The Causal Nexus between Financial Development and Economic Growth in Kenya

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Abstract

This paper aims to reexamine the relationship between financial development and economic growth in Kenya over the period of 1971-2011. Since, financial sector plays a vital role in mobilizing and allocating savings into productive ventures, the core issue of this investigation remains important for developing economics. The examination is based on a Cobb-Douglas production augmented by incorporating financial development. A simulation based ARDL bounds testing and Gregory and Hansen's structural break cointegration approaches are being utilized in this study. Cointegration is being found between the series in the presence of a structural break in 1992. It is also being established that, in the long run, development of financial sector has positive impact on economic growth. Here remains an important policy implication for the concerned individuals of Kenya, that is, they may emphasize on financial development to ignite economic growth.

Keywords: Economic Growth, Financial Development, Kenya

Introduction

The theoretical and empirical literature on the finance-growth nexus holds an inconclusive and ambiguous explanation about the relationship between the variables in question. The work of Schumpeter, (1934) revealed that financial sector development is an important determinant of economic growth. He argued that a sound and developed financial system can offer efficient services of financial intermediaries, which make it possible to transfer funds to the most innovative entrepreneurs. McKinnon, (1973) and Shaw, (1973) claimed that financial development has positive upshot on economic growth. Moreover, the empirical findings on this issue—in the horizon of developed and developing economies—pans out to be dissimilar. The empirical evidence unwrap that, financial development constitutes a potentially important mechanism for long run economic growth[1]. Hence, it is critical for a nation to verify, depending on the concerned context, whether financial development influences economic growth as an engine or not.

Popiel, (1994) defined Kenya as one of the countries in African Region having a well developed financial system basing on the ground that it has Banking, Insurance, Capital Markets, Pension Funds, Quasi-Banking crafted by Savings and Credit Cooperative Societies (SACCOs), Microfinance institutions (MFIs), Building Societies, Development Finance Institutions (DFIs) and informal financial services such as Rotating Savings and Credit Associations (ROSCAs). In 1997 (IMF, 2000), however, the liberalization of capital account took place, which involved slackening of the restriction in capital and money market, derivatives, credit operations, direct investments, real estate transactions, personal capital movements, provisions specification to commercial banks and institutional investors. Financial sector happens to be a giant contributor in the economy of Kenya. Specifically it contributes 4 % to GDP, providing assets equivalent to about 40% of GDP. The financial sector development comprises a number of commercial banks and non-bank financial institutions. In order to achieve price stability and the expected growth in the economy, The Central Bank of Kenya paves the optimal path for both reserve money and consistent money supply.

In the light of the expression of the Central Bank of Kenya[2], within the fiscal year 2010-11, the money supply, liquidity and reserve money were targeted to grow by 16.8% and 2.4%, respectively. In June 2011, domestic credit increased by Ksh 254.4 billion or 23.4%, compared to Ksh 222.5 billion or 25.8% in a similar period in 2010; and the concerned authority had a target of expanding the credit by Ksh 205.9 billion or by 18.9%. The private sector, in terms of lending, was dominating the segment with a share of 77.8% of total lending, in June 2011; compared to a share of 73.5% in June 2010. Money supply,M_3, grew at the rate of 15.1% in June 2011 compared to an increasing rate of 26.2% in the retrospective period of 2010,whichwas projected to grow at the rate of16.8% for June 2011. The expansion in money supply in June 2011 was supported by the growth in net domestic asset (NDA) and in the net foreign asset (NFA) of banking system. The NDA expanded by Ksh 179.9 billion or by 19.6% in June 2011, compared to the growth rate of KSh 236.4 billion or 34.6% of the earlier year; which happened due to an amplified credit provision related to private and other public sectors. The NDA accounted for 99.21% of expansion in M_3. The progress rate at the NFA of banking systems was booked at Ksh 1.4 billion or 0.5% in June 2011, having an

[1]Greenwood and Jovanovic, 1990; Bencivenga and Smith, 1991; Levine et al. 2000 and Baltagi et al. 2009.
[2]Central Bank of Kenya. Research Dept. Several Monthly Economic Reviews

expansion rate of Ksh 12.3 billion or 4.6% in the last period. The accumulation of the NFA was reflected in the holdings of the Central Bank of Kenya.

The aim of this present study is to reinvestigate the linkages between financial development and economic growth in the case of Kenya using annual data over the period of 1971–2011. For this purpose, we employ Cobb–Douglas production function to investigate the relationship between financial development and economic growth including real interest rate, capital and labor as additional factors of production. It is being found that, the variables are integrated at I(1), in the presence of structural breaks. A simulation based ARDL approach to cointegration and Gregory and Hansen's structural break cointegration tests are being applied then. Conditional on the real interest, labor and capital, we report that financial development has positive impact on economic growth in the long run. This finding of the study might give interesting conclusions to the existing literature for the following reason: developed nations received more attention while exploring the connection between economic growth and financial development compared to the developing nation. Interestingly, the nature of financial development is distinct between developed and developing countries. Hence, it makes more sense to conduct experiments using the time series analysis taking the data of developing country like Kenya, which, to our knowledge, has been inadequately explored or never been explored by applying financial development index. This particular work intends to fill that gap by addressing the research objective.

The whole study is segmented into five sections. Section I bears the introductory discussion, section- II expresses a brief literature review, which is followed by section- III, representing methodology and data issues. Results and related discussions are being presented at the next section, and finally section-V draws the conclusion of this study.

2. Literature Review

The works which were done in the past, revolving around the study objective of finding association between financial development and economic growth, were especially focused on the data of developed economies; whereas the literature on the same ground based on emerging and developing countries, particularly for African economies is not adequate. The fundamental question that is found in the relevant empirical literature is: what role does financial development play in economic growth of a nation? To answer this, it is necessary to investigate the causal relationship between the two variables (Levine, 2005; Ang, 2008; Demirgüç-Kunt and Levine, 2008; Shahbaz, 2009, 2012). The direction of the causality had much attention from different researchers; yet, generally speaking, they left out the nature of this relationship in a vague state (Calderon and Liu, 2003). Frequently, the properties of the developing and emerging economies differs from that of the developed countries basing on the traits of their political and economic system, various institutional arrangements, the level of financial development and the role of financial institution on capital market.

In African countries, there is no conclusive evidence on the causal nexus between financial development and economic growth. Agbetsiafia, (2004) conducted a study based on seven African countries and ended up vouching for the unidirectional causality running from financial development to economic growth. Abu-Bader and Abu-Qarn, (2008) applied four dissimilar indicators of financial development in the cases of Egypt, Morocco and Tunisia. They found that bi-directional causality exists between financial development and economic growth. Baliamoune-Lutz, (2008) investigated short-run dynamics and long-run relationship between income and financial development of the North African countries—specifically

Algeria, Egypt, and Morocco— by utilizing the cointegration and VECM models using four indicators of financial development. The empirical results depicted long-run relationship between income and each of the financial development indicators except credit to private sector in Algeria. Based on the Granger causality test, one cannot ascertain a certain way of causality, since the connection type of the variables turns out to be a mixed bag.

Atindehou et al. (2005) used three different indicators of financial development related to West African countries and found fragile causal relationship between financial development and economic growth. Interestingly enough, for the three SSA countries, Odhiambo (2007) found conflicting outcome. According to him, in Kenya and South Africa demand-side effect was supported, while in Tanzania, the supply-side impact was indentified. Odhiambo, (2008) vouched for a unidirectional cohesion, running from economic growth to financial development, by considering money supply (M_2/ GDP) and saving rate as measures of financial development. Unidirectional causality, starting from M_2/GDP and heading towards economic growth—in Kenya—was found by Agbetsiafia, (2004). However, in the case of South Africa, a bi-directional causality running between M2/GDP and economic growth was found by Odhiambo (2010), which supported the supply-side hypothesis. Here Odhiambo worked with the ratio of currency to narrow down the definition of money as a gauge of financial development. By using the Granger Causality test, Odhiambo (2009) found that M_2/GDP has a grave bearing on the economic growth in Kenya, both in the long and short run scenarios.

After investigating the impact of financial development on economic growth by applying ARDL bounds testing approach to cointegration, in Bangladesh, Hye and Islam, (2012) found negative impact of real interest rate and financial development on economic growth. Hye, (2011) went for the same nature of work, within the context of India, finding a positive influence of financial development on economic growth. Within the circumstances of Pakistan, Hye and Wizart (2013) investigated the relationship between financial liberalization and economic growth. They came to a conclusion that, financial liberalization has positive impact on economic growth in long run; yet, the degree of that impact may remain insignificant.

3. Methodology and Data Construction

By going through the empirical studies on finance and growth nexus, it can be comprehended that, the researchers have utilized various proxies of financial development in order to construct financial development index (FDI). The construction of FDI[3] required the calculation of the weights of financial indicators, which took aid from the principal component method (PCM). In this study, emphasize is given to build FDI for Kenya. In Kenya, financial system is dominated by the banking sector. The index focuses more on financial development in the context of banking sector. The ratios used here are: domestic credit provided by banking sector as a percent of GDP; domestic credit to private sector as a percent of GDP; money plus quasi money (M_2) as a ratio of money (M1). The data of all these series is collected from world development indicators (WDI). The weight of each series is computed by using the principal component method (PCM).

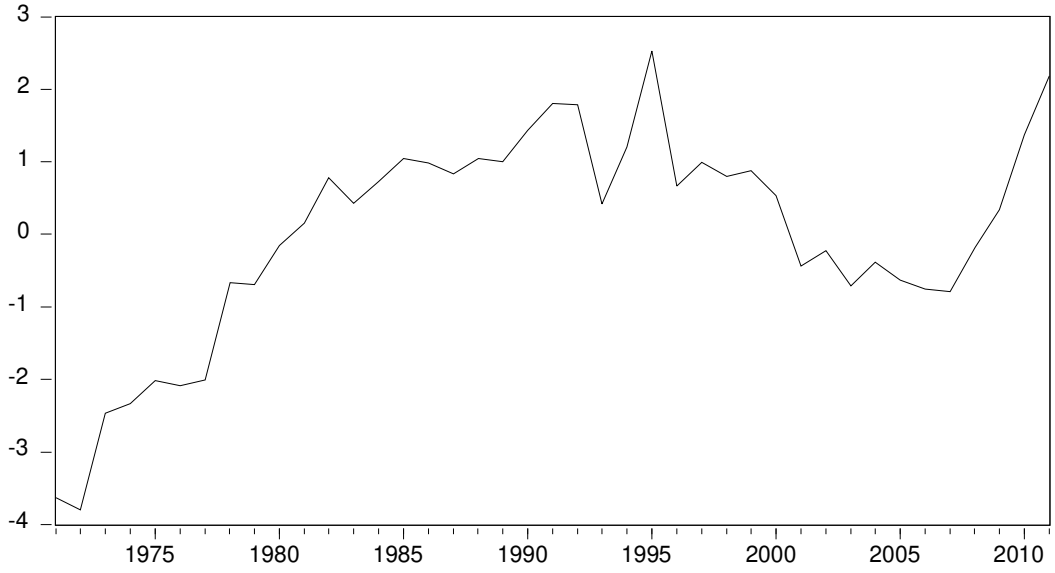
[3]Ang and Mckibbin, (2007) constructed FDI in case of Malaysia; Khan and Qayyum, (2007) utilized four indicators of financial development in case of Pakistan. Kar et al. (2008) constructed financial liberalization index for Turkey; Hye and Isalm, (2012) also developed an index of financial development in case of Bangladesh.

Table-1: Financial Development Index Analysis

	Eigen values	% variation	% cumulative	
PC1	2.270	75.650	75.650	
PC2	0.679	22.660	98.310	
PC3	0.050	1.690	100	
	Eigenvectors		Weights	
	PC1	PC2	PC1	PC2
LDCB	-0.636	0.286	-2.693	1.212
LDCP	-0.627	0.349	-3.650	2.033
LFIN	-0.449	-0.892	-2.241	-4.447

Table-1 explains the construction of financial development index. In order to select the principal component (PC), the three PCs—domestic credit provided by banking sector as a percent of GDP, domestic credit to private sector as a percent of GDP and money plus quasi money (M_2) as a ratio of M_1—turns out to be 75.65%, 22.66% and 1.69% of the standardized variance, respectively. In this paper, we select the first PC to calculate financial development index. The first principal component is a linear combination of the three standard measures of financial development with weights given by the first eigenvector. In Kenya, financial system is dominated by the banking sector. The trend of financial development index is shown in the Figure-1.

Figure-1: Financial Developemnt Index



The graph of FDI is shown at figure-1, which states the dynamism in financial development that took place in Kenya during the sample period. First, it shows a steady upward trend from 1971 to 1991, and then it illustrates a moderate upward slope from 1992 to 1993 followed by a sharp decline. Again, the line increases sharply until 1995 from the last point. From 1995 to 2008, it fluctuates and shows moderate declining trend till 2008. From 2008 to onwards, it moved upward. This study covers annual data over the period of 1971-2011, which is the longest possible data set for Kenya. The World Development Indicators (CD-ROM, 2012) is being used to collect the data regarding real GDP per capita, real interest rate, capital and labor.

Assuming real interest rate (r_t) and financial development (f_t) as a determinant of total factor productivity, the Cobb-Douglas production function is modeled as following:

$$y_t = \Omega l_t^{\beta} k_t^{\varphi} \tag{1}$$

Here, y_t indicates real GDP per capita, Ω demonstrate residual withholding the impact of real interest rate and financial development. $l_t$and k_t are labor and capital, respectively. The β andφ remains as partial elasticities of the respective variables. All the data used in this study were converted to logarithmic form. We can rewrite equation (1) as follows:

$$ly_t = \pi_0 + \pi_1 lf_t + \pi_2 lr_t + \pi_3 ll_t + \pi_4 lk_t + u_t \tag{2}$$

Here, ly_t, lf_t, lr_t, ll_t, lk_t and u_t are natural log of real GDP per capita, financial development, real interest rate, labor force, capital use; in the said equation error term is assumed to be normally distributed in time *T*. The methodological discussion has severalsteps. At the first step of this study, we applied the augmented Dickey-Fuller (ADF) (Dickey and Fuller, 1979, 1981) and Phillips and Perron, (1988) tests for checkingthe order of integration among the series. In order to check the robustness of the stationarity properties, we applied the unit root test in the presence of structural breaks. To overcome the limitation of the conventional unit root process, Perron suggested allowing for a known or exogenous structural break in the Augmented Dickey–Fuller (ADF) tests. Zivot-Andrews, (1992) provided three version of the structural break model to investigate the unit root hypothesis for real GDP per capita, real interest rate, financial development, labor and capital. In the presence of structural break points in the series, these econometric models are proven to be very useful while investigating the stationarity properties of the macroeconomic variables.

At the second step, we apply the ARDL bounds testing approach to cointegration developed by Pesaran et al. (2001). This approach provides a method for assessing both the short run and long run phenomena. The critical value bounds are computed by stochastic simulations using 20000 replications. The ARDL model used in this study can be expressed as follows:

$$\begin{aligned}\Delta ly_t = {} & \pi_0 + \pi_1 ly_{t-1} + \pi_2 lf_{t-1} + \pi_3 lr_{t-1} + \pi_4 ll_{t-1} + \pi_5 lk_{t-1} \sum_{i=1}^{p} \theta_i \Delta ly_{t-i} \\ & + \sum_{i=1}^{p} \phi_i \Delta lf_{t-i} + \sum_{i=1}^{p} \gamma_i \Delta lr_{t-i} + \sum_{i=1}^{p} \varphi_i \Delta ll_{t-i} + \sum_{i=1}^{p} \Omega_i \Delta lk_{t-i} + u_t \end{aligned} \tag{3}$$

Here, *p* signifies the maximum lag length which is determined by the user.The ARDL bounds test approach is being referred to estimate equation (3), using the ordinary least squares (OLS) method. F-test is used in a bounds test for understanding the existence of a long-run relationship (Pesaran et al. 2001), and it also tests for the joint significance of lagged level variables involved. The null hypothesis of the non-existence of a long-run relationship for the equation of $F_{\ln Y}(\ln Y_t / \ln F_t, \ln L_t, \ln K_t)$ is $H_0 : \pi_1 = \pi_2 = \pi_3 = \pi_4 = \pi_5 = 0$ and the alternative hypothesis remains as $H_a : \pi_1 \neq \pi_2 \neq \pi_3 \neq \pi_4 \neq \pi_5 \neq 0$. F-statistics is being used while considering the other four variables in turn, as the dependent variables.

Coming to the third step, in order to check the robustness of the cointegration test,long run relationship between real GDP per capita, financial development, real interest rate, labor and capital is being examined by applying such a cointegration test that accommodates for structural breaks in the series, only if the individual series are found to be nonstationary I(1). Instead of assuming that the cointegration vectors are time invariant we use the Gregory and Hansen,(1996) residual-based test of cointegration, which allows the existence of one-time change in the cointegrating parameters. Gregory and Hansen analyzed four models and then tested the null hypothesis of nocointegration. The models include shifts in either the intercept (Model C) or trend (ModelC/T) or shifts in the intercept and slope (Model C/S). In this study, the application of the C/S is unique, because it allows long run equilibrium relationship to rotate as well as to shift in a parallel fashion.

Finally, the error correction model (ECM) is being applied,referringto equation (2). To ensure the convergence of the dynamics relatedto the long run equilibrium, the sign of the lagged error correction (ECM) coefficient must be negative and statistically significant. A general correction model is formulated as follows:

$$\Delta ly_t = \sum_{i=1}^{p} \theta_i \Delta ly_{t-i} + \sum_{i=1}^{p} \phi_i \Delta lf_{t-i} + \sum_{i=1}^{p} \gamma_i \Delta lr_{t-i} + \sum_{i=1}^{p} \varphi_i \Delta ll_{t-i} + \sum_{i=1}^{p} \Omega_i \Delta lk_{t-i} + \lambda ECM_{t-1} + \mu_t \quad (4)$$

Where λ is the speed of adjustment parameter showing the convergencepace from short run towards long run. To ensure the application of correct statistical methods to the model, diagnostic analysis is conducted. The stability tests such as the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) developed by Brwon et al. (1975) and based on the recursive regression residuals, were employed to that end.

4. Results and Discussion

The variablesconsidered in this studyare most likely to have unit roots, eventually nonstationarity .Again, innovation accounting with nonstationary variables are inconsistent. Adding with the said concerns, we also need to check the variables for the order of integration before we test them for cointegration. In this regard, the most common test is the Augmented Dickey-Fuller (ADF) (Dickey and Fuller, 1979, 1981) test. However, Phillips and Perron, (1988) proposed a modification of the Dickey-Fuller (DF) test and developed a more comprehensive theory of unit root nonstationarity. Table-2 presents the results of both the ADF and PP tests. Both tests provide us with a consistent set of results: while real GDP per capita, financial development, real interest rate, capital and labor have unit root regardless of the tests, the first differences of these series, are clearly stationary under both tests, and thus these variables are integrated at I (1).

Table-2: Unit root test results

Variables	Augmented Dicky-Fuller (ADF)		Phillips-Perron (PP)	
	T-statistics	Unit Root	T-statistics	Unit Root
$\ln Y_t$	1.069(1)	I(1)	-2.965(1)	I(1)
$\ln F_t$	-2.421(0)	I(1)	-2.407(1)	I(1)
$\ln R_t$	-2.785(1)	I(1)	-3.373(1)	I(1)

$\ln L_t$	-2.547(4)	I(1)	-0.0435(5)	I(1)
$\ln K_t$	-1.302(0)	I(1)	-1.558(1)	I(1)
$\Delta \ln Y_t$	-5.781 (0)***	I(0)	-3.186 (1)*	I(0)
$\Delta \ln F_t$	-7.212 (0)***	I(0)	-7.185 (2)***	I(0)
$\Delta \ln R_t$	-4.527 (2)***	I(0)	-9.590 (16)***	I(0)
$\Delta \ln L_t$	-3.173 (8)*	I(0)	-1.883 (4)*	I(0)
$\Delta \ln K_t$	-4.834 (0)***	I(0)	-4.735 (4)***	I(0)

Note: ***, ** and * represent significant at 1%, 5% and 10% level of significance. Lag order is shown in parenthesis based on SBC.

Table-3: Structural Break Unit root test results

Variables	Zivot-Andrews (ZA) Test		
	T-statistics	Break Year	Decision
$\ln Y_t$	-3.346(1)	1992	Unit root exists
$\ln F_t$	-0.848(4)	2005	Unit root exists
$\ln R_t$	-4.266(2)	2004	Unit root exists
$\ln L_t$	-3.737(4)	1993	Unit root exists
$\ln K_t$	-3.337(1)	2005	Unit root exists
$\Delta \ln Y_t$	-3.467 (4)*	2004	Stationary exists
$\Delta \ln F_t$	-0.848 (4)*	2005	Stationary exists
$\Delta \ln R_t$	-6.183 (2)***	2002	Stationary exists
$\Delta \ln L_t$	-5.466 (4)***	1992	Stationary exists
$\Delta \ln K_t$	-5.754 (0)***	1979	Stationary exists

Note: ***, ** and * represent significant at 1%, 5% and 10% levels of significance. Lag order is shown in parenthesis

The issue of structural break is handled by applying Zivot-Andrews, (1992) unit root test. This test makes room for a single unknown structural break arising in the series. The results for Zivot and Andrew, (1992)unit root test are presented in Table-3. This empirical evidence indicates that the series are non-stationary at level but found to be stationary at 1st difference. This signifies that all the series are integrated at I(1).

Table-4: Lag Length Selection Criteria

Lag length Criteria						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-28,097	----	0,000	1,742	1,957	1,819
1	277,059	513,948	0,000	-13,003	-11,710	-12,543
2	375,125	139,357	0,000	-16,849	-14,478	-16,005
3	438,700	73.613*	5.75e-15*	-18.878*	-15.431*	-17.652*

Note: * indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion

The appropriate lag order of the variables is important for the ARDL bounds model specification. Table-4 indicated the lag length criterion. F-test results are sensitive to the number of lags set for each first-different variable in the equation (Bahmani-Oskooee and Nasir, 2004). Given our sample size, the SBC is preferred to the AIC. Narayan, (2005) and Pesaran and Shin, (1999) argued that SBC-based ARDL model performs better than AIC-based model. Therefore, the optimal lag length based on the SBC is selected. The result indicates that three is the optimal lag in such yearly frequency data over the period of 1971-2011 in thecase of Kenya.

Table-5: The ARDL Bounds Test to Cointegration

Dependent variable	Forcing variables		F-statistic	Decision	
$\ln Y_t$	$\ln F_t, \ln R_t, \ln L_t, \ln K_t$		5.849**	Cointegration exists	
Asymptotic critical value	95% critical bounds			90% critical bounds	
	I(0)	I(1)		I(0)	I(1)
F(5, 2)	3.204	4.539		2.669	3.797

Notes: ** indicates a rejection of the null hypothesis of no cointegration at the 5% level of significance. The lag order is shown within the small brackets beside the F-statistic.

The estimation results are being presented in Table-5 which is related to cointegration based on the ARDL method. If the calculated *F*-statistic exceeds the upper critical bound then null hypothesis of no cointegration among variables can be rejected. If the calculated *F*-statistic falls below the lower critical bound then null hypothesis of no long run relationship cannot be rejected. If the calculated *F*-statistic remains between the lower and upper critical bounds then the decision is inclusive. In addition, Pesaran et al. (2001) postulatedthat the critical values for the bounds test are sensitive to the number of regressors (k) in the model;while, Narayan, (2005) argued that the critical values of the *F*-test depend on the sample size. Since, we have a relatively small sample size, we have computed critical values (CVs) of the *F*-test by stochastic simulations using 20, 000 replications. According to the results in Table-5, evidence exists for cointegration when the variable $\ln Y_t$ is used as dependent variable in the case of Kenya.

Table-6: Gregory-Hansen Structural Break Cointegration test

Procedure	Estimated Model	$\ln Y_t(\ln F_t, \ln R_t, \ln L_t, \ln K_t)$	Time Break
ADF	T-Statistics	-2.889***	1992
	P-Value	0.006	

Note: :*** represents significant at 1% level of significance. The ADF statistics show the Gregory–Hansen tests of cointegration with an endogenous break in the intercept. The critical values provided by Gregory and Hansen, (1996).

In order to check the robustness of the cointegration relations among the variables, Gregory and Hansen, (1996) structural break cointegration approach is being applied. Reliability of the ARDL becomes doubtful due to the presence of structural breaks in a given series. Hence, we utilized Gregory and Hansen, (1996) structural break cointegration approach to test both the reliability and robustness of long run relationship among the variables (see Gregory and

Hansen, 1996). The results of Gregory–Hansen cointegration test i.e. a residual based cointegration test are shown in Table-6 which accommodates single structural break in the series. This has confirmed the cointegrating relationship among real income, financial development, real interest rate, labor and capital in the case of Kenya, in the presence of structural breaks.

Table-7: Long Run Analysis for Kenya

Dependent Variable: $\ln Y_t$		
Variables	Coefficient	Std. Error
Constant	3.087*	1.667
$\ln F_t$	0.039**	0.025
$\ln R_t$	0.043*	0.025
$\ln L_t$	0.071	0.092
$\ln K_t$	0.287**	0.087
Diagnostic Test		
AR 1-2 test:	F(2, 28) = 1.2087 [0.3137]	
ARCH 1-1 test:	F(1, 37) = 1.5956 [0.2144]	
Normality test:	Chi^2 (2) = 2.9122 [0.2331]	
RESET23 test:	F(2, 28) = 1.7614 [0.1903]	

Notes: ** and * indicate significance at 5% and 10% levels, respectively.

Table-7 presents the long run coefficients of the ARDL model. The estimated long run coefficients of real interest rate and financial development are positively associated with economic growth in Kenya. It is noted that a 1 percent increase in lr_t leads economic growth by 0.043 percent. This finding is consistent with the view noted by Khan and Qayyum, (2007) in the case of Pakistan. In case of financial development, a 1 percent increase in lf_t drives the growth in real GDP by 0.039 percent, given that all else is same. This result is consistent with earlier findings reported by Ang, (2007); Khan and Qayyum, (2007) and Shahbaz, (2009, 2012) and Kar et al. (2008) for Malaysia, Pakistan and Turkey respectively. Capital usage has positive impact on economic growth as predicted by the growth theories. All else remaining same, a 1 percent increase in economic growth is linked with a 0.287 percent boost in capital use in Kenyan economy. This implies that capital is a stimulus for economic growth. The relationship between labor and economic growth is positive,yet insignificant. The diagnostic tests for long run results reported in Table-7 show that the underlying desirable assumptions of classical linear regression model (CLRM) are fulfilled.

Table-8: Short Run Analysis for Kenya

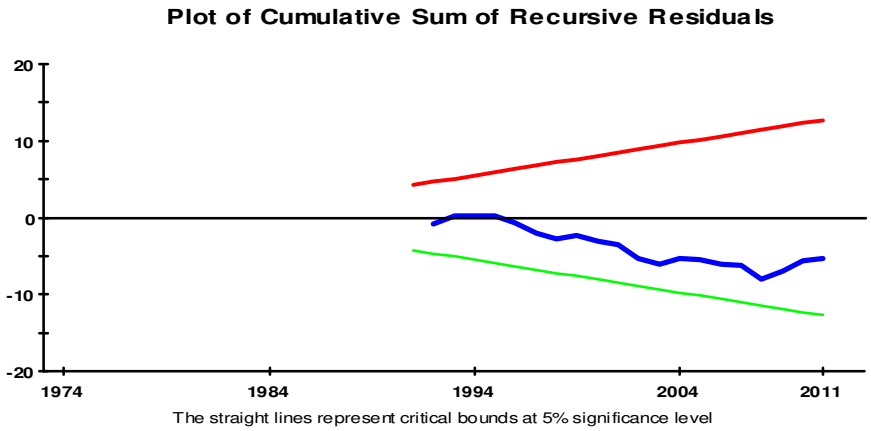
Dependent variable = $\Delta \ln Y_t$			
Variables	Coefficient	Standard Error	P-Value
$\Delta \ln F_t$	0.011**	0.004	0.018
$\Delta \ln R_t$	0.005*	0.003	0.081
$\Delta \ln L_t$	-19.154***	6.205	0.004
$\Delta \ln L_{t-1}$	23.186***	6.167	0.001
$\Delta \ln K_t$	0.081***	0.010	0.000
ECM_{t-1}	-0.284***	0.092	0.004

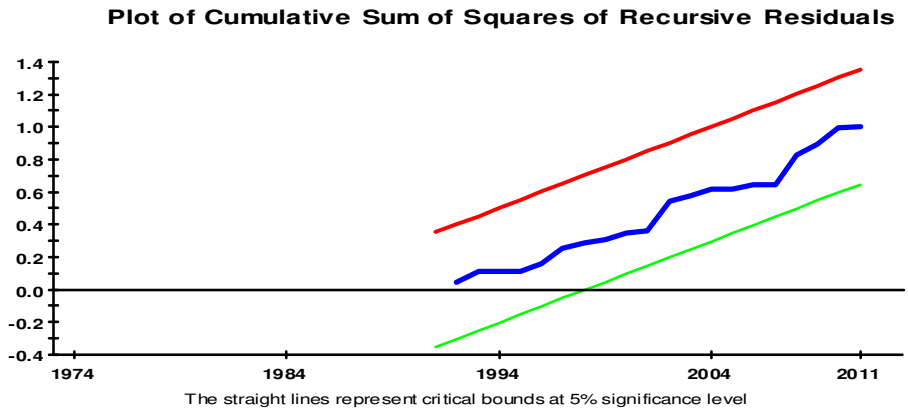
R^2	0.745	$Adj - R^2$	0.675
CUSUM	[Stable]	CUSUMSQ	[Stable]
*ecm = LGDP -.039355*LFDI -.28761*LK -.071125*LL -.043714*LRIR -3.0874*INPT*			
Diagnostic Tests:	F-statistic	P-Value	
Normality test:	χ^2 (2) = 0.908	0.635	
AR 1-2 test:	F(2, 30) = 0.453	0.639	
ARCH 1-10 test:	F(10, 18) = 0.754	0.667	
Hetero test:	F(10, 27) = 0.602	0.798	
Hetero – X test:	F(20, 17) = 0.314	0.992	
RESET23 test:	F(2, 30) = 0.015	0.984	

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

The short run results reported in Table-8 indicate that the impact of financial development, real interest rate, lag of labor and capital on economic growth is positive and it is statistically significant at 5 percent, 10 percent and 1 percent levels, respectively. The negative sign on the error correction term confirms the expected convergence process in long run dynamics. In fact, 28.5 percent of last year's disequilibria are corrected in the current year, suggesting a good speed of adjustment in the relationship process following a shock in the last year.

Additionally, Table-8 presents the diagnostic tests performed on growth model for Kenya. The model carries out several diagnostic tests. The Ramsey's RESET test is considered as a general test for model misspecification. The LM-test isknown for finding autocorrelation in the estimated residuals. The said test is for heteroscedasticity in the form of auto-regressive conditional autocorrelation heteroscedasticity(ARCH). The test statistic and the critical value are calculated as for the autoregressive (LM) process. A significant ARCH test signals a mistakenly specified model. The normality test is also conducted on the residuals.This test is based on theexamination of skewness and kurtosis of residuals. The residual should be normally distributed for making inference regarding the model. The results of the tests suggest that the estimations of the long-run coefficients and the ECM are free from serial correlation, heteroscedasticity and non-normality at 1% level. The equations are also free from any functional-form misspecification at 1% level. The adjusted R-squared values are in the vicinity of 67.5 percent, signifying a good fit for the models. The plots of the CUSUM and CUSUMSQ statistics are well within the critical bounds, implying that, all coefficients in the ECM model are stable over the sample period 1971-2011.





V. Conclusion and Policy Implications

The relationship between financial development and economic growth within the frame of Kenya is being reinvestigated, using the Cobb-Douglas production function. This issue holds grave importance for a country like Kenya having a developing economy and where the role of financial sector is believed to be a vital one for mobilizing and allocating savings into productive investments. A freshly developed simulation based ARDL bounds testing and Gregory and Hansen structural break cointegration are being implemented for testing the long run scenario, while using the ADF, PP and Zivot-Andrews structural break unit root tests the stationarity properties of the variables have been examined.

It is being found that all the variables are integrated at order one I(1), which is consistent with the structural break unit root tests. Our results confirmed the cointegration between financial development, real interest rate, labor, capital and economic growth in the case of Kenya. Gregory-Hansen cointegration test—a residual based cointegration test—accommodates one structural break in the series. This test confirmed the cointegrating relations among the variables. Financial development has positive influence on economic growth. Along with financial development, real interest, labor and capital are also important determinants influencing economic growth. This finding implies that Kenyan policymakers can vibrate the development of financial sector and thus can stimulate economic growth in Kenyan economy, in the long run.

This study demonstrates a positive impact of financial development on economic growth; still, without making an allowance for trade openness, the optimal impact of financial development on economic growth can't be grabbed. This paper can be augmented for future research following Shahbaz, (2012) by incorporating foreign capital inflows (Rahman and Shahbaz, 2012) in Cobb-Douglass production function for Kenya; and by implementing the rolling window approach that provides better results, compared to other cointegration approaches (Hye and Islam, 2012).

References

1. Abu-Bader, S., & Abu-Qarn, A. S. (2008). Financial development and economic growth: The Egyptian experience. Journal of Policy Modeling, 30(5), 887-898.
2. Agbetsiafia, D., (2004). The finance growth nexus: evidence from Sub-Saharan Africa. Savings and Development 38, 271–288.
3. Ang, J. B., (2008). Survey of recent developments in the literature of finance and growth. Journal of Economic Surveys, 22, 536-576.
4. Ang, J. B., Mckibbin, W. J., (2007). Financial liberalization, financial sector development and growth: evidence from Malaysia. Journal of Development Economics 84, 215-233.
5. Atindehou, R. B., Guyeie, J. P., Amenounve, E. K., (2005). Financial intermediation and economic growth: evidence from Western Africa. Applied Financial Economics 15, 777-790.
6. Bahmani-Oskooee, M., Nasir, A. B. M., (2004). ARDL approach to test the productivity bias hypothesis.Review of Development Economics, 8, 483-488.
7. Baliamoune-Lutz, M., (2008). Financial development and income. International Advances in Economic Research 14, 422-432.
8. Baltagi, B. H., Demetriades, P. O., Law, S. L., (2009). Financial development and openness: evidence from panel data. Journal of Development Economics 89, 285-296.
9. Bencivenga, V. R., Smith, B. D., (1991). Financial intermediation and endogenous growth. Review of Economic Studies 58, 195-209.
10. Brown, R. L., Durbin, J., Evans, J. M., (1975). Techniques for testing the constancy of regression relations over time. Journal of the Royal Statistical Society 37, 149-163.
11. Calderon, C., Liu, L., (2003). The direction of causality between financial development and economic growth.Journal of Development Economics 72, 321-34.
12. Demirgüç-Kunt, A., Levine, R., (2008). Finance, financial sector policies, and long-run growth. Policy Research, Working Paper 4469, The World Bank Development Research Group, Finance and Private Sector Team.
13. Dickey, D., Fuller, W. A., (1979). Distribution of the estimates for autoregressive time series with a unit root. Journal of the American Statistical Association 74, 427-431.
14. Dickey, D., Fuller, W. A., (1981). Likelihood ratio statistics for autoregressive time series with a unit root. Econometrica 49, 1057-1072
15. Greenwood, J., Jovanovic, B., (1990). Financial development, growth, and the distribution of income. Journal of Political Economy 98, 1076-1107.
16. Gregory, A. W., Hansen, B. E., (1996). Residual-based tests for cointegration in models with regime shifts. Journal of Econometrics 70, 99-126
17. Hye, Q. M. A., (2011). Financial development index and economic growth: empirical evidence from India. The Journal of Risk Finance 12, 98-111.

18. Hye, Q. M. A., Islam F., (2012). Does financial development hampers economic growth: Empirical evidence from Bangladesh.Journal of Business Economics and Management.14(2), 558-582
19. Hye, Q. M. A., Wizarat, S., (2013). Impact of financial liberalization on economic growth: A case study of Pakistan. Asian Economic and Financial Review 2, 270-282.
20. International Monetary Fund (2000), Annual Report on Exchange Arrangements and Exchange Restrictions, Washington, D.C.
21. Kar, M., Peker, O., Kaplan, M., (2008). Trade liberalization financial development and economic growth in the long run: the case of Turkey. The South East European Journal of Economics and Business 3, 25-38.
22. Khan, M. A., Qayyum, A., (2007). Trade liberalization, financial sector reforms and growth.Available on http://mpra.ub.uni-muenchen.de/2655/1/MPRA_paper_2655.pdf.
23. Levine, R., (2005). Finance and growth: theory,mechanism and evidence. In: Aghion, P., Durlauf, S.N. (Eds.), Handbook of Economic Growth, 1. Elsevier, North-Holland, pp. 865–934.
24. Levine, R., Loayza, N., Beck, T., (2000). Financial intermediation and growth: causality analysis and causes. Journal of Monetary Economics 46, 31-77.
25. McKinnon, R. I., (1973). Money and capital in economic development.Brookings Institution, Washington, DC.
26. Narayan, P. K. (2005). The saving and investment nexus for China: evidence from cointegration tests. Applied Economics, 37, 1979-1990.
27. Odhiambo, N. M., (2007). The determinants of savings in South Africa: an empirical investigation. African Finance Journal 9, 17-33.
28. Odhiambo, N. M., (2008). Financial depth, savings and economic growth in Kenya: a dynamic casual relationship. Economic Modelling 25, 704-13.
29. Odhiambo, N. M., (2009). Finance-growth-poverty nexus in South Africa: a dynamic causality linkage. The Journal of Socio-Economics 38, 320-325.
30. Odhiambo, N., (2010). Finance-investment-growth nexus in South Africa: an ARDL-bounds testing procedure. Economic Change and Restructuring43, 205-219.
31. Pesaran, M. H., Shin, Y., Smith, R. J., (2001). Bounds testing approaches to the analysis of level relationships. Journal of Applied Econometrics 16, 289-326.
32. Pesaran, M. H., Shin. Y., (1999). An autoregressive distributed lag modeling approach to cointegration analysis. Chapter 11 in Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium, Strom S. (ed.). Cambridge University Press: Cambridge.
33. Phillips, P. C., &Perron, P. (1988). Testing for a unit root in time series regression. Biometrika, 75(2), 335-346.
34. Popiel, P. A., (1994). Financial systems in Sub-Saharan Africa: A comparative Study. World Bank discussion Papers - African Technical Department Series
35. Schumpeter, J. A., (1934). The theory of economic development.Cambridge, MA, Harvard University Press.
36. Shahbaz, (2009). A reassessment of finance-growth nexus for Pakistan: under the investigation of FMOLS and DOLS techniques. The IUP Journal of Applied Economics 1, 65-80.
37. Shahbaz, M., (2012). Does trade openness affect long run growth? Cointegration, causality and forecast error variance decomposition tests for Pakistan. Economic Modelling 29, 2325-2339.
38. Shahbaz, M., Rahman, M.M., (2012). The dynamic of financial development, imports, foreign direct investment and economic growth: cointegration and causality analysis in Pakistan. Global Business Review, 13, 201–219.

39. Shaw, E. S., (1973). Financial deepening in economic development. New York, Oxford University Press.
40. Zivot, E., Andrews, D., (1992). Further evidence on the great crash, the oil price shock, and the unit root hypothesis. Journal of Business and Economic Statistics 10, 251-270.