.807	-2.976***
Zimbabwe	-2.158	-4.279***	-2.195	-3.744***	-1.820	-5.200***

The critical values differ according to the number of observations and lags included. More details may be obtained from the author.

Notes: ** and *** denote 5% and 1% level of significance, respectively.

Note: Significance levels are based on critical values from response surfaces in MacKinnon (1996).

Table 2. Cointegration test results – Trace statistic (cont.)

	Hypothesized No. of CE(s)			
	None		At most 1	
	LIQ			
	Trace Statistic	0.05 Critical Value	Trace Statistic	0.05 Critical Value
Botswana	21.19301	20.26184	8.984289	9.164546
Cameroon	27.59812	20.26184	7.923728	9.164546
Côte d'Ivoire	77.43891	20.26184	22.63250	9.164546
Ethiopia	12.80418	12.32090	0.835086	4.129906
Gabon	50.97812	18.39771	0.297880	3.841466
Ghana	--	--	--	--
The Gambia	67.42555	25.87211	12.44630	12.51798
Kenya	55.07071	20.26184	4.735996	9.164546
Madagascar	31.13488	25.87211	8.188349	12.51798
Malawi	23.95102	20.26184	5.982518	9.164546
Mauritius	26.25805	25.87211	8.809636	12.51798
Niger	34.36617	25.87211	4.996160	12.51798
Nigeria	36.57696	20.26184	6.788654	9.164546
Senegal	45.86224	25.87211	10.41098	12.51798
Swaziland	99.25836	18.39771	0.000764	3.841466
Togo	29.14217	20.26184	9.569280	9.164546
South Africa	41.12221	25.87211	9.711776	12.51798
Zimbabwe	29.23385	25.87211	7.198064	12.51798
	PRIVCR			
Botswana	36.20655	25.87211	7.119924	12.51798
Cameroon	28.49341	25.87211	9.160228	12.51798
Côte d'Ivoire	45.66697	20.26184	13.69197	9.164546
Ethiopia	18.39314	25.87211	7.325575	12.51798
Gabon	35.26050	25.87211	5.990523	12.51798
Ghana	31.68868	25.87211	9.974062	12.51798
The Gambia	84.47623	18.39771	0.490475	3.841466
Kenya	71.96736	20.26184	5.544523	9.164546
Madagascar	34.68207	25.87211	5.030427	12.51798
Malawi	42.76803	25.87211	8.703441	12.51798
Mauritius	33.00089	18.39771	2.393089	3.841466
Niger	43.14691	25.87211	9.469380	12.51798
Nigeria	42.41382	25.87211	11.31797	12.51798
Senegal	30.58270	20.26184	8.380337	9.164546
Swaziland	27.00438	18.39771	2.110347	3.841466
Togo	28.32960	25.87211	6.724192	12.51798
South Africa	19.94146	18.39771	1.309335	3.841466
Zimbabwe	37.05157	25.87211	12.48753	12.51798

Notes: The critical values differ according to the number of observations and lags included. Eigen value test results (not reported but may be obtained from the author) are in general consistent with those associated with the trace test. In those cases where the results are not consistent we relied on the results of the trace statistic because the latter tends to have a superior power in small samples (see Lüütkepohl et al., 2001). The critical values in cointegration tests are based on the response surface coefficients of MacKinnon-Haug-Michelis (1999).

Table 3. Zivot-Andrews Unit Root Test
t-value (break year)

Country	<i>Income</i>			<i>LIQ</i>			<i>PRIVCR</i>		
	Intercept	Trend	Both	Intercept	Trend	Both	Intercept	Trend	Both
Botswana	-2.24 (1971)	-3.46 (1988)	-3.40 (1987)	-3.36 (1993)	-2.55 (1981)	-3.59 (1994)	-3.36 (1983)	-4.16 (1990)	-4.82 (1991)
Cameroon	-4.36 (1988)	-4.04 (1986)	-4.56 (1983)	-2.73 (1993)	-2.58 (1991)	-2.49 (1991)	-3.94 (1993)	-2.92 (1983)	-2.82 (1987)
Côte d'Ivoire	-2.63 (1983)	-4.10 (1977)	-3.38 (1975)	-2.64 (1974)	-3.11 (1978)	-3.36 (1977)	-2.70 (1993)	-3.32 (1987)	-3.25 (1987)
Ethiopia	-2.51 (1991)	-5.79*** (1986)	-5.46** (1996)	-2.04 (1988)	-2.09 (1993)	-3.69 (1991)	-4.13 (1992)	-4.14 (1979)	-4.29 (1978)
Gabon	-3.10 (1974)	-4.22 (1977)	-4.18 (1974)	-2.98 (1993)	-3.23 (1991)	-3.61 (1987)	-3.71 (1992)	-3.47 (1988)	-4.26 (1987)
Ghana	-2.76 (1979)	-2.79 (1987)	-4.22 (1981)	-3.82 (1977)	-3.05 (1970)	-4.25 (1976)	-3.78 (1986)	-3.11 (1980)	-3.54 (1986)
The Gambia	-3.08 (1975)	-4.12 (1981)	-4.04 (1980)	-2.73 (1979)	-2.56 (1982)	-2.49 (1975)	-4.02 (1987)	-2.97 (1985)	-3.23 (1978)
Kenya	-4.08 (1971)	-3.51 (1978)	-4.77 (1971)	-3.72 (1978)	-3.49 (1979)	-4.01 (1985)	-2.74 (1978)	-4.14 (1983)	-4.83 (1985)
Madagascar	-3.88 (1981)	-2.59 (1970)	-3.08 (1981)	-4.39 (1982)	-2.65 (1991)	-4.64 (1982)	-3.20 (1980)	-3.17 (1986)	-3.58 (1980)
Malawi	-3.82 (1981)	-2.42 (1995)	-2.94 (1971)	-2.65 (1993)	-2.71 (1974)	-2.75 (1987)	-3.47 (1978)	-4.23 (1983)	-4.88 (1978)
Mauritius	-3.63 (1987)	-4.20 (1993)	-4.23 (1993)	-4.20 (1977)	-3.21 (1983)	-4.04 (1977)	-1.35 (1979)	-4.36 (1984)	-4.29 (1981)
Niger	-4.79** (1973)	-4.58** (1995)	-5.04 (1973)	-3.26 (1996)	-4.71** (1994)	-4.38 (1992)	-3.13 (1978)	-3.83 (1987)	-3.54 (1986)
Nigeria	-2.95 (1970)	-2.82 (1975)	-3.65 (1981)	-2.94 (1994)	-3.05 (1985)	-3.41 (1980)	-3.25 (1981)	-2.99 (1985)	-3.88 (1981)
Senegal	-1.39 (1995)	-3.09 (1995)	-3.18 (1994)	-3.45 (1993)	-4.47** (1978)	-3.05 (1993)	-3.86 (1978)	-5.1*** (1982)	-4.70 (1980)
Swaziland	-9.27*** (1988)	-2.37 (1996)	-8.2*** (1988)	-1.47 (1985)	-4.9** (1993)	-4.92 (1992)	-4.23 (1981)	-3.66 (1996)	-4.17 (1981)
Togo	-3.57 (1977)	-4.43 (1979)	-4.38 (1981)	-3.73 (1981)	-4.67** (1987)	-4.08 (1986)	-4.86** (1994)	-3.92 (1994)	-4.24 (1994)
South Africa	-4.66 (1985)	-3.34 (1975)	-3.51 (1973)	-1.58 (1984)	-2.96 (1996)	-3.00 (1993)	-0.59 (1978)	-2.02 (1993)	-1.99 (1992)
Zimbabwe	-4.54 (1970)	-4.43** (1975)	-4.83 (1977)	-4.59 (1994)	-4.79** (1993)	-4.40 (1992)	-3.59 (1995)	-4.29 (1986)	-2.69 (1996)

Critical values for Zivot and Andrews (1992) tests are as follows.

Intercept: -4.80 (5%), -5.43 (1%); trend: -4.42 (5%), -4.93 (1%); both: -5.08% (5%), -5.57% (1%).

** ,*** denote significance at the 5% and 1% levels, respectively.

Table 4. Tests for Cointegration with Structural Breaks (Gregory-Hansen test)

	<i>Income and LIQ</i>			<i>Income and PRIVCR</i>		
	Break Date	GH Test Statistic	Reject Ho of no Cointegration?	Break Date	GH Test Statistic	Reject Ho of no Cointegration?
Botswana	1977	-1.82	NO	1976	-1.01	NO
Cameroon	1984	-3.33	NO	1984	-3.39	NO
Côte d'Ivoire	1981	-1.24	NO	1981	-3.16	NO
Gabon	1978	-2.95	NO	1978	-2.98	NO
Ghana	1978	-1.83	NO	1978	-1.92	NO
The Gambia	1979	-3.89	NO	1979	-3.48	NO
Kenya	1978	-3.86	NO	1978	-3.82	NO
Madagascar	1977	-1.15	NO	1979	-4.29	NO
Malawi	1978	-3.21	NO	1978	-3.06	NO
Mauritius	1988	-4.01	NO	1988	-3.54	NO
Nigeria	1987	-3.01	NO	1987	-3.19	NO
South Africa	1986	-3.06	NO	1986	-3.46	NO

Gregory-Hansen (1996) critical values for Regime Shift are: -5.47 and -4.95 for the 1% and 5% levels, respectively.

Table 5. Granger Causality/Block Exogeneity Wald Tests

DM: Null hypothesis dependent variable is weakly exogenous (Wald statistic, [p value]*)

Dependent variable	<i>fd = LIQ</i>			<i>fd = PRIVC</i>		
	<i>Lags</i>	<i>Y</i>	<i>Fd</i>	<i>Lags</i>	<i>Y</i>	<i>fd</i>
Botswana	2	8.88 [0.01]	0.28 [0.86]	3	15.23 [0.00]	3.00 [0.39]
Cameroon	1	0.41 [0.52]	0.63 [0.42]	1	0.57 [0.44]	0.15 [0.69]
Côte d'Ivoire	2	6.19 [0.04]	2.01 [0.36]	1	9.95 [0.00]	33.02 [0.00]
Ethiopia	2	5.15 [0.07]	3.69 [0.15]	3	16.59[0.00]	12.70[0.00]
Gabon	2	2.09 [0.35]	9.83 [0.00]	2	0.80 [0.67]	5.91 [0.051]
Ghana	1	0.03 [0.86]	0.06 [0.81]	2	2.88 [0.23]	3.78 [0.15]
The Gambia	2	5.48 [0.06]	7.83 [0.02]	1	0.88 [0.34]	0.02 [0.00]
Kenya	5	3.10 [0.68]	9.68 [0.08]	1	0.58 [0.44]	13.11 [0.04]
Madagascar	3	4.98 [0.17]	2.27 [0.51]	2	3.16 [0.20]	17.76 [0.00]
Malawi	1	0.02 [0.86]	0.31 [0.57]	2	3.02 [0.22]	2.81 [0.24]
Mauritius	1	0.84 [0.35]	7.21 [0.00]	6	51.02 [0.00]	10.05 [0.12]
Niger	6	14.08 [0.02]	5.64 [0.46]	1	0.02 [0.89]	4.402 [0.03]
Nigeria	1	3.20 [0.07]	6.16 [0.013]	1	5.13 [0.02]	8.43 [0.00]
Senegal	2	5.78 [0.06]	7.47 [0.02]	2	2.95 [0.22]	10.89 [0.00]
Swaziland	6	2.42 [0.87]	42.56 [0.00]	2	2.72 [0.25]	1.51 [0.46]
Togo	1	0.23 [0.62]	9.05 [0.00]	1	0.04 [0.83]	9.46 [0.00]
South Africa	6	27.32 [0.00]	25.77 [0.00]	2	12.97 [0.00]	10.50 [0.00]
Zimbabwe	6	22.43 [0.00]	77.18 [0.00]	6	29.77 [0.00]	146.1 [0.00]

The lag structure was determined two criteria: the Final Prediction Error (FPE) and Akaike Information Criterion (AIC).

* To make references we use a $p < 0.05$.

Table 6. Financial Development Indicator in 1997

Country	Market structure	Financial Products	Financial liberalization	Monetary policy instruments	Institutional environment	Financial openness	Overall financial development index in 1997
Botswana	92	51	65	71	71	46	66
Cameroon	59	45	39	86	57	46	55
Côte d'Ivoire	71	54	68	43	43	85	61
Ethiopia	41	18	7	29	14	23	22
Gabon	77	5	64	86	100	77	68
<i>Ghana</i>	79	75	45	71	86	85	73
The Gambia	62	20	69	43	71	85	58
Kenya	56	55	77	71	71	100	72
Madagascar	68	52	61	71	57	69	63
Malawi	62	56	43	43	43	46	45
Mauritius	76	69	86	71	100	100	84
Niger	73	35	67	43	57	85	60
Nigeria	82	54	40	57	86	54	62
Senegal	62	42	70	43	71	62	58
<i>Swaziland</i>	63	62	63	86	0	77	58
Togo	70	32	68	29	14	77	48
South Africa	93	100	93	100	100	62	91
Zimbabwe	73	45	57	86	57	62	63
Average	69.94	48.33	60.11	62.72	61.00	68.94	61.84

Indices are on a 0-100 scale. The averages have been recomputed based on the countries included in the present study.

Source: Gelbard. and Leite (1999).

Table 7. Institutional environment and the effects of financial development (*PRIVCR*) on income

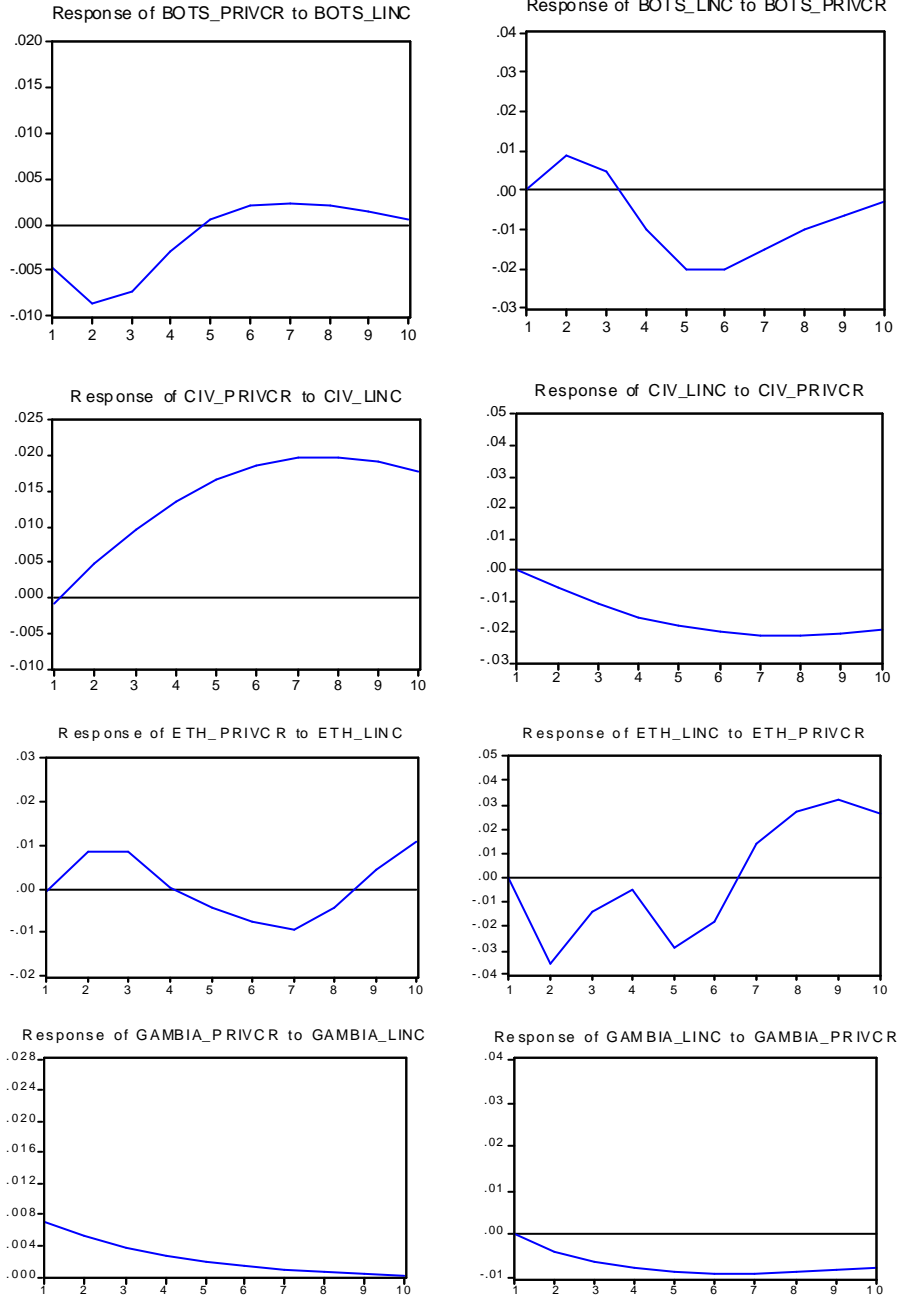
Country	Institutional environment (1997)	Does <i>PRIVCR</i> cause <i>Income</i> ?	Short-run effect	Long-run effect
South Africa	100	YES (bi-directional)	Negative	Negative
Gabon	100	NO	--	--
Mauritius	100	YES	Negative	Positive
Nigeria	86	YES (bi-directional)	Negative	Negative
Ghana	86	NO	--	--
Botswana	71	YES	Positive	Negative
The Gambia	71	NO	--	--
Kenya	71	NO	--	--
Senegal	71	NO	--	--
Cameroon	57	NO	--	--
Madagascar	57	NO	--	--
Niger	57	NO	--	--
Zimbabwe	57	YES (bi-directional)	Positive	Negative (and mixed)
Côte d'Ivoire	43	YES (bi-directional)	Negative	Negative
Malawi	43	NO	--	--
Ethiopia	14	YES (bi-directional)	Negative	Negative (positive after 6 years)
Togo	14	NO	--	--
Swaziland	0	NO	--	--
Average	61			

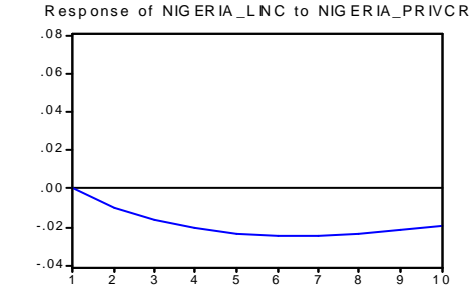
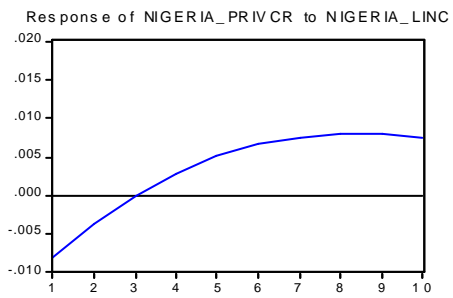
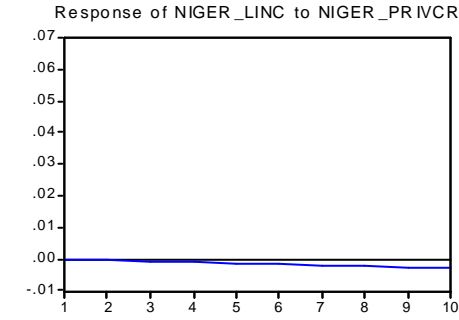
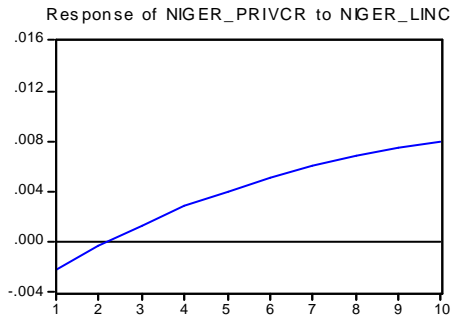
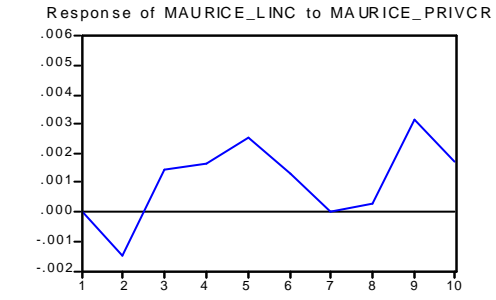
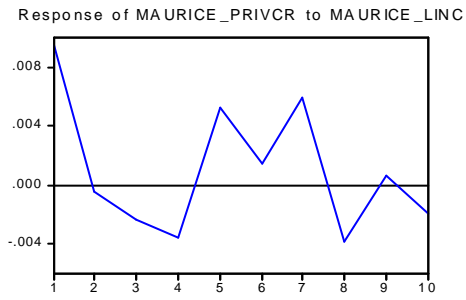
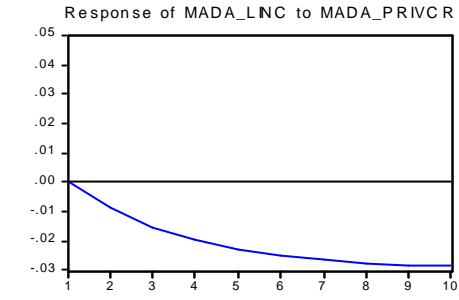
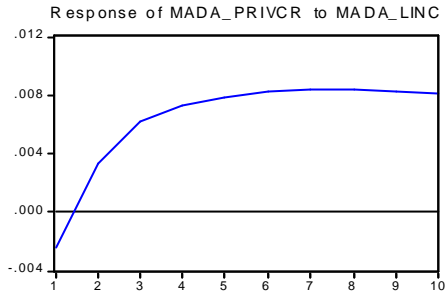
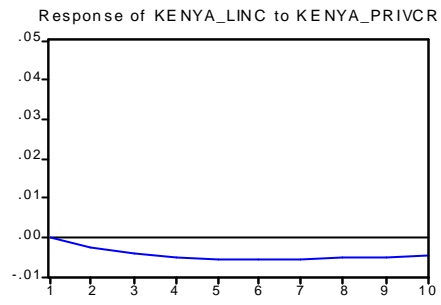
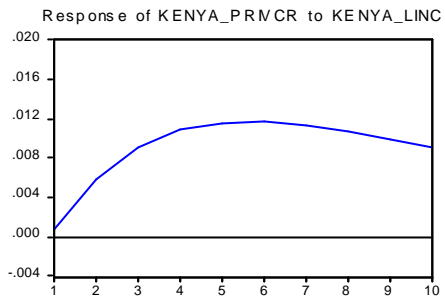
The institutional environment index is a measure of the extent of supporting institutions. It includes indicators of private ownership of land, private ownership of buildings, easiness of debt recovery through the judicial system, adequacy of commercial legislation, the presence of laws governing the use of checks, easiness of transferring ownership of real estate or land, and adequacy of land and property registration (source: Gelbard and Leite, 1999).

Inferences on the short-run and the long-run effects are based on impulse response functions (see Figure 1).

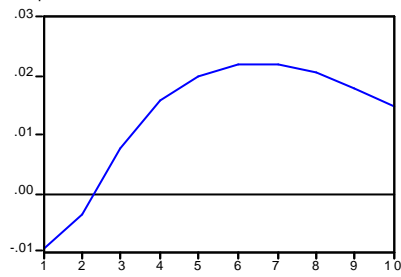
Figure 1. Impulse response functions

Response to Cholesky One S.D. Innovations

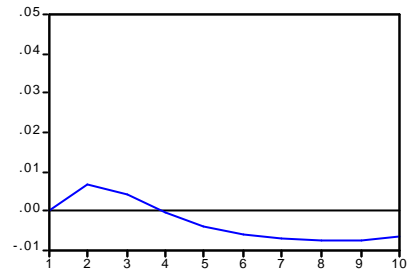




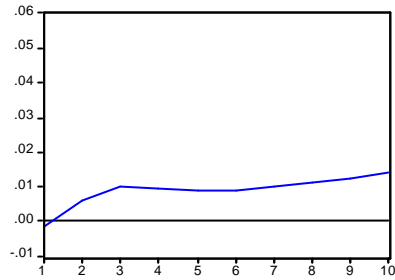
Response of SENEGAL_PRIVCR to SENEGAL_LINC



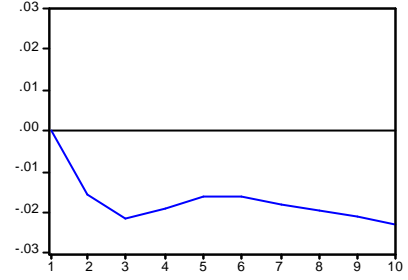
Response of SENEGAL_LINC to SENEGAL_PRIVCR



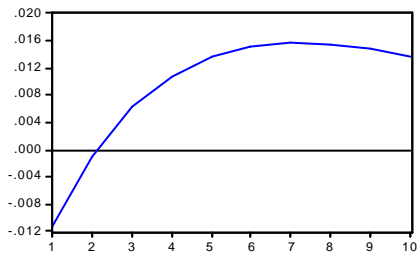
Response of SOUTH_AFRICA_PRIVCR to SOUTH_AFRICA_LINC



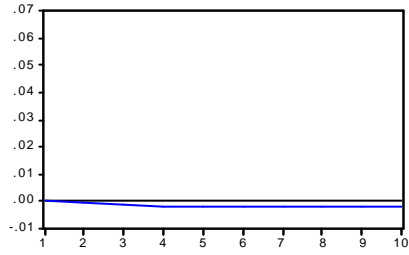
Response of SOUTH_AFRICA_LINC to SOUTH_AFRICA_PRIVCR



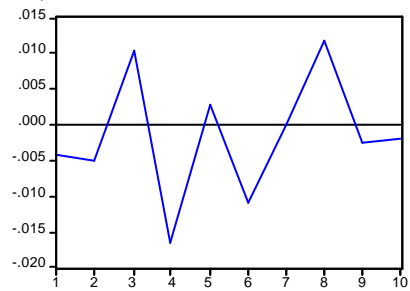
Response of TOGO_PRIVCR to TOGO_LINC



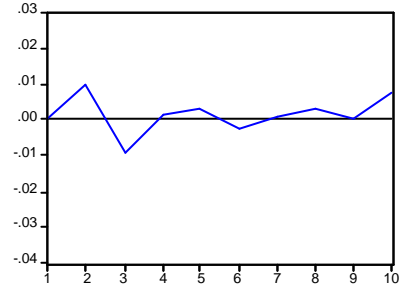
Response of TOGO_LINC to TOGO_PRIVCR



Response of ZIMBABWE_PRIVCR to ZIMBABWE_LINC



Response of ZIMBABWE_LINC to ZIMBABWE_PRIVCR



Endnotes:

¹ See Levine (2005) for a summary of the theoretical and empirical literature on this topic and Ang (2008a) for an excellent survey of recent developments in the literature of growth and finance. Also, see Arestis and Demetriades (1997) for an interesting critical survey of the empirical evidence.

² Using cointegration technique and VEC models, and measures of financial depth (ratio of broad money to nominal GDP) and financial intermediaries effectiveness (the ratio of reserve money to total deposits and the ratio of reserve money to quasi money), Balamoune-Lutz (2003) also finds support for the demand-following proposition in Morocco but finds no support for the supply-leading hypothesis.

³ Ang and McKibbin (2007) combine four measures into a single index of financial development. However, because the indicators we use (LIQ and PRIVCR) measure two different aspects of financial development and the results we obtain indicate the effects of the two are not always consistent, we opted for using them as separate measures.

⁴ The econometric methodology is *succinctly* presented in the paper because it is well known.

⁵ The link between inequality and financial development could also be through the impact that inequality could have on the level of generalized trust in a society and the effect that trust could have on financial development (see Calderón et al. (2002), and Balamoune-Lutz, 2005 and 2009).