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Long-Run Relationships among Financial Development, Financial Inclusion, and Economic Growth: Empirical Evidence from Kenya

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ABSTRACT

Purpose: This study aims to assess the impact of financial development and financial inclusion on economic growth in Kenya by investigating the long-run relationships among them.

Design/methodology/approach: This study uses bank claims on the private sector and broad money to proxy for financial development, and mobile money to proxy for financial inclusion. With controlling for investment and trade openness, this study employs the vector error-correction model to investigate the long-run relationships among real gross domestic product (GDP), bank claims on the private sector, broad money, and mobile money for the period 2007-2018.

Finding: The study finds the existence of stable long-run relationships in which financial inclusion has a significant positive impact on future economic growth, whereas financial development reveals a mixed impact, as the latter shows a significant negative impact. The empirical results also indicate that there exists a bidirectional relationship between mobile money and economic growth and a unidirectional relationship running from bank claims on the private sector to economic growth.

Research limitations/implications: The study recommends the policymakers to improve access to affordable credit by the private sector or lower the lending rates on credit to encourage the necessary innovation and expansion in plant capacity in agriculture, industry and manufacturing while creating an environment that fosters innovations in information technology and promotes mobile money services to extend financial inclusion to the poor.

Keywords: Economic growth, Financial inclusion, Financial development, Mobile money, Vector error correction model (VECM)
JEL Classification Code: G20; G21; I30

1. Introduction

Economists hold differing perspectives on the importance of financial development in economic growth. First, it is argued that financial sector

development is an important determinant of economic growth (McKinnon (1973), Shaw (1973), King and Levine (1993a, 1993b), Calderón and Liu (2003), and Bist (2018)). On the contrary, it is postulated by several economists that financial development responds automatically to the changing demands of an expanding economy and thus economic growth drives financial sector development (Robinson (1952), Kuznets (1955), Lucas (1988)). Another view also

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suggests an interaction in both directions, namely, that financial development boosts economic growth and economic growth enhances financial sector development at the same time (Lewis (1955), Patrick (1966), Luintel and Khan (1999)).

Along with the debate on the importance of financial development in economic growth, financial inclusion has recently gained much attention as a growth determinant. Meaning the ease of accessibility and availability of the financial services for all economic agents, financial inclusion has important implications on long-term economic growth, as it helps reduce extreme poverty and boost shared prosperity, thus promoting sustainability in both inclusive and equitable economic growth (Pradhan et al. (2016b), Kim et al. (2018)). This article particularly focuses on the role of mobile money to proxy for financial inclusion, as it has been greatly enhanced by the adoption of mobile money services through widespread cellular communications, notably among the previously unbanked and underserved population segments. Mobile money decreases the prices of competitors significantly and promotes resource mobilization and demand for banking products, so that it can contribute to economic development, reduce poverty, and increase shared prosperity as an engine to both financial inclusion and equitable growth.

The study examines the influence of financial development and financial inclusion upon economic growth in Kenya by investigating their long-run relationships. In particular, the study explores the dynamic linkages among financial development, financial inclusion, and economic growth by adopting a vector error correction model (VECM) for quarterly time series data spanning 2007 to 2018. The research uses the ratio of bank claims on the private sector to GDP and the ratio of broad money to GDP to proxy for financial development and the ratio of mobile money transactions to GDP to proxy for financial inclusion.

Kenya is chosen for the research as the country of interest, since it has been a pioneer in introducing mobile money services in Africa, which has the highest financial exclusion rate with a large population

living below the poverty line. According to Groupe Spécial Mobile Association (GSMA (2015)), sub-Saharan Africa has the highest mobile money penetration in the world, with Eastern Africa leading at 55% and Kenya pioneering at 58%. Kenya launched its first mobile money service called M-pesa in March 2007, and since then money transactions have greatly diversified in the country through M-pesa to provide individuals with avenues to easier payments, savings, access to healthcare and education, as well as the availability of loans and investments in small businesses.

II. Literature Review

A. Financial Development and Economic Growth

Financial development can boost economic growth through capital accumulation and technological advancement by increasing the saving rate, pooling and mobilizing savings, producing investment information, facilitating and encouraging foreign capital inflows, optimizing capital allocations, and diversifying risk. This is because financial development is the process of lowering costs for seeking information, enforcing contracts, and making transactions in the financial system. A well-developed financial system thus promotes access, transparency, and stability, playing a critical role in mobilizing long-term investments.

Theoretically, the premise that financial development is a major stimulus for economic growth was first established by Schumpeter (1911), who acknowledges that a well-functioning financial system promotes innovation by identifying and funding entrepreneurs encouraged to implement production processes along with innovative products. Patrick (1966) later articulated the possible interactions between financial development and economic growth with the supply-leading, demand-following, and feedback effects hypotheses.

First, the “supply-leading” hypothesis of financial development posits that financial sector development creates a condition under which real economic growth

can occur by intermediating funds from savers to investors. According to Patrick's supply-leading hypothesis, well-managed financial deepening increases the supply of funds, facilitates financial transactions at a lower cost, and mobilizes savings to ensure that valuable resources are efficiently allocated to development activities, thus leading to real economic growth. This hypothesis has also been supported by McKinnon (1973), Shaw (1973), King and Levine (1993a, 1993b), Beck et al. (2000), Levine et al. (2000), Calderón and Liu (2003), Shan (2005), and Ductor and Grechyna (2015). Pradhan et al. (2016a) argue in their study of the interactions among financial sector development, innovation, and economic growth that a well-developed financial sector accompanied by enhanced innovative capacity contributes to long-run economic growth.

By contrast, the "demand-following" hypothesis asserts that economic growth leads to financial sector development. The phrase "where enterprises lead, finance follows" coined by Robinson (1952) implies that financial development responds to the changing demands of the economy. Similarly, Patrick (1966), Gurley and Shaw (1967), Jung (1986), Odhiambo (2007), and Zang and Kim (2007) indicate that real economic growth causes financial sector development, as the former is accompanied by increased demand for financial services, thereby inducing financial sector expansion.

Lastly, Patrick (1966) hypothesizes a feedback effect between financial sector development and economic growth. Under this hypothesis, financial development and economic growth are mutually causal and have an interaction between the demand-following and supply-leading hypotheses. It is argued that supply-leading is prominent in the early stages of economic development, but gradually diminishes as development proceeds, thus making demand-following predominant. Empirical studies that support the feedback effect hypothesis include Demetriades and Hussein (1996), Luintel and Khan (1999), and Al-Yousif (2002).

B. Financial Development and Economic Growth in Africa

In Africa, the finance-growth nexus has recently received focus albeit with inconclusive results. For example, Adu et al. (2013) find that whether financial development is important for economic growth depends on the selection of the indicator used as a proxy. Ndikumana (2000) and Ghirmay (2004) find empirical evidence to support either the supply-leading hypothesis or the feedback effect hypothesis between financial development and economic growth in sub-Saharan African economies and contend that African countries should advance their economic growth by improving their existing financial systems.

Jedidia et al. (2014) employ the autoregressive distributed lag method to examine the finance-growth nexus in Tunisia, pointing out that bank credit to the private sector drives long-run economic growth, whereas its short-run effect is dependent on the fragility of the financial sector. On the contrary, Odhiambo (2009) examines the finance-growth-poverty link in South Africa and finds that economic growth causes financial depth, whereas both finance and growth lead to poverty reduction. Further, Akinlo and Egbetunde (2010) investigate the dynamic interaction between financial development and economic growth in sub-Saharan African countries, finding that the supply-leading hypothesis holds in the Congo Republic, the Central African Republic, Nigeria, and Gabon and that the demand-following hypothesis holds in Zambia. They also find a feedback effect in Chad, Kenya, South Africa, Swaziland, and Sierra Leone.

C. Financial Inclusion and Economic Growth

Along with the debate on the relationship between financial development and economic growth, the role of financial inclusion has been highlighted by many researchers on abating income inequality and economic growth. According to Kim et al. (2018), financial inclusion can be defined as "the ease of accessibility and availability of the formal financial

services, such as bank deposit, credits, insurance, etc., for all participants in an economy”. Lack of accessibility to financial services for the poor, or financial exclusion can slow economic growth and raise an important issue of inequality in society (Demirgüç-Kunt et al. (2008)).

Sarma and Pais (2011) attempt to construct the Human Development Index measuring the quality of human life and find that levels of human development evolve closely with a financially inclusive system in an economy. Hariharan and Marktanner (2012) adopt a simple Solow growth model to evaluate the growth potential of increasing financial inclusion and find that a 10 percent increase in financial inclusion may contribute to increase an average worker’s income by 1.34 percent. Andrianaivo and Kpodar (2011), Kim et al. (2018), and Ali et al. (2019) empirically investigate whether financial inclusion spurs economic growth and find that both are mutually causal.

Mobile money, indicating the provision of financial services through a mobile device, is suggested as an effective way to expand economic opportunities for the poor in rural areas as well as the underprivileged and unbanked in society by providing them with access to various basic financial services. Potential economic impacts of mobile money are well summarized by Jack and Suri (2011). Its mechanism of easy payment and safe storage facilitates trade, inter-personal transactions, net household savings, and transfers across a long distance. Mobile money also promotes timely transfer of small amounts of money and expands the geographic reach of informal risk-sharing networks to allow individuals to share risk and make investment decisions more efficiently. Mbiti and Weil (2015) find that mobile money complements the banking sector as it causes the prices of competing money transfer services to decrease, stimulates demand for financial products such as credit and savings, and revolutionizes the pattern of remittances. Therefore, mobile money is found to have direct and significant effects on financial inclusion by improving the financial behavior of rural households and increasing their welfare (Bongomin et al. (2018),

Ggombe (2015)).

Based on the above-mentioned literature, the study adopts the VECM to evaluate the joint impact of financial development and financial inclusion on economic growth in Kenya. The research adopts mobile money services to proxy for financial inclusion and adopts bank claims on the private sector and broad money to proxy for financial development, so that it investigates the long-run relationships among financial development, financial inclusion, and economic growth.

III. Data and Empirical Model

A. Data

The research uses quarterly time-series data spanning from 2007 to 2018. Financial development is proxied by the ratio of bank claims on the private sector to GDP (CPSY) and the ratio of broad money to GDP (M2Y). The first variable excludes credit to the public sector and thus reflects the efficient allocation of resources in the economy since the private sector is considered to use funds in a more productive way. It precisely measures the contribution of the financial sector to funding private sector investment and is related to the quantity and efficiency of investment in an economy by indicating the financial depth of the banking system and measuring how successful the financial sector intermediates funds from savers to investors. Bank claims on the private sector have a clear advantage over monetary aggregate measures such as M1, M2, and M3 since it represents the investment funds channeled into the private sector more accurately (De Gregorio and Guidotti (1995)). This ratio has been adopted in numerous studies such as Beck et al. (2000), Calderón and Liu (2003), Demetriades and Hussein (1996), and King and Levine (1993a, 1993b).

The second variable can measure the financial depth and degree of financial sector intermediation (Calderón and Liu (2003), King and Levine (1993b)).

However, it might not be a satisfactory indicator for developing countries since it may also measure the extent of monetization, which can increase without financial development, as pointed out by Khan et al. (2006).

For CPSY and M2Y, there can be a problem of stock flow on the items found on financial intermediary balance sheets. In order to address these concerns, the research computes the ratio by averaging the real financial balance sheet items in periods t and $t-1$ and dividing them by real GDP in year t , following the recommendations of King and Levine (1993a) and Levine et al. (2000). For example, we adjust the ratio of bank claims on the private sector to GDP as $CPSY_t = 0.5(CPSY_t/CPI_t + CPSY_{t-1}/CPI_{t-1})/(GDP_t/CPI_t)$.

Financial inclusion is proxied by mobile money services measured as the ratio of total mobile money transactions to nominal GDP (MMY). The former refers to universal access to the useful and affordable financial products and services needed by individuals and businesses in a fair, responsible, and sustainable way. Since the mobile money services facilitate the flow of money and reduce the cost and risk inherent in dealing with cash, mobile money adoption is considered as a powerful tool for enhancing financial inclusion and is closely related to financial inclusion shown by Bold et al. (2012) and Porteous (2006).

For economic growth, the research adopts real GDP per capita (GDP) following Levine (1999). For the control variables in the model, the research employs investment and trade openness known to have a strong influence on economic growth. The former is measured as the ratio of gross fixed capital formation to nominal GDP (INVY), while the latter is measured as the ratio of the sum of exports and imports to nominal GDP (OPNY) that represents the exposure of the country's economy to international trade.

B. Model Specification

To explore the long-run relationships among

financial development, financial inclusion, and economic growth, the study considers the following regression model:

$$GDP_t = \beta_0 + \beta_1 CPSY_t + \beta_2 M2Y_t + \beta_3 MMY_t + \beta_4 INVY_t + \beta_5 OPNY_t + \varepsilon_t \quad (1)$$

where GDP_t is real GDP per capita, $CPSY_t$ is bank claims on the private sector, $M2Y_t$ is broad money, MMY_t is mobile money, $INVY_t$ is investment, and $OPNY_t$ is trade openness. To have a long-run relationship, these variables should be cointegrated and the disturbance term ε_t should be stationary.

Cointegration tests can be carried out using Johansen's (1988) multivariate cointegration model based on the error correction representation:

$$\Delta Y_t = \mu + \Pi Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + \varepsilon_t \quad (2)$$

where $Y_t = (GDP_t, CPSY_t, M2Y_t, MMY_t, INVY_t, OPNY_t)'$, μ is a 6×1 vector of the constant terms, Π and Γ_i represent 6×6 coefficient matrices, ε_t is a 6×1 vector of disturbances, and Δ is a difference operator with p denoting the lag length. Note that Π contains information about the long-run relationships.

The VAR system of regression eq. (2) can be estimated using OLS, and Johansen's (1988) rank testing procedure can be applied to test the long-run equilibrium relationship between economic growth and the explanatory variables of financial development, financial inclusion, and the control variables. Johansen (1988) proposes two likelihood ratio test statistics for determining the cointegrating vectors of Y_t . The first is the trace statistic given by

$$LR_{trace}(r) = -T \sum_{i=r+1}^K \ln(1 - \hat{\lambda}_i) \quad (3)$$

and the second is the maximum eigenvalue test statistic given by

$$LR_{max}(r, r+1) = -T \ln(1 - \hat{\lambda}_{r+1}) \quad (4)$$

where $\hat{\lambda}_i$ denotes the i -th estimated characteristic roots

Table 1. Johansen cointegration rank test results

	Eigenvalue	Statistic	5% Critical Value	1% Critical value
Panel A: Trace Statistics				
None		135.08***	94.15	103.18
At most 1	0.79	64.06	68.52	76.07
At most 2	0.49	33.18	47.21	54.46
At most 3	0.29	17.44	29.68	35.65
At most 4	0.17	9.12	15.41	20.04
At most 5	0.15	1.78	3.76	6.65
Panel B: Maximum Eigenvalue Statistics				
None		71.02***	39.37	45.10
At most 1	0.79	30.88	33.46	38.77
At most 2	0.49	15.74	27.07	32.24
At most 3	0.29	8.32	20.97	25.52
At most 4	0.17	7.35	14.07	18.63
At most 5	0.15	1.78	3.76	6.65

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

of the Π matrix and T is the number of time series observations. According to Lütkepohl et al. (2001), both tests have similar properties with respect to small-sample power and there are no major differences between maximum eigenvalue and trace tests. However, they recommend to use the trace tests if one wants to apply just one version of the tests since the tests have superior power over the maximum eigenvalue tests and are advantageous if there exist at least two more cointegrating relations in (2).

Once the variables in consideration were found to have a cointegrating relationship, the VECM can be applied to estimate the relevant dynamic regression equation. The VECM can be formulated as follows:

$$\begin{aligned} \Delta GDP_t = & \beta_0 + \sum_{i=1}^{p-1} \beta_1(i) \Delta CPSY_{t-i} + \sum_{i=1}^{p-1} \beta_2(i) \Delta M2Y_{t-i} \quad (5) \\ & + \sum_{i=1}^{p-1} \beta_3(i) \Delta MMY_{t-i} + \sum_{i=1}^{p-1} \beta_4(i) \Delta INVY_{t-i} \\ & + \sum_{i=1}^{p-1} \beta_5(i) \Delta OPNY_{t-i} + \sum_{i=1}^{p-1} \beta_6(i) \Delta GDP_{t-i} \\ & + \Omega ECT_{t-1} + e_t \end{aligned}$$

where Δ denotes the differencing of the variable, ECT_{t-1} denotes the long-run equation, and e_t is the stationary disturbance term. In eq. (5), the research focuses on the equation of real GDP per capita to investigate the short-run dynamics of the variables of interests.

IV. Results and Discussions

A. Empirical Results

Before applying Johansen's test procedure, the research tests the macro variables for nonstationarity by applying the efficient GLS unit root test by Elliott et al. (1996) and fails to reject the null hypothesis of no unit root in all the variables at the 5% level. Further, the research chooses the optimal lag length of two based on the results of the Bayesian information criteria, which are also used in the subsequent analysis of the VECM for long-run and short-run dynamics.¹⁾

Table 1 presents the results of the cointegration rank tests for both the trace and the maximum eigenvalue statistics in (3) and (4). Both tests indicate the existence of at most one cointegrating vector present in the system at both the 1% and the 5% levels, which implies the existence of five independent common stochastic trends in the system of six macro variables for Kenya.

1) The results of the unit root tests and lag length determination are not reported but can be provided on request. We select the optimal lag length based on the Bayesian information criteria, as it is known to select the most parsimonious model.

Table 2. Granger causality test results

Null hypothesis	F-statistic	P-value
<i>GDP</i> does not granger-cause <i>CPSY</i>	0.62	0.43
<i>CPSY</i> does not granger-cause <i>GDP</i>	4.67**	0.03
<i>GDP</i> does not granger-cause <i>M2Y</i>	0.32	0.57
<i>M2Y</i> does not granger-cause <i>GDP</i>	5.46**	0.02
<i>GDP</i> does not granger-cause <i>MMY</i>	4.05**	0.04
<i>MMY</i> does not granger-cause <i>GDP</i>	5.80**	0.02
<i>GDP</i> does not granger-cause <i>INVY</i>	1.49	0.22
<i>INVY</i> does not granger-cause <i>GDP</i>	0.50	0.48
<i>GDP</i> does not granger-cause <i>OPNY</i>	2.08	0.15
<i>OPNY</i> does not granger-cause <i>GDP</i>	0.01	0.94

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

Table 3. Normalized coefficient estimates of long-run equation

GDP	CPSY	M2Y	MMY	INVY	OPNY	_cons
1.0000	-17.08**	45.11***	-3.76***	-19.22***	-0.46	-12.08
	(6.77)	(8.94)	(0.46)	(7.44)	(1.52)	
	[-2.53]	[5.04]	[-8.17]	[-2.58]	[-0.31]	

Note. *, ** and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The values of t-statistics are given in square brackets and the standard errors are given in parentheses.

Since there exists a unique cointegrating vector in the six variable VAR system (2), the research can model the VECM representation using one error correction term that captures the long-run relationships among the variables. Before analyzing the long-run relationships, the research performs multivariate Granger causality tests for the VECM to examine whether the causality among financial development, financial inclusion, and economic growth is unidirectional or bidirectional.

Table 2 presents the F-statistics and p-values for the Granger causality tests from the VECM specification in (2). First, for financial development, the study can reject that neither bank claims on the private sector nor broad money Granger-cause economic growth at the 5% level and the empirical evidence strongly supports the “supply-leading” hypothesis that financial development leads to economic growth. This finding is consistent with those of Jedidia et al. (2014) and Calderón and Liu (2003). For financial

inclusion, the study can reject the null hypothesis of no causality for mobile money as well as for economic growth at the 5% level. Thus, the empirical evidence strongly suggests that bidirectional causality exists between financial inclusion and economic growth, and that financial inclusion may be an important determinant of economic growth.

Next, the study estimates the multivariate VECM in (2) to analyze the long-run relationships among financial development, financial inclusion, and economic growth. The long-run relationships are represented by the coefficient matrix Π of the long-run equation in (2), which can be obtained by estimating the cointegrating vector and normalizing it with respect to the coefficient estimate of GDP_t .

Table 3 presents the long-run estimation results that the slope coefficient estimates of the macro variables are found to be significant at the 5% level, except for the control variable of trade openness ($OPNY_t$). Regarding financial development, the results

indicate that bank claims on the private sector ($CPSY_t$) have a positive and statistically significant coefficient estimate for economic growth in the long run, which implies that it influences economic growth positively. However, the ratio of broad money to GDP ($M2Y_t$), the second proxy for financial development, has a significant but negative coefficient estimate for economic growth. This negative effect may be partly due to the ineffectiveness of broad money in developing countries to serve as a financial development proxy since it includes currency held outside banks that may represent the degree of monetization rather than the degree of financial development, as pointed out by Khan et al. (2006). Therefore, the study concludes the empirical finding lends partial support to the supply-leading hypothesis in Kenya that financial development stimulates economic growth through increased private sector productivity, in line with the findings of Levine et al. (2000), Calderón and Liu (2003), and Jedidia et al. (2014).

For financial inclusion, the slope coefficient estimate for mobile money (MMY) is statistically significant with a positive long-run effect on economic growth in Kenya. This finding may be ascribed to the fact that the adoption of mobile money enhances financial access and has great potential to influence economic growth through multiple channels. The mobile money ecosystem has increased both mobile savings and access to credit, thereby boosting entrepreneurial activities, particularly for small and medium-sized enterprises. In addition, the technology has greatly contributed to building a more effective payment system to facilitate the trading of goods and services, thus increasing aggregate expenditure. Ultimately, the multiplier effect of the mobile money ecosystem has largely contributed to economic growth

through financial inclusion with a more robust deposit base and increased mobile saving portfolios. This finding is consistent with those of Hariharan and Marktanner (2012) and Kim et al. (2018).

Finally, the results show that investment (INVY) has a positive and statistically significant slope coefficient estimate for economic growth, consistent with economic theory. This implies that an increase in investment not only boosts aggregate demand but also stimulates the productivity and productive capacity of the economy, thus increasing economic growth in the long run. Finally, trade openness has an insignificant effect on economic growth, indicating that it may not be an important factor for economic growth in Kenya.

Table 4 presents the coefficient estimates of eq. (5) to investigate the short-run dynamics of the macro variable in the system. The estimated coefficient of the error correction term, Ω , presented at the first column exhibits a speed of adjustment parameter estimate toward the long-run equilibrium and is statistically significant at the 1% level, confirming the existence of stable long-run relationships among the variables of interest. It also has the expected negative sign, which implies that whenever there is a deviation from the long-run equilibrium, quarterly economic growth adjusts to it by 0.57%.

In the short run, all the coefficient estimates for the lagged values of financial development and financial inclusion are statistically significant; moreover, both broad money and mobile money have positive short-run effects on economic growth, whereas bank claims on the private sector have negative short-run effects.

Table 4. Error Correction Model

ECM(-1)	D.GDP	D.CPSY	D.M2Y	D.MMY	D.INVY	D.OPNY	_cons
-0.0057***	0.144	-0.447**	0.550**	0.029**	-0.141	0.003	-0.0014
(0.0016)	(0.150)	(0.207)	(0.235)	(0.012)	(0.199)	(0.034)	(0.0014)
[-3.69]	[0.96]	[-2.16]	[2.34]	[2.41]	[-0.71]	[0.08]	[-1.01]

Note. *, ** and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The values of t-statistics are given in square brackets and the standard errors are given in parentheses.

B. Discussion of empirical results

The main findings of this paper indicate that stable long-run relationships among financial development, financial inclusion, and economic growth exist. For financial development, there is mixed evidence; bank claims on the private sector stimulate economic growth in the long run through increased investment efficiency, yet broad money is found to have a significant but negative effect on economic growth. For financial inclusion, mobile money has a statistically significant positive influence on economic growth in the long run, which suggests it has contributed to a more prosperous economy by enhancing financial accessibility. Finally, from the Granger causality tests, we find a unidirectional relationship between bank claims on the private sector and economic growth, but a bidirectional interaction between mobile money and economic growth. These empirical results support that financial inclusion and economic growth are mutually causal, whereas they lend partial support to the supply-leading view that financial development contributes to economic growth.

V. Conclusion

In the literature, the relationship between financial development and economic growth has long been investigated by many scholars because of its varied implications for economic development policies; the demand-following hypothesis emphasizes growth-enhancing development policies, whereas the supply-leading hypothesis emphasizes policies of financial sector liberalization.

The study examines the long-run relationships among financial development, financial inclusion, and economic growth in Kenya between 2007 and 2018 using quarterly data. Bank claims on the private sector and broad money are used to proxy for financial development and mobile money to proxy for financial inclusion. Adopting the VECM, the study contributes

to the existing literature by incorporating the mobile money ecosystem as an “on-ramp” for universal financial access. The empirical results reveal that stable long-run equilibrium relationships exist among financial development, financial inclusion, and economic growth in Kenya; in particular, economic growth adjusts to correct any deviation from the long-run equilibrium in the short run. The results also show that bank claims on the private sector and mobile money have statistically significant and positive effects on economic growth, suggesting that both variables are growth-enhancing factors in the long run. On the contrary, broad money has a negative long-run effect on economic growth. It is found that while financial development causes economic growth in Kenya, there are mixed evidence with positive and negative effects, which lends partial support to the supply-leading hypothesis. Finally, there exists a bidirectional linkage between mobile money and economic growth, suggesting that financial inclusion is an important determinant of economic growth and that economic growth drives financial inclusion simultaneously.

This paper provides empirical grounds to suggest some implications for policy. First, given the positive effects of the private sector credit for stimulating economic growth, it is recommended to implement the policies that can improve access to affordable credit by the private sector or lower the lending rates on credit to encourage the necessary innovation and expansion in plant capacity in agriculture, industry and manufacturing as proposed by Adu et al. (2013). Second, the negative effects of broad money on economic growth may imply that central bankers in Kenya should exercise extra caution to prevent expansionary monetary policies from resulting in excess money supply with hurting economic growth. Third, given the existence of a bidirectional linkage between financial inclusion and economic growth, the policymakers should create an environment that fosters innovations in information technology and promotes mobile money services to extend financial inclusion to the poor. For example, they can implement government requirements to offer basic or low-fee

accounts with easing documentation requirements to open an account for the rural residents and the poor, or induce mobile money providers to lower banking costs for them.

Finally, this study analyzes the relationships among financial development, financial inclusion and economic growth using the macro economic variables and opens the door to further research about how mobile money can help foster economic growth at the micro level. For example, Munyegera and Matsumoto (2014) find that the households in Uganda are likely to receive remittances more frequently by using mobile money and increase their per capita consumption by 72 percent. However, the remittances may also affect economic growth negatively if the receiving households rely on them for subsistence and reduce their income-generating activity. Therefore, it will be an interesting research topic to identify the main use of the remittances in Kenyan rural areas. Also, there exist some external barriers to financial inclusion such as low income and levels of education that can exclude women and young people more in Africa (Zins and Weill (2016)). Therefore, it will be interesting to investigate the degree to which mobile money can engage with these alienated groups in Kenya and ponder upon policy intervention to remove the barriers.

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