

# **Financial Development and Economic Growth in Africa**

## **ABSTRACT**

We revisit in this paper the debate between financial development and economic growth in Africa. While past studies for Africa have used banking related measures, we focus on capital account measures and the depth of stock markets. We examine sixteen African countries and employ both Fixed Effect Models (FEM) and System Generalized Methods of Moments (SGMM). The former indicate very weak results between financial development and typical economic growth controls. Under endogenous stock market capitalization, however, growth controls have the expected results and portfolio flows and Foreign Direct Investment (FDI) have consistently positive and robust effects on economic growth when South Africa is excluded from the sample. In almost all specifications, portfolio flows and FDI is positively associated with economic growth, indicating the importance of the financial openness measure portfolio of stocks and FDI for African economic growth. An important implication of this paper is that policy makers of these African countries should stimulate economic growth by opening their equity markets to international investors and encouraging FDI.

**Keywords:** Economic Growth, Financial Openness, Trade Openness, Africa.

**JEL Classification Numbers:** O16, F65, F10.

## **1. Introduction**

The relationship between financial openness and economic growth has been extensively debated in the economic literature. A number of arguments have been put forth as to why developments in the banking system play an important role for economic growth. Schumpeter (1912), for instance, explains how banks actively stimulate economic growth by identifying profitable investments. Other studies, such as: Levine and Zervos (1998); Levine et al. (2000); and Beck and Levine (2004), provide evidence consistent with the view that financial and stock markets are important engines of economic growth. On the other hand, Krugman (1993) argues that international financial integration is unlikely to be a major engine of economic development. Krugman drew such conclusions after noting that capital is relatively unimportant for economic development and large flows of capital from rich to poor countries have never occurred. Similarly, Lucas (1998) states economists “badly over stress” the role of financial systems, and Robinson (1952) argues that banks respond passively to economic growth.

Several studies have been conducted on economic growth and financial openness in emerging markets. Demirguc-Kunt and Levine (1996), for example, examine 44 industrial and developing countries from 1976 to 1993 and suggest that countries benefit from easy access to well-functioning stock markets where residents and domestic firms can buy, sell, and issue securities. Bekaert and Harvey (2001) also analyse real economic growth and financial openness in emerging markets, and find that average real economic growth increases between 1 per cent and 2 per cent per annum after increasing financial openness. Kyaw and McDonald (2009) find positive effects of FDI flows on economic growth but these are sensitive to the level of income in the 126 developing countries studied. For African economies, in particular, the recent studies by Yartey and Adjasi (2007) and Enisan and Olufisayo (2009) show a positive relationship

between economic growth and financial market development. On the other hand, Singh (1997) investigates the link between stock market development and financial openness in developing countries in the 1980's and 1990's and concludes stock market developments are unlikely to help in achieving quicker industrialization and faster long term growth in most developing countries.<sup>1</sup>

The debate on whether financial development and stock market help growth is ongoing. In the context of Africa, there exists strong need and potential for growth and it becomes important to revisit the topic in order to address the problem of economic underdevelopment. In addition, there are very limited empirical studies on Africa's economic growth and financial market development as defined in this paper. While there are several studies (e.g., Gries et al. (2009), Demetriades and James (2011), Baliaoune-Lutz (2013), and Rousseau and D'Onofrio (2013)) examining the role of banking in African economies, none has approached this issue from the viewpoint of measures not tied to the banking sector, but related to the balance of payments or to the depth of the stock market.<sup>2</sup>

This paper adopts an empirical perspective that takes into account the higher than average annual stock returns of the sixteen African economies (8.23% with standard deviation of 40.71) relative to the world market stock returns measured by Morgan Stanley Capital International-MSCI (1.90% with standard deviation of 19.12) over the 1995-2010 period studied herein. This perspective is grounded on the theoretically stimulating wealth effect channel reviewed by Poterba (2000), who suggests that the rising stock market in the U.S. has surely contributed to

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<sup>1</sup> Singh (1999) states: "For the typical African economy, even if no harm is done to the real economy, a stock market will be at best a costly irrelevance, in the sense that it would only benefit a small number of urban corporations, if any one at all" (p. 361).

<sup>2</sup> The data are discussed in detail in section 3 below. Our measures of financial development come from Lane and Milesi-Ferretti (2007) quantifying the stock of external asset and liabilities per GDP and the stock of portfolio equity assets and FDI per GDP, in addition to the more conventional trade openness (TO) measured by import plus export divided by GDP and the capital account openness (KAOPEN) measure by Chinn and Ito (2008). We also look at the depth of the stock market by calculating stock market capitalization as a percentage of GDP, and interact this with the financial development measures.

rising consumer spending in the 1990s. While Lettau and Ludvigson (2001) examine the role of fluctuations in the aggregate consumption/wealth ratio for predicting quarterly U.S. stock returns, empirical evidence varies considerably across countries, especially when an international component is included, such as the trade balance, as recently demonstrated by Holinski and Vermeulen (2012). In general, the “wealth effect” operates like this: higher than average stock returns lead to higher consumption expenditures and thus to higher output growth. Funke (2004) examines a panel of 16 emerging markets and finds some evidence of a small but statistically significant stock market wealth effect. Over a 3-year period a 10% decline (increase) in stock prices is associated, on average, with a 0.2–0.4% decrease (increase) in private consumption.

While the wealth effect may indeed be weaker in emerging markets, the endogeneity of GDP growth and stock market capitalization can be worthwhile exploring when African stock markets have grown much faster than the world average. When stock market capitalization increases, consumers feel wealthier and spend more on goods and services, thus helping GDP growth. This is what is captured in standard growth equations with real GDP growth rate as the dependent variable. However, the bidirectional route goes from economic growth to higher stock market capitalization: higher income leads to higher consumption by either the Keynesian marginal propensity to consume or to higher savings (national savings is written by  $S = Y - C - G$ ), which pushes up stock markets.

In order to account for this reverse causation channel, we allow in the dynamic panel estimations for stock market capitalization to be endogenous to economic growth. We then estimate the implications of this bidirectional relationship for African stock markets which have been subject to a substantial increase in the degree of globalization (of financial or trade nature)

over the period. Our results indicate important effects through portfolio equity and FDI inflows helping economic growth in Africa over the recent period.

This paper is organized as follows: we present in the next section the literature review; followed by sections on the data and methodology, and results. A concluding remarks section summarizes this study.

## **2. Literature Review**

For cross-country evidence over the world, Barro (1991) investigates the sources of growth rate of real per capita GDP, focusing on 98 countries during the period from 1960 to 1985. His results do not explain the relative weak growth performance of countries in sub-Saharan Africa and Latin America. Mankiw et al. (1992) use annual data for all countries in the world (also from 1960 to 1985), except the centrally planned economies. In general, their results indicate that the Solow model is consistent with the international evidence and acknowledge the importance of human as well as physical capital. Gregorio and Guidotti (1995) find different results based on the group of countries in the sample. When they empirically examine the long-run growth and financial development, they find financial development is positively correlated with growth in a large cross-country sample, but its impact changes across countries and is negative in the Latin American panel. Their findings further strengthen the need for more research, particularly in developing markets including African countries that may operate differently from developed countries.

Recently, Bangake and Eggho (2011) conclude there is strong evidence of a bidirectional long-run causality between financial development and economic growth in 71 developed and developing countries over the period from 1960 to 2004. However, their results indicate a

marked difference based on the country's income level in the short-run. For low and middle income countries, there is no evidence of short-run effect, while in high income countries economic growth significantly affects finance. Choong (2012) also finds a positive link between financial openness (particularly, FDI) and economic growth using a panel of 95 developed and developing countries from 1983 to 2006. However, he also finds that the domestic financial system is a significant prerequisite for the financial openness to have a positive impact on economic growth

Misati and Nyamongo (2012) investigate the impact of financial liberalization on economic growth in Sun-Saharan Africa. Using annual data from 34 countries covering the period 1983-2008, they use two models, namely: growth and banking crisis. Their results from the crisis model are that financial liberalization positively affects banking crisis, implying that financial liberalization could cause volatility in the financial system. The growth model indicates mixed results on the relationship between financial openness and growth depending on the financial liberalization indicator used.

Previous works on African markets include Yartey and Adjasi (2007), who examine the importance and development of stock markets in Africa. Their analysis of unbalanced panel data from 14 African countries using Generalized Method of Moments (GMM) indicates that stock markets have indeed contributed to the financing and growth of large corporations in certain African countries. However, they do not find conclusive empirical evidence on the impact of stock markets on economic growth in these 14 African countries. Other studies on the African stock market, such as Adjasi and Biekpe (2006), document a positive relationship between stock market development and economic growth. Their key results show a positive relationship between stock market development and economic growth. Another positive relationship between

economic development and stock market development appears in N’Zue (2006), who shows unidirectional causality running from stock market development to economic growth, although his results are limited to Cote d’Ivoire. Enisan and Olufisayo (2009) examine the long run and causal relationship between stock market and economic growth for seven countries in sub-Saharan Africa for the period from 1980 to 2004. Their analysis of these countries suggests stock market development has a significant positive long run impact on economic growth. Granger causality tests based on Vector Error Correction Model (VECM), however, suggest bidirectional “Granger Causality” between economic growth and stock market development.

Baliamoune-Lutz (2013) explores the long-run relationship between financial development and income using 18 African countries annual data from 1960 to 2001 and finds mixed results on the link between financial development and income using VAR models. Similarly, Demetriades and James (2011) find no relationship between financial development and economic growth in Sub-Saharan African Countries. Using panel co-integration for 18 Sub-Saharan countries over the period of 1975 – 2006 they find no significance long run link between financial development and growth. Gries et al. (2009) also find similar results using cointegration for sixteen Sub-Saharan African countries. They find no significant long run relationship among finance, growth and openness in the Sub-Saharan African. On the other hand, Rousseau and D’Onofrio (2013) find positive relationships between financial development (measured by M1 and M2 money stocks and by their difference M2-M1) and growth for the majority of their sample of 22 Sub-Saharan African countries over the period from 1960 to 2009 using time series (VECM/VAR) models.

An extensive literature has been written on financial liberalization and economic growth. However, there is no consensus as to how financial liberalization affects economic growth, as

suggested by Stiglitz (2000) or Eichengreen and Leblang (2003), and reviewed by Henry (2007). The argument has two sides. First, Gregorio and Guidotti (1995), Quinn (1997), and Arteta et al. (2001), among others, document that financial openness increases the capital accumulation of the country, which in turn increases economic growth. However, this positive relationship between openness and economic growth may be a conditional one that depends on the strength of country's financial institutions as pointed out by Klein and Olivei (2008). On the other hand, Rodrik (1998) and Prasad et al. (2003), among others, suggest that financial liberalization causes crisis (capital flight) or that it has no significant impact on growth.

The other possible channel could be the reduced cost of capital due to liberalization. Several papers address the relations between the cost of capital and financial liberalization for emerging markets. Among them are Edison and Warnock (2003), Bekaert and Harvey (2003), and Henry (2007), with all concluding that financial liberalization is negatively related with the cost of capital. Due to the reduction in the cost of capital, projects having negative net present value turn into positive net present values, which increase economic growth.

An underlying condition for the economy to grow (along with external factors) is that there is an efficient functioning of stock markets. Levine and Zervos (1998) find stock market liquidity is positively and significantly correlated with current and future rates of economic growth, capital accumulation, and productivity growth. Furthermore, they find that stock market liquidity is a robust predictor of real per capita gross domestic product growth, physical capital growth, and productivity growth. Greenwood and Smith (1997) show that large stock markets can lower the cost of mobilizing savings and thereby facilitate investment in the most productive sector of the economy. Arestis et al. (2001) find that the effects of banks are more powerful, although both banks and stock markets may be able to promote economic growth. They also suggest the



contribution of stock markets on economic growth may have been exaggerated by studies utilizing cross-country growth regressions. Levine and Zervos (1996) find a strong correlation between overall stock market development and long-run economic growth, and suggest that the functioning of equity markets affects liquidity, risk diversification, acquisition of information about firms, corporate control, and savings mobilization. By altering the quality of these services, the functioning of stock markets can alter the rate of economic growth and Senbet (2001) has reported that stock market capitalization is less liquid in Africa. It is also possible that the way domestic stock markets complement financial openness (through interactive terms) matters in an additional role on economic growth.

### **3. The Data and Methodology**

In this paper, the data sources are the *International Financial Statistics* (IFS) of the International Monetary Fund (IMF), the World Bank ([www.worldbank.org](http://www.worldbank.org)), and *DataStream*. Within the data, wide varieties of openness measures exist, starting with the traditional trade openness measures, capital account openness measures by Chinn and Ito (2008), and the measures of international financial openness (IFI and GEQY) by Lane and Milesi-Ferretti (2007). The capital account openness (KAOPEN) measure by Chinn and Ito (2008) is based on the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). International Financial Integration (IFI) measures constitute stock of external asset and liabilities per GDP. GEQY constitutes stock of portfolio equity assets and FDI per GDP. Trade openness (TO) is measured by import plus export divided by GDP for each year and country. Real GDP growth data are collected from the World Bank website. Primary enrolment rate data is collected

from the World Bank, which is defined by the World Bank as: *adjusted net primary enrolment rate*, the total number of pupils of the official primary school age group who are enrolled at primary or secondary education levels, expressed as a percentage of the corresponding population. Adjusted net enrolment rate (ANER) extends the measure to those of the official primary school age range who have reached secondary education because they might access primary education earlier than the official entrance age or skip grades due to their performance. Gross capital formation as a percentage of GDP, which is proxy for investment, is collected from the World Bank is defined as consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Discount rate data collected from IFS and is defined as the rate at which central banks lend or discount eligible paper for deposit money banks<sup>3</sup>. The annual inflation rate is measured by the change in Consumer Price Index (CPI), which is collected from IFS. Real Effective Exchange Rate (REER) is obtained from the World Bank for 9 countries: Cote d'Ivoire, Ghana, Malawi, Morocco, Nigeria, South Africa, Tunisia, Uganda, and Zambia. We complement the missing REER data for the other 7 countries with data from Darvas (2012). The seven countries the REER obtained from Darvas (2012) are: Botswana, Egypt, Kenya, Mauritius, Namibia, Swaziland and Tanzania. REER is defined as the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs. An increase means an appreciation of domestic currency against the basket of currencies. The base year for the REER is 2005 = 100. Economic Freedom Index data is obtained from The Heritage Foundation

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<sup>3</sup> The lending rate in IFS is defined as the bank rate that typically meets the short- and medium-term financing needs of the private sector.

(<http://www.heritage.org>). Data on civil war are obtained from Sarkees and Wayman (2010) “Correlates of War”.<sup>4</sup>

We compiled data for a larger number of African countries but in the end examined only a subset of sixteen countries in order to avoid consistency problems, which ranged from hyperinflation in Zimbabwe, lack of important controls for growth regressions in other countries, and so on. The list of all countries used in the empirical analysis below is as follows: Botswana, Cote d’Ivoire, Egypt, Ghana, Kenya, Malawi, Mauritius, Morocco, Namibia, Nigeria, South Africa, Swaziland, Tanzania, Tunisia, Uganda, and Zambia.

Table 1 presents the descriptive statistics of the data while Table 2 presents the correlations and Figures 1 to 3 present the charts of Real GDP growth, GEQY and stock market capitalization by country, respectively. From the figures, RGDP has been stable in South Africa but not market capitalization, which has substantially increased over time. There are some increases in market cap in Namibia and Morocco too.

The average real GDP growth for the sample countries is 4.5% in the study period with minimum of -6.6% in Morocco in 1995 and maximum 16.7% in Malawi in 1995. The average trade openness is 62.0% of GDP for the sample countries with the minimum of 17.7% in Egypt in 2001 and maximum of 174.6% in Swaziland in 2003. Capital account openness measure KA Openness average is -0.08 with the minimum -1.84 in Botswana in 1996 and maximum of 2.48 in Egypt in 2004. The financial openness measure IFI average is 1.37 with the minimum of .45 in Malawi in 2007 and maximum of 3.21 in Zambia in 2000. The financial openness measure

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<sup>4</sup> Economic freedom index will not be used below due to its high correlation with some other series. In our sample, there was civil war (defined as intra-state conflict with 1,000 or more deaths in a year) in only four countries in some (and not many) years: Cote d’Ivoire, Egypt, Namibia, and Nigeria. This represents one fourth of the countries in our final sample of sixteen countries used in the estimations below. Combined with the small number of years, the frequency of civil war is thus much less than earlier studies which covered the 1960s or 1970s. We conducted two sets of estimations: with the civil war dummy and without. We will report the latter below but the former are available upon request to the authors.

GEQY average is 56.6% in the study period with the minimum of 9.9% in Tanzania in 1995 and maximum of 147.9% in Botswana in 2000. The average standard deviation measure of stock return volatility is .06 with the minimum of .02 in Ghana in 2007 and the maximum of .16 in Nigeria in 2009. The average beta measure of stock return volatility is .35 with the minimum of -1.08 in Ghana in 2004 and the maximum of 2.59 in South Africa in 2006. The average stock market capitalization per GDP is 34% with the minimum of 0.55% in Zambia in 1995 and maximum of 291.3% in South Africa in 2007. The average primary school enrolment is 81.9% with the minimum of 48.7% in Tanzania in 1995 and maximum of 99.8% in Tunisia in 2003. The average investment per GDP (captured by gross capital formation relative to GDP) is 21% with minimum of 8.9% in Cote d'Ivoire in 2007 and maximum of 38.1% in Morocco in 2008. The average discount rate is 13.9% with the minimum of 1.3% in Mauritius in 2004 and maximum of 50.2% in Malawi in 1995. The average inflation is 10% in the sample with the minimum of -0.29% in Uganda in 2002 and maximum of 83.3% in Malawi in 1995.

Generally, the correlations indicate that investment and school enrolment are positively correlated and the discount rate and investment/GDP ratio are also negatively correlated. We will avoid using them in the same model due to the established theoretical links in these two pairs of series: investment is usually higher in more educated places and investment decreases with higher discount rates. Beta and Market cap also show a positive correlation coefficient. We use both series in the same empirical model, however, since they capture concepts which are not theoretically linked (volatility and market size) and we will test for sensitivity excluding Beta from the empirical model later.

//Tables 1 and 2 around here//

The data were collected annually for the period from 1995 to 2010. This period is selected for several reasons. First, most of the African countries started stock markets in the mid- 1990's as reported by Yartey and Adjasi (2007). Second, capital flows increased by 122.5% using Chinn and Ito (2008)'s capital account openness measure from 1995 to 2007. Capital flows also increased by 80.7 % using GEQY Lane and Milesi-Ferretti (2007)'s measure of financial openness for the same time period. In contrast, the very broad IFI measure of financial openness by Lane and Milesi-Ferretti (2007) declined by 9.2% in the same period. On the other hand, trade openness increases for the same time period for these African countries by 17%, a much smaller rate of change which suggests the African economies have expanded relatively more on the financial rather than the traditional trade side over the period. Third, for the sake of comparison to other samples, these African countries' trade and financial openness measures are on average still lower than the average developing countries measures reported, for example, by Esqueda et. al. (2012), indicating there is still untapped potential for more trade and financial openness.

We use dynamic panels developed by the Blundell and Bond (1998) System Generalized Method of Moments (SGMM) methodology<sup>5</sup>. In this setting, and to better capture the reverse causation mechanism between economic growth and market capitalization, we employ the system SGMM model proposed by Blundell and Bond (1998). This will ensure estimations of dynamic panel versions models below while observing the correct identification of our model.

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<sup>5</sup> In order to reduce the number of instruments, we use *xtabond2* stata command introduced by Roodman (2009) with 1 to 2 lags in the collapse procedure. Since, Roodman (2009) argues that the standard SGMM may be vulnerable to instrument proliferation. We employed the most common test to verify the validity of instruments in this GMM setup is Hansen-J's test of over-identifying restrictions.

The model employed for real GDP growth is of the following form:

$$z_{it} = \gamma + \beta z_{it-1} + \delta (\text{Open}_{it}) + \lambda (\text{SMC}_{it}) + \mu (\text{Vol}_{it}) + \sum_{k=1}^n \alpha_k x_{it}^k + \varepsilon_{it} \quad (1),$$

where: real GDP growth ( $z$ ) is the dependent variable,  $\gamma$  is a constant, and  $\varepsilon_{it}$  is an idiosyncratic error term. Equation (1) contains one lag of the dependent variable. Convergence exists if  $\beta$  is larger than zero and smaller than unity. Based on the extensive economic growth literature, such as Gyimah-Brempong et al. (2006),  $x$  is a vector of traditional fundamentals in the growth literature: one empirical model below has the primary enrolment (human capital) and the discount rate (an indicator of the state of monetary policy) as fundamentals; another model has I/GDP as an alternative economic fundamental, since the correlation between the discount rate and I/GDP was found to be -0.388. The other fundamental control variable used is REER, which is an important variable for these export oriented African countries. In both models, *SMC* stands for market capitalization and captures the extent of equity market development. The variables in *Open<sub>it</sub>* contain each of the four openness measures introduced above: IFI, GEQY, KA, and TO (depending on the model), as well as interactive terms between *SMC* and the openness series. As for additional controls, *Vol<sub>it</sub>* is a stock-volatility measure (beta or standard deviation), calculated from Total risk capturing the total volatility of each country's monthly returns.<sup>6</sup> We conduct

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<sup>6</sup> Derived from the single index model, total risk is expressed as  $\sigma^2$  and is calculated as follows: Total Risk = Systematic Risk + Country Specific Risk, or  $\sigma_{it}^2 = \beta_{it}^2 [\sigma_{Mt}^2] + \sigma_{\varepsilon_{it}}^2$ , where:  $\sigma_{it}^2$  represents the total variance,  $\beta_{it}$  is the market (non-diversifiable) risk on country  $i$ ,  $\sigma_{Mt}^2$  is the market variance and  $\sigma_{\varepsilon_{it}}^2$  is the random component of total risk that does not vary systematically with the economy. We use monthly stock market returns in order to calculate the time-varying betas and standard deviation. The window for calculating the betas and unconditional volatility is a 24 months period, as done previously by Fung and Hsieh (2004), Cohen et al. (2005), Petkova and Zhang (2005) and Esqueda et al. (2012).

extensive analysis of the correlation coefficients among the series collected in Tables 2 in order to avoid biases in the estimation caused by multicollinearity problems.<sup>7</sup>

In order to address endogeneity between the GDP growth and stock market capitalization, we use stock market capitalization as GMM style along with the lagged real GDP growth and all other independent variables are used as IV style in our model. The endogeneity of GDP growth and stock market capitalization could be explained by the simultaneity of both stock market capitalization and GDP growth. When stock market capitalization increases, due to wealth effect, consumption could also increase, implying a higher GDP growth. This is what is captured in (1). The reverse channel is also possible, however: as economic growth increases, a higher level of investment in the stock market is required to finance new businesses, which in turn leads to an increase in stock market capitalization. In order to account for this channel, we allow stock market capitalization to be endogenous to economic growth. In addition to theory, papers on African economies by Adjasi and Biekpe (2006) and Enisan and Olufisayo (2009) have identified a positive or sometimes bidirectional relationship between GDP growth and stock market capitalization.

As a preliminary analysis, fixed effect models will be estimated under a modified version of equation (1) with a constant term varying across countries. In contrast to random effect models, the fixed effect model considers the constant varying by country to be correlated with the regressors in (1).

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<sup>7</sup> Economic freedom index, for example, is positively correlated with several variables of the real economy, since higher scores of the index indicate conduciveness of the environment for business which in turn stimulate economic growth. The discount rate was also highly correlated with the standard deviation measure of volatility. Other examples include: the discount rate positively correlated with the inflation rate (0.67), as well as the correlation between openness measures GEQY and IFI (0.500). In case high correlation coefficients were found, we drop one of the variables from the estimations.

#### **4. Results and Discussion**

The fixed effect models (FEM) are estimated as a first pass for the economic growth models in (1). The results are presented in Tables 3 and 4 for the fixed effect models for all countries with the volatility measure of beta as one of the independent variables. Generally, stock market capitalization has a positive and statistically significant coefficient in about half of the specifications, indicating a positive relationship between economic growth and stock market capitalization. Primary enrolment, the proxy for human capital, is positively related with economic growth as expected and is strongly statistically significant in Table 3 models. Investment is also positively correlated with economic growth and is statistically significant in half of the specification (1) of Table 4. Discount rate is not included in Table 4 because of its negative and significant correlation with investment (correlation coefficient of -0.388 in Table 2). However, the discount rate has the expected negative sign and is significant only in column (1) of Table 3.

The fixed effect model shows very weak support for our working hypothesis with only a positive and significant coefficient of market cap interacted with capital account openness [column (9) of Tables 3 and 4]. When South Africa is excluded from the sample, Table 4 show the statistically significant financial openness measure GEQY. Including all sample countries the results don't show any significance, and tables including South Africa available upon request from the authors. Overall, there is a very weak positive relationship between economic growth and financial and trade openness under FEM. However, there is a positive and significant relationship between economic growth and stock market capitalization similar to some recent findings by Cheng et al (2012), and also those already reviewed above by Adjasi and Biekpe (2006) and Enisan and Olufisayo (2009) for African economies.



The fixed effect models results also indicate capital account openness is negatively associated with economic growth for the sample countries. This result is contrary to expectations. As countries open their capital accounts, it should have a positive impact on economic growth as in Klein and Olivei (2008), among others. However, the capital account openness variable is based on the binary dummy. When Henry (2007) explains why financial liberalizations impact is small or none, he attributes one of the probable cause to be the binary nature the data. Henry (2007) puts forward three problems that could potentially explain the relatively small valuation effects. First, stock price effects at the date of liberalization may be small if liberalization were expected. Second, investors may perceive that the liberalization will be reversed (Malaysia in 1997 has actually reversed). Third, countries seldom move from having a completely closed stock market to one that is fully open. Most countries undergo several stock market liberalizations subsequent to the first. Therefore, the result of capital account being away from our expectations could be due to the binary nature of the variable.

//Tables 3 and 4 around here//

This paper attempts to fill the gap in the literature by controlling for the endogeneity between economic growth and stock market capitalization, which has been documented - in one way or another - by some of the papers reviewed on Africa. SGMM models results are therefore presented in Tables 5 and 6 when beta is used as a measure of stock market volatility. Other specifications with standard deviation of stock returns used as a volatility measure have also been estimated and are available upon request. As before, primary enrolment is used in Table 5 and investment/GDP ratio is used in Tables 6. The model specifications of all the system GMM models are good: there is no second order auto correlation (none of the m2 are significant) and the tests of over-identifying restrictions are valid (i.e., Hansen-J do not reject the null).

Overall, results for Tables 5 and 6 indicate the financial openness measure GEQY is consistently positive and significantly associated with economic growth when South Africa is excluded from the sample. That indicates strong support for our hypothesis of a positive relationship between financial development and economic growth. Since South Africa is different in its development from the rest of Africa, Allen et al. (2011), no surprise the effect of financial openness in economic growth on rest of African countries. The financial openness channel affecting growth in Africa is through portfolio equity and FDI stocks (i.e., GEQY), as can be confirmed in columns (3, 7 and 11) of Tables 5 and 6. The GEQY coefficient is significant at the 5% level in Table 5 and at the 10% level in Table 6. This finding strengthens the suggestion that foreign direct investment is the most stable form of foreign capital as pointed out by Chari et al. (2012). Furthermore, there is some evidence that traditional trade openness is positively and significantly associated with economic growth (see column (8) of Tables 5 and 6). Marginal IFI is also statistically significant when interacted with traditional trade openness (see column (10) of Tables 5 and 6). The positive marginal effects suggest that - in addition to the direct effects of GEQY – International Financial Integration complements trade openness in helping economic growth.

//Tables 5 and 6 around here//

Stock market capitalization show positive and significant association with economic growth in SGMM models in Table 5 (in half of the models) similar to the previous findings along the lines of positive relationships between stock markets and growth are provided by Adjasi and Biekpe (2006) using dynamic panel models, Enisan and Olufisayo (2009) using Auto Regressive Distributed Lag (ARDL), and N’Zue (2006) using cointegration for Cote d’Ivoire. However, Table 6 do not show such significance of market capitalization, when investment is in the model

(which is highly significant). This suggests, for Table 5 with human capital and the discount rate as growth fundamentals, that portfolio and equity flows are complemented by other types of financial measures for the samples with all countries.<sup>8</sup> Another way to look at this set of findings is that institutions matter. Hermes and Lensink (2003) suggest that the development of financial system is an important precondition for positive relations between foreign capital (FDI) and economic growth. The financial system therefore plays an enhancing role in this link. As Henry (2007) put it, many factors may influence the general level of efficiency of a country. Weak institutions and inappropriate government regulation, for instance, can distort economic decision making and reduce productivity.

The SGMM findings on economic growth and volatility (beta) show no statistically significant coefficients in Tables 5 and 6, thus supporting no relationship between volatility and growth. When assessing the direct impact of other measures, Kose et al. (2006) report that trade and financial integration weaken the relationship between growth and volatility, measured as the standard deviation of output growth. The inverse relation between stock volatility and economic growth has been documented by Schwert (1989), Campbell et al. (2001) and Guo (2002) for U.S. stock markets. Adopting the perspective of stock market fluctuations, our results suggest there is no such negative volatility relationship in Africa, although Museru et al. (2014) report negative effects of volatility measures (based on aid, revenue, and public investment) on African GDP per capita growth from 1992 to 2011.

From the control variables, human capital is positively associated with economic growth and this result in system GMM is weaker in magnitude and significance than the fixed effect models. The human capital coefficient is about 0.10 in this study, which is very similar to the findings of

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<sup>8</sup> On a technical note, given that SGMM addresses endogeneity of stock market capitalization with economic growth and reduces biases and standard errors [Bun and Kiviet (2006) and Judson and Owen (1999)], the SGMM model results indicate new evidence for our sample of African countries for the period 1995-2010.

Gyimah-Brempong et al. (2006), who report the coefficient to be 0.081. The investment/GDP ratio has the expected positive signs in most cases and its coefficient in Table 6 is close to the sample mean of about 21% reported in Table 1. Another control variable, the discount rate, is found to be not significantly related with economic growth in the estimates of Table 5 and the relationship is weaker than that reported in the fixed effect models. We test the sensitivity of the result excluding beta from the model but the results are sensitive to the exclusion of the beta so we left it in the model.

We also run the models including South Africa. The tables are not presented in order to save space but are available upon request from the authors. As pointed out by Allen et al. (2010), South Africa's economic development level is higher than other African countries and we expect the results to be different. The results are indeed different. Overall, we find that without South Africa, the direct measures of financial openness (GEQY) are significant and stronger. While including South Africa financial openness (GEQY) is not statistically significant. It may be that the level of sophistication of financial markets in South Africa is fundamentally higher than the others, thus helping a more clear-cut link between openness and growth for the sample in which South Africa is excluded.

## **5. Concluding Remarks**

We investigate economic growth and financial and trade openness using fixed effects and SGMM models. Our major working hypothesis finds support for flows of portfolio capital and FDI having a positive effect on real GDP growth for the sixteen African economies studied from 1995 to 2010 when South Africa is excluded from the sample. These economies have grown, on

average, 4.5% a year over the period, which is significantly higher than other countries.<sup>9</sup> In general, typical growth controls (such as education and investment share) have the expected sign, particularly in dynamic panels, but openness measures other than GEQY (trade openness, KA openness, and a global index of assets and liabilities) are found to be less important in Africa. Previous works by Gries et al. (2009), Demetriades and James (2011), and Balamoune-Lutz (2013) have found modest, if any, effects of financial development (measured by banking-related measures) in Sub-Saharan African countries, while some more positive findings have been documented (under many stock measures) by Rousseau and D'Onofrio (2013) for the majority of Sub-Saharan African countries over the period from 1960 to 2009 using time series techniques. The fixed effect model results indicate in almost all cases that there is a positive and significant relationship between economic growth and stock market capitalization. However, no particular variable shows consistent results and there is no empirical relationship between growth factors and economic growth in the fixed effect models. SGMM results, on the other hand, indicate the financial openness measure GEQY is consistently positive and significantly associated with economic growth when South Africa is excluded from the sample. There is thus a strong support for our main hypothesis. The financial openness channel affecting growth is found to be portfolio equity and FDI stocks (GEQY). This finding can be contrasted to those also estimated under dynamic panels by Kyaw and McDonald (2009), who find the positive effects of FDI flows on economic growth are sensitive to the level of income in the 126 developing countries studied. They conjecture that the failure to identify a relationship in lower income countries might be due to the possibility that the positive effect of FDI depends on absorptive capacity. In our case, we

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<sup>9</sup> Kose et al. (2006) report, for example, an average median real GDP growth of 2.80% for industrial countries for the 1961-2000 years, versus 1.57% for developing countries. Within the latter group of countries, more financially integrated economies have grown on average 2.61% per year and less financially integrated at 1.23%. For the 1990s alone, their real growth numbers are 1.88% for industrial countries and 1.39% for developing countries.

have a relatively more homogenous sample of African economies and the effects of portfolio flows on economic growth are sensitive to the presence of South Africa in the sample. Since our sample of countries has several lower income countries, the results in this paper strengthen the suggestion that foreign direct investment is the most stable form of foreign capital as pointed out by Chari et al. (2012) for a wide sample of markets all over the world. Stock market capitalization shows direct association with economic growth in our dynamic panels for the period of 1995 to 2010 when the human capital is in the model. This finding is contrast to Naceur and Ghazouani (2007) with results for eleven Middle East and North Africa (MENA) using dynamic panel models.

Yet, we do find that International Financial Integration complements trade openness in helping economic growth for the models with primary enrolment and investment. The latter finding for economic growth in Africa can be interpreted through the role of institutions, as proposed by Hermes and Lensink (2003) for FDI and economic growth. More generally, as Henry (2007) has reviewed, many factors may influence the general level of efficiency of a country. Weak institutions and inappropriate government regulation can distort economic decision making and reduce productivity. An implication of this paper is that policy makers in Africa should open their equity markets to international investors and encourage FDI. This complements anecdotal evidence or recent research, such as by Whalley and Weisbrod (2012), who have reported that some portion of the elevated growth in Sub-Saharan Africa in the three years before the financial crisis and also in the two years afterwards (2008-2009) can be attributed to Chinese inward investment. Since some of these flows tend to revert quickly, an area for future research is the link between volatility of capital inflows and economic growth.

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**Table 1. Descriptive statistics**

|   | N   | Mean   | St. Dev. | Min.  | Max.   |
|---|-----|--------|----------|-------|--------|
| Real GDP growth                                       | 256 | 4.53   | 2.89     | -6.58 | 16.73  |
| Trade Openness  | 208 | 61.95  | 28.81    | 17.69 | 174.61 |
| KA Openness   | 240 | -.08   | 1.47     | -1.84 | 2.48   |
| IFI   | 208 | 1.37   | .52      | .45   | 3.21   |
| GEQY  | 208 | 56.55  | 32.25    | 9.86  | 147.93 |
| Stock return volatility (SD)                          | 170 | .06    | .03      | .02   | .16    |
| Stock return volatility (Beta)                        | 164 | .35    | .53      | -1.08 | 2.59   |
| Stock market capitalization<br>as a percentage of GDP | 226 | 34.04  | 50.32    | 0.55  | 291.28 |
| Primary Enrolment Rate                                | 177 | 81.91  | 13.96    | 48.67 | 99.79  |
| Gross Capital Formation/GDP<br>(GCFPERGDP)            | 240 | 20.98  | 5.31     | 8.69  | 38.12  |
| Discount rate   | 252 | 13.88  | 9.80     | 1.33  | 50.23  |
| Inflation   | 248 | 10.04  | 10.50    | -0.29 | 83.33  |
| REER  | 256 | 105.06 | 19.61    | 63.37 | 177.23 |

Note: Annual data from 1995 – 2010 for sixteen African countries. Zimbabwe is excluded from the sample due to the country's extremely high inflation. Real GDP growth data are collected from the World Bank website. Trade openness is measured by import plus export divided by GDP for each year and country. KA Openness data obtained from Chinn and Ito (2008) is a measure of the degree of a country's capital account openness. IFI and GEQY are from Lane and Milesi-Ferretti's IMF website. Stock return volatilities are time varying calculated from monthly indices of the corresponding countries using a 24-month period window as explained in the data section. Stock market capitalization as a percentage of GDP is the product of total number of stocks outstanding multiplied by current stock price divided by GDP. Primary enrolment rate is proxy for the human capital, and is the total number of pupils of the official primary school age group who are enrolled at primary or secondary education levels, expressed as a percentage of the corresponding population. Gross capital formation as a percentage of GDP, which is proxy for investment, is collected from the World Bank. Gross capital formation consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Gross capital formation data is not available for Nigeria. Discount rate data collected from IFS and is defined as the rate at which central banks lend or discount eligible paper for deposit money banks. The annual inflation rate is measured by the change in Consumer Price Index (CPI), which is collected from IFS.

Table 2. Correlations

| Probability    | R_GDP_GR          | XM_OPEN           | KA OPEN           | IFI               | GEQY              | SD                | Beta              | Market Cap        | Prim Enrollment   | Investment GDP    | Discount Rate    | Inflation        |
|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------|------------------|
| R_GDP_GR       | 1.000             |                   |                   |                   |                   |                   |                   |                   |                   |                   |                  |                  |
| XM_OPEN        | -0.106<br>(0.127) | 1.000             |                   |                   |                   |                   |                   |                   |                   |                   |                  |                  |
| KA OPEN        | 0.110<br>(0.090)  | -0.219<br>(0.002) | 1.000             |                   |                   |                   |                   |                   |                   |                   |                  |                  |
| IFI            | -0.173<br>(0.013) | 0.279<br>(0.000)  | -0.092<br>(0.187) | 1.000             |                   |                   |                   |                   |                   |                   |                  |                  |
| GEQY           | 0.084<br>(0.228)  | 0.316<br>(0.000)  | 0.039<br>(0.576)  | 0.500<br>(0.000)  | 1.000             |                   |                   |                   |                   |                   |                  |                  |
| SD             | 0.051<br>(0.509)  | -0.384<br>(0.000) | 0.219<br>(0.006)  | 0.074<br>(0.400)  | 0.183<br>(0.035)  | 1.000             |                   |                   |                   |                   |                  |                  |
| Beta           | -0.018<br>(0.822) | -0.166<br>(0.061) | 0.001<br>(0.991)  | -0.022<br>(0.804) | 0.356<br>(0.000)  | 0.415<br>(0.000)  | 1.000             |                   |                   |                   |                  |                  |
| Market Cap.    | -0.079<br>(0.234) | -0.179<br>(0.014) | -0.057<br>(0.409) | -0.161<br>(0.028) | 0.259<br>(0.000)  | 0.237<br>(0.002)  | 0.598<br>(0.000)  | 1.000             |                   |                   |                  |                  |
| PrimEnrollment | 0.173<br>(0.021)  | 0.062<br>(0.443)  | 0.197<br>(0.009)  | -0.144<br>(0.075) | 0.386<br>(0.000)  | 0.151<br>(0.083)  | 0.424<br>(0.000)  | 0.323<br>(0.000)  | 1.000             |                   |                  |                  |
| Investment/GDP | 0.283<br>(0.000)  | 0.139<br>(0.052)  | 0.121<br>(0.071)  | -0.165<br>(0.021) | 0.372<br>(0.000)  | -0.152<br>(0.059) | -0.095<br>(0.250) | -0.015<br>(0.828) | 0.405<br>(0.000)  | 1.000             |                  |                  |
| Discount Rate  | -0.007<br>(0.917) | -0.166<br>(0.018) | 0.007<br>(0.912)  | 0.267<br>(0.000)  | -0.247<br>(0.000) | 0.023<br>(0.769)  | -0.140<br>(0.076) | -0.175<br>(0.009) | -0.294<br>(0.000) | -0.388<br>(0.001) | 1.000            |                  |
| Inflation      | 0.077<br>(0.226)  | -0.012<br>(0.872) | -0.011<br>(0.869) | 0.366<br>(0.000)  | -0.099<br>(0.165) | 0.172<br>(0.025)  | -0.092<br>(0.241) | -0.142<br>(0.035) | -0.234<br>(0.002) | -0.128<br>(0.052) | 0.670<br>(0.000) | 1.000            |
| REER           | 0.112<br>(0.073)  | -0.331<br>(0.000) | 0.048<br>(0.459)  | -0.347<br>(0.000) | -0.327<br>(0.000) | 0.144<br>(0.062)  | -0.025<br>(0.753) | -0.056<br>(0.400) | 0.063<br>(0.403)  | 0.073<br>(0.260)  | 0.089<br>(0.159) | 0.026<br>(0.687) |

Note: P-value in parentheses.

Table 3. Fixed Effect Model: real GDP growth dependent variable primary enrollment model: Excluding South Africa

|                        | (1)                | (2)                 | (3)                 | (4)                | (5)                 | (6)                 | (7)                  | (8)                | (9)                 | (10)                | (11)               |
|------------------------|--------------------|---------------------|---------------------|--------------------|---------------------|---------------------|----------------------|--------------------|---------------------|---------------------|--------------------|
| Real GDP growth (lag)  | 0.002<br>(0.196)   | -0.203<br>(0.198)   | -0.208<br>(0.195)   | -0.205<br>(0.201)  | -0.177<br>(0.165)   | -0.207<br>(0.197)   | -0.224<br>(0.183)    | -0.216<br>(0.200)  | -0.180<br>(0.168)   | -0.201<br>(0.204)   | -0.204<br>(0.207)  |
| Primary Enroll.        | 0.059**<br>(0.023) | 0.118***<br>(0.027) | 0.105***<br>(0.033) | 0.103**<br>(0.040) | 0.092***<br>(0.022) | 0.116***<br>(0.027) | 0.104***<br>(0.032)  | 0.102**<br>(0.040) | 0.094***<br>(0.024) | 0.112***<br>(0.034) | 0.104**<br>(0.045) |
| REER                   | 0.005<br>(0.007)   | 0.029*<br>(0.016)   | 0.026*<br>(0.013)   | 0.023<br>(0.015)   | 0.019<br>(0.012)    | 0.024<br>(0.015)    | 0.030*<br>(0.014)    | 0.028<br>(0.016)   | 0.024<br>(0.014)    | 0.029<br>(0.018)    | 0.027*<br>(0.014)  |
| Discount Rate          | -0.082*<br>(0.042) | -0.068<br>(0.088)   | -0.045<br>(0.058)   | -0.051<br>(0.064)  | -0.052<br>(0.057)   | -0.072<br>(0.089)   | -0.033<br>(0.051)    | -0.045<br>(0.065)  | -0.045<br>(0.059)   | -0.065<br>(0.074)   | -0.054<br>(0.074)  |
| Market Cap.            |                    | 0.025<br>(0.016)    | 0.024<br>(0.018)    | 0.024<br>(0.016)   | 0.036**<br>(0.015)  | 0.079<br>(0.059)    | 0.108***<br>(0.020)  | 0.070**<br>(0.031) | 0.028**<br>(0.010)  | 0.023<br>(0.015)    | 0.023<br>(0.018)   |
| Beta                   |                    | -0.409<br>(0.309)   | -0.460<br>(0.409)   | -0.411<br>(0.303)  | -0.124<br>(0.355)   | -0.277<br>(0.379)   | 0.033<br>(0.399)     | -0.324<br>(0.347)  | 0.005<br>(0.404)    | -0.468<br>(0.373)   | -0.482<br>(0.446)  |
| IFI                    |                    | 0.619<br>(1.413)    |                     |                    |                     | 1.023<br>(1.603)    |                      |                    |                     | 0.501<br>(1.289)    |                    |
| GEQY                   |                    |                     | 0.012<br>(0.033)    |                    |                     |                     | 0.036<br>(0.039)     |                    |                     |                     | 0.009<br>(0.038)   |
| XM Openness            |                    |                     |                     | 0.014<br>(0.033)   |                     |                     |                      | 0.028<br>(0.034)   |                     | 0.009<br>(0.037)    | 0.007<br>(0.033)   |
| KA Openness            |                    |                     |                     |                    | -1.663**<br>(0.731) |                     |                      |                    | -2.403**<br>(0.988) |                     |                    |
| Market Cap*IFI         |                    |                     |                     |                    |                     | -0.045<br>(0.047)   |                      |                    |                     |                     |                    |
| Market Cap.*GEQY       |                    |                     |                     |                    |                     |                     | -0.001***<br>(0.000) |                    |                     |                     |                    |
| Market Cap.*XM Open    |                    |                     |                     |                    |                     |                     |                      | -0.001<br>(0.001)  |                     |                     |                    |
| Market Cap.*KA Open    |                    |                     |                     |                    |                     |                     |                      |                    | 0.012*<br>(0.006)   |                     |                    |
| IFI*XM Openness        |                    |                     |                     |                    |                     |                     |                      |                    |                     | 0.518<br>(3.180)    |                    |
| GEQY*XM Openness       |                    |                     |                     |                    |                     |                     |                      |                    |                     |                     | 0.278<br>(2.034)   |
| <i>R Square within</i> | 0.093              | 0.202               | 0.203               | 0.201              | 0.184               | 0.207               | 0.236                | 0.211              | 0.198               | 0.204               | 0.204              |
| <i>N</i>               | 154                | 98                  | 98                  | 98                 | 112                 | 98                  | 98                   | 98                 | 112                 | 98                  | 98                 |

Notes: The dependent variable is real GDP growth. Annual data from 1995 – 2010. IFI, GEQY, XM Openness, KA Openness are measures of financial, trade, and capital account openness. Beta is country level measure of stock market volatility. REER is real effective exchange rate. **Robust standard errors** are in parenthesis below the coefficients. \* p<.10, \*\* p<.05, \*\*\* p<.01. In all specifications stock market capitalization is in natural log.

Table 4. Fixed Effect Model: real GDP growth dependent variable investment model: Excluding South Africa

|                        | (1)                 | (2)               | (3)               | (4)               | (5)               | (6)               | (7)                 | (8)                | (9)                | (10)              | (11)               |
|------------------------|---------------------|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------|--------------------|--------------------|-------------------|--------------------|
| Real GDP growth (lag)  | 0.041<br>(0.170)    | -0.353<br>(0.209) | -0.349<br>(0.210) | -0.337<br>(0.219) | -0.233<br>(0.220) | -0.358<br>(0.205) | -0.385*<br>(0.188)  | -0.355<br>(0.212)  | -0.236<br>(0.218)  | -0.354<br>(0.221) | -0.390<br>(0.216)  |
| Investment/GDP         | 0.174***<br>(0.054) | 0.206*<br>(0.098) | 0.192*<br>(0.101) | 0.177<br>(0.103)  | 0.082<br>(0.119)  | 0.207*<br>(0.096) | 0.192**<br>(0.077)  | 0.197*<br>(0.101)  | 0.136<br>(0.131)   | 0.155<br>(0.103)  | 0.130<br>(0.107)   |
| REER                   | -0.003<br>(0.009)   | 0.009<br>(0.017)  | 0.029*<br>(0.016) | 0.028<br>(0.018)  | 0.011<br>(0.014)  | 0.004<br>(0.015)  | 0.029**<br>(0.013)  | 0.034*<br>(0.017)  | 0.018<br>(0.012)   | 0.013<br>(0.019)  | 0.021<br>(0.015)   |
| Market Cap.            |                     | 0.032<br>(0.023)  | 0.028<br>(0.023)  | 0.026<br>(0.018)  | 0.039<br>(0.023)  | 0.093<br>(0.114)  | 0.133***<br>(0.036) | 0.092**<br>(0.032) | 0.018<br>(0.028)   | 0.027<br>(0.019)  | 0.017<br>(0.021)   |
| Beta                   |                     | -0.217<br>(0.429) | -0.316<br>(0.397) | -0.333<br>(0.371) | 0.615<br>(0.494)  | -0.124<br>(0.468) | 0.410<br>(0.543)    | -0.272<br>(0.421)  | 0.909<br>(0.673)   | -0.479<br>(0.332) | -0.686*<br>(0.359) |
| IFI                    |                     | -1.348<br>(0.937) |                   |                   |                   | -0.875<br>(1.154) |                     |                    |                    | -1.459<br>(0.949) |                    |
| GEQY                   |                     |                   | 0.023<br>(0.018)  |                   |                   |                   | 0.058**<br>(0.024)  |                    |                    |                   | 0.041*<br>(0.023)  |
| XM Openness            |                     |                   |                   | 0.050<br>(0.040)  |                   |                   |                     | 0.071*<br>(0.039)  |                    | 0.022<br>(0.066)  | 0.079*<br>(0.042)  |
| KA Openness            |                     |                   |                   |                   | -2.102<br>(1.246) |                   |                     |                    | -3.421*<br>(1.696) |                   |                    |
| Market Cap*IFI         |                     |                   |                   |                   |                   | -0.049<br>(0.083) |                     |                    |                    |                   |                    |
| Market Cap.*GEQY       |                     |                   |                   |                   |                   |                   | -0.002**<br>(0.001) |                    |                    |                   |                    |
| Market Cap.*XM Open    |                     |                   |                   |                   |                   |                   |                     | -0.001*<br>(0.001) |                    |                   |                    |
| Market Cap.*KA Open    |                     |                   |                   |                   |                   |                   |                     |                    | 0.024*<br>(0.012)  |                   |                    |
| IFI*XM Openness        |                     |                   |                   |                   |                   |                   |                     |                    |                    | 2.110<br>(3.142)  |                    |
| GEQY*XM Openness       |                     |                   |                   |                   |                   |                   |                     |                    |                    |                   | -2.889*<br>(1.378) |
| <i>R Square within</i> | 0.064               | 0.237             | 0.224             | 0.233             | 0.126             | 0.245             | 0.291               | 0.257              | 0.167              | 0.257             | 0.284              |
| <i>N</i>               | 210                 | 103               | 103               | 103               | 121               | 103               | 103                 | 103                | 121                | 103               | 103                |

Notes: The dependent variable is real GDP growth. Annual data from 1995 – 2010. IFI, GEQY, XM Openness, KA Openness are measures of financial, trade, and capital account openness. Beta is country level measure of stock market volatility. REER is real effective exchange rate. **Robust standard errors** are in parenthesis below the coefficients. \* p<.10, \*\* p<.05, \*\*\* p<.01. In all specifications stock market capitalization is in natural log form.

Table 5. System GMM Model: real GDP growth dependent variable: Primary enrollment Excluding South Africa

|                       | (1)                | (2)                 | (3)                 | (4)                 | (5)                  | (6)                | (7)                 | (8)                  | (9)                  | (10)                | (11)                 |
|-----------------------|--------------------|---------------------|---------------------|---------------------|----------------------|--------------------|---------------------|----------------------|----------------------|---------------------|----------------------|
| Real GDP growth (lag) | -0.784<br>(0.507)  | -0.713**<br>(0.311) | -0.791**<br>(0.386) | -0.715**<br>(0.313) | -0.651**<br>(0.258)  | -0.412*<br>(0.238) | -0.508**<br>(0.232) | -0.562***<br>(0.207) | -0.648**<br>(0.260)  | -0.787**<br>(0.347) | -0.770**<br>(0.348)  |
| Primary Enroll.       | 0.067**<br>(0.031) | 0.101*<br>(0.059)   | 0.057<br>(0.059)    | 0.093<br>(0.064)    | 0.132**<br>(0.059)   | 0.089<br>(0.058)   | 0.009<br>(0.050)    | 0.051<br>(0.074)     | 0.131**<br>(0.060)   | 0.048<br>(0.045)    | 0.032<br>(0.044)     |
| REER                  | 0.030*<br>(0.016)  | 0.027<br>(0.030)    | 0.061**<br>(0.028)  | 0.039*<br>(0.022)   | 0.042*<br>(0.023)    | 0.013<br>(0.027)   | 0.058**<br>(0.027)  | 0.056**<br>(0.024)   | 0.042*<br>(0.023)    | 0.027<br>(0.023)    | 0.043***<br>(0.016)  |
| Discount Rate         | 0.028<br>(0.055)   | 0.170<br>(0.113)    | 0.125<br>(0.116)    | 0.156<br>(0.104)    | 0.238**<br>(0.098)   | 0.132<br>(0.099)   | 0.106<br>(0.112)    | 0.113<br>(0.125)     | 0.238**<br>(0.099)   | 0.198**<br>(0.093)  | 0.202**<br>(0.090)   |
| Market Cap.           |                    | 0.047**<br>(0.023)  | 0.052*<br>(0.029)   | 0.052**<br>(0.026)  | 0.045<br>(0.036)     | 0.111<br>(0.323)   | 0.253**<br>(0.121)  | 0.368**<br>(0.163)   | 0.043<br>(0.043)     | 0.035<br>(0.024)    | 0.037<br>(0.025)     |
| Beta                  |                    | -0.349<br>(0.833)   | -0.858<br>(0.767)   | -0.346<br>(0.816)   | -0.463<br>(0.674)    | 0.250<br>(0.533)   | 0.200<br>(0.607)    | -0.174<br>(0.742)    | -0.462<br>(0.685)    | -1.044<br>(0.823)   | -0.964<br>(0.722)    |
| IFI                   |                    | -0.650<br>(1.347)   |                     |                     |                      | 0.219<br>(4.202)   |                     |                      |                      | -3.583**<br>(1.577) |                      |
| GEQY                  |                    |                     | 0.041**<br>(0.018)  |                     |                      |                    | 0.105**<br>(0.044)  |                      |                      |                     | 0.081***<br>(0.020)  |
| XM Openness           |                    |                     |                     | 0.010<br>(0.035)    |                      |                    |                     | 0.178**<br>(0.073)   |                      | -0.063*<br>(0.034)  | 0.057<br>(0.036)     |
| KA Openness           |                    |                     |                     |                     | -0.844***<br>(0.301) |                    |                     |                      | -0.920***<br>(0.251) |                     |                      |
| Market Cap*IFI        |                    |                     |                     |                     |                      | -0.085<br>(0.250)  |                     |                      |                      |                     |                      |
| Market Cap.*GEQY      |                    |                     |                     |                     |                      |                    | -0.003**<br>(0.002) |                      |                      |                     |                      |
| Market Cap.*XM Open   |                    |                     |                     |                     |                      |                    |                     | -0.006**<br>(0.003)  |                      |                     |                      |
| Market Cap.*KA Open   |                    |                     |                     |                     |                      |                    |                     |                      | 0.003<br>(0.010)     |                     |                      |
| IFI*XM Openness       |                    |                     |                     |                     |                      |                    |                     |                      |                      | 0.001***<br>(0.000) |                      |
| GEQY*XM Openness      |                    |                     |                     |                     |                      |                    |                     |                      |                      |                     | -0.060***<br>(0.023) |
| m2                    | -0.93<br>(0.353)   | -1.03<br>(0.304)    | -1.00<br>(0.316)    | -1.08<br>(0.278)    | -1.23<br>(0.219)     | -1.02<br>(0.307)   | -1.37<br>(0.171)    | -1.27<br>(0.205)     | -1.22<br>(0.221)     | -1.03<br>(0.304)    | -0.96<br>(0.337)     |
| Hansen-J              | 1.20<br>(0.753)    | 1.49<br>(0.960)     | 4.14<br>(0.657)     | 4.71<br>(0.582)     | 4.28<br>(0.639)      | 7.04<br>(0.317)    | 2.98<br>(0.811)     | 1.93<br>(0.926)      | 3.53<br>(0.740)      | 1.28<br>(0.973)     | 2.02<br>(0.918)      |
| N                     | 154                | 98                  | 98                  | 98                  | 112                  | 98                 | 98                  | 98                   | 112                  | 98                  | 98                   |
| No. of Instruments    | 8                  | 14                  | 14                  | 14                  | 14                   | 15                 | 15                  | 15                   | 15                   | 16                  | 16                   |

Notes: The dependent variable is real GDP growth. Annual data from 1995 – 2010. IFI, GEQY, XM Openness, KA Openness are measures of financial, trade, and capital account openness. REER is real effective exchange rate. Beta is country level measure of stock market volatility. **Robust standard errors** are in parenthesis below the coefficients and p-values are in parenthesis below the values of m2 and Hansen-J tests. \* p<.10, \*\* p<.05, \*\*\* p<.01. The command used is xtobd2- and in all specifications stock market capitalization (in natural log form) is treated as endogenous variable.



Table 6. System GMM Model: real GDP growth dependent variable: Investment model- Excluding South Africa

|                           | (1)                 | (2)                  | (3)                  | (4)                  | (5)                  | (6)                  | (7)                 | (8)                  | (9)                  | (10)                 | (11)                 |
|---------------------------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------------------|----------------------|----------------------|----------------------|----------------------|
| Real GDP growth (lag)     | 0.196<br>(0.504)    | -0.559***<br>(0.187) | -0.625***<br>(0.221) | -0.543***<br>(0.180) | -0.628***<br>(0.193) | -0.441***<br>(0.165) | -0.384*<br>(0.197)  | -0.454***<br>(0.141) | -0.628***<br>(0.188) | -0.643***<br>(0.220) | -0.640***<br>(0.225) |
| Investment/GDP            | 0.145***<br>(0.044) | 0.344***<br>(0.118)  | 0.279**<br>(0.128)   | 0.368***<br>(0.122)  | 0.249*<br>(0.144)    | 0.347***<br>(0.108)  | 0.287***<br>(0.088) | 0.389***<br>(0.095)  | 0.263**<br>(0.132)   | 0.289**<br>(0.132)   | 0.273*<br>(0.140)    |
| REER                      | 0.011<br>(0.017)    | 0.038***<br>(0.012)  | 0.047***<br>(0.013)  | 0.022**<br>(0.010)   | 0.040***<br>(0.013)  | 0.030***<br>(0.009)  | 0.033***<br>(0.012) | 0.028***<br>(0.010)  | 0.039***<br>(0.013)  | 0.027**<br>(0.012)   | 0.030***<br>(0.011)  |
| Market Cap.               |                     | 0.030<br>(0.028)     | 0.031<br>(0.027)     | 0.023<br>(0.027)     | 0.053<br>(0.055)     | -0.217<br>(0.272)    | 0.102<br>(0.092)    | 0.270**<br>(0.123)   | 0.048<br>(0.064)     | 0.022<br>(0.028)     | 0.020<br>(0.027)     |
| Beta                      |                     | 0.481<br>(0.692)     | -0.034<br>(0.570)    | 0.487<br>(0.731)     | -0.182<br>(1.078)    | 0.898<br>(0.672)     | 0.796*<br>(0.466)   | 0.383<br>(0.571)     | -0.223<br>(1.027)    | -0.262<br>(0.568)    | -0.264<br>(0.516)    |
| IFI                       |                     | 0.523<br>(0.629)     |                      |                      |                      | -2.439<br>(3.095)    |                     |                      |                      | -0.907*<br>(0.529)   |                      |
| GEQY                      |                     |                      | 0.027*<br>(0.014)    |                      |                      |                      | 0.045*<br>(0.024)   |                      |                      |                      | 0.042**<br>(0.018)   |
| XM Openness               |                     |                      |                      | -0.021<br>(0.023)    |                      |                      |                     | 0.103**<br>(0.052)   |                      | -0.057**<br>(0.023)  | -0.010<br>(0.027)    |
| KA Openness               |                     |                      |                      |                      | -0.253<br>(0.499)    |                      |                     |                      | -0.518<br>(0.481)    |                      |                      |
| Market Cap.*IFI           |                     |                      |                      |                      |                      | 0.163<br>(0.199)     |                     |                      |                      |                      |                      |
| Market Cap.*GEQY          |                     |                      |                      |                      |                      |                      | -0.002<br>(0.001)   |                      |                      |                      |                      |
| Market Cap.*XM Open       |                     |                      |                      |                      |                      |                      |                     | -0.005**<br>(0.002)  |                      |                      |                      |
| Market Cap.*KA Open       |                     |                      |                      |                      |                      |                      |                     |                      | 0.009<br>(0.018)     |                      |                      |
| IFI*XM Openness           |                     |                      |                      |                      |                      |                      |                     |                      |                      | 0.001***<br>(0.000)  |                      |
| GEQY*XM Openness          |                     |                      |                      |                      |                      |                      |                     |                      |                      |                      | -0.017*<br>(0.009)   |
| m2                        | 0.74<br>(0.460)     | -1.14<br>(0.254)     | -1.12<br>(0.263)     | -1.13<br>(0.260)     | -1.26<br>(0.206)     | -0.82<br>(0.410)     | -1.03<br>(0.305)    | -1.17<br>(0.243)     | -1.26<br>(0.208)     | -1.10<br>(0.270)     | -1.03<br>(0.302)     |
| Hansen-J                  | 1.83<br>(0.607)     | 6.73<br>(0.347)      | 4.85<br>(0.563)      | 7.28<br>(0.295)      | 5.97<br>(0.427)      | 3.58<br>(0.733)      | 7.15<br>(0.308)     | 1.58<br>(0.954)      | 2.36<br>(0.884)      | 2.56<br>(0.862)      | 1.87<br>(0.931)      |
| <i>N</i>                  | 210                 | 103                  | 103                  | 103                  | 121                  | 103                  | 103                 | 103                  | 121                  | 103                  | 103                  |
| <i>No. of Instruments</i> | 7                   | 13                   | 13                   | 13                   | 13                   | 14                   | 14                  | 14                   | 14                   | 15                   | 15                   |

Notes: The dependent variable is real GDP growth. Annual data from 1995 – 2010. IFI, GEQY, XM Openness, KA Openness are measures of financial, trade, and capital account openness. REER is real effective exchange rate. Beta is country level measure of stock market volatility. **Robust standard errors** are in parenthesis below the coefficients and p-values are in parenthesis below the values of m2 and Hansen-J tests. \* p<.10, \*\* p<.05, \*\*\* p<.01. The command used is xtabod2- and in all specifications stock market capitalization (in natural log form) is treated as endogenous variable.

Figure 1. Real GDP growth by country

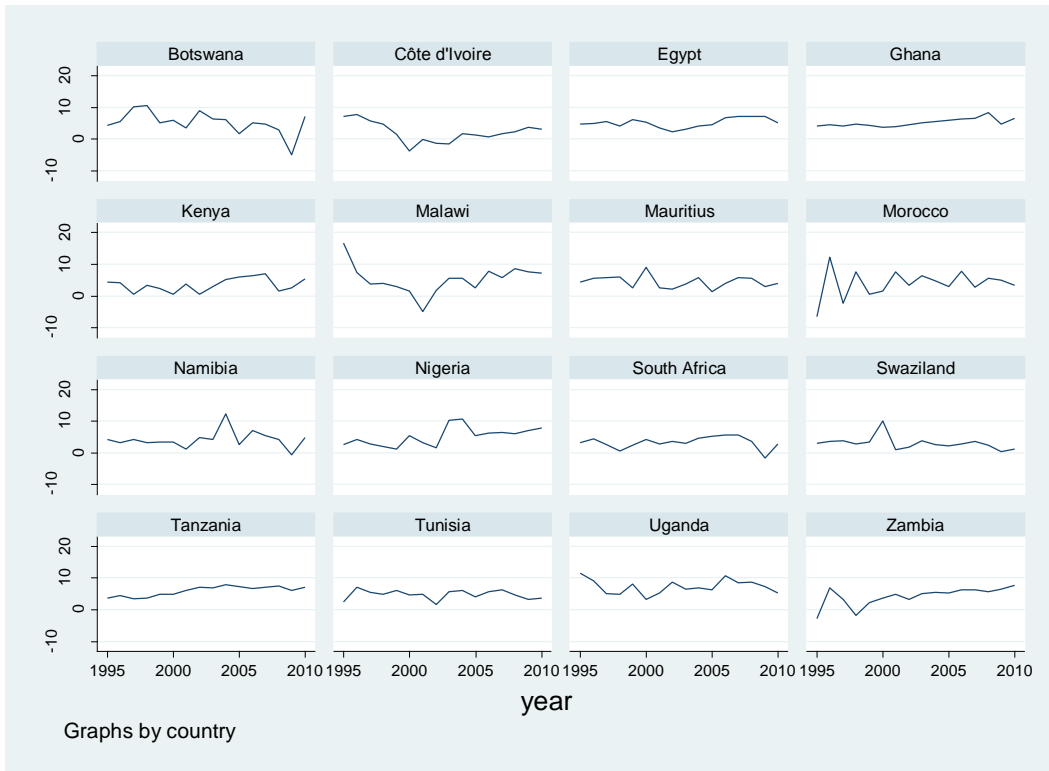


Figure 2. GEQY financial openness measure by country

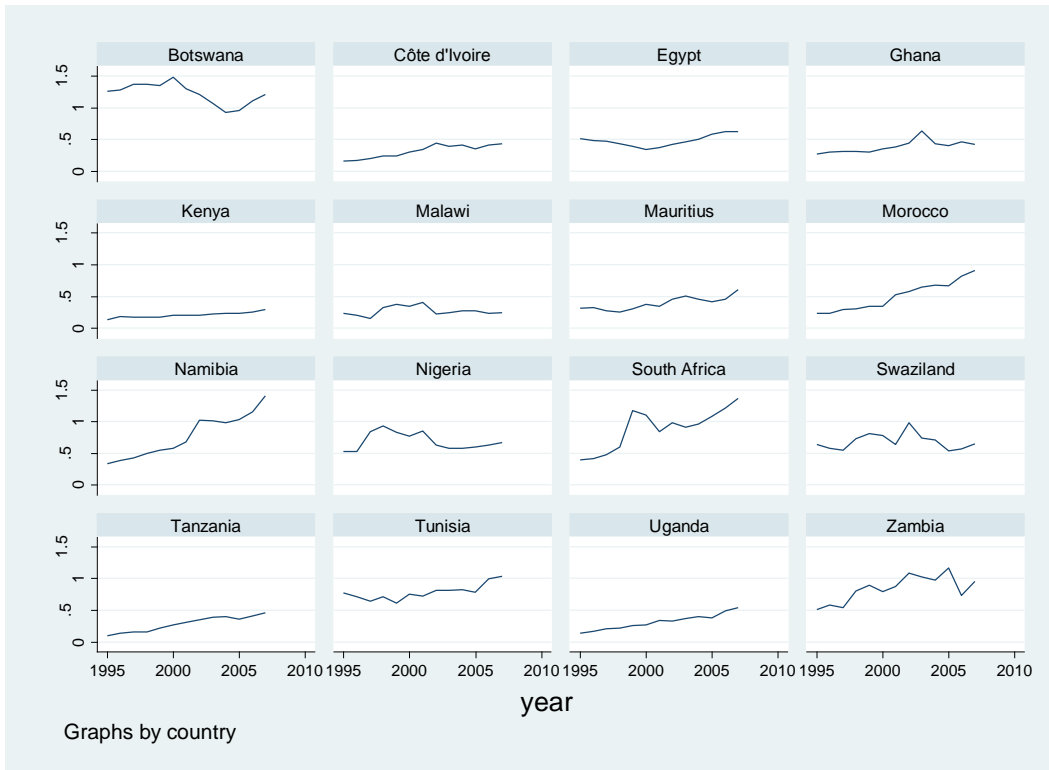


Figure 3. Stock Market Capitalization of listed companies as a percentage of GDP

