FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH IN KENYA: EVIDENCE FROM AN EXPANDED NEOCLASSICAL GROWTH APPROACH

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ABSTRACT

The paper investigates the relationship between the development of financial market and economic growth in Kenya during 1970–2008 using an expanded neoclassical growth model. The study finds that development of the financial sector, especially the size of banking sector, leads to enhanced economic growth. By contrast, other financial intermediaries including domestic credit provided by banking sector to the private sector do not seem to explain economic growth. The results reaffirm that traditional indicators of economic growth, such as capital formation and population growth enhance economic growth in the long-run while increases in fertility levels lead to the opposite result.

Keywords: Kenya, financial development, economic growth

JEL Classification: 016, G10, 040

1. INTRODUCTION

The role of financial development within economic development has been well discussed in both the theoretical and empirical literature. Early in the 20th century, scholars such as Schumpeter (1934) observed that financial markets play a vital role in the economic growth process by channeling funds to the most efficient investors and by fostering entrepreneurial innovation. However, others such as Lucas (1988) have dismissed the importance of the development of the financial sector as a precedent for economic growth.

Financial development includes the expansion of financial services and the growth of financial institutions as well as an increase in per capital amount of financial services and institutions or an increase in the ratio of financial assets to income (Ahmed and Ansari, 1998). The development of the financial sector, especially in developing countries, is seen as a part of the growth strategy of the private sector, which aims to stimulate economic activity and reduce poverty by generating local savings, which in turn lead to productive investments and better resource allocation. This process is supposed to increase an investor’s borrowing options, thus allowing him or her to choose an optimal debt structure for a given period (Mihalca, 2007).

There has been considerable development in both the market- and the bank-based financial markets in Sub-Saharan Africa since the early 1990s, with substantial financial growth registered.

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in Kenya in particular (Yartey and Adjasi, 2007). However, the role of financial development within economic development in many African countries is poorly researched. The few studies that have looked at financial development in Africa have grouped countries together using panel data even though African countries are diverse in terms of their institutional arrangements for monetary policy and have experienced diverse outcomes in terms of macroeconomic performance and volatility (Honohan and O’Connell, 1997).

This makes is difficult to make any generalization about financial systems in Africa as countries very so diverse in terms of financial development and access to financial services. For instance, while MPESA mobile based banking system has been a huge success in Kenya allowing millions of people to have access to financial services, the quest to replicate this success in other African countries like Tanzania and South Africa has faced many obstacles. This study thus aims to fill the research gap and expand on the neoclassical growth model in order to investigate the relationship between financial market development and economic growth in Kenya during 1970–2008 periods.

The remainder of the paper is organized as follows. Section 2 provides an overview of the background and financial development in Kenya. The model specification and data issues are presented in Section 3, while the econometric methodology and empirical findings are presented in Section 4. Concluding remarks are given in the last section.

2. BACKGROUND AND FINANCIAL DEVELOPMENT IN KENYA

2.1. Background

Once considered to be one of Sub-Saharan Africa’s success stories, Kenya became independent from Britain in 1963 and opted for a market-based economy supportive of the private sector that was open to foreign investment. Kenyan GDP performed relatively well compared with other Sub-Saharan African countries between 1964 and 1980 with an average annual growth rate of 5%. During the same period, the fiscal deficit and overall balance of payments were manageable (ranging between 3% and 6% of GDP). However, despite this overall positive economic trend, Kenya’s growth began to decline during 1973–1976, a period that witnessed an annual average growth rate of just 3.4%. This drop in economic growth was attributed to macroeconomic instability resulting from various economic shocks including oil price increases in 1973, the 1979 decline in coffee prices, and the breakup of the East African Community partnership in 1977.

From 1980, Kenya implemented structural adjustment programs; however, they failed to create the necessary conditions for sustained economic growth, leading to a poor economic performance during the 1980s and 1990s. Between 1997 and 2002, the economy grew by an average annual rate of 1.5%, which was well below the estimated population growth rate of 2.5% per annum. The failure of the structural adjustment programs and political turmoil led to widespread poverty, which resulted in over half of the population living below the poverty line of US$ 1 per day (Williams, 2005).

Kenya’s economic growth began to recover after government change in 2002 with real GDP growth of 2.8% in 2003, 4.3% in 2004, 5.8% in 2005, 6.1% in 2006, and 7.0% in 2007.
Financial Development and Economic Growth in Kenya

However, the violent protests that followed the disputed 2007 elections hurt the country’s reputation and when combined with drought slowed economic growth, resulting in GDP growth of less than 2% in 2008 and 2.6% in 2009.

2.2. Financial Development in Kenya

Kenya is considered to have one of the broadest and most developed financial systems in sub-Saharan Africa. The sector comprises 45 commercial banks, 13 non-bank financial institutions, two mortgage finance companies, 89 foreign exchange bureaus, four building societies, 47 insurance companies, a large post office savings bank with over 874 branches, 57 hire purchase companies, over 2,670 savings and credit cooperatives, and over 86 non-governmental organizations/microfinance institutions (Table 1) (Odhiambo, 2008; MIX, 2010).

Kenya’s formal banking sector serves 22.6% of the country’s adult population, while non-bank financial institutions, including microfinance institutions, savings and credit cooperatives, and mobile phone service providers, serve another 17.9% of the population, bringing the total served by formal financial services to 40.5%. Another 26.8% of Kenyans rely on the informal financial sector, including non-governmental organizations, self-help groups, and individual unlicensed moneylenders, while 32.7% of the population does not use any form of financial services (Arora and Ferrand, 2007).

In addition to traditional forms of financial services, mobile banking has rapidly expanded access to financial services in Kenya since Safaricom, the Kenyan affiliate of global mobile telecommunications provider Vodafone, launched its M-PESA service in March 2007. M-PESA allows customers to access an electronic payment and store value system through their mobile phones and offers cash deposit and withdrawal access at 16,900 Safaricom outlets throughout Kenya, nearly half of which are located outside of urban centers (MIX, 2010). This has had a profound impact on financial deepening in Kenya, as more than 20 million Kenyans are mobile phone users. In 2010, almost 12 million users, more than half of Kenya’s adult population, were using M-PESA financial services per month with over two million transactions carried out daily. The service also allows users to open and access saving services through a local bank.

3. MODEL AND DATA DESCRIPTION

3.1. Model Specification

In order to empirically test the relationship between economic growth and financial sector development in Kenya, we assume, as in Amavila (2008), that the value of the country’s economic activity, such as its GDP ($Y$), depends on the country’s technical capability ($X$) such that

$$ Y = F(X) $$

Moreover, technical capability has two broad dimensions, namely domestic ($X_d$) and global ($X_f$) links, that is, $Y = F(X_d, X_f)$. Domestic production in which global links are, respectively, absent and exogenously present is shown in (2a) and (2b) below:
\[ Y = AF (X_d) \]  \hspace{1cm} (a)
\[ Y = X_f F (X_d) \]  \hspace{1cm} (b)

where in (2a) \( A \supset X_d \), in (2b) \( X_f \supset A \), where \( d \) is for domestic, and \( f \) is the foreign links.

The underlying domestic production relations include the economically active population \( (N) \) and physical capital \( (K) \), which can be stated in a neoclassical multiplicative form as

\[ Y_t = AK^\alpha N^\beta \]  \hspace{1cm} (3)

where \( N \) consists of unskilled labor \( (L) \) and skilled labor is defined as human capital \( (H) \). We suppose that \( N = L^*H^\rho \), which implies that \( L = (NH^{-\beta})^{1/\alpha} \). Using Solow’s model of economic growth, we can then assume that \( L \) evolves at an exogenous rate \( (n) \) equal to the rate of the growth of \( N \), thus

\[ L_t = e^{nt} (NH^{-\beta})^{1/\alpha} \]  \hspace{1cm} (4)

Given (4), (3) becomes

\[ Y_t = AK^\alpha e^\beta n (H^{(1/a)(\beta_1 - b\beta_1)}) / a \]  \hspace{1cm} (6)

In per capita and natural logarithmic terms, (6) is

\[ y_t = \alpha k + \beta_1 nt + \left( 1/a - \beta_1 \right) h \]  \hspace{1cm} (7)

where \( y = \log (Y/N) \), \( k = \log (K/N) \), \( h = \log (H/N) \), \( \alpha = \) productivity shifter, \( \alpha = \) elasticity of physical capital, \( \beta_1 = \) elasticity of raw labor, \( \beta_1 = \) elasticity of \( H \), and \( n = \) natural rate of the growth of \( N \) over time \( t \). As noted by Amavilah (2008), (7) understates the level of \( H \) and overstates its statistical importance. He proposes that the correct evolution of \( H \) should be based on the economically active population \( (N) \). Thus

\[ H_t = e^{\gamma N} \]  \hspace{1cm} (8)

where \( q \) is the vector of processes and activities that refine \( N \) such as education, training, experience, health, nutrition, and mortality/fertility. Further, \( n \) is the rate of the growth of \( L \), which is equal to the rate of the growth of \( N \) based on the exogenous neoclassical growth model. Given (8), (6) becomes

\[ Y_t = AK^\alpha e^\beta n e^{(\beta_1 -(b\beta_1)/a)q + \beta_1 n} \]  \hspace{1cm} (9)

Studies have argued that economic growth especially for developing countries like Kenya also depend on the rate of growth of total exports (openness) when exports can be considered a factor of production that enhances the productivity of capital and labor by releasing the foreign exchange constraint, taking advantages of economies of scale, and reducing resource use misallocation by reallocating resources based on their comparative advantage (Mbaku, 1989; Barbza, 2007). We can introduce into (9) the impact of trade as described in (2) such that

\[ Y_t = AK^\alpha e^\beta n e^{(\beta_1 -(b\beta_1)/a)q + \beta_1 n} X_f \]  \hspace{1cm} (10)

where \( \gamma \) is expected to indicate the direction and magnitude of the impact of trade expansion on economic growth. When (10) is normalized we get
where \( x_f = X_f / N \), and we can thus estimate (10) as

\[
y_t = a + \alpha k + \beta^1_n t + \left( \frac{\phi(a\beta_2 - b\beta_1)}{\alpha} \right) q + \gamma x_f + \mu \tag{11}\n\]

where \( \eta = \frac{\phi(a\beta_2 - b\beta_1)}{\alpha} \).

To assess the role of financial development within economic development in Kenya this study assumes that total factor productivity (TFP) is the main engine of economic growth and that any cross-country differences in income are largely because of differences in TFP (Caselli, 2005). In other words, \( TFP = f(\text{financial development}) \). According to Greenwood and Boyan (1990), an efficient financial system performs the task of screening investment projects, which thus improves the quality of investments, reduces business failures, and effectively raises productivity. Thus, examining the contribution of TFP to economic growth provides an indication of how financial development influences the process of economic development (Ang, 2008).

From Equation (11) we can, therefore, calculate TFP growth as the “Solow residual” or the proportion of output not accounted for by input growth.

\[
a = y_t - \alpha k - \beta^1_n t - \eta q - \gamma x_f \tag{12}\n\]

In our estimation of (11), \( y \) is per capita GDP. Further, since we use the rate of population growth (\( n \)) with the coefficient \( \beta^1_n \), we do not need data for either \( L \) or \( N \).

### 3.2. Data Sources and Description

This section provides a brief description of the variables used in this study. In our analysis, the dependent variable is GDP (\( Y \)) per capita growth expressed in real US dollars and population (\( N \)) in millions of people. This study also includes a set of variables that measure endowments for both physical capital, measured as (\( K \)), and human capital, measured as a vector of activities that refine \( N \). Capital formation refers to the net additions of capital stock such as equipment, buildings, and other intermediate goods that are used in combination with labor to provide goods and services. Data on \( Y, K, \) and \( N \) was obtained from World Development Indicators 2010 (WDI), which are available online from the World Bank website (World Bank, 2010). The 1970–2008 time period was selected based on the availability of data.

Knowledge is embedded in human beings by means of education and training, as well as through a diversity of informal learning. Hence, the level of literacy, the level of educational attainment, and the amount of training provided to a country’s population are important measures of its investment in human capital (Grossman and Helpman, 1991). Owing to a lack of consistent and reliable data on education, this study instead uses fertility rate (\( FE \)) as a proxy of education. As noted by Jeffery and Basu (1996), education is one of the most important determinants of fertility, as low fertility has been associated with high literacy, especially among women of developing countries. Thus, \( FE \) can be used as a measure of \( q \), the process and activities that refine the active population (\( N \)). Data on \( FE \) were obtained from the WDI.
We employ four measures of financial liberalization and development to capture the variety of channels through which financial development can affect economic growth. To measure banking sector development, studies traditionally use measures of the overall size of the banking sector by dividing the stock of broad money ($M_2$) by GDP. However, King and Levine (1993) and Levine and Zervos (1998) argue that this indicator does not measure whether the liabilities are those of banks, the central bank, or other financial intermediaries. This study thus follows King and Levine (1993) and Boyd et al. (2001) by employing four proxies of financial sector development. The first measure is the ratio of the liquid liabilities ($LIQ$) of the financial sector to GDP ($M_3$). This ratio equals the sum of currency, demand, and interest-bearing liabilities of bank and non-bank financial intermediaries as a percentage of GDP. This indicator measures the size of the banking sector in relation to the economy as a whole and it has been found to be strongly associated with real GDP per capita. The study assumes that the size of the financial sector is positively associated with financial services (King and Levine, 1993).

The second measure of financial development is the ratio of domestic credit ($DC$) to the private sector to GDP. This ratio excludes the public sector and, therefore, reflects a more efficient resource allocation in the economy, since the private sector is able to utilize funds in a more efficient and productive manner compared with the public sector. $DC$ is an indicator of the depth of the banking system and thus it can act as a measure of success of the financial sector as the intermediary for channeling savings to investors. Previous studies have also found that a certain degree of host country development of the financial system as measured by $DC$ is an important prerequisite for foreign direct investment to have a positive effect on the host economy (Hermes and Lensink, 2003). We expect the coefficient for $DC$ to be positive in our regressions.

Since the above two measures do not consider the allocation of capital between the private and the public sector (King and Levine, 1993), and in order to obtain a more direct measure of financial depth, private credit ($PC$) is our third measure of development for the banking sector. This measure equals the value of loans granted by banking institutions to the private sector as a percentage of GDP. The primary advantage of this measure is that by isolating credit to the private sector it measures more precisely the contribution of financial institutions in funding private sector investment (Levine and Zervos, 1998; Boyd et al., 2001; Beck and Levine, 2003).

Inflation rate ($INFL$) is used in this study as an indicator of macroeconomic stability (Allen and Ndikumana, 1998; Levine et al., 2000). $INFL$ is expected to slow financial development because it can make private credit side loans to contract over extended periods. Moreover, inflation can have a dampening effect on liquid liabilities, thereby making depositors more hesitant to place their savings in the formal financial system for fear of not being able to get them back quickly enough (Allen et al., 2010). Since high inflation distorts economic activity and reduces investment in productive enterprises, thus reducing economic growth, we expect the coefficient for inflation to be negative.

The impact of trade openness on economic growth is introduced in Equation (2) and measured as the ratio of trade to GDP ($T$). According to Easterly et al. (1993), although economic policies and country characteristics such as educational attainment and political stability contribute little to explaining the lack of economic growth, a country’s terms-of-trade changes are highly correlated with economic growth.
There is fairly convincing cross-country evidence that exports are associated with growth although developing countries such as Kenya face a number of risks associated with trade. The best known risk is declining terms of trade, because worldwide prices of primary commodities they export tend to fall over time relative to import prices. In Kenya, three primary commodities, namely horticulture, tea, and coffee, account for over 50% of total export earnings. Thus, owing to the small relative size of its market contribution, Kenya cannot influence world market prices and is, therefore, a price-taker in the international markets of these commodities. The sign for $T$ can thus be either positive or negative. The datasets used for the financial development indicators and trade index are also derived from the WDI (World Bank, 2008). Table 2 provides a detailed description of all the variables used in this study and their sources.

Table 1
Financial Institutions

<table>
<thead>
<tr>
<th>Institutions</th>
<th>Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial Banks</td>
<td>45</td>
</tr>
<tr>
<td>Non-Bank Financial Institutions (NBFIs)</td>
<td>13</td>
</tr>
<tr>
<td>Mortgage Finance Companies</td>
<td>2</td>
</tr>
<tr>
<td>Foreign Exchange Bureaus</td>
<td>89</td>
</tr>
<tr>
<td>Building Societies</td>
<td>4</td>
</tr>
<tr>
<td>Insurance Companies</td>
<td>47</td>
</tr>
<tr>
<td>Post Office (874 branches)</td>
<td>1</td>
</tr>
<tr>
<td>Mobile Phone Companies</td>
<td>4</td>
</tr>
<tr>
<td>Hire Purchase Companies</td>
<td>57</td>
</tr>
<tr>
<td>Savings and Credit Cooperatives</td>
<td>2,670</td>
</tr>
<tr>
<td>NGO/ Micro Finance Institutions</td>
<td>Over 86</td>
</tr>
</tbody>
</table>

Source: Microfinance Information Exchange (MIX), 2010.

Table 2
Definition of Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Growth ($y$)</td>
<td>Per capita real GDP growth</td>
<td>WDI</td>
</tr>
<tr>
<td>Capital Formation ($K$)</td>
<td>Net additions of capital stock that are used to provide goods and services.</td>
<td>UN</td>
</tr>
<tr>
<td>Natural growth ($n$)</td>
<td>The births and deaths in a country’s population</td>
<td>WDI</td>
</tr>
<tr>
<td>Fertility ($FE$)</td>
<td>Total births per woman</td>
<td>WDI</td>
</tr>
<tr>
<td>Liquid Liabilities ($LIQ$)</td>
<td>Liquid Liabilities / GDP</td>
<td>FSEDD</td>
</tr>
<tr>
<td>Domestic Credit ($DC$)</td>
<td>Domestic Credit Provided by baking sector/GDP</td>
<td>FSEDD</td>
</tr>
<tr>
<td>Private Credit ($PC$)</td>
<td>Private Credit by Deposit Money Banks and Other Fin. Inst / GDP</td>
<td>FSEDD</td>
</tr>
<tr>
<td>Inflation ($INFL$)</td>
<td>Consumer prices inflation (annual %)</td>
<td>WDI</td>
</tr>
<tr>
<td>Openness to Trade ($T$)</td>
<td>Total amount of exports and imports / GDP</td>
<td>WTO</td>
</tr>
</tbody>
</table>

3.3. Methodology

This study follows recent financial development literature by using the autoregressive distributed lag bounds (ARDL) approach as proposed by Pesaran et al. (2001) to compute the short-run and long-run elasticities for the link between financial development and economic growth in Kenya. The choice of this methodology is influenced by several factors; among them the ability of ARDL models to yield consistent estimates of the long-run coefficients that are asymptotically normal irrespective of the order of integration of the explanatory variables. The ARDL methodology has an advantage over the cointegration techniques that require the underlying series to be both I(1), as the bounds test does not impose restrictive assumption that all the studied variables must be integrated of the same order.

As noted by Harris and Sollis (2003), the ARDL approach also provides unbiased estimates of the long-run model and valid t-statistics, even when some repressors are endogenous, because the inclusion of dynamics can help correct for the endogeneity bias. Another important feature of the ARDL model is that it takes into account the error correction term in its lagged period. The analysis of error corrections and autoregressive lags fully covers both the long-run and the short-run relationships of the variables tested. Because the error correction term in the ARDL does not have restricted error corrections, the ARDL is termed an unrestricted error correction model. The ARDL approach is also more appropriate for estimation purposes in the case of small samples, as in our case, which has only 39 observations and eight parameters (excluding the constant term) compared with cointegration techniques that require large sample sizes (Blin and Ouattara, 2009).

An ARDL representation of the relationship between financial development, trade openness, and economic growth in Kenya as in Equation (11) is formulated as follows:

\[
\Delta y_t = \beta_{0} + \Sigma \beta_{1i} \Delta k_{t-i} + \Sigma \beta_{2i} \Delta n_{t-i} + \Sigma \beta_{3i} \Delta FE_{t-i} + \Sigma \beta_{4i} \Delta LJQ_{t-i} + \Sigma \beta_{5i} \Delta DC_{t-i} + \Sigma \beta_{6i} \Delta PC_{t-i} + \\
\Sigma \beta_{7i} \Delta INF_{t-i} + \Sigma \beta_{8i} \Delta T_{t-i} + \beta_{9} k_{t-i} + \beta_{10} n_{t-i} + \beta_{11}FE_{t-i} + \beta_{12}DE_{t-i} + \beta_{13}LJQ_{t-i} + \\
\beta_{14} DC_{t-i} + \beta_{15} PC_{t-i} + \beta_{16} INF_{t-i} + \beta_{17} T_{t-i} + \epsilon_t
\]

where \(\beta_{ip}\) is a drift component and \(\epsilon_t\) is the white noise error. In this equation, the terms with the summation signs capture the short-run dynamics of the model, whereas other terms represent the long-run relationship. The ARDL process begins with a test of the presence of a long-run relationship among the variables using the bounds testing procedure of Pesaran et al. (2001). This procedure is based on F-statistics with an asymptotic non-standard distribution and is a joint significance test of the null hypothesis of no cointegration/long-run relationship (Ho: \(\alpha_{9} = \alpha_{10} = \alpha_{11} = \alpha_{12} = \alpha_{13} = \alpha_{14} = \alpha_{15} = \alpha_{16} = \alpha_{17} = 0\)). If the calculated F-statistics exceeds the upper critical value proposed by Pesaran et al. (2001), the null hypothesis of no long-run relationship is rejected regardless of the variables’ order of integration. However, if the test statistics falls within the bounds, the test is inconclusive. A test statistic below the lower critical bounds value suggests that there is no cointegration/long-run relationship. Once the existence of a long-run relationship between variables in the model has been confirmed, the long-run and short-run models can be derived using information criteria such as the Schwartz Bayesian Criteria (SBC) or Akaike Information Criteria (AIC).

The ARDL approach to cointegration does not require the pre-testing of the variables included in the model for unit roots, unlike other techniques such as the Johansen approach.
(Pesaran et al., 2001). However, if the order of integration of any of the variables is greater than I(1), the critical bounds provided by Pesaran et al. (2001) are invalid since they are computed on the basis that variables are I(0) or I(1). It is thus necessary to test for unit roots and ensure that all variables satisfy the underlying assumption of the ARDL methodology before proceeding to the estimation stage (Blin and Ouattara, 2009). This paper, therefore, starts its econometric analysis by analyzing the order of integration of the included variables.

4. **EMPIRICAL RESULTS**

4.1. Unit Root Tests

To test the order of integration of the variables used in this study, we use the augmented Dickey–Fuller and Phillips–Perron tests, which are considered to be the standard for testing unit roots. The results of these tests indicate that the variables are stationary either at the levels or at the first difference (Table 3). In other words, the order of integration of all the variables used in this study are either I(0) or I(1). After confirming the variables’ order of integration, the ARDL methodology can be applied confidently since it meets the conditions for variables having either a I(0) or a I(1) order of integration.

<table>
<thead>
<tr>
<th>Variables</th>
<th>ADF</th>
<th>PP</th>
<th>Variables</th>
<th>ADF</th>
<th>PP</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>-5.367***</td>
<td>-5.362***</td>
<td>ΔY</td>
<td>-11.166***</td>
<td>-10.267***</td>
<td>I(0)</td>
</tr>
<tr>
<td>K</td>
<td>-2.091</td>
<td>-2.037</td>
<td>ΔK</td>
<td>-6.224***</td>
<td>-6.273***</td>
<td>I(1)</td>
</tr>
<tr>
<td>n</td>
<td>-0.706</td>
<td>-0.060</td>
<td>Δn</td>
<td>-8.160***</td>
<td>-8.411***</td>
<td>I(1)</td>
</tr>
<tr>
<td>FERT</td>
<td>-0.796</td>
<td>-0.645</td>
<td>ΔFERT</td>
<td>-2.624*</td>
<td>-2.636*</td>
<td>I(1)</td>
</tr>
<tr>
<td>LIQ</td>
<td>-2.870**</td>
<td>-2.869**</td>
<td>ΔLIQ</td>
<td>-5.460***</td>
<td>-5.434***</td>
<td>I(0)</td>
</tr>
<tr>
<td>DC</td>
<td>-3.967***</td>
<td>-4.541***</td>
<td>ΔDC</td>
<td>-6.658***</td>
<td>-6.638***</td>
<td>I(0)</td>
</tr>
<tr>
<td>PC</td>
<td>-2.976**</td>
<td>-2.967**</td>
<td>ΔPC</td>
<td>-5.652***</td>
<td>-5.649***</td>
<td>I(0)</td>
</tr>
<tr>
<td>lNFL</td>
<td>-3.296**</td>
<td>-3.250**</td>
<td>ΔlNFL</td>
<td>-6.193***</td>
<td>-6.277***</td>
<td>I(0)</td>
</tr>
<tr>
<td>T</td>
<td>-2.536</td>
<td>-2.714*</td>
<td>ΔT</td>
<td>-5.747***</td>
<td>-5.737***</td>
<td>I(0)</td>
</tr>
</tbody>
</table>

Note: *** represent significance at 1% level. The critical values are based on the finite sample values computed by McKinnon (1991). The software Stata 8 was used for these tests.

4.2. Long-run Relationship

The ARDL cointegration procedure is implemented in estimating Equation (13) using annual data for Kenya in 1970–2008. Before testing for the existence of a long-run relationship among the variables, it is important to decide the order of the ARDL lag. The results based on AIC and SBC suggest that the process is an AR(1).

The bounds test is then employed to ascertain for existence of a long-run relationship among the variables (Table 4). The F-statistics from the test is above the 5% critical bounds proposed by Pesaran et al. (2001) which imply that the null hypothesis of no cointegration can be rejected. This confirms the existence of a long-run relationship among the independent variables in our model.
Table 4
Bounds Tests for the Existence of Cointegration

<table>
<thead>
<tr>
<th>F-Statistics</th>
<th>5% Critical values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I(0)</td>
</tr>
<tr>
<td>8.12</td>
<td>2.32</td>
</tr>
</tbody>
</table>

Table 5 shows the results of the long-run test statistics based on SBC. The selected ARDL model (1, 1, 2, 2, 1, 1, and 2) passes the standard diagnostic tests (serial correlation, functional form, normality, and heteroskedasticity). The results in Table 5 show that all variables, with the exception of openness to trade, are statistically significant at the 10% level. The financial development measures include bank indicators (Liquid Liabilities, Domestic Credit, and Private Credit) and inflation. The long-run ARDL model has an $R^2$ of 0.61, which is an indication of a good predictive power. All control variables are significant at the 1% level and they have the predicted signs. The results indicate that capital formation has a positive impact on economic growth in Kenya. Specifically, the results indicate that a 1% increase in gross capital formation, ceteris paribus, results in a 7.8% growth in GDP in the long-run. The results also indicate that population growth has a positive impact on growth, while an increase in fertility has a negative impact on economic growth in Kenya.

While higher population growth as a contributor to economic growth may not be consistent with the mainstream economic development literature, some recent scholars such as Fengler (2010) believe that rapid population growth in Africa, especially in Kenya, is not a fundamental development challenge. Fengler (2010) notes that in Kenya the number of children per family has fallen sharply from 8.1 children in 1978 to 4.6 children in 2008 and, consequently, the fastest growing group in Kenya’s population is no longer young children but adults, which will

Table 5
Estimated Long-run Coefficients using ARDL (1, 2, 2, 1, 1, and 2) Selected based on SBC

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>88.48</td>
<td>2.45**</td>
</tr>
<tr>
<td>Capital Formation ($K$)</td>
<td>7.79</td>
<td>3.74***</td>
</tr>
<tr>
<td>Population Growth ($n$)</td>
<td>19.92</td>
<td>2.58***</td>
</tr>
<tr>
<td>Fertility ($FE$)</td>
<td>-60.25</td>
<td>-2.81***</td>
</tr>
<tr>
<td>Liquid Liabilities ($LIQ$)</td>
<td>14.66</td>
<td>2.02*</td>
</tr>
<tr>
<td>Domestic Credit ($DC$)</td>
<td>-21.23</td>
<td>-3.32***</td>
</tr>
<tr>
<td>Private Credit ($PC$)</td>
<td>-13.07</td>
<td>-2.86***</td>
</tr>
<tr>
<td>Inflation ($INFL$)</td>
<td>-0.19</td>
<td>-3.70***</td>
</tr>
<tr>
<td>Openness to Trade ($T$)</td>
<td>-2.02</td>
<td>-0.60</td>
</tr>
</tbody>
</table>

Note: *** Significant at 1 percent level
Dependent Variable: Economic Growth ($y$)
Adj. $R^2 = 0.61$ ; Wald F-Statistic = 8.12[0.00]***; DW-Statistic = 2.32
almost triple in size from 21 million in 2010 to approximately 60 million in 2050. This increased population density together with rural–urban migration has created higher urban agglomeration, which is critical for achieving sustained economic growth because large urban centers allow for innovation and increased economies of scale. As noted by World Bank (2008), no country has ever reached high income with low urbanization.

The most natural interpretation of the fertility results comes from neoclassical growth theory. It is expected that increased fertility grows population size, which initially reduces the capital-to-labor and land-to-labor ratios, thus depressing income per capita. While this initial decline can later be compensated by higher output derived from an increased labor force and capital accumulation, this compensation could be incomplete if certain factors of production, such as land, are supplied inelastically (Acemoglu and Johnson, 2007). This might be the case for Kenya because of its high poverty rates in rural areas, which account for most fertility (UNFPA, 2009).

The effects of financial development on economic growth, as denoted by the signs of their coefficients, were mixed. The results indicate that the ratio of liquid liabilities ($LIQ$) has a positive impact on economic growth, as the coefficients of both variables are significant at the 10% level. Specifically, a 1% growth in the size of the $LIQ$, ceteris paribus, leads to a positive change of 14.66 in per capita GDP in the long-run. The results of $INFL$ are negative and significant at the 1% level, which indicates that inflation distorts economic activity and reduces investment in productive enterprises, thus reducing economic growth. Specifically, a 1% growth in $INFL$, ceteris paribus, leads to a contraction of 0.19% in per capita GDP in the long-run. However, growth in domestic and private credit does not translate into positive per capita income growth in Kenya.

The significant $LIQ$ coefficient accompanied by the negative but significant coefficients of $DC$ and $PC$ might be a reflection of the lack of broad and deep financial markets in Kenya. With only one in five households having access to finance, there are low levels of $PC$ access in Kenya, which is just 18% of GDP. This is occasioned by the weak propensity to lend by the banks, which has been blamed on limitations to secure lending, the weak enforcement of creditor rights, and inadequate debtor information systems (Sacerdoti, 2005). The negative and significant coefficient of $DC$ might also be an indicator of the failure of the banking sector as an effective intermediary for the channeling of savings to investors. Studies indicate that only a small proportion of Kenyans have access to credit because of the lack of supply that results from the rationing behavior of both formal and informal lending institutions (Atieno, 2001).

The finding of a weak and negative relationship between $DC$, $PC$, and economic growth in Kenya is also consistent with earlier studies from the same sub-region. Allen and Ndikumana’s (1998) study of financial intermediation and economic growth among Southern Africa Development Community countries argues that the weak link between financial intermediation and economic growth might reflect pervasive inefficiencies in the credit allocation mechanism in these countries. They recommend the strengthening of financial sector legislation and banking system supervision as ways of enhancing the efficiency of the financial sector. Aziakpono (2005) also examines the effects of financial integration on the financial development and economic performance of Southern African Customs Union
countries and finds a weak relationship between financial intermediation and economic growth. He attributes this to, among others, weak institutional and structural impediments in these countries.

The results of trade openness \((T)\) indicate a negative and not statistically significant effect on economic growth, which is no surprise. Loanna (2010) investigates the relationship between openness and growth for a sample of 34 African countries over the period 1960–2003 using panel cointegration analysis and causality tests. The results of this study suggest that trade openness has a negative effect on economic performance with causality running from openness to growth rather than vice versa. Elsewhere, Mendoza’s (1997) simple visual analysis of the relationship between sustained economic growth and terms of trade for Kenya finds a negative trend. The author attributes this negative trend in terms of trade for Kenya to the relative price of its exports, which largely reflects the protracted and severe decline in real commodity prices, mostly agricultural raw materials, over the past two decades.

4.3. Short-run Dynamics

Since all the variables in our model are cointegrated, we use an error correction model mechanism to investigate the short-run dynamics. The results of this estimation based on SBC criteria are presented in Table 6. As the \(R^2\) of 0.73 indicates, the error correction model fits the data reasonably well, and its coefficient has the expected negative sign and is highly significant. This reinforces the long-run relationship found among the variables included in the model.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>3.20</td>
<td>1.66</td>
</tr>
<tr>
<td>(\Delta y(-1))</td>
<td>-0.18</td>
<td>-1.57</td>
</tr>
<tr>
<td>(\Delta K)</td>
<td>5.70</td>
<td>2.61**</td>
</tr>
<tr>
<td>(\Delta n)</td>
<td>11.06</td>
<td>0.38</td>
</tr>
<tr>
<td>(\Delta n(-1))</td>
<td>-27.15</td>
<td>-1.14</td>
</tr>
<tr>
<td>(\Delta FE)</td>
<td>92.34</td>
<td>0.61</td>
</tr>
<tr>
<td>(\Delta FE(-1))</td>
<td>34.32</td>
<td>0.18</td>
</tr>
<tr>
<td>(\Delta LIQ)</td>
<td>12.68</td>
<td>1.93*</td>
</tr>
<tr>
<td>(\Delta DC)</td>
<td>-9.35</td>
<td>-1.84*</td>
</tr>
<tr>
<td>(\Delta PC)</td>
<td>-16.61</td>
<td>-2.20**</td>
</tr>
<tr>
<td>(\Delta NFL)</td>
<td>-0.14</td>
<td>-3.16***</td>
</tr>
<tr>
<td>(\Delta T)</td>
<td>1.99</td>
<td>0.60</td>
</tr>
<tr>
<td>Ecm(-1)</td>
<td>-0.96</td>
<td>-1.94*</td>
</tr>
</tbody>
</table>

Note: *** Significant at 1 per cent level
Dependent Variable: Economic Growth \((y)\)

Adj. \(R^2 = 0.73;\)  Wald F-Statistic = 7.55(0.00)***;  DW-Statistic = 2.73
The results in Table 6 suggest that the control variables, except capital, are not statistically significant at the 10% level. This implies that population growth, fertility, and trade openness do not have a significant effect on economic growth in the short-run. However, capital formation does have a significant and positive impact on economic growth in the short-run. The results also show that all financial development variables are statistically significant at the 10% level. Specifically, this study confirms the positive short-run impact of liquidity on economic growth. It also reaffirms the negative short-run relationship between domestic credit, private credit, inflation, and economic growth.

The coefficient of the error correction model is found to be relatively large and statistically significant at the 10% level. This confirms a long-run relationship between the variables. Further, the coefficient at -0.96 indicates a relatively rapid adjustment process with almost 96% of the disequilibria of the previous year’s shock adjusting back to the long-run equilibrium in the current year.

5. CONCLUSION

The empirical findings suggest that capital formation plays an important role in enhancing Kenya’s economic growth in both the short-run and the long-run. Moreover, the growth in population has a positive and important role in enhancing economic growth in the long-run. However, increased levels of fertility might translate into declining economic growth in the long-run.

The results also indicate that the development of financial sector, especially the size of the banking sector as measured by liquidity liabilities, leads to enhanced economic growth in both the long-run and the short-run. However, other financial intermediaries, such as the domestic credit provided by the banking sector to the private sector, do not seem to explain economic growth in the short-run or in the long-run, perhaps because of inefficiencies in the credit allocation mechanism because only 22.6% of Kenya’s adult population are served by formal banks. This study also shows that high inflation reduces economic growth in both the short-run and the long-run perhaps because of the distortion in economic activity and/or reduction of investment in productive enterprises.

Further, the results of this study indicate that trade, as represented by trade openness, does not play a positive role in enhancing economic growth in Kenya as reflected by the non-significant coefficient. This is perhaps because of the country’s poor terms of trade. Based on the presented findings, this study suggests the development of strong, broad, and deep financial markets that can reach a broader segment of Kenya’s adult population. This should increase participation in the financial sector in the Kenyan economy as more people gain access to these services. Although the country should keep its financial liberalization through the market determination of interest rates, it should also embrace a sound monetary practice that keeps inflation low and stable. Kenya should also adopt an outward-oriented growth strategy that includes the promotion of export-led growth instead of import substitution. There is a need to diversify and add value to traditional agricultural raw material exports that are subject to the vagaries of weather and international price fluctuations. While population growth has a positive effect on growth in the long-run, perhaps because of urban agglomeration, this impact is
mitigated by increases in fertility, which has a negative impact on growth by exerting pressure on limited natural resources. There is, therefore, a need to invest in human capital, especially in education and health, which will lead to higher productivity in both physical and financial capital and lower fertility – all of which enhance economic growth. Rising urbanization also calls for the development of institutions and infrastructure so that the benefits of rising economic density can be shared widely.

References


