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RESEARCH AND
POLICY

Contents

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The following are guidelines for the publication;

1) The Journal shall be published twice a year and disseminated through the office of the Editor-In-Chief, who is supported at various stages by the Editorial Committee from within the MEFMI Secretariat.

2) Contributions should be made in the English language and shall ordinarily be published on a continuous first-come-first-served basis, thus allowing for the deferment of some successful articles received late to subsequent issues.

3) Contributions shall be published on a voluntary basis. Special contributions may be occasionally commissioned on an exceptional case-by-case basis.

4) Contributions submitted for publication should be related to macroeconomic and financial management. The contributions should be incisive, informative and as far as possible original, with proper acknowledgement of the work of others used, so as to avoid plagiarism. Contributions will only be published with the authors' consent and their acceptance of liability for content and implications of their contributions.

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8) The Journal shall be distributed in electronic form to stakeholders and other relevant parties.

9) In addition to complying with the editorial guidelines as set out above, contributions should meet the following specific criteria for eligibility for publication:

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iii. Contributions should be concise and brief, within a maximum limit of 5000 words, excluding diagrams and other necessary illustrations;
iv. Contributions need to properly acknowledge
v. others' work, including appending of relevant bibliographies, references, etc;

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i. Title
ii. Author and Designation
iii. Abstract
iv. Introduction
    a. The issues/problem
    b. Purpose / objective/s
    c. Scope
v. Methodology
vi. Analysis and Interpretation
vii. Conclusion / Recommendations
viii. References using the Harvard style

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i. Meeting submission deadlines, i.e. articles should be received within 2 months of the Research and Policy Seminar;
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The Macroeconomic and Financial Management Institute of Eastern and Southern Africa (MEFMI) publishes the MEFMI Research and Policy Journal in English.

1. Competition and Financial Sector Development in Kenya

By Camilla Chebet Talam and Samuel Kiemo Mwangi[1]

Abstract

This paper assesses how financial sector reforms that have increased access to financial services, enhanced efficiency in the banking sector and promoted financial sector stability by increasing competition in the banking sector. We use bank-specific data for the period 2011-2016 categorized into large, medium and small peer groups for 41 banks and 12 microfinance banks. In order to make inferences on competition and access; competition and efficiency in intermediation and, competition and stability, we estimate three main measures of competition (concentration ratios, Panzar – Rose and Persistence of Profit) and apply the Herfindahl-Hirschman Index (HHI), concentration ratios, the Panzar-Rosse model, and Persistence of Profitability model to investigate competitiveness.

The findings suggest that financial sector reforms have resulted in an improvement in competition and efficiency among banking sector categories in Kenya. The reforms have however, significantly benefited the large institutions in reducing concentration and oligopolistic behavior in the banking sector. These reforms have promoted financial development via increased access to financial services and increased bank efficiency. The finding of oligopolistic behavior in the banking sector indicates that large financial institutions promote financial development by increasing financial deepening and efficiency. However, financial consolidation may intensify oligopolistic behavior that may have equivocal effects on financial sector stability. This study proposes that policy should limit its role to providing an enabling environment through monitoring and enforcing current legislation and allow profit maximising financial sector players to enhance competition through innovative business models and collaborative partnerships rather than impose additional regulations on financial sector players to promote competition.

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1.1   Introduction

The financial sector plays the key role of desynchronizing income and consumption streams such that an economic agent can spend more than their income stream through borrowing (Danthine and Donaldson, 2015). The financial sector enables economic agents to spend more than their income through borrowing, thus facilitates them in increasing and smoothening their consumption over time. Efficient desyncronisation of income and expenditures over time and risk results in an increase in savings and channels investments into the most productive projects – ultimately promoting economic growth. The development of the financial sector, in terms of efficiency, stability and deepening of the various financial institutions and thus vibrancy of financial sector is essential for economic growth.

Huang (2011) highlights that financial development cannot be measured by a single number and he goes on to distinguish financial development indicators into various categories including financial intermediary, financial depth, financial size, etc. However, the extant literature on the role of competition in fostering financial sector development only focuses on financial sector development narrowly, either defining financial sector development as efficiency or stability or profitability but does not consider financial sector development holistically as encompassing all these aspects as suggested by Huang (2011). From the definitions of financial development from Levine at al (2000), Beck (1997) and Huang (2011), this paper considers 3 main indicators of financial development, access to finance (financial depth), efficiency in financial intermediation and stability, in relation to competition. By considering efficiency, stability, profitability, and access in relation to competition, this paper contributes to a gap in the literature.

In Kenya, there has been considerable debate about the consolidation of banks stemming from the impact of the segmented banking sector on liquidity distribution, banks loan-to-asset ratios and

profitability (Misati & Kamau, 2014). In addition, there have been various mergers and acquisition following a period of financial stress in the banking sector over the past few years. At the same time, legislation and regulation in the financial sector has been undertaken to promote competition in the financial sector. Some of the reforms promote competition through providing a level playing field and minimizing the barriers to entry so that new players can enter the market. This is positively linked to financial development manifested in financial deepening, efficiency and stability. Other reforms promote financial consolidation through mergers and acquisition reducing the number of players in the market hence reducing competition. Proponents of the positive link between financial consolidation and stability assert that increased concentration through the mergers of many small financial institutions to few large financial institutions fosters stability despite reducing competition. Few big financial institutions are considered to be safer and less vulnerable to financial instability (Beck et al., 2006; Uhde & Heimenshoff, 2009, Allen & Gale 2004). The premise is that fewer, bigger banks are stronger with a larger asset base, safer in terms of better risk taking behavior, more resilient to macroeconomic shocks and financial stress - their higher profits and larger capital base forming the first line of defense against shocks. By advocating for consolidation and undertaking reforms to promote competition, policy has been promoting two contrasting outcomes in the financial sector reforms suggesting a trade-off between competition and financial sector development as empirical evidence suggests.

Moreover, Berger & Hannan (1989) assert that more concentrated markets tend to be more profitable due to their non-competitive price setting practices, as a result of their structure according to the Structure-Conduct-Performance (SCP) theory. SCP theory links a bank's conduct and performance to its market structure (Hannan 1991). If the few large financial institutions set high lending rates and lower deposits rates as suggested by Berger & Hannan (1989) then this high cost of credit is likely to limit access of credit to small and medium enterprises and low income consumers. This finding emphasizes the importance of promoting smaller financial institutions that serve a niche market and offer relatively lower cost of credit to a market that would otherwise be ignored and hence underserved by the larger banks. Weiß at al. 2013 in a study across 440 domestic and international bank mergers, report that more concentrated banking systems posed a higher potential of systemic risk relative to less concentrated banking systems under the "concentration-fragility" hypothesis. Anginer et al. 2014 also confirm a negative relationship between competition and banking sector risk,

where greater competition (thus low concentration) promotes diversified risks and thus reduces banks financial fragility. This evidence suggests that promoting competition can not only positively affect financial deepening and efficiency in the financial sector but also lessen financial fragility, thus suggesting that stability is a result of efficiency and financial depth. Therefore, in spurring competition in the financial sector, policy promotes all aspects of financial development.

This paper aims to contribute to this debate in studying competition structure in Kenya's financial sector to inform policy on whether competition or consolidation is desirable for financial sector development. Following Claessens (2009) we discuss the links between competition and financial development on the following three dimensions: first, access to financial services for households and firms i.e., whether access to financial services has increased on account of greater competition; the second dimension is efficiency of financial services i.e. whether greater competition has reduced interest rates spreads and transactions costs as well as maintained profitability, and finally financial sector stability i.e., whether increased competition has promoted sufficient banks' capital buffer to promote resilience. To undertake this investigation, this paper reviews Kenya financial sector reforms and the outcomes in view of the various elements of competition. The rest of the paper is structured as follows: section 2 provides stylized facts on how the financial sector has developed, section 3 is a summary of the main reforms in Kenya's financial sector over the period under review; section 4 discusses theoretical framework and literature review on competition and the 3 main indicators of financial development, access to finance, efficiency in intermediation and stability, section 5 details the methodology while section 6 presents the results, findings and concludes the paper.

1.2   Stylized Facts in Financial Sector Development in Kenya

In Kenya, we can consider the implications of competition or lack thereof through different facets of financial development. Firstly, at financial depth through the access to financial services via the banking sector; secondly, efficiency by observing the behavior of banks and financial institutions in price setting of deposits and savings rates and thirdly, stability measured by banks capital adequacy ratio efficiency (CAR) and liquidity. These proxies for financial development are in line those applied in various studies of financial development in literature (King and Levine, 1993 a, b; Levine et al., 2000; Al-Yousif 2002; Claessens et al., 2011a, b, Puatwoe et al 2017, among others).

1.2.1   Access to Financial services

The recent financial access survey report dubbed the 2016 Kenya FinAccess Household Survey reports that financial exclusion has reduced to 17.4% from 41.3% ten years ago. Therefore, formal financial inclusion has increased to 75% in 2016 from 26.7% in 2006. (**Chart 1**).

Chart 1: Number of individuals using different financial services (millions)
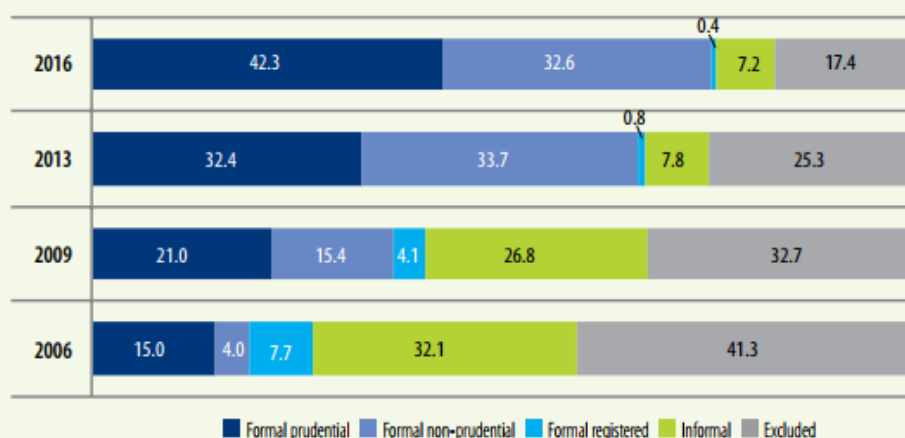
Source: FinAccess household survey 2016, Central Bank of Kenya

The same report indicates that 38.4% of the Kenyan population use banking financial services, up from 14% in 2006 in comparison to 71.4% of the population who use mobile financial services (MFS) (FinAccess Survey 2006). Although access to financial services has increased overall, the banking sector has contributed less to this increase compared with mobile financial services (Chart 2).

Chart 2: Use of different financial service providers over the years (%)
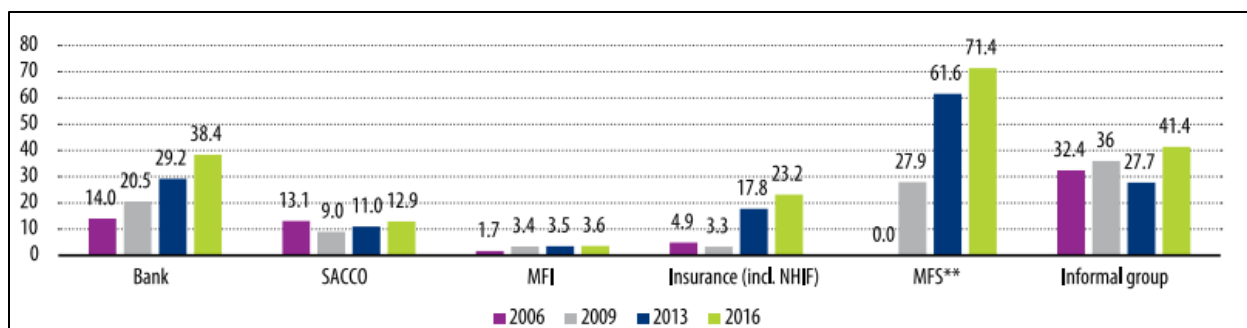
Source: FinAccess household survey 2016, Central Bank of Kenya

Table 1: Banking Sector Assets to GDP and Domestic Private Sector Credit to GDP, 2014

2014	Banking Sector Assets to GDP	Domestic Private Sector Credit to GDP
Kenya	44.14	34.42
Nigeria	18.25	14.54
Tanzania	18.91	13.83
Uganda	19.49	14.37
Egypt	65.83	25.95
South Africa	76.93	151.48
Cape Verde	83.31	62.85
Mauritius	121.9	100.13

Source: Helgi Library

Private sector credit to GDP is a common indicator of financial depth in the literature. Kenya's private sector credit to GDP is higher than its peers in the East Africa region only surpassed by South Africa, Cape Verde and Mauritius. When private sector credit to GDP is compared to banking sector assets to GDP, it emerges that Kenya's banking sector assets to GDP are higher in relation to its peers but lower in relation to South Africa, Cape Verde and Mauritius (Table 1). This indicates that Kenya's financial sector is bank-led rather than market led though not to the extent of South Africa, Cape Verde and Mauritius whose banking sector are mainly bank driven. However, it is important to note that in South Africa, Cape Verde and Mauritius mobile financial services are not as prominent or as developed as that of Kenya.

Kenya's financial sector can be considered bank-led as banking sector assets as a percentage of GDP average at 60 percent from year 2012-2015, compared to pension sector assets at 14 percent, insurance sector assets at 8 percent, deposit taking SACCO sector assets at 5 percent and microfinance banks sector assets at 1 percent. (Table 2). Compared to other African countries like South Africa, Mauritius, Cape Verde, Kenya has relatively low rate of banking sector penetration as

measured by credit to private sector as a percentage of GDP (Chart 3). Inefficiency in financial intermediation arising possibly from the structure of competition in the banking sector may be the cause of low bank usage by individuals that does not translate from high concentration of net bank assets in the financial sector. For instance banks are not competitive in targeting "low hanging fruits" i.e. the underserved markets to increase market share. Contrastingly, these statistics may also indicate that competition in the financial sector by other financial service providers is rising as non-bank financial institutions such as mobile network operators (MNOs) fill the gap left by the banking sector. The 2015 Brookings Financial and Digital Inclusion Project (FDIP), which measures financial inclusion in four broad dimensions: country commitment, mobile capacity, regulatory environment, and adoption of traditional and digital financial services, has ranked Kenya 1st among 21 with 89 percent compared to South Africa, 9 percentage points behind and this is largely driven by mobile network operators driving mobile financial services (Chart 4).

Chart 3: Credit to the Private Sector (as a Share of GDP – 2015)
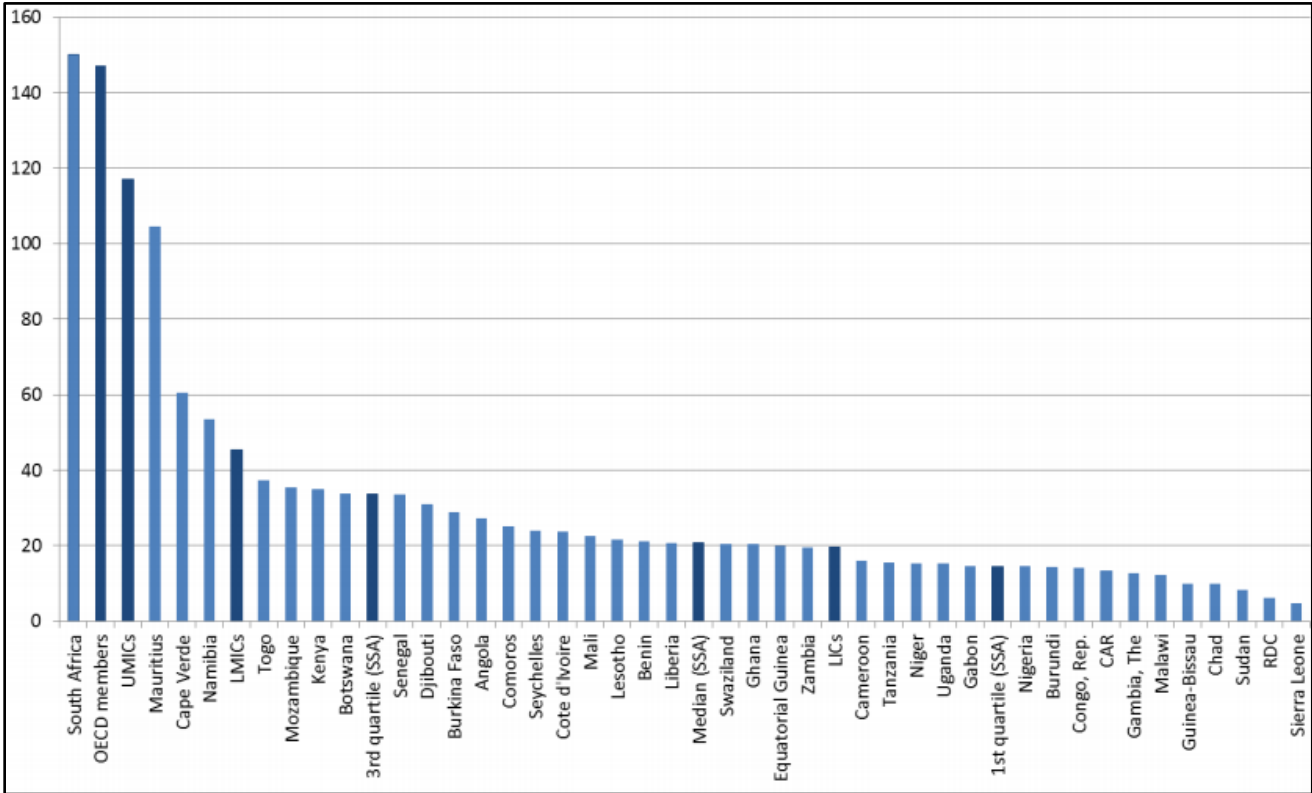
Source: World Bank FINDEX

Table 2: Financial Sector Assets as Percentage of Kenyan GDP

Indicators (As % of GDP)	2012	2013	2014	2015
Banking Sector Net Assets	54.69	57.14	60.87	69.14
Micro Finance Assets		0.88	1.06	1.06
Pension sector Assets	12.88	14.73	14	14.93
Insurance Assets	7.3	7.74	7.96	8.91
Saccos Assets (DTSs)	2.2	5.44	5.63	6.31
TOTAL	**77.07**	**85.93**	**89.52**	**100.35**
NSE Market Capitalization.	29.85	40.6	42.93	38.25

Source: Kenya Financial Stability Report 2015

Chart 4: Kenya ranked first in financial inclusion by FDIP rankings
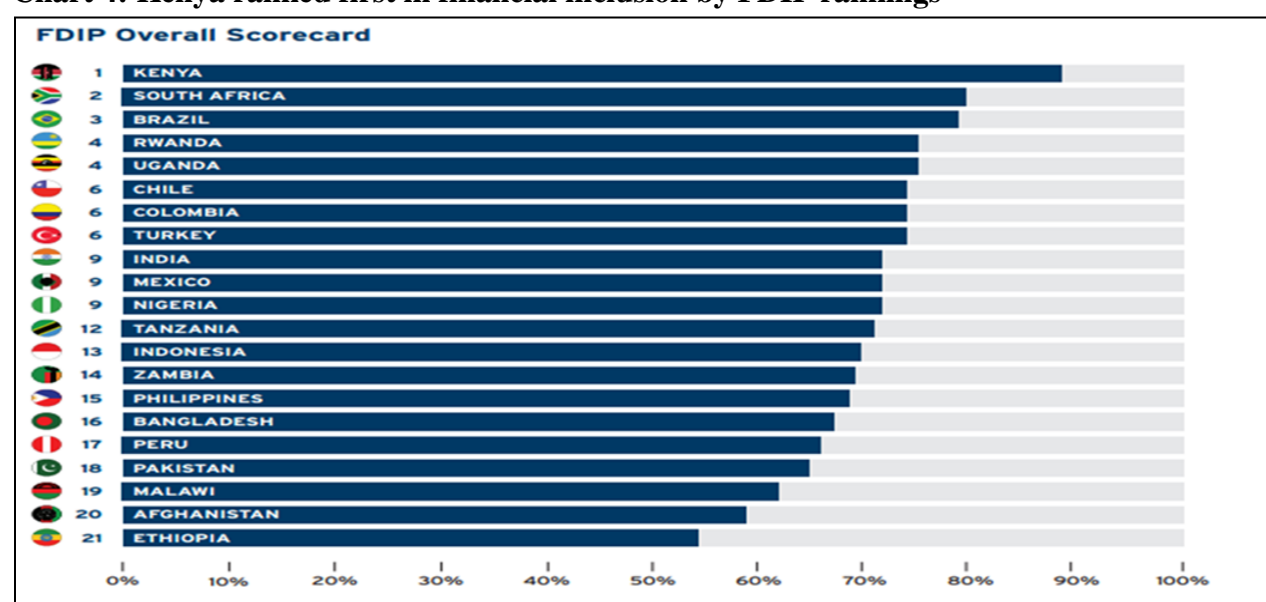
Source: Brookings Financial and Digital Inclusion Project (FDIP), Brookings Institution

Consequently, banks responded differently, for instance, some banks exploited the opportunity to create synergies with telecommunication companies by creating digital saving and credit products, that leverage on Safaricom's telecommunication infrastructure. Contrastingly, other banks ventured in mobile financial services market by establishing products similar to M-Pesa to compete with the existing digital financial products. Telecommunication players enhanced competition in the financial sector especially with respect to the banks.

1.2.2 **Kenya's Banking Sector Efficiency**

Kenya has a vibrant interbank bank with an average weighted interest rate of 7.5% in line with short term rates and consistently high volumes indicating an active interbank market. However segmentation has been witnessed with some high interbank rates and dynamic interbank participation. Segmentation in the banking sector has been cited as a reason for the high cost of credit, due to lack of a competitive credit pricing mechanism (Misati and Kamau, 2014). They attribute the segmented interbank market to the actions of large banks in limiting credit lines to banks in the medium and small peer group, and an asymmetric response to the policy rates in the setting of commercial bank lending rates.

In addition to high funding costs that are experienced by different financial institutions partly due to segmentation, the banking sector faces high monitoring costs that are passed on to the consumers. These have been attributed to the lack of a well-functioning credit information sharing system. High funding and monitoring costs contribute to high intermediation costs and ultimately bank inefficiency as reflected in high interest rates spreads. The interest rate spread remains high at about 11 percent as at July 2016 (Chart 5).

Chart 5: From early 1990's Kenya experienced high interest rate regime
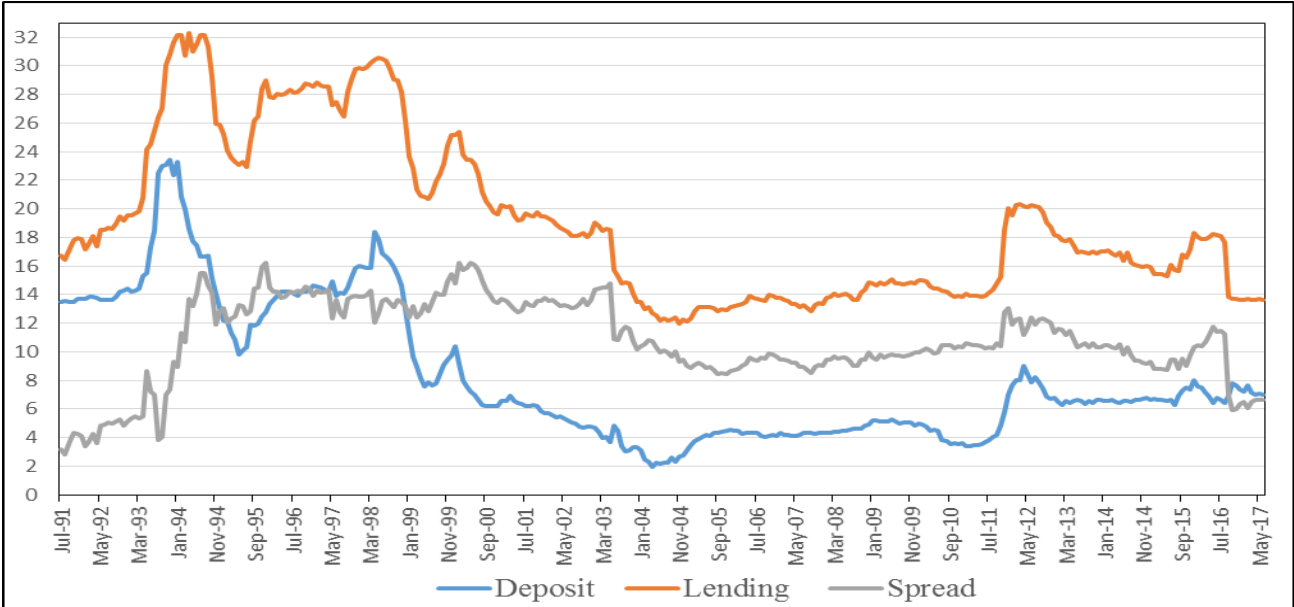
Source: Central Bank of Kenya

A consistently high interest rate spread over a long period of time is a strong indicator of inefficiencies in the banking sector; it indicates monopolistic tendencies, where banks create credit allocation inefficiencies through high interest rates at the expense of channeling credit to productive sectors (Mwega, 2011). Variations in the interest rate spread are attributed to bank efforts to maintain high profit margins. Kenya's banking sector may be inefficient but still maintains high profitability. For instance, compared to other African countries, Kenyan banking sector profitability measured by Return on Assets (ROA) and Return on Equity (ROE) has consistently remained above its peers yet its interest rate spreads are high (Table 3).

Table 3: Commercial banks performance comparison cross selected countries

Return on Asset (%)				
	2012	2013	2014	2015
Kenya	4.6	3.6	3.4	3.1
South Africa	1.3	1.5	1.5	1.5
Uganda	3.9	2.5	2.6	2.6
Tanzania	2.7	2.6	3.0	2.9
Rwanda	3.3	2.6	2.8	2.8
Burundi	3.6	2.2	1.2	1.9
Return on Equity (%)				
	2012	2013	2014	2015
Kenya	29.8	28.9	26.6	25.2
South Africa	17.7	18.6	18.8	20.7
Uganda	24.2	25.2	16.1	16.0
Tanzania	22.0	20.8	22.8	22.4
Rwanda	14.4	11.3	15.4	15.7
Burundi	24.8	14.1	7.8	11.6

Source: Financial Soundness Indicators (FSI), IMF 2015

1.2.3 Commercial Banks Stability

Although, Kenya's financial sector has been stable with no evidence of systemic risk, liquidity distribution has been skewed towards large banks with a larger deposit base and access to funding from the interbank market. Large banks also tend to have lower capital adequacy ratios relative to small and medium banks with higher loan-to-asset values indicating efficiency in credit allocation relative to small and medium banks. Kenya's Banking Sector Annual report 2015 indicates that although large banks have a smaller margin above minimum capital to adequacy ratios when compared to small and medium banks they have higher efficiency in capital utilization. Large banks also tend to be more resilient to credit and liquidity risk relative to small and medium banks, due to

small and medium banks higher non-performing loans, smaller deposit base and lower liquidity ratios (Bank Supervision Annual Report, 2015). Financial sector stability may be compromised by a non-competitive banking sector as the vulnerabilities of some financial institutions may lead to systemic risk due to interconnectedness of the banking sector.

1.2.3.1 Kenya Financial Sector Reforms and Outcomes

Kenya has undertaken various policy reforms to promote competition that are mostly focused on reducing information asymmetry, monitoring, operating and funding costs of banks. Other policy reforms with respect to competition aim to increase the number of financial institutions and subsequently the breadth and variety of financial products. The policy to adopt mobile financial services through the enactment of the National Payment System Act 2011 and regulations have led to developments that may have an impact on competition; these have been driven by non-bank financial institutions. The banking sector has leveraged on technology to reduce their costs and efficiency by introducing digital financial products/services that ride on mobile and technology platforms. Financial sector reforms reduced the risk of bank distress caused by governments directing bank's lending (government owned banks in particular) to unviable and not creditworthy borrowers.

1.3 Financial Sector Reforms

1.3.1 Credit Information Sharing Mechanism

Beck and Fuchs (2004) highlight lack of credit information for borrowers and lenders, as a structural issue affecting competition in Kenya's financial system, resulting in information asymmetry for both borrowers and lenders. Kenya developed the credit reference bureau (CRB) regulations and legislation in 2008. The CRBs are mandated to collect, store and disseminate information on individual's credit and borrowing behavior. The Credit Information Sharing (CIS) framework was operationalized in July 2010. The framework promotes sharing of borrower's credit information among banks and other relevant financial institutions. The aim of the CIS mechanism is twofold; firstly, to provide information to financial institutions to reduce their information search costs with the aim of alleviating adverse selection. Secondly, to provide credit history information to borrowers to be used to negotiate interest rates in loan contracts. In 2011, the amendment widened the scope of

the CIS mechanism to include MFBs and SACCOs, while in 2013 further amendments were passed mandating sharing of positive and negative information.

The CIS mechanism has witnessed major developments in 2015 including introduction of new products such as credit scoring, decision models, trigger alerts, etc. The numbers of data sources have increased from 41 in 2014 to 325 by December 2015, of which SACCOs comprised 204 of the new sources introduced during this period. Usage of credit information sharing by commercial banks and Microfinance banks has been on the rise since 2010 (Chart 6).

Chart 6: Usage of credit information sharing by commercial banks and Microfinance banks
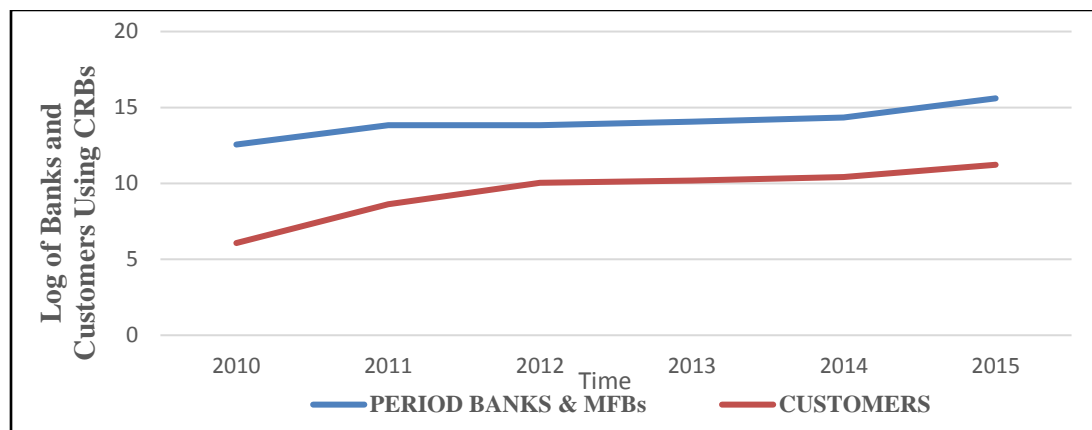
Source: Central Bank of Kenya

The quality of information provided to CRBs has also increased as rejection rates by the CRBs has reduced to 3.4% in December 2015 compared with 9.3% in March 2011 (Kenya Credit Information Sharing Report, 2012; CBK Bank Supervision Report, 2015). We expect that the growth of the CIS framework and the recent improvements in the framework will translate to an increase in financial services access and lower interest spreads from lower monitoring costs as competition in the financial sector improves.

1.3.2 Agency Banking

The Central Bank of Kenya rolled out regulations for agency banking in 2010. Agency banking allows banks to transact through third party intermediaries with the aim of increasing financial inclusion particularly in underserved markets with lower costs of operating for banks. The agency banking model ameliorated the difficulties and costs of setting up "Brick" and "Mortar" branches in remote

locations such as lack of connectivity to the electricity grid, seasonal or infrequent traffic, and lack of a road network among other costs. A bank is able to expand its operations cost-effectively, by increasing its market share without incurring further cost of rent/occupancy and employee costs as these are borne by the agent. The agency banking model also increases the efficiency of the bank as the bank can leverage on technology through the use of a mobile phone facilitated by a bank agent who is the third party. In 2012, agency banking was extended to MFBs.

The uptake of the agency banking model has been tremendous with more banks taking up agency banking since its introduction in 2010 (Chart 7). Efficiency measured as the number of depositors per bank employee (output per employee) has been increasing as agency banking becomes mainstream. As efficiency increases, we expect it to translate to lower interest rate spreads and increased access to financial services particularly in remote areas. Claessens (2005) asserts that networks such as ATM's and branches are significant in terms of competition in the financial sector hence agency banking extends this view of networks. We therefore expect that the agency banking model will level the playing field, hence intensify competition as banks that take up this model gain the advantage of reaching underserved markets in remote areas.

Chart 7: Agency banking adoption by Commercial banks and MFB's
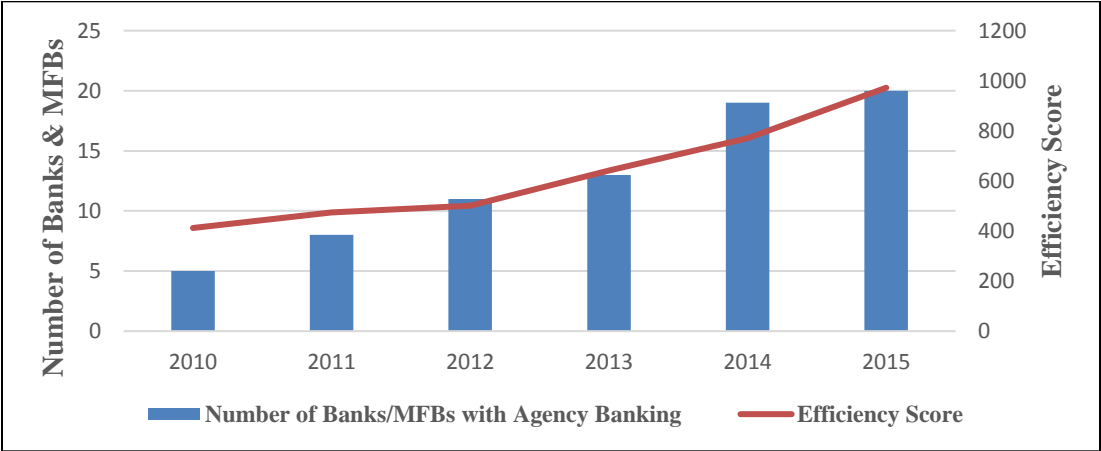
Source: Central Bank of Kenya, 2015

1.3.3 Deposit insurance

The enactment of the Kenya Deposit Insurance Corporation (KDIC) Act, 2014 established KDIC as an autonomous corporate body responsible for providing a safety net for savings, banking and

payments. KDIC provides deposit insurance for all deposits in the event of a bank failure. Additionally, KDIC manages banks under receivership and liquidation on behalf of CBK. Membership of the KDIC is mandatory for all deposit taking institutions licensed under the Kenya Deposit Insurance Act 2012. The coverage limit of insurance deposit is maximum Kshs. 100,000 (USD 1, 010) per depositor and as at 2015 over 80% of deposits were covered (KDIC Annual Report, 2015). Diamond and Dybvig (1983) argue that banks that are subject to bank runs can attract deposits based on a deposit guarantee framework where investors face privately observed risks which lead to a demand for liquidity. Therefore, membership of small peer group commercial and microfinance banks, which are deemed to be susceptible to failure, stand to gain with deposit insurance since depositors' liquidity risk is transferred to KDIC. During bank runs, depositors rush to withdraw their deposits because they expect the bank to fail. In 2016 when a commercial bank in Kenya was put under receivership, over 80% percent of customers of the stressed bank accessed their deposits through deposit insurance hence this did not lead to a second round bank run effect on other peer banks that were perceived to be susceptible. Introduction of deposit insurance has consistently led to accumulation of banks deposits signaling access to cheaper source of funds for banks (Table 4).

Table 4: Introduction of deposit insurance has consistently led to accumulation of banks deposits

Measure	June-2014	Dec. 2014	June-2015	Dec.-2015
Total Accounts	27,423,271	30,697,704	33,936,072	37,353,419
Total Deposits (Kshs. Bns)	2,188	2,385	2,631	2,674
Insurance Cover (Kshs. Mns)	213,708	224,868	246,772	244,647
Fund Growth (Kshs. '000s')	47,176,750	52,165,034	54,914,117	61,726,669

Source: KDIC, 2015

1.3.4 Microfinance Banks (MFBs)

Microfinance institutions emerged as a way for the low and middle income population to access financial services as banks high minimum operating fees barred this segment of the population from accessing and using financial services in the early 80's. In 2007-2008, Equity Bank Limited, a commercial bank expanded into underserved markets of the low and middle income population by providing financial services at affordable rates and without ledger fees. Inadvertently, Equity Bank

spurred competition between commercial banks and Deposit-taking Microfinance institutions (DTM) in the banking sector by pursuing the same niche as that of DTMs.

With rapid growth of DTMs and commercial banks offering similar products at affordable rates, DTMs became limited in terms of their funding base due to the public's perception of their riskiness. In a bid to level the playing field, enhance financial inclusion, and improve market confidence of DTMs, they were translated to Microfinance Banks (MFBs) by an amendment to the Microfinance Act 2013. MFBs have grown tremendously from 2010, from only 2 DTMs in 2010 to a total of 12 MFBs in July 2016 with an asset base of Kshs. 69 billion as at March 2016 (Chart 8). This is a clear indication of reduced decline in the concentration of market power to a more competitive financial subsector. This is expected to translate into cheaper cost of funds for MFBs. Low barriers to entry and exit have generally led to greater product differentiation, lower cost of financial intermediation, increased access to financial services, and enhanced stability (Claessens 2009). The legal reforms to MFBs has reduced barriers to entry and we envisage this to have a positive effect on financial access and stability of MFBs.

Chart 8: MFB's have recorded significant growth since 2010
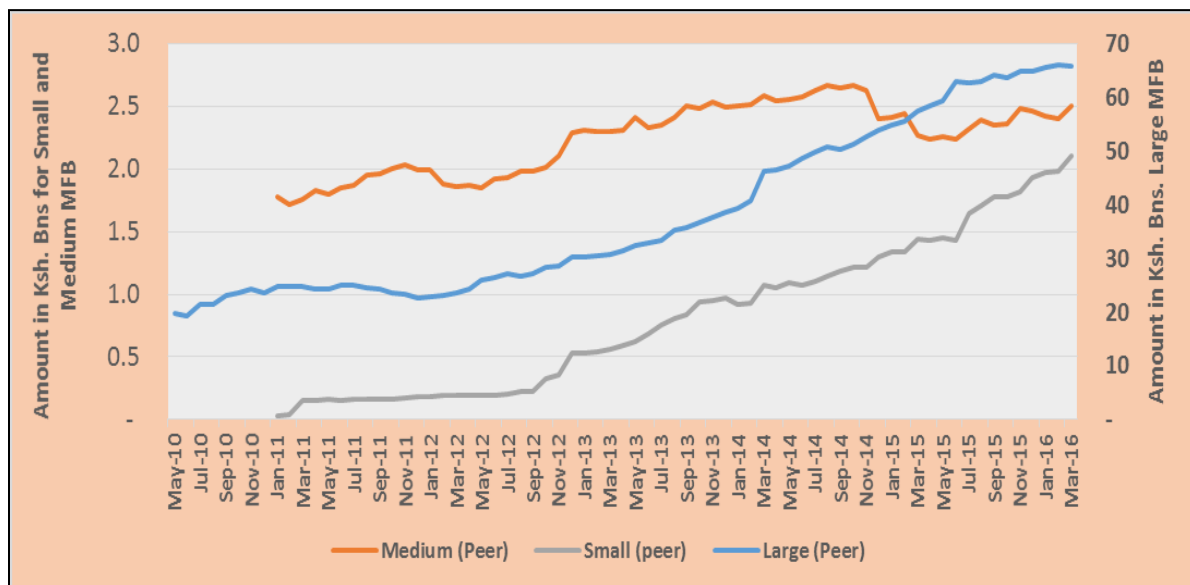
Source: Central Bank of Kenya, March 2016

1.3.5 Mobile Financial Services

Mobile financial services (MFS) arose from the Safaricom Limited Mobile money transfer services dubbed (M-Pesa), a transaction channel that allows people to transact through the use of a mobile phone and a third party agent. As M-Pesa became popular, telecommunication companies began to exploit the opportunity of using their telecommunication infrastructure to develop financial services that would be accessible "at the touch of a button", affordable and with limited requirements of documentation. MFS have revolutionized the financial sector in Kenya. As at 2015 MFS related financial activities had almost tripled since 2010 (Table 5). The expansion of MFS is attributed to adoption of mobile money transfer services by different institutions comprising of both financial and non-financial, including banks, pensions, SACCOs, merchants like microfinance institutions (MFI), NGOs, insurance, government agencies, among others for cash disbursement and repayment of loans and salary payments as well as purchases of goods and services. The trajectory of MFS maintained an upward trend as various financial services have been integrated to the payment system including, credit, savings, deposit, insurance and pension financial products.

Table 5: Kenya MFS Mobile Money Transfers

Year	2010	2011	2012	2013	2014	2015
Total number of agents	39,449	50,471	76,912	113,130	123,703	143,946
Total Mobile money transfer accounts (million	16.4	19.2	21.1	25.3	25.2	31.6
Total number of transactions (million)	311	433	575	733	911	1,114
Total value of transactions (Ksh billion)	732.2	1,169.20	1,537.50	1,901.57	2,371.79	2,816.10
Average value per transaction (Ksh)	2,354	2,700	2,672	2,594	2,604	2,528

Source: Kenya Financial Stability Report 2015

1.3.6 The Horizontal Repo

The Master Repurchase Agreement, otherwise known as the "Horizontal Repo", was rolled out in September 2008 by CBK with the aim of enhancing the intermediation process. Segmentation in the interbank market meant funding costs were considerably high for the small and medium peer groups of banks who have a smaller deposit base relative to banks in the large peer group (Bank Supervision Annual Report, 2015). Small and medium banks tend to have few credit lines with the main lenders in the interbank market where they obtained loans at significantly high rates at times. Due to these high funding costs and limited funding sources, there is a greater chance of banks in the small and medium peer groups passing these costs onto the consumer through lending rates. This segmentation inhibits development of the interbank market and may augment liquidity challenges for banks with

limited funding sources. Hence, segmentation contributes to high intermediation costs, and impedes financial sector development. Therefore, an active horizontal repo market can level the playing field by providing liquidity to banks perceived as vulnerable thus promoting competition in the banking sector.

1.3.7 *Kenya National Payment System Act*

The enactment of Kenya National Payment System Act 2012 provided the necessary legal framework to govern payment system in Kenya. An efficient, reliable and safe payment services, and settlement house, enables banks and customers to transact in real time and at a reduced cost, thus promoting adequate liquidity to the banking system. The introduction of a regional payment system is expected to unlock capital flows to fund banks' balance sheet hence promote financial deepening.

1.4 Literature Review

Empirical literature defines and measures financial development in several ways. As Huang (2011) posits there is no single aggregate measure for financial development. Huang (2011) outlines the various widely used indicators for financial development and categorizes into various groups such as measures of financial efficiency, measures of financial size and measures of financial intermediation (also known as financial depth). Huang (2011) indicates that these measures reflect different elements of financial development as measured by principal component analysis and are thus determinants or can be used as proxies of financial development. Levine et.al (2000) define financial development as financial intermediation measured by ability of financial system to efficiently mobilize and allocate savings, lower transaction costs, control the pooled risks. Beck (1997) defines financial development as an increase in; financial depth, financial intermediation, credit to private sector, and private sector credit to GDP. Other measures of financial development include money supply as a proportion of GDP, total financial assets to GDP, stock market capitalization to GDP, among others.

Claessens & Laeven 2005, Levine, Loayza & Beck, 2000, Besanko & Thakor 1992, Allen & Gale 2004 found a positive association between increased competition and financial development via increased efficiency, greater intermediation and stability. Claessens and Laeven (2005) find a positive relationship between a competitive banking sector and the growth of industries, where a more competitive banking sector provides vital financing to financially dependent industries enabling them to seize growth opportunities. Similarly, Besanko and Thakor (1992) find that heightened competition

lowers the cost of intermediation reducing the cost of capital for non-financial firms resulting in higher growth. Petersen and Rajan (1995) argue that too little competition through intensive market power reduces relationship lending, while Petersen and Rajan (1994) and, Boot and Thakor (2000) argue that too little competition ties borrowers to a particular institution discouraging borrowers from entering a lending relationship with such banks. Chong et al 2013 find that an increase in bank competition reduces financial constraints on Small and Medium Enterprises (SMEs), increasing their access to finance. These studies illustrate that an increase in competition is associated with greater access to financial services, the financial depth element of financial development.

Competition and efficiency of the banking sector is vital in ensuring that resources are allocated to the most productive sector. Pagano (1993) argues that banks with significant market power are able to charge higher lending rates and offer savers a lower deposit rate resulting in a reduction in credit to productive sectors of the economy. Acikalin and Sakinc (2013) suggest that bank competition is strongly related to innovation which increases efficiency and provides higher social welfare. In the case of perfect competition, prices are reduced to equate the price to the marginal cost, this erodes excess profits and enhances social efficiency to its optimal level.

Literature has been debating between the competition-fragility and competition-stability hypotheses for several years. According to the competition-fragility hypothesis, an increase in competition reduces the market power of banks and results in fragility as banks take on risk to increase eroded profit margins. On the other hand, competition-stability hypothesis posits that competition reduces the probability of bank failures. Proponents of the competition-stability hypothesis suggest that concentrated banks increase fragility through too-big-to-fail mentality and thus take on more risk. Allen and Gale (2000, 2004) indicate a less concentrated banking sector with many banks is more susceptible to banking crises. Hong et al (2012) find that concentration is inversely associated with bank risk and thus increased competition lowers bank risk. In a study of over 2,000 banks in Europe, Schaeck and Cihak (2010) conclude that competition promotes stability by encouraging banks to increase capital ratios particularly where there are lower regulatory restrictions on banks. In a later study on panel banking data for European countries, using a different measure of competition Schaeck and Cihak (2013) corroborate their previous findings of a positive link between competition and stability and conclude that competition is stability-enhancing. Opponents of the financial consolidation and stability nexus argue that there may be negative direct and indirect consequences

of financial consolidation due to heterogeneity of financial systems. Amel et al. (2002) points out the heterogeneity of banking systems such as the distinction between commercial banks and investment banks, retail and wholesale banking and bank-led versus market-led financial sectors as determining factors on the impact of financial consolidation on risk taking and profitability. They further show that financial consolidation may not necessarily mean that larger consolidated institutions are safer and more profitable as these institutions may have different risk taking strategies than the smaller individual institutions within them. Further, the consolidation may not result in increased profitability as the financial institutions may experience diseconomies of scale thus offset any economies of scale gained from the larger firms in the merger.

A holistic view of competition on various facets of financial development is vital to determine whether there is a tradeoff between increasing access and ensuring resilience of the institution. Dell A'riccia and Marguez (2004) point out that even as increased competition increases access to financial services, as financial institutions take on risky lending, they weaken their lending standards as was the case in the U.S. Sub-prime loan market. Shaffer (1998) counters the benefits of competition in the banking sector. He argues that, commercial banks main function is to screen and separate prospective borrowers into categories by quality. He finds that the probability of adverse selection increases as the number of bank competitor's increase due to imperfect screening technologies. Therefore, the rejected customer (either of high or low quality) can continue to apply and access credit from competing banks. The greater the competition among banks, the higher the likelihood of selecting low quality applicants, leading to "winner's curse". Cao and Shi (2000) confirm Shaffer's (1998) arguments and empirically demonstrate that a bank extending a loan in a highly competitive market may be "wining the right to fund a lemon". Cetorelli (2001) affirms that, as the number of competing banks increase in the market, it exacerbates the winner's curse, the number of banks active in performing screening and competing to supply credit would actually fall; as a result, loan interest rates would be higher and credit quantities smaller than in a market with fewer banks. Although access to finance and stability are elements of financial development, during periods of financial fragility such as the global financial crisis, regulation prioritizes financial stability to increasing access to finance. This begs the question whether competition can have asymmetric effects on financial development. For instance, is competition negatively correlated with financial development

if it increases financial depth at the cost of banking sector stability? Schaeck and Cihak (2013) resolve this apparent conflict between the two indicators of financial development by linking efficiency to stability. Schaeck and Cihak (2013) establish a link between efficiency and stability such that any reforms that improve efficiency in banks promotes stability, hence promoting financial development. Literature (Schaeck and Cihak (2013); Flamini et al, (2009); Guzman (2000,)) illustrates the positive association between depth, efficiency and stability. Flamini et al (2009) find although there is high risk in Sub-Saharan Africa, banking sectors and market power have kept returns high in SSA banking sectors, thus promoting persistence of profit, the ploughing back of these profits has promoted safer banks thus supported stability. Guzman (2000) finds that banks in a monopolistic economy have a depressing effect on economic growth as these banks ration credit more than banks in the competitive environment where credit rationing conditions exist. Additionally he found monopoly power in banking to be inefficient since it led to excessive monitoring even without credit rationing. In banking sectors with monopoly power, loan rates are higher, increasing likelihood of default. Banks aim to maximize profitability often times by increasing efficiency. By increasing efficiency banks minimize risks and decisions that may be costly and in so doing safeguard their stability. Financial development is thus a combination of depth, efficiency and stability as these studies suggest.

Claessens (2009) provides a broader perspective of the unique nature of competition in the financial sector due to various networks, complexity and the greater affinity to the positive effects of competition while neglecting the disadvantages of competition and the tradeoff between competition and other objectives for the economy and financial sector. Existing literature raises a number of issues about competition and financial development. Competition does not always lead to financial development; therefore, we must be wary of the negative effects of competition. In addition, there seems to be an optimal level of competition, and therefore it is important to accurately measure competition. This will enable determination of the level of competition that produces desirable effect on financial development. We must also be cognizant of network effect that is prevalent in the financial sector, such as distribution network channels that include ATM, branches, branchless banking; funding networks and other networks such as counter-party exposures and cross border exposures. In evaluating the effects of these financial sector reforms, we have to take into consideration the time lag between the implementation of the reforms and their outcome.

1.4.1   *Measures of Bank Competition and Financial Development*

The definition of financial development in this paper borrows from Levine et.al (2000) and Beck (1997) measures of financial development namely; efficiently mobilize and allocate savings, lower transaction costs leading to increased financial access, and increased stability in the financial system. Over time different empirical models have been developed to examine the relationship between competition and financial development. These models can be broadly classified as structure-conduct performance models and structure-conduct dynamic model.

1.4.1.1 The Structure-Conduct-Performance Model

Concentration Ratios including the 'K' bank concentration ratios (CR_K), Herfindahl-Hirschman Index (HHI) and Lerner Index are underpinned by the Structure-Conduct-Performance model. According to this model, market structure drives conduct which is reflected in performance. These ratios are based on the assumption that higher market power indicated by high ratios, result in super-normal profits due to monopolistic tendencies. Concentration ratio (CR_K) indicates the market structure of 'K' firms in the economy, where 'K' is the number of largest firms. It uses market share of the 'K' to indicate the degree of oligopolistic competition in an economy. This is calculated as the sum of K's firm market share and can range 0% to 100%, where 0% percent indicate perfect competition (least monopolistic competition) of 'K' and 100% indicate monopoly or strong elements of oligopoly of 'K'.

The CR_K suffers several drawbacks such as; excluding market share of all firms and heavy reliance on a few large banks, hence it endogenously determines the result, to some extent. In addition, it does not consider important information such as distribution of the firm size, business model, and other indicators of bank performance. These limitations led to development of Herfindahl-Hirschman index (HHI) which measures a firm's size in relation to the industry. The HHI is calculated as a square root of the sum of the squares of the market share of each participant in the market. The HHI ranges from 0 to 1 representing a large number of small firms when closer to 0 and a single monopoly when closer to 1. An increase in the HHI ratio indicates lower competition and higher market power, while a decline in the ratio indicates an increase in competition and lower market power. This ratio is

considered a standard tool of measuring concentration, as it gives more weight to larger firms. Although, the HHI index considers all banks and hence is better than the concentration ratio, it does not consider other factors that may impact competition and therefore assumes competition is exogenous.

Lerner Index measures market power by differentiating between the price (interest rate) and marginal cost taking into consideration divergence between product price and marginal production cost (Berger et.al 2009). Lerner Index is a superior measure of competition under the Structure-Conduct models due to its accuracy in measuring market power located between perfect competition and maximum market power (Demirguc-Kunt & Peria 2010). However, Lerner Index is a static measure of competition hence suffers from accurately measuring market power in a dynamic and ever-changing operating environment.

The drawback of these measures necessitated the development of better measures of competition The Structure-Conduct-Dynamic Model such as the Panzar-Rosse and persistence of profit (POP) models.

The Structure-Conduct-Dynamic Model

The Panzar-Rosse (P-R) and the Persistence of Profitability (POP) models are underpinned by structure-Conduct and dynamic performance firms. They seek to measure degree of competition in relation to dynamic nature of operating environment (Claessens 2009, Goddard 2011).

i)   Panzar - Rosse (P-R) Model

The Panzar - Rosse (P-R) model measures the degree of competition with respect to the actual behavior of (marginal) bank conduct. Under perfect competition, an increase in input prices raises both marginal costs and total revenues by the same amount as the rise in costs. Under a monopoly, an increase in input prices will increase marginal costs, reduce equilibrium output and consequently reduce total revenues (Claessens 2009). The PR model provides a measure ("H-statistic") of the degree of competitiveness of the industry, which is calculated from reduced form bank revenue equations as the sum of the elasticities of the total revenue of the banks with respect to the bank's input prices. The H-statistic falls between 0 and 1, where closer to 0 is collusive (joint monopoly) competition, closer to 1 indicates monopolistic competition and 1 is perfect competition.

Panzar-Rosse (1987) demonstrate that when a bank faces a demand curve with constant elasticity and a Cobb-Douglas technology, then the magnitude of the H-statistic can be interpreted as an inverse measure of the degree of monopoly power, or alternatively, as a measure of the degree of competition. Rozas (2007) states that P-R is a static approach, a critical feature of the empirical implementation is that the test must be undertaken on observations that are in long-run equilibrium. In previous studies, testing for long-run equilibrium involves the computation of the H-statistic in a reduced-form equation of profitability, using a measure such as ROE or ROA in place of revenues as the dependent variable. The resulting H-statistic is supposed to be significantly equal to zero in equilibrium, and significantly negative in case of disequilibrium. This empirical test has traditionally been justified on the grounds that competitive markets will equalize risk-adjusted rates of return across firms such that, in equilibrium, rates of return should not be correlated statistically with factor input prices.

ii)   The Persistence of Profitability (POP)

POP hypothesis developed by Mueller (1986) rectify the weakness of the static models (Goddard 2011). Static models were found to be good in identifying causal relationships when markets are in equilibrium, however they only provide a snapshot of a dynamic competitive process (Claessens and Laeven, 2004; Shaffer 2004). On the other hand Dynamic model such as POP measures competition taking into consideration both the structure and conduct-based competition indicators such as association between high competition and high profitability (Claessens 2009). POP models the dynamic firm level profits to overcome the problems of static, cross-sectional models such as Lerner Index. POP is based on two conditions only. The first assume the banks operate in environment where there is free entry and exit such that the market activities sufficiently eliminate any abnormal profit. The second assume all firms profits tend to converge in long-run identical values.

Previous empirical studies on persistence of profit in banking are relatively scant. However the available studies (Berger et al. 2000; Goddard et al. 2004a; Agostino et al. 2005; Knapp et al. 2006; Bektas 2007;, Athanasoglou et al. 2008; Flamini 2009) found an average persistence of profit estimate, in the form of a first-order autoregressive coefficient in a time-series regression of firm-level normalized profit rates, in the range 0.4 to 0.5. Additionally, the persistence of profit has been found to be lower in developing countries than in developed countries. This pattern is attributed to

lower sunk costs of entry, faster economic growth, the role of government etc. variations across countries

1.5 Financial Development and Competition Models

1.5.1 *Data and Methodology*

The data utilized in this investigation is commercial bank and MFB's data, grouped into small, medium and large peer groups as per CBK's classification. The monthly data covers the period 2011 to 2016. This period is chosen as most financial reforms occurred in 2010 and due to the time it takes for these reforms to impact behaviour of the banks, we allow a lag of one year and begin investigations in 2011.

We consider the effect of competition on increasing access to financial services, increasing efficiency in intermediation and fostering stability. We therefore expect to see the benefits of a competitive banking sector through these three main channels, as well as its spill over to the rest of the financial sector and the economy as a whole. To enable us to make inferences on competition and access; competition and efficiency in intermediation and competition and stability, we chose to estimate three main measures of competition (concentration ratios, Panzar – Rose and Persistence of Profit) from the wide literature and measures of competition. Concentration measures derived from the structure-conduct-performance would enable us to make inferences on competition and access. The Panzar - Rose model underpinned by industrial organization and market behavior theory would enable us to better understand competition and efficiency in financial intermediation by looking at banks' marginal behavior. The Persistence of Profit model according to literature on competition and stability would enable us to consider the dynamic nature of competition and bank stability. Other measures such as the Lerner Index are static in nature hence not accurate in measuring market power in a dynamic industry.

1.5.2 *Models*

We first estimated two concentration ratios, the 'K' bank concentration ratios (CR_K) (equation 1) and the Herfindahl-Hirschman index (HHI) (equation 2) as follows;

$$CR_K = \sum_{k=i}^{k} s_i \qquad\qquad equation\ 1$$

$$HHI = \sum_{i=1}^{n} s_i^2 \qquad\qquad equation\ 2$$

Where the 'k' is the number of largest firms in Kenya and the 'n' represents the number of all commercial banks and MFB in Kenya and 'S' indicated the market share proxied by total assets. We calculate concentration ratios to determine competition level as well as access to finance as measured by total assets. According to the structure-conduct-performance theory, we expect that if market share is concentrated in a few large banks, then there is low competition in the market. In Kenya, the large banks account for 65% of total lending (Bank Supervision Report, 2016), thus we expect low competition and that access to financial services mainly credit allocation will be driven by a small number of banks who control the market. Therefore, concentration measures will enable us to consider competition and access to financial services as these will both be measured by total assets.

To test the degree of bank competition with regard to efficiency in utilizing its inputs (deposits, and labour) in the intermediation process of transforming deposits into loans, we consider marginal bank behavior by estimating the Panzar-Rose model. Prior to estimating the Panzar-Rose model, we have to ensure that it is in equilibrium meaning the banking sector's rate of return is not correlated with factor inputs prices. We therefore estimated the Panzar - Rosse (P-R) model in equilibrium (equation 3):

$$\ln(ROA_{i,t}) = \alpha + \beta_1 \ln(w_{i,t}) + \beta_2 \ln(w2_{i,t}) + \beta_3 \ln(w3_{i,t}) + \gamma_1 \ln(y2_{i,t}) + \gamma_2 \ln(y3_{i,t}) +$$
$$\gamma_3 \ln(INF_t) + \gamma_4 \ln(Stbill_t) + \varepsilon_{i,t} \qquad\qquad equation\ 3$$

Where $ROA_{i,t}$ is the rate of return proxied by the ratio of net income to total asset is the dependent variable while input prices $w_{i,t}$, $w2_{i,t}$, and $w3_{i,t}$ were the factor inputs and thus the independent variables ($w_{i,t}$ is the input price of funds proxied by gross interest expense over total deposits, $w2_{i,t}$ is the input price of labour proxied by administrative expenses over total assets, $w3_{i,t}$ is the input price of capital/equipment proxied by other operating income over total assets). The factor inputs should not be correlated with the rate of return in perfect competition as all banks are price takers. Control variables included proxies for credit risk, bank size and the macroeconomic environment measured by inflation and the 91-day Treasury bill rate ($y2_{i,t}$ net total loans over total assets is included as a proxy for banks credit risk, $y3_{,it}$ which is total assets is included as a proxy for bank size, $INF_{,t}$ a proxy for inflation and $Stbill_{,t}$ a proxy for the 91-day Treasury bill rate). Control variables are

included to account for other factors that may positively or negatively affect a bank's profitability. We estimated the Panzar-Rose model (equation 4) as follows:

$$\ln(P_{i,t}) = \alpha + \beta_1 \ln(w_{i,t}) + \beta_2 \ln(w2_{i,t}) + \beta_3 \ln(w3_{i,t}) + \gamma_1 \ln(y2_{i,t}) + \gamma_2 \ln(y3_{i,t}) +$$
$$\ln(INF_{i,t}) + \ln(Stbill_{i,t}) + \varepsilon_{i,t} \qquad\qquad\qquad\qquad\qquad equation\ 4$$

Where $p_{i,t}$ is the output price of loans as the dependent variable, proxied by the ratio of gross interest revenue over total assets. The independent variables (factor input prices) and the control variables are similar to those in equation 3. This is similar to the manner prescribed by Panzar-Rosse (1987). Equation 3 and equation 4 are estimated in pooled panel OLS as well as the fixed effects model. The pooled panel model assumes all banks are homogenous, while the fixed effects model aims to distinguish bank specific factors that can affect their efficiency such as corporate governance, business model, etc. We compute the Panzar – Rose H-Statistic as the summation of $\beta_1 + \beta_2 + \beta_3$ otherwise known as the marginal cost. The model in equation 4 aims to compare this marginal cost with the output price.

We also estimated the Persistence of Profitability (POP) model (equation 5) to test whether the market makes supernormal profits in the long run which may indicate low competition. Although we estimate the POP to determine competition, if these profits are ploughed back to increase banks capitalization we can observe bank stability using POP. We estimated POP using an autoregressive model due to the fact that, the model considers past performance in determining current and future performance. Therefore, due to this feature of the autoregressive model we are able to observe persistence. The model is as follows:

$$roa_{i,t} = \alpha + \beta_1 \ln(roa_{i,t-1}) + \beta_2 roa_{i,t-1} + \gamma_1 \ln(y2_{i,t}) + \gamma_2 \ln(y3_{i,t}) + \gamma_3 \ln(INF_{i,t}) +$$
$$\gamma_4 \ln(Stbill_{i,t}) + \ln(w_{i,t}) + \ln(w2_{i,t}) + \ln(w3_{i,t}) + \varepsilon_{i,t} \qquad\qquad equation\ 5$$

Where $roa_{i,t}$ is the profit rate proxied by net income over total assets as the dependent variable, the independent variable is lagged profit rate ($roa_{i,t-1}$ is the lagged proxy for the profit rate) and credit risk, bank size, inflation, the 91-day Treasury bill rate and factor inputs $w_{i,t}$, $w2_{i,t}$, and $w3_{i,t}$ are control

variables (y2 is the proxy for credit risk and y3 is the proxy for bank size, INF_t a proxy for inflation and $Stbill_t$ a proxy for the 91-day Treasury bill rate, $w_{i,t}$ is the input price of funds proxied by gross interest expense over total deposits, $w2_{i,t}$ is the input price of labour proxied by administrative expenses over total assets, $w3_{i,t}$ is the input price of capital/equipment proxied by other operating income over total assets). Although the POP model uses markup calculated as total income over total expenditure, return on asset can also be used as a proxy as shown in the approach in Mueller (1986) and McMillan (2009). We decided to estimate the POP model following the approach of Mueller (1986) due to the fact that the Kenyan banking sector has a ROA higher than those in its peers in the East African region and South Africa as well (Table 1). We therefore, believe that ROA would be a better proxy for profit persistence in the model. As Kenya's ROA is the highest across comparable economies we expect to see profit persistence. We also expect to see stability through higher capital ratios for banks with profit persistence.

1.5.3   Robustness of Models

To ensure that the banking sector is in equilibrium before running the Panzar Rosse model, we estimated an equation where we regressed return on asset on factor inputs to ensure that there was no correlation between the return on asset and factor inputs. This assumption underpinning the PR model is that in equilibrium all players (banks) are price takers in the market as they are not able to influence their factor inputs. The Panzar Rosse H statistic is only valid if the model is in equilibrium. The regression on equation (3) above confirmed that there was no correlation between the return on asset and factor inputs and that the model was in equilibrium thus our estimated H- statistic is valid and inferences can be made from it. The return on asset was applied to the persistence of Profit model as prescribed by Mueller (1986) which is a better measure for profit than the typical ratio of total income divided by total expenditure. By using ROA, the POP model yielded results that can be easily compared and corroborated with other metrics of profitability in the banking sector. Return on Asset is also computed in a similar manner for banks and Microfinance banks hence it is possible to compare the POP from both by using ROA as the dependent variable instead of mark up. The coefficients in the Panzar Rosse and Persistence of Profit model were tested using t-tests of significance at the 10%, 5% and 1% level of significance. The R^2 was compared with the adjusted R^2 of both the Panzar Rosse and Persistence of Profit to ensure robust results. In addition a wald test was undertaken on the coefficient of the Panzar Rosse H-statistic for both the banks and Microfinance and the wald test

confirmed that the H-statistic was significantly different from zero and thus statistically significant The diagnostic tests for serial correction and endogeneity were undertaken using the Durbin Watson statistic to ensure robustness of results.

1.6 Results

The Concentration Ratio (CR_K) indicates that the five large banks out of a total of forty-three banks in Kenya comprise over 50% of the market share between 2011 and 2015 (Table III), indicating a decline from 75% from the findings of Mwega (2011) for the period 1998-2008. The CR_K indicates that market power of the banking sector declined marginally from 2011 to 2014, and therefore competition increased during this period. The HHI confirms that Kenya's banking sector faces moderate competition corroborating the CR_K findings that competition has improved over the period in review (Table IV). HHI results indicate that competition has improved most among the large banks as their market power has been declining from 2011 to 2015, while competition among medium and small banks has remained the same over the same period. These findings supports the link between financial access and competition as 3 banks categorized as large banks by market share dominate agency banking accounting for 87% of all bank agents in the market, where access is measured by number of banks agents (Bank Supervision Department Report, 2016).

Table III: Commercial Banks and Microfinance Banks (MFB) Concentration Ratios

	Concentration Ratio (CR_K)											
	Total Assets			Market Share			Total Assets			Market Share		
	Large Banks	Medium Banks	Small Banks	Large Banks	Medium Banks	Small Banks	Large MFB	Medium MFB	Small MFB	Large MFB	Medium MFB	Small MFB
2011	0.544	0.367	0.090	0.561	0.354	0.085	0.912	0.080	0.007	0.903	0.093	0.005
2012	0.530	0.374	0.097	0.543	0.361	0.096	0.915	0.069	0.016	0.910	0.076	0.014
2013	0.512	0.391	0.097	0.521	0.380	0.098	0.918	0.059	0.023	0.911	0.068	0.020
2014	0.488	0.427	0.085	0.503	0.408	0.089	0.936	0.042	0.023	0.932	0.047	0.021
2015	0.499	0.423	0.079	0.505	0.411	0.084	0.937	0.036	0.028	0.933	0.042	0.025

Table IV: Commercial Banks HHI

	HHI (Total Assets)			
	All Banks	**Large banks**	**Medium banks**	**Small banks**
2011	0.251	0.225	0.109	0.023
2012	0.246	0.222	0.104	0.024
2013	0.239	0.211	0.110	0.025
2014	0.237	0.209	0.109	0.025
2015	0.241	0.214	0.109	0.022

The Panzar – Rose H-statistic of the entire banking sector is 0.625 indicating Kenya's banking sector structure is that of monopolistic competition. The H-statistic is interpreted as the summation of the beta coefficients of the three main factor inputs. The higher the summation of the beta coefficients i.e. the H-statistic, the higher the level of competition.   The H-statistic in relating factor inputs to the output price indicating efficiency in intermediation. For instance, the H-statistic can be interpreted as the return, for a 1 unit increase in factor inputs, output price rises by 0.65 units. The higher the return, the higher the H-statistic, therefore the higher the efficiency in intermediation. From the H-statistic we can infer the positive correlation between an increase in competition and increase in efficiency in financial intermediation. Whether there is causality and the direction of causality is a matter for further research but this positive link between competition and efficiency in intermediation is corroborated by various literature on the same.

 In comparison with the H-Statistic estimated by various researchers (Mwega, 2011, Gudmundson et al., 2014), competition has increased in the banking sector during the period 2011-2016. The H-statistic (Table V) affirms the findings from the HHI and CR that the greatest competition in the banking sector is from the large bank peer group which has been increasing over time, while the small peer banks are the least competitive. Competition among banks has increased from 0.58 between 1994 and 2001 (Buchs and Mathisen (2005), and Claessens and Laeven (2003)), 0.38 between 1998 and 2007 (Mwega, 2011) and 0.50 between 2000 and 2011 (Gudmundson et al, 2013). In comparison to South Africa's H-Statistic that was estimated at 0.711, South Africa's banking sector exhibits monopolistic competition similar to Kenya's banking sector, though Simatele (2015) affirms that competition is higher in South Africa's banking sector. However, this comparison must be made cautiously due to the influence of MFS in Kenya that does not exist in South Africa, also taking into consideration that South Africa's banking sector assets hold a larger proportion to South African GDP relative to Kenya's banking assets to GDP. This finding may be based on the argument that,

large peer group banks compete for the market share of the small peer group which tend to be niche markets, here it is likely that the small peer group faces the greatest competition from the large banks as they lose market share to the large banks. In terms of competition among themselves, small peer group banks serve a unique segment of the financial market and hence are less likely to compete for market share amongst its peers. In the Microfinance sub-sector, according to the H-statistic (Table III), the large MFB peer group is the most competitive within this sub-sector and compete with the medium and small MFBs. Overall, we expected competition in the MFBs to be lower on aggregate as they offer differentiated products and serve a niche market which tend to be geographically or community based. This hypothesis was corroborated as we found that there is greater competition among large banks relative to large MFBs. Particularly, since large banks compete more fiercely with MFBs for market share as they leverage on various financial innovation to reach geographically remote areas or niche market that have been traditionally served by MFBs such as SME lending and micro-insurance.

Table V: H-Statistic 2011-2016

Banking Sector (Banks & MFBs) H-Statistic		Banks H-Statistic		MFB H-Statistic	
$\beta 1$	0.465 (0.092)	$\beta 1$	0.119 (0.026)	$\beta 1$	0.0146 (0.003)
$\beta 2$	0.160 (0.069)	$\beta 2$	0.026 (0.002)	$\beta 2$	0.567 (0.205)
$\beta 3$	0 (5.506)	$\beta 3$	0.484 (0.088)	$\beta 3$	0.041 (0.008)
Banking Sector	**0.625**	**All Banks**	**0.629**	**All MFBs**	**0.622**

There is still an element of segmentation as large banks dominate the market hence competition is high from large banks, which enables them to improve their efficiency and performance relative to other peer groups as well as the MFB segment. Microfinance banks compete amongst themselves, and banks compete with MFBs as well as among themselves. We expected that when MFBs were accelerated from Deposit-Taking Microfinance institutions, they would attract cheaper funding from deposits due to perceived stability hence enhance competition with banks. However, the benefits of this policy may have been offset by technological innovations that enabled banks to reach the market

segment traditionally served by MFBs and reinforced the status quo. It could be that MFBs may not have the technology and other capacity to retain their market by adopting these technologies. For instance, although MFBs were allowed to operate through agency banking which could have increased their efficiency, banks adopted agency banking faster than MFBs and contracted agents at a faster rate than MFBs despite MFB having the first mover advantage by operating in the geographical area where most of these agents operate from.

According to industrial organization theory, in a competitive market that allocates resources efficiently, we do not expect excess profits to continue as new entrants share the market and profits with the rest of the existing firms in the market. In the case of the financial sector, we expect that when the number of financial institutions increase, assuming they offer similar products, with few barriers to entry and exit increase, the profits of each individual financial institution declines. Banks that were previously able to sustain abnormal profits over a long period of time for instance a ROA of 6 percent where the average ROA is 3 percent, experience a decline in the growth of abnormal profits as their ROA declines to the average ROA in the sector. Under the Structure-Conduct-Performance theory, the market structure drives conduct and hence is reflected in performance, that is to say, that in a highly concentrated market, we expect abnormal profits to persist. From the estimation of the persistence of profit, we find that there is a relatively lower persistence of profit among banks when compared with microfinance banks during the period 2011-2016 as observed by the coefficient of previous period return on asset (ROA). The previous period ROA coefficient for banks is 0.39 and indicating low profit persistence, thus affirming that competition intensified among banks over the period under review. Compared to banks, the previous period ROA coefficient for MFBs is 0.44 indicating profits have been more persistent among MFBs indicating less competition. These results contradict our expectation of persistence of profit for banks compared to MFBs. The high ROA maintained by large banks are an indication of stability through ploughing back profits in building up capital. In terms of competition, however, although competition in the industry is declining, large banks, due to their position in the market and market share, may indicate an element of oligopolistic competition (Table VI). The ultimate debate lies in whether competition should be increased at the expense of higher capital and what this effect would have on financial sector development.

Table VI: Persistence of Profit

Dependent Variable	ROA	Banks		Microfinance Banks	
		Coefficient	**t-statistic**	**Coefficient**	**t-statistic**
Independent Variables	LOG(ROA(-2))	0.003	0.903	0.002	0.850
	ROA(-1)	**0.393****	2.185	**0.437*****	4.345
	Y3	**0.004*****	3.858	**-0.004*****	-3.920
	CREDRISK(-1)	**-0.002****	-1.978	-0.005	-0.218
	INF(-1)	0.000	2.993	0.000	1.577
	STBILL(-2)	0.000	-0.635	0.000	-1.533
	W	**-0.101*****	-3.121	**0.416*****	4.512
	W2	0.122	0.225	**-0.773*****	-3.615
	W3	0.061	0.235	**-0.136*****	-7.042
R-Squared		0.781		0.818	
Adj. R-Squared		0.771		0.798	
S.E		0.005		0.006	
DW Statistic		2.124		1.528	

** Significant at the 5% significance level. *** Significant at the 1% significance level.

The finding that Kenya's banking sector has a monopolistic competition where large banks have oligopolistic tendencies supports Pagano (1993) and Guzman (2000) findings that high market power may contribute to an element of credit rationing in monopolistic competitive banks. Given the similarities between South Africa and Kenya's banking sector and the positive effects of reforms on increasing competition in both countries, it is not surprising that both banking sectors face monopolistic competition with some indication of oligopolistic tendencies, whereas in South Africa, these are evidenced in high bank transaction fees, in Kenya, these are evidenced by high interest rate spreads. We therefore, infer that although the policy reforms increased competition in the financial sector, they have had asymmetric effects. This can also be inferred from the mildly active horizontal

repo market and the persistently high interest rate spread despite these reforms. Ultimately, this high cost of intermediation may limit the efficient allocation of credit to productive sectors, and may hinder the long run economic growth and financial development. Our findings that large peer banks which have become more competitive over time, are also most efficient in capital utilisation as indicated by the lowest Capital adequacy ratio (CAR) supports the argument that competition is positively correlated with efficiency.

1.6.1   *Discussion of findings*

The full outcome of the various financial reforms may yet be observed as it may take time for these measures to be fully implemented by the commercial banks and microfinance banks. For instance, CIS currently covers only about 10% of the population taking loans from commercial banks and microfinance banks, therefore it is unlikely that its effect will be observed on lending rates. It will take time before the CIS mechanism can function fully and cover a large segment of the population that it has an effect on intermediation costs.

On the other hand, some financial sector reforms have had the effect of reinforcing the status quo, as the ones fully gaining from those reforms had various advantages that enabled them to exploit their benefits. This is the case with mobile financial services. Most of the new products developed and offered to the market that leverage on the mobile phone platforms, are largely driven by banks in the large group as they had the technological expertise and capacity to adopt them. These banks, possibly due to their technical and skill capacity in the sector, have fostered partnerships with mobile network operators to develop mobile financial services. Some reforms have been fairly successful including deposit insurance and the Real Time Gross Settlement system as they have evened the playing field, deposits to medium and small banks continue to increase even after three banks were placed in receivership in late 2015 and early 2016 signaling confidence in these once perceived vulnerable peer groups.

The financial sector reforms are therefore working in improving competition in the banking structure, though asymmetrically and this has had an impact on financial development via increased access to financial services and increased bank efficiency to some extent. The financial sector reforms have also been effective in decreasing oligopolistic behavior as indicated by the decline in persistence of profits. The finding of oligopolistic behavior in the banking sector may indicate that large financial institutions promote financial development by increasing financial deepening and efficiency which

corroborates Schaeck and Cihak (2013) link between efficiency and stability as large banks are capital efficient and have been able to retain consistently high earnings that have led to their stronger capital base. However, financial consolidation may intensify oligopolistic behavior that may have equivocal effects on financial sector stability.

1.7   Conclusion and Areas of Future Research

The study affirms that competition has been increasing marginally in both the commercial banks and MFBs subsector. However, large banks are the ones driving competition indicating an element of oligopolistic competition in Kenya's banking sector. Increasing competition has positively affected access to financial services and efficiency in financial intermediation. Therefore, we find support for the positive link between competition and financial development and conclude that competition fosters financial development and there is no trade-off between financial depth, financial efficiency and stability as these are complimentary and have a positive association to each other as literature and empirical evidence suggests.

Although, reforms and legislation have improved competition and promoted financial sector development, it may take time to fully realize the benefits of these reforms as implementation and feedback effects takes time. Therefore, this study proposes that policy should limit its role to providing an enabling environment through monitoring and enforcing current legislation thus allowing profit maximing financial sector players to enhance competition through innovative business models and collaborative partnerships, rather than impose additional regulation on financial sector players.

Due to the cross border operations of a significant portion of Kenyan banks (11 banks), research on the effect of cross border network effects on competition will enhance understanding into the impact of these effects on competition in the banking sector. In addition, research that investigates the optimal levels of competition will support the government as it seeks to improve competition in the financial sector and ameliorates some of the policies currently implemented.

References

Acikalin, S., & Sakinc, I. (2013). Assessing Competition with the Panza-Rosse Model in the Turkish Banking Sector . Journal of Economics Bibliography Vol. 2, Issue 1.

Agostino, M., Leonida, L., and Trivieri, F., (2005) Profits persistence and ownership: evidence from the Italian banking sector, Applied Economics, 37, 1615-21.

Allen, F., & Gale, D. (2000). Financial contagion. Journal of political economy, 108(1), 1-33.

Allen, F., & Gale, D. (2004). Competition and financial stability. Journal of Money, Credit, and Banking, 36(3), 453-480.

Al-Yousif, Y. K. (2002). Financial development and economic growth: another look at the evidence from developing countries. Review of Financial Economics, 11(2), 131-150.

Amel, D., Barnes, C., Panetta, F., & Salleo, C. (2004). Consolidation and efficiency in the financial sector: A review of the international evidence. Journal of Banking & Finance, 28(10), 2493-2519.

Anginer, D., Demirguc-Kunt, A., & Zhu, M. (2014). How does competition affect bank systemic risk?. Journal of Financial Intermediation, 23(1), 1-26.

Association, C. I. (2012). Kenya Credit Information Sharing Report. Nairobi.

Athanasoglou, P. P., Brissimis, S.N. and Delis, M.D. (2008) Bank-specific, Industry-specific and macroeconomic Determinants of Bank Profitability, Journal of International Financial Markets Institutions and Money, 18, 121-136.

Beck, T., & Demirguc-Kunt, A. (2006). Small and medium-size enterprises: Access to finance as a growth constraint. Journal of Banking & Finance, 30(11), 2931-2943.

Beck, T., & Fuchs, M. Structural Issues in the Kenyan Financial System: Improving Competition and Access.

Bektas, E. (2007) The persistence of profits in the Turkish banking system, Applied Economics Letters, 14, 187-190.

Bensako, D. A., & Thakor, A. V. (1992). Banking Deregulation: Allocational Consequences of Relaxing Entry Barriers. Journal of Banking and Finance Vol 16, 909-932.

Berger, A. N. and Hanna, T.H. (1998). The efficiency Cost of Market Power in the Banking Industry: A Test of the 'Quiet Life' and Related Hypotheses. Review of Economics and Statistics 8, 454-465

Berger, A., & Hannan, T. (1989). The Price-Concentration Relationship in Banking. The Review of Economics and Statistics,71(2), 291-299. doi:10.2307/1926975

Berger, A.N., Bonime, S.D., Covitz, D.M., Hancock, D., (2000) Why are bank profits so persistent? The roles of product market competition, information opacity and regional macroeconomic shocks. Journal of Banking and Finance 24, 1203-1235.

Bikker, J., & Groeneveld, J. (2000). Competition and Concentration in the EU Banking Industry. Kredit und Kapital, 62-98.

Boot, A. W., & Thakor, A. V. (2000). Can relationship banking survive competition?. The journal of Finance, 55(2), 679-713.

Buchs, T. D., & Mathisen, J. (2005). Competition and efficiency in banking: Behavioral evidence from Ghana.

Cao, M., and S. Shi, 2000, Screening, bidding, and the loan market, Queens University, mimeo.

Casu, B., & Girardone, C. (2008). Bank Competition, Concentration and Efficiency in the Single European Market. The Manchester School, 441-468.

Cetorelli, N. (1999). Competitve Analysis in Banking: Appraisal of the methodologies . Federal Reserve Bank of Chicago.

Cetorelli, N., (2001) Competition among banks: Good or bad? Federal Reserve Bank of Chicago working paper

Cetorelli, N., and M. Gambera, (2001) Banking market structure, financial dependence, and growth: International evidence from industry data, Journal of Finance, Vol. 56, No. 2, pp. 617648.

Chong, T. T. L., Lu, L., & Ongena, S. (2013). Does banking competition alleviate or worsen credit constraints faced by small-and medium-sized enterprises? Evidence from China. Journal of Banking & Finance, 37(9), 3412-3424.

Claessens, S. (2005). Access to financial services: a review of the issues and public policy objectives. World Bank Policy Research Working Paper, (3589).

Claessens, S. (2009). Competition in the Financial Sector: Overview of Competition . IMF Staff Working Papers.

Claessens, S., & Laeven, L. (2003). Financial development, property rights, and growth. The Journal of Finance, 58(6), 2401-2436.

Claessens, S., & Laeven, L. (2004). What drives bank competition? Some international evidence. Journal of Money, Credit and Banking, 563-583.

Claessens, S., & Laeven, L. (2005). Financial Dependence, Banking Sector Competition, and Economic Growth. World Bank Policy Research Working Paper No. 3481.

Danthine, J. P., & Donaldson, J. B. (2014). Intermediate financial theory. academic press.

Dell A'riccia , & Marguez . (2004). Credit Booms and Lending Standards:. IMF Working Paper.

Dell'Ariccia, Giovanni, Luc Laeven and Deniz Igan, 2008, "Credit Booms and Lending Standards: Evidence from the Subprime Mortgage Market," IMF Working Paper, Working Paper No. 08/106, Washington, D.C.

Demirguc-Kunt, A. & M.S.M Peria. 2010. A Framework for Analyzing Competition in the Banking Sector: An Application to the Case of Jordan. Policy Research working paper No. 5499, 1-24

Diamond, D. W. and Dybvig, P.H. (1983) Bank Runs, Deposit Insurance, and Liquidity The Journal of Political Economy, Vol. 91, No. 3 (Jun., 1983), pp. 401-419

Flamini, V., McDonald, C.A., and Schumacher, L.B. (2009) The Determinants of Commercial Bank Profitability in Sub-Saharan Africa, IMF Working Paper No. 09/15

Goddard, J., Liu, H., Molyneux, P. and Wilson, J.O., 2011. The persistence of bank profit. Journal of Banking & Finance, 35(11), pp.2881-2890.

Goddard, J., Molyneux, P., and Wilson, J.O.S., (2004a) The profitability of European banks: A cross-sectional and dynamic panel analysis. Manchester School, 72, 363-381.

Guzman, M., 2000, Bank structure, capital accumulation, and growth: A simple macroeconomic model, Economic Theory, Vol. 16, No. 2, pp. 421455.

Hannan, T. H. (1991). Foundations of the structure-conduct-performance paradigm in banking. Journal of Money, Credit and Banking, 23(1), 68-84.

Huang, Y. (2011). Determinants of financial development. Palgrave Macmillan.

Kenya, C. B. (2015). Bank Supervision Report . Nairobi.

Kenya, C. B. (2016). Bank Supervision Report . Nairobi.

Kenya, C. B. (2016). FinAccess household survey . Nairobi.

King, R. G., & Levine, R. (1993). Finance, Entreprenuership and Growth. Journal of Monetary Economics, 513-542.

Knapp, M., Gart, A., and Chaudhry, M. (2006) The impact of persistence and mean reversion of bank profitability on post-merger performance in the banking industry, Journal of Banking and Finance, 30, 3503-3517.

Levine, R., Loayza, N. and Beck, T. (2000). Financial intermediation and growth; Causuality and causes. Journal of Monetary Economics 46, 31-37

McMillan, D. G., & Wohar, M. E. (2011). Profit persistence revisited: the case of the UK. The Manchester School, 79(3), 510-527.

Misati, R. and Kamua, A. (2015). Local and International Dimensions to Credit Provision by Commercial Banks in Kenya.

Mueller, D. C. (1986). Profits in the long run. Cambridge University Press.

Mwega, F., (2011) The Competitiveness and Efficiency of the Financial Services Sector in Africa: A Case Study of Kenya. African Development Review, Vol. 23, No. 1, 2011, 44–59

Ngugi, R. (2001). An empirical analysis of interest rate spread in Kenya (Vol. 106). Nairobi: African Economic Research Consortium.

Nicoló, G. D., Bartholomew, P., Zaman, J., & Zephirin, M. (2004). Bank consolidation, internationalization, and conglomeration: Trends and implications for financial risk. Financial markets, institutions & instruments,13(4), 173-217.

Pagano, M., 1993, Financial markets and growth. An overview, European Economic Review, Vol. 37,pp. 613622.

Panzar, J. C., & Rosse, J. N. (1987). Testing for "Monopoly" Equilibrium. Journal of Industrial Economics, 443-456.

Petersen, M. A., and R. G. Rajan, 1995, The effect of credit market competition on lending relationship, Quarterly Journal of Economics, Vol. 110, pp. 407443.

Petersen, Mitchell A., and Raghuram G. Rajan. "The benefits of lending relationships: Evidence from small business data." The journal of finance49.1 (1994): 3-37.

Puatwoe, J. T., & Piabuo, S. M. (2017). Financial sector development and economic growth: evidence from Cameroon. Financial Innovation, 3(1), 25.

Rosse, J. N., and Panzar, J. C. (1977). Chamberlin versus Robinson: An Empirical Test for Monopolu Rents. Bell Laboratories Economic Discussion Paper.

Rozas, G. L. (2007). Testing for Competition in the Spanish Banking Industry: The Panzar-Rosse Approaches Revisited. Banco de Espana Working Papers.

Simatele, M. (2015). Market structure and competition in the South African banking sector. Procedia Economics and Finance, 30, 825-835.

Shaffer, S., (2004). Patterns of competition in banking, Journal of Economics and Business, 56, 287-313.

Shaffer, S., 1998, The winner's curse in banking, Journal of Financial Intermediation, Vol. 7, No. 4, pp. 359392.

Uhde, A., & Heimeshoff, U. (2009). Consolidation in banking and financial stability in Europe: Empirical evidence. Journal of Banking & Finance, 33(7), 1299-1311.

Weiß, G. N., Bostandzic, D., & Neumann, S. (2014). What factors drive systemic risk during international financial crises?. Journal of Banking & Finance, 41, 78-96.

2. A Fiscal Sustainability Analysis in Uganda[2]

By Grace A Tinyinondi[3]

Abstract

This paper uses the Present Value Budget Constraint (PVBC) method to test the solvency of public debt in Uganda and estimates the fiscal reaction function as a test for fiscal sustainability. Two periods are analyzed; 1993 to 2017, which contains key changes in the financing landscape of Uganda in terms of increased domestic and non-concessional financing and higher public expenditure on transport and energy infrastructure development. The second period; 1993 to 2022, includes projections for 2018 to 2022 from the medium term expenditure framework in the most recent Budget Framework Paper. The results indicate that the present value budget constraint does not hold and contrary to theory, the primary balance does not respond to the increase in the public debt with an increase in the primary surplus (or decrease in the primary deficit). These results suggest fiscal insolvency and unsustainable fiscal policy in both periods. In this regard, there is need for more robust domestic revenue, which includes improving the implementation and productivity of government projects to spur economic growth.

Keywords: Fiscal sustainability, Fiscal reaction function, Public debt, Fiscal deficit.

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1 Introduction

The 2007/08 global financial and economic crisis highlighted the importance of fiscal policy as a macroeconomic policy tool (Romer, 2011; Blanchard, Dell'Ariccia, and Mauro, 2010). In their post-crisis evaluation of macroeconomic policy, Blanchard et al. (2010) noted that advanced and emerging economies with high pre-crisis levels of debt were faced with limited fiscal space with which to counter the effects of the crisis, while emerging economies with low pre-crisis debt levels were able to use fiscal policy to restore stability and stimulate growth without threatening fiscal sustainability. In the case of the Low Income Countries (LICs), debt relief and increased integration with the global financial markets have enabled them to adopt new public financing strategies and sources. However, while providing more alternatives, the new financing strategies pose some risks and vulnerabilities that in turn are a risk to LICs' fiscal space and fiscal sustainability (IMF, 2015).

The historical trend in public debt to GDP for LICs indicates a sharp debt buildup through the 1980s followed by a reduction in the 2000s, reflecting the impact of debt relief in these countries (Abbas et al., 2010). A post-2007/08 global financial and economic crisis review by the IMF and World Bank revealed that there has been a gradual change in this trend in line with the new public financing strategies embraced by LICs (IMF, 2015). The study revealed a decline in financing from multilateral creditors and Paris Club creditors (PCCs) and increased financing from the domestic market, international capital markets, and Non-Paris Club creditors. This was a result of improved fundamentals in a number of LICs, a prolonged period of low interest rates in advanced economies, and the decline in concessional financing from PCCs accompanied by the growing role of emerging markets. In addition, there was increased non-concessional financing from commercial sources and NPCCs[4] (Table 1).

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[4] The sum of PC and NPCC does not equal to the total bilateral debt stock because countries with continuous data on PCC and NPCC debt from 2007 to 2014 represent only around 30 percent of the sample.

Table 1: Public debt stock in Low Income Countries by creditor, 2007 to 2014
(% of GDP)[5]

Type of Debt & Creditor	2007	2014
External	**38.0%**	**33.8%**
Multilateral	20.4%	16.1%
Bilateral	14.1%	13.8%
o/w Paris Club[2]	7.0%	3.0%
o/w Non-Paris Club[2]	8.0%	11.7%
Commercial	3.5%	4.1%
Domestic	**14.7%**	**15.1%**

Adapted from IMF (2015)

The IMF and World Bank study found that the improved domestic and global factors in particular changed the financing structure of the "frontier LICs" which are LICs that have liberalized their capital accounts and are open and more integrated with the global economy[6]**.** However, at the same time, LICs' closer integration into the global economy has increased their exposure to market risks such as currency risks associated with sovereign bonds and heightened roll over risk associated with Eurobonds that involve bullet payments. These risks are heightened by a weaker global economy in the form of lower global commodity prices and less favorable global lending conditions as well as growth in contingent liabilities pertaining to public-private partnerships (PPPs), pension funds, debts from state-owned enterprises and sub-national entities, natural disasters. Bailouts of non-public entities were also a potential risk which could increase debt levels and compromise debt sustainability in the event of adverse economic shocks.

Uganda is a HIPC beneficiary and a frontier LIC whose public domestic and non-concessional debt has increased significantly and therefore faces the aforementioned risks. The period analyzed in the empirical studies on Uganda's fiscal sustainability (Ejalu, 2016; Fedelino and Kudina, 2003) was prior to two key events in Uganda's fiscal policy: i) a fiscal reform in 2012/13 to issue government securities for fiscal policy (Langford & Namanya, 2014) and ii) a scale up of public infrastructure expenditure financed by non-concessional borrowing beginning in 2014/15 (BTTB, 2014).

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[5] [1]Based on countries with continuous data from 2007 to 2014, representing slightly over 50 percent of the sample.

[6] Bolivia, Mongolia, Mozambique, Nigeria, Papua New Guinea, Zambia, Bangladesh, Cote d'Ivoire, Ghana, Kenya, Senegal, Tanzania, Uganda, Vietnam.

The main objective of this study is to assess how these two key developments have impacted upon Uganda's fiscal sustainability to date.

The rest of the paper is organized as follows: Section 2.0 provides an overview of fiscal financing and public debt developments in Uganda, Section 3.0 discusses the relevant literature, Section 4.0 explains the theoretical framework, Section 5.0 provides the empirical analysis and results and Section 6.0 concludes.

2   Overview of fiscal financing and the public debt in Uganda

Figure 1 shows that, after an initial decline, Uganda's primary deficit trended upwards from 2011/12 and halted in 2016/17 due to lower than programmed external loan disbursements due to the cancellation of a World Bank budget support loan on account of social safety issues related to World Bank projects; and slow progress in the execution of government projects (MoFPED, 2017a). Domestic financing began to grow in 2012/13 after a fiscal reform in 2012/13 to issue government securities for fiscal policy and was even higher than external financing in 2014/15. External financing has increased significantly in recent years, reflecting the government's Vision 2040 strategy to close gaps in the country's transport and energy infrastructure. The scale up of public infrastructure spending and investment is expected to play a key role in spurring economic growth in Uganda (NPA, 2013). Specifically, investments to increase power generation are expected to positively impact on growth of the industrial sector and support growth of the rural economy, investment in roads and railway infrastructure are expected to reduce the costs of transportation and increase connectivity between production areas and markets, including the markets of the East African Community (EAC) Partner States, which contribute significantly to Uganda's export earnings.

Figure 1: Evolution of the deficit, financing and public debt (% of GDP)
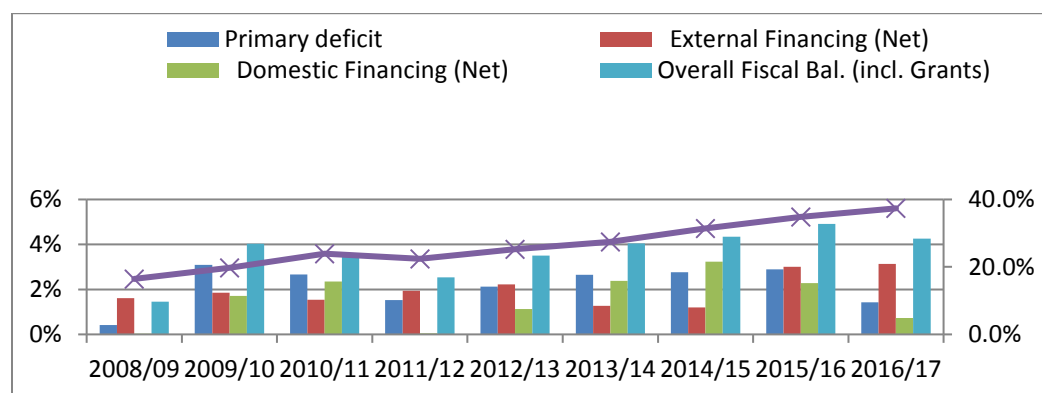
Data source: Ministry of Finance, Uganda and Bank of Uganda

The increase in external financing is largely due to growth in bi-lateral non-concessional financing, mainly from China, for the construction of hydropower projects. Bi-lateral debt has grown from 12.1 percent of the total external debt outstanding as at end-June 2012 to 26.6 percent as at end June 2017 (Table 2). Non-concessional borrowing has been contracted at higher interest rates; a shorter grace and repayment period compared to the concessional financing and is thus expected to increase the debt service burden.

Table 2: Distribution of External Debt Stock by Creditor Category (% of total)

Type of Creditor	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Bilateral	**12.1**	**13.1**	**12.6**	**14.5**	**23.4**	**26.6**
o/w Paris Club	1.6	1.8	2.2	2.2	3.0	3.8
o/w Japan	0.7	0.9	1.3	1.7	2.4	3.0
o/w Non-Paris Club	10.5	11.3	10.4	12.3	20.4	22.8
o/w China	7.0	8.0	7.7	9.6	17.8	20.3
Multilateral	**87.9**	**86.9**	**87.4**	**85.5**	**76.6**	**70.8**
o/w IDA	59.4	58.6	58.3	55.8	48.9	45.2
Commercial Bank	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2.6**

Adapted from Ministry of Finance DSA Report, December 2017

Fiscal outlook (2017/18 to 2021/22)

Uganda's public debt is projected to continue increasing in the medium term up to 47.8 percent to GDP in 2019 /20 and 2021/22 (Figure 2). It is projected to decline thereafter due to lower borrowing following the completion of key infrastructure projects, as well as higher GDP growth as the economy becomes more productive (MoFPED, 2017b and c). Non-concessional financing is projected to grow to 82.8 percent of the total for the externally financed projects by 2021/22 (Table 3).

Figure 2: Outlook of the deficit, financing and public debt (% of GDP)
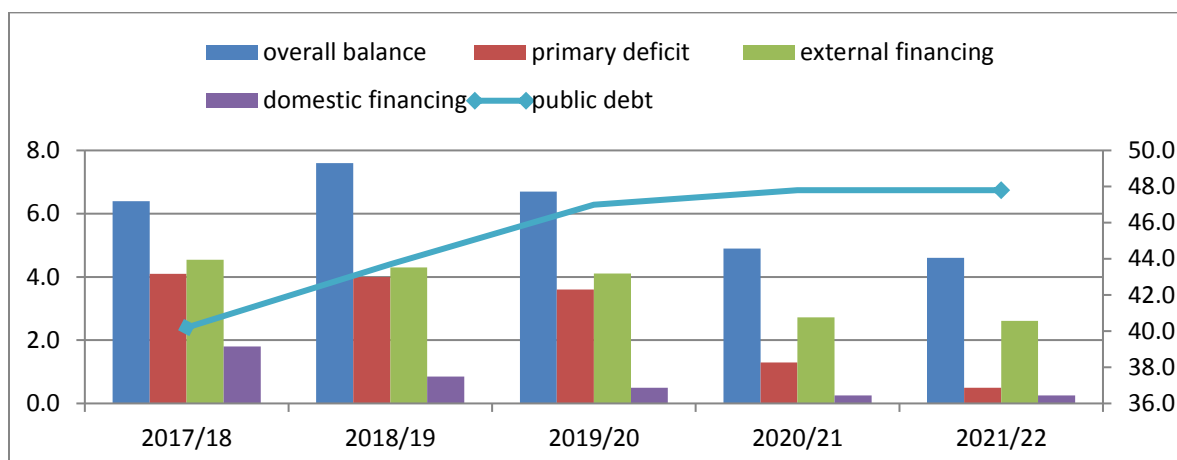
Data source: Ministry of Finance, Uganda Budget Framework Paper 2018/19 and National DSA, 2017.

Table 3: Medium term projections for external financing (US$, Millions)

Financing Source	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
Budget support (net of HIPC debt relief)	**171.1**	**49.2**	**40.0**	**40.0**	**40.0**	**40.0**
Grants	8.8	9.2	0.0	0.0	0.0	0.0
Loans(including revolving credit)	162.3	40.0	40.0	40.0	40.0	40.0
Externally financed projects	**878.6**	**1,861.9**	**1,773.4**	**1,682.2**	**935.2**	**786.4**
Grants	195.6	419.4	330.2	279.1	64.1	6.0
Concessional loans	474.5	552.2	683.5	574.3	270.2	96.3
Non-concessional loans	208.4	890.2	759.8	828.8	600.9	684.2
o/w Hydro Power Projects	120.5	336.2	246.9	209.5	0.0	0.0
o/w Other	87.9	554.0	512.9	619.3	600.9	684.2
Total	**1,049.7**	**1,911.1**	**1,813.4**	**1,722.2**	**975.2**	**826.4**
Concessional loans (% of Total)	45.2	28.9	37.7	33.3	27.7	11.7
Non-concessional loans (% of Total)	19.9	46.6	41.9	48.1	61.6	82.8
Hydro Power Projects (% of Total)	11.5	17.6	13.6	12.2	0.0	0.0

Source: Ministry of Finance Uganda Budget Framework Paper 2018/19

Public debt dynamics

The dynamics of Uganda's public debt to GDP in the most recent national DSA indicate that the increase in the public debt is largely due to primary deficits, both historically and over the projection period (Table 4 and Figure 3). The automatic dynamics contributed to the increase in the public debt

in 2014/15 to 2016/17 but are projected to reduce the public debt ratio to GDP over the medium term (2017/18 to 2021) mainly due to projected real GDP growth (Figure 4). The debt stabilizing primary balance was on average a primary deficit of 0.9 percent to GDP during 2014-2017 and a primary surplus of 1.6 percent to GDP over the projection period. In both periods, the actual and projected primary deficit is higher (Figure 5).

Table 4: Public Debt Dynamics for Uganda

Indicator	Historical			Projections				
	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
Change in public sector debt	**3.9**	**3.5**	**2.3**	**3.3**	**3.5**	**3.2**	**0.9**	**0.0**
Identified debt-creating flows	5.8	3.0	1.6	4.1	4.0	3.6	1.3	0.5
Primary deficit	2.7	2.9	1.2	4.1	5.4	4.5	2.7	2.5
Automatic debt dynamics	3.1	0.1	0.4	0.0	-1.4	-0.9	-1.4	-2.0
Contribution from interest rate/growth differential	-0.3	0.0	0.2	-0.5	-1.0	-1.4	-1.9	-2.0
o/contribution from average real interest rate	*1.0*	*1.4*	*1.5*	*1.3*	*1.1*	*1.0*	*1.0*	*1.0*
o/w contribution from real GDP growth	*-1.3*	*-1.4*	*-1.3*	*-1.7*	*-2.1*	*-2.5*	*-2.9*	*-3.0*
Contribution from real exchange rate depreciation	3.5	0.1	0.3	0.5	-0.4	0.5	0.5	0.0
Residual, including asset changes	-1.9	0.4	0.7	-0.8	-0.5	-0.3	-0.4	-.05

Source: Ministry of Finance Uganda National DSA Report, December, 2017

Figure 3: Change in the public sector debt
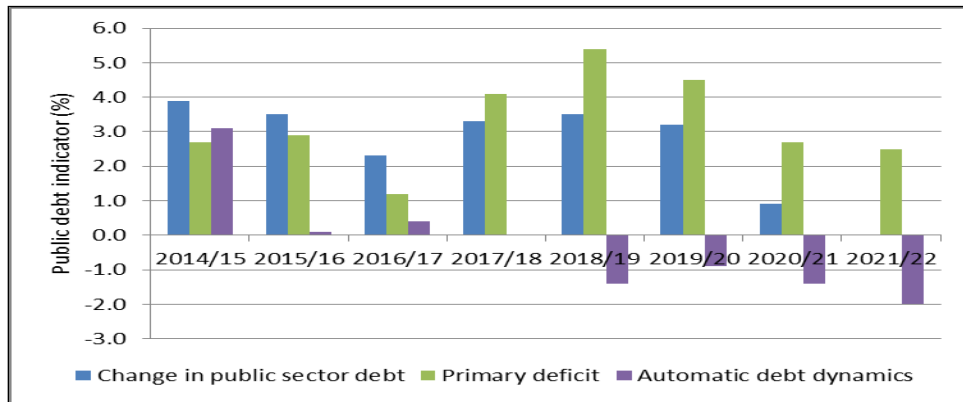
Data Source: Ministry of Finance Uganda National DSA Report, December, 2017

Figure 4: Automatic debt dynamics – Interest rate, real GDP growth and the real exchange rate depreciation
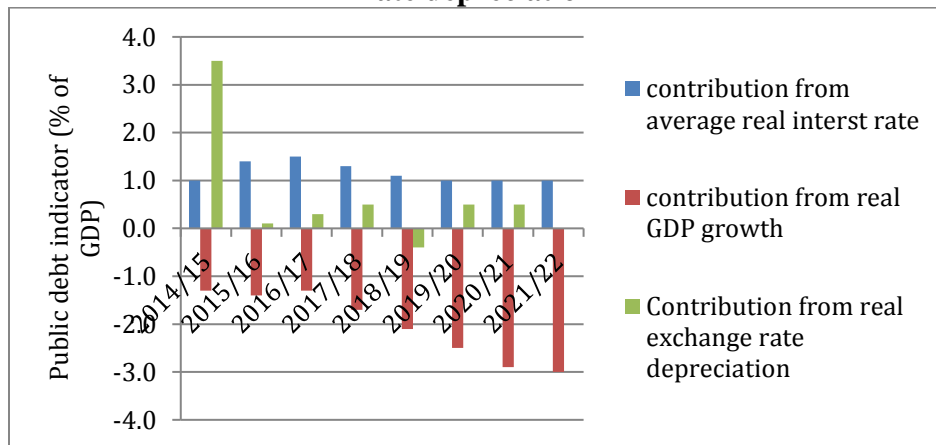
Data Source: Ministry of Finance Uganda National DSA Report, December, 2017

Figure 5: The debt stabilizing primary deficit
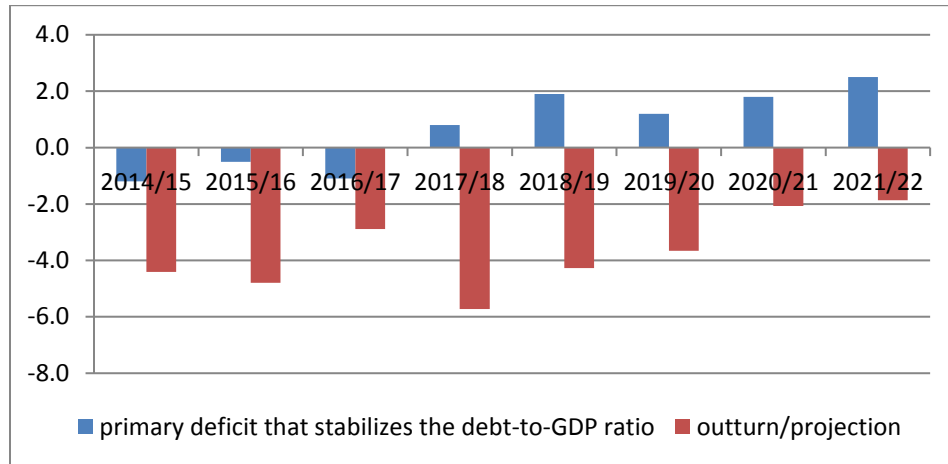
Data Source: Ministry of Finance Uganda National DSA Report, December, 2017

3 Literature Review

The literature review begins with the theories underlying fiscal policy and public debt. According to the tax smoothing theory developed by Barro (1979), fiscal deficits arise from a difference in the timing of expenditure and taxes. The theory assumes exogenous government expenditure and optimal constant tax rates that should not follow the uneven pattern of government expenditure. However, the tax rates may be adjusted in events such as war or peace and boom or recession. Thus, in the face of rising expenditure (e.g. during war), the government could raise the tax rate which would imply that the current fiscal deficit would be smaller. On the other hand, the current fiscal deficit and real debt would rise when output is below normal. Barro argues that primary surpluses to pay off the debt violate the tax-smoothing theory as this policy implies a temporary increase in the tax rates. A second theory of budget deficits developed by Barro (1989) is based on the Ricardian equivalence theorem in which it is argued that budget deficits have no first order effects on the economy since the present value of the additional taxes is equal to the debt. This is because the rational Ricardian investors will increase savings in anticipation of future tax increases by the government to repay its debt. However, the second order effects of the fiscal deficits, which include the distortionary effects of taxes, affect the economy.

A review of the public debt theories presented and discussed extensively in Salsman (2017) indicates that the fiscal sustainability theory is consistent with the post Keynesian theories of public debt, which

were developed following a period in which developed countries experienced a huge increase in non-development expenditure, public debt and inflation. The post-Keynesian theories criticized the modern theories view that public debt does not present any burden on the economy and the future generation. The post-Keynesian theories were developed from the Keynesian modern theories that argued that the public debt was necessary and even desirable to enable the government to stimulate the economy.

Earlier theories of public debt (ie the classical public debt theories of the 18th century; Adam Smith, David Ricardo and J.S. Mill) generally held a negative view of public debt. The theories reasoned that public expenditure is to a large extent not productive in nature and therefore public borrowing crowds out private sector income that would have been invested productively. They argued that critical public expenditure should preferably be financed through taxation (Tsoulfidis, 2007). Later, the neoclassical public debt theories of the 19th century were proponents of governments incurring debt, but only under certain circumstances such as market failures.

Theoretically, fiscal sustainability assesses whether the current fiscal policy can be continued into the long term without threatening government solvency. That is, if a particular mix of fiscal policy, in terms of government expenditure, revenue mobilization and financing, were to lead to insolvency then that fiscal policy would be considered unsustainable (Chalk and Hemming, 2000; Burnside, 2004). It is on the basis of this definition that the government budget constraint, the fundamental building block of fiscal sustainability analysis, is developed. The key components of the theoretical framework for fiscal sustainability are the single-period government budget constraint, the lifetime budget constraint and the no-Ponzi scheme condition. According to the single period budget constraint, the net issuance of debt is a result of gross receipts from issuing new debt minus any amortization payments made in the period while the government's lifetime budget constraint states that the present value of government's debt at the end of its life should be equal to the present value of seigniorage revenue and primary surpluses generated over the life of the debt. The lifetime budget constraint assumes a no-Ponzi scheme condition, implying that government will not pay its debt by incurring new debt, but by running primary surpluses.

This study adopts this standard theoretical framework of the government budget constraint to assess fiscal sustainability in Uganda. The theoretical framework reflects the modern public debt theories, which are proponents of governments incurring debt to improve economic productivity, but acknowledge the burden imposed by the debt on gross national product due as well as other macroeconomic risks posed by the debt.

Empirical studies have employed deterministic and probabilistic methods to analyze fiscal sustainability. The deterministic methods assume that the path of the public debt is known, based on given parameters and they include solvency analysis based on the intertemporal budget constraint, time series analysis of the fiscal reaction function and analysis of the dynamics of the debt-to-GDP ratio. On the other hand, the probabilistic approaches include an element of uncertainty regarding the path of the public debt to GDP ratio and include fan-charts for public debt dynamics.

Hamilton and Flavin (1986) founded the empirical framework to test government's present value budget constraint as a test for fiscal sustainability. They conducted stationarity and cointegration tests on the primary balance and the public debt of the USA using annual data from 1960 to 1984. The study found that both the primary balance and public debt were stationary and concluded that the PVBC held in the case of the USA, implying that investors rationally expected the budget to be balanced in present-value terms. Based on their finding, Hamilton and Flavin inferred that the prevailing sentiment in Washington that current deficits could continue forever was wrong and that there was need for the adjusted deficit series to turn into surplus.

Fiscal sustainability analyses in LICs have used the intertemporal budget constraint/PVBC methodology which entails the use of stationarity and cointegration tests on the components of the primary balance. Ejalu (2016) used the PVBC approach to assess the fiscal sustainability of the countries in the East African Community (EAC- Kenya, Burundi, Tanzania, Rwanda and Uganda) in the period 1980 to 2011 and also employed an error correction model to examine the fiscal policy adjustments in these countries. Ejalu found that only Tanzania showed evidence of a long run relationship between government taxes and expenditure, an indication of fiscal unsustainability while this finding did not hold in Uganda and the rest of the EAC countries. In addition, the error correction or response of taxes to economic changes was not statistically significant in the case of Uganda. This finding on Uganda is similar to an earlier study by Fedelino and Kudina (2003) who also used the budget constraint concept of the PVBC model to investigate whether the public debt levels of HIPC

beneficiaries were sustainable on the basis of current and projected fiscal primary balances. This was based on the fact that HIPC beneficiaries had engaged in poverty reducing expenditure which meant fiscal expansion that could potentially lead them back into the debt trap. According to their model, debt sustainability was attained when the ratio of debt to GDP was stationary and consistent with the overall demand, domestic and external, for government securities. The authors used annual data from 1990 to 2000 and made assumptions about creditor behavior and the macro economy to derive simulations on debt sustainability for the next ten years. They found that Burkina, Mali, Mozambique, Zambia and Uganda failed the fiscal sustainability test based on both historical and projected fiscal primary balances.

The PVBC was found to hold in the case of Namibia, an upper middle income country in Sub Saharan Africa. Zaaruka, Ndove and Tjipe (2004) used the PVBC approach to assess domestic debt sustainability in Namibia using outturns for the period 1990/91 to 2001/02 and projections for the period 1990/01 to 2005/6. They found evidence of a cointegrating relationship between government revenues and expenditures and concluded that the budget deficit based on the historical data had been sustainable and would remain so, at least in the medium term as projected in Namibia's medium term framework.

Mafusire (2015) used the fiscal reaction methodology by Bohn (1998) alongside calculation of fiscal sustainability indicators based on Blanchard (1990), to assess fiscal sustainability in Swaziland over the periods 1986-2012 and 2000-2016 (projections for 2013 to 2016). The model included a vector of variables that affect the primary deficit, output gap, lagged primary deficits as well as the debt variable, interest rate and GDP growth. The findings indicated all the relevant variables were stationary and statistically significant and thus relevant in explaining movements in the primary deficit. Using the two approaches, the sustainability of fiscal policy was found to hold in Swaziland, but became unsustainable over the projection period.

Nzaramba (2015) estimated fiscal reaction functions for ten African countries, Algeria, Ivory Coast, Ghana, Kenya, Nigeria, Rwanda, South Africa, Tanzania, Tunisia and Zambia from 1970 to 2012 using Bohn's (1998) basic fiscal rule. They also introduced foreign direct investments and remittances as variables which are important factors for African countries vis-à-vis the primary balance and the public debt. The findings showed that four countries; Algeria, Ghana, Rwanda and South Africa had sustainable debt paths. The findings regarding the foreign direct investment and remittances differed

across the ten countries. In Cote d'Ivoire, South Africa and Tunisia FDI was positive and significant while in Kenya, only remittances were positive and significant. Rwanda, Tanzania and Zambia had positive and significant coefficients for FDI and remittances while (…….) had showed a positive sign for the FDI variable that is statistically significant. The finding of an unsustainable public debt path for Kenya is confirmed in the study by Ikikii (2017) based on monthly data for the period July 2000 to March 2014. The fiscal reaction function estimated by Ikikii revealed a negative response of the primary balance to an increase in the public debt.

Ghatak and Sánchez-Fung (2006) employed the PVBC, fiscal reaction and debt dynamics approaches to analyze fiscal policy sustainability for five developing countries in Africa and Asia (ie Peru, Philippines, South Africa, Thailand and Venezuela) over the period 1970 to 2000. The unit root and cointegration tests indicated that the present value budget constraint did not hold in the five countries, however, estimations of the fiscal reactions indicated sustainable fiscal policy, but suggested that fiscal behavior was procyclical. The public debt dynamics showed that corrective actions were undertaken to halt the unsustainable trend of the public debt. A later study on South Africa by Burger et al. (2011) estimated the fiscal reaction function for the period 1946 to 2008 using various estimation techniques, including Ordinary Least Squares (OLS), Vector Auto regression (VAR), General Method of Moments (GMM) and Vector Error-Correction (VECM), State-Space and Threshold Autoregressive (TAR). They found evidence of a positive response in the primary balance to an increase in the public debt, which suggested sustainability of fiscal policy.

Abbas (2005) developed a debt sustainability framework and conducted a simulation study on Ghana, Tanzania and Uganda to address the weaknesses of the traditional approaches to analyzing debt sustainability such as the IMF/World Bank LIC DSA and the PVBC methodology. These shortcomings include failure to adequately incorporate domestic debt, measurement of the stock of debt, issues in relation to uncertainty, the links between public debt (or fiscal) and external debt sustainability. The study found the greatest fiscal risk to be posed by declining grants and currency depreciation, and that a post-HIPC increase in the debt/GDP ratio was positively correlated with the size of the required fiscal surplus and more so when combined with currency depreciation. The results also revealed that a debt/GDP increase due to domestic borrowing rather than external borrowing required smaller increases in the primary balance. This was interpreted to mean that the cost of public

domestic debt was still slightly cheaper than the depreciation-adjusted cost associated with concessional foreign debt. Based on these findings, Abbas concluded that the ideal financing mix for African countries to finance poverty reduction and the current account deficit is one that has concessional external financing contracted after taking into account the exchange rate depreciation risk and domestic financing. Moreover, the domestic financing should be part of an explicit objective to develop the domestic debt and financial markets, which are crucial for long-term economic growth.

This paper uses the stationarity tests by Hamilton (1986) and the fiscal reaction function test by Bohn (1998) to assess fiscal sustainability in Uganda the period when Uganda had higher public domestic and non-concessional external financing and a scale up of public infrastructure investment. The analysis also includes the projections in the medium term fiscal framework.

4   Theoretical Framework

Theoretically, fiscal sustainability assesses whether the current fiscal policy can be continued into the distant future without threatening government solvency. Thus, if a particular mix of fiscal policy, in terms of government expenditure, revenue mobilization and financing, were to lead to insolvency then that fiscal policy would be considered unsustainable (Chalk and Hemming, 2000; Burnside, 2004). The key components of the theoretical framework for fiscal sustainability are the single-period government budget constraint, the lifetime budget constraint and the no-Ponzi scheme condition.

This section briefly presents the theoretical framework, following Burnside (2004) with one main modification that assumes no monetization of the deficit. The theoretical framework for fiscal sustainability is premised on the idea that the government is faced with a flow budget constraint with the identity:

$$B_t - B_{t-1} = I_t - X_t - (M_t - M_{t-1}) _____ (1)$$

Where, t is the time, B_t is the market value stock of public debt at the end of period t, I_t is interest payments, X_t is the primary balance (revenue minus noninterest expenditure), and M_t is the monetary base at the end of period t. This identity implies that the net issuance of debt between two periods is the gross receipts from issuing new debt minus any amortization payments made in the period. We

modify this identity so that the government does not finance its expenditures by printing money and therefore exclude the last term in the identity as follows:

$B_t - B_{t-1} = I_t - X_t$ _____ (2)

The flow budget constraint (2), is also the first step in deriving the lifetime government budget constraint, which plays a crucial role in assessing a government's finances, interpreting its fiscal policies, and predicting the consequences of particular shocks to the economy for prices and exchange rates. The lifetime budget constraint is derived from the flow budget constraint (2) which can be re-written as:

$$b_{t-1} = (1 + r)^{-(j+1)}b_{t+j} + \sum_{i=0}^{j}(1 + r)^{-(i+1)}x_{t+i}_____(3)$$

Equation (3) provides a link between the amounts of debt the government has at two dates: t-1 and t+j, where, b_{t-1} is the end-of-period stock of real debt in the initial period, r is the real interest rate and x_t is the real primary surplus. The first term $(1 + r)^{-(j+1)}b_{t+j}$ is the stock of real debt on date t+j and the second term $\sum_{i=0}^{j}(1 + r)^{-(i+1)}x_{t+i}$ is the total of the primary surpluses incurred between the periods t-1 and t+j.

Imposing the condition (4), the government's lifetime budget constraint given in equation (4):

$$\lim_{j\to\infty}(1 + r)^{-j}E_t b_{t+j} = 0_____(4)$$

$$b_{t-1} = \sum_{i=0}^{\infty}(1 + r)^{-(i+1)}x_{t+i}_____ (5)$$

Condition (4) is a no-Ponzi game restriction that requires that at time infinity, debt should not grow faster than the interest rate. This implies that the government is making some repayments over the life of the debt and that the present value of future primary balances matches or exceeds the existing stock of debt, which indicates that the government is solvent. The lifetime budget constraint (5) builds on this no-ponzi condition to show that the government finances its initial debt through seigniorage revenue and running primary surpluses in the future, whose present value is equal to its initial debt

obligationsThe Hamilton and Flavin (1986) hypothesis that the government is subject to a present-value borrowing constraint implies that, expressed in expectational form to show the expectation of creditors, the lifetime budget constraint is:

$$b_t = E_t \sum_{i=1}^{\infty}(1+r)^{-i}\ (x_{t+i} - v_{t+i})^t \underline{\hspace{4cm}}(6)$$

where, expressed in real terms, r is the real interest rate on debt, $i_t = I_t/P_t$; and $x_t = X_t/P_t$ and v_t is an error term. Hamilton and Flavin propose a test of the null hypothesis that equation 6 holds as a test of fiscal sustainability. Formally, Hamilton and Flavin test the equivalent null hypothesis that the condition of (4) holds against an alternative:

$$\lim_{j\to\infty}(1+r)^{-j}E_t b_{t+j} = a\ (1+r)^t \underline{\hspace{4cm}}(7)$$

with a≠0. So their test boils down to whether a=0 or a≠0. Equation (6) can be re-written as:
$$b_t = E_t \sum_{i=0}^{\infty}(1+r)^{-j}z_{t+i} + a\ (1+r)^t + \eta_t\underline{\hspace{3cm}}(8)$$

where;
$\eta_t = -E_t \sum_{i=1}^{\infty}(1+r)^{-i}v_{t+i}$ and $z_t = x_t$; b_t is the debt (in market value terms) and z_t is the primary deficit in real terms.

5 Empirical Analysis

5.1 Data and methodology

The empirical analysis was carried out using two approaches, the PVBC model following the steps in Hamilton and Flavin (1986) and the fiscal reaction function, following Bohn (1998). The data used is annual (fiscal year) data on the primary balance, public debt (domestic and external), Composite Price Index (CPI) and Gross Domestic Product (GDP) covering the period 1992/1993 to 2021/22. GDP and CPI data was sourced from the Uganda Bureau of Statistics, government primary balance and public debt data was sourced from the Ministry of Finance Government Finance Statistics database and the central bank.

Hamilton and Flavin propose a simple test of fiscal sustainability by testing the hypothesis that creditors expect the government budget to be balanced in present-value terms. This hypothesis

implies a stationary process in the lifetime budget constraint (equation 8) with a =0 in the regression. When a =0, b_t, will be stationary, whereas for a > 0, b_t, will not be stationary.

$$b_t = E_t \sum_{i=0}^{\infty}(1+r)^{-j}z_{t+i} + a\,(1+r)^t + \eta_t \underline{\hspace{4cm}}(8)$$

Hamilton and Flavin's empirical test boils down to whether a=0 or a≠0 and entails two steps:

1. Assume that η_t is stationary and test for a unit root in the primary balance (z_t,) using a Dickey and Fuller test statistic. If the presence of a unit root in can be rejected, then z_t may be considered stationary, and it can be assumed that the expected future primary surpluses by creditors, $E_t \sum_{i=0}^{\infty}(1+r)^{-j}z_{t+i}$ is also stationary.

2. Test for a unit root in the public debt (b_t). If the presence of a unit root cannot be rejected, then the no-ponzi restriction (4) is rejected in favor of (7), with a≠0. If the presence of a unit root can be then it may be concluded that (4) holds.

$$\lim_{j\to\infty}(1+r)^{-j}E_t b_{t+j} = 0 \underline{\hspace{4cm}}(4)$$

$$\lim_{j\to\infty}(1+r)^{-j}E_t b_{t+j} = a\,(1+r)^t \underline{\hspace{4cm}}(7)$$

6   Empirical results

Stationarity tests

Formal tests for stationarity of the variables using the Augmented Dickey-Fuller tests were conducted. The Augmented Dickey-Fuller (ADF) test reveals that the null hypothesis of a unit root is not rejected for both the primary balance and the public debt both in levels and ratios of GDP and over the three periods ie 1993-2013, 2013-2017 and 1993-2022 (Tables 5). Following Hamilton and Flavin (1986), the ADF test results indicate that the no-Ponzi condition is not met and suggest fiscal insolvency over these periods. The results of the unit root test for the period 2013 to 2017, which followed the fiscal reforms of 2012/13 and the scale up of public expenditure on infrastructure projects, suggest that there was a deterioration in fiscal solvency as the series become more non-stationary as evidenced by the higher order of integration. However, the results would need to be validated by a longer time series as the period 2013 to 2017 provides only five observations.

Table 5: Summary Results of ADF Unit Root Test

Variable		Augmented Dickey-Fuller test statistic**(level)**	Probability. *	ADF test statistic (first difference)	Probability. *	Order of integration
1993 to 2013						
Publicdebt		0.39	0.98	-3.52	0.02	I(1)
RealDebtgdp		-0.90	0.77	-3.67	0.01	I(1)
Primbalance		-0.96	0.75	-4.02	0.01	I(1)
RealPrimbalgdp		-1.73	0.40	-6.26	0.00	I(1)
2013 to 2017						
Publicdebt		1.50	0.99	-1.39	0.50	I(2)
RealDebtgdp		-0.57	0.79	-2.13	0.24	I(2)
Primbalance		-1.50	4.56	-1.52	0.44	I(2)
RealPrimbalgdp		-1.91	0.30	-2.38	0.19	I(3)
1993 to 2022						
Publicdebt		0.31	0.97	-5.47	0.00	I(1)
RealDebtgdp		-1.46	0.5414	-4.57	0.00	I(1)
Primbalance		-1.69	0.43	-7.45	0.00	I(1)
RealPrimbalgdp		-1.05	0.72	-7.82	0.00	I(1)
Test critical values:	1% level	-3.679322				
	5% level	-2.967767				
	10% level	-2.622989				

*MacKinnon (1996) one-sided p-values.

Notes: Lag length selection with Schwartz info criterion is used for the ADF.

Estimating the Fiscal Reaction Function

Bohn's (1998) fiscal reaction function captures the response of the primary balance to key variables. A positive response indicates that the government is taking actions that offset the changes in debt, for example reducing the non-interest expenditure or increasing revenue. The fiscal reaction function can be stated as:

$$pb_t = F(d_{t-1}, x_t) \underline{\hspace{8cm}} (9)$$

The primary balance in period t (pb_t) responds to the existing debt (d_{t-1}) and various control variables (x_t) through a function $F(d_{t-1}, x_t)$. We follow (Burger et al., 2011; Mafusire, 2015; Ikikii, 2017) by including as additional explanatory variables, lags of the primary balance *(pb_{t-1}),* the public debt (*b_{t-1}*) and the output gap, *ygap_{t-1}*. Therefore, taking the lifetime budget constraint (equation 5) with the

variables expressed as ratios of GDP and including controls to address the issue of omitted variable yields the equation:

$$pb_t = + pb_{t-1} + b_{t-1} + ygap_{t-1}\ \rule{5cm}{0.4pt}\ (10)$$

The Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) unit root tests in Table 6 provide the same results, with the exception of the lag of the primary balance. Three estimation methods, Ordinary Least Squares (OLS), Generalized Method of Moments (GMM) and the Autoregressive Distributed Lag model (ARDL) are used to estimate the fiscal reaction function in light of the differing results in the stationarity tests.

Table 6: Summary Results of ADF Unit Root Test

Unit root test	Sub Period: 1993-2017				Full Period: 1993-2022			
	pbt	pbt-1	bt-1	ygapt-1	pbt	pbt-1	bt-1	ygapt-1
Augmented Dickey-Fuller test statistic(**level**)	-2.45	-4.10	-2.84	-2.80	-2.39	-1.35	-3.07	-3.07
Probability.*	0.14	0.00	0.07	0.07	0.15	0.59	0.04	0.04
ADF test statistic (first difference)	-7.07	-5.55	-5.31	-5.80	-8.14	-6.45	-6.01	-6.38
Probability.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Order of integration	I(1)	I(0)	I(0)	I(0)	I(1)	I(1)	I(0)	I(0)
Phillips-Perron Test statistic(**level**)	-2.34	-4.05	-3.07	-2.79	-2.27	-3.40	-2.84	-3.07
Probability.*	0.17	0.00	0.04	0.07	0.19	0.02	0.07	0.04
Phillips-Perron Test (first difference)	-8.21	-13.15	-5.91	-5.85	-10.39	-11.21	-5.26	-6.38
Probability.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Order of integration	I(1)	I(0)	I(0)	I(0)	I(1)	I(0)	I(0)	I(0)
Test critical values:	1% level	-3.679322						
	5% level	-2.967767						
	10% level	-2.622989						

*MacKinnon (1996) one-sided p-values.

Notes: Lag length selection with Schwartz info criterion is used for the ADF and Bandwidth selection 1 (Newey-West using Bartlett kernel) is used for the Phillips-Perron Test

The results of the OLS, GMM and ARDL are presented in Table 7 for the historical period 1993 to 2017 and the period 1993 to 2022. Contrary to the theoretical expectation of a positive response, the debt bt_{-1} is negative in all the regressions although it is only statistically significant in the ARDL model. The long run results of the ARDL indicate that the government responds to a one percentage point increase in public debt with a 0.03 percentage point decrease in the primary balance (increase

in the primary deficit) based on the data from 1993 to 2017. The decrease in the primary balance (increase in the primary deficit) increases to 0.36 percentage points when the medium term projections are included. These findings indicate that the government is unable to run a primary surplus to counter an increase in the public debt. Fiscal policy is unsustainable as adjustment will become necessary and may only be achieved at a very high cost to the economy. The coefficient on the lag of the output gap is positive and significant in the ARDL model, which shows that the government responds to an increase in the output gap with an increase in the primary balance. The coefficient increases when the medium term framework projections are included, suggesting that the government may be planning to behave counter cyclically in the future.

Table 7: Fiscal reaction function for Uganda

Independent variable: pb_t	OLS	GMM	ARDL
Coefficient			
1993 – 2017			
pbt_{-1}	-0.016812	-0.016812	2.357741***
bt_{-1}	-0.018317	-0.018317	0.029802**
ygapt-1	-0.037607	-0.037607	0.074857**
C	-4.860035***	-4.860035***	6.507684***
R-squared	0.192236	0.192236	0.999853
Adjusted R-squared	0.076842	0.076842	0.997059
S.E. of regression	1.892777	1.892777	0.111718
Durbin-Watson stat	1.190822	1.190822	3.047226
Mean dependent var	-5.883070	-5.883070	0.140565
S.D. dependent var	1.969977	1.969977	2.060076
Sum squared resid	75.23467	75.23467	0.012481
J-statistic		7.31E-30	
F-statistic	1.665901		357.8759
1993-2022			
pbt_{-1}	0.165282	0.165282	0.359791
bt_{-1}	-0.018192	-0.018192	-0.332507*
$ygapt_{-1}$	-0.032442	-0.032442	1.165551*
C	-3.549551***	-3.549551***	8.791379*
R-squared	0.263953	0.263953	0.948376
Adjusted R-squared	0.179024	0.179024	0.856601
S.E. of regression	1.893894	1.893894	0.748868
Durbin-Watson stat	1.198299	1.198299	2.791446
Mean dependent var	-5.488804	-5.488804	0.152632
S.D. dependent var	2.090213	2.090213	1.977569
Sum squared resid	93.25771	93.25771	5.047226
J-statistic		1.59E-29	
F-statistic	3.107943		10.33365
Breusch-Pagan LM Serial correlation Prob. F (2,7)			0.1891
Breusch-Pagan Heteroscedasticity test. Prob F (16,9)			0.5959
t-Bounds test			12.35187
F-statistic	Test critical values: 10% level: 3.2 5% level: 3.67 2.5% level: 4.08 1% level: 4.66		

Source: Authors' computations
*significant at 10 percent level of significance, ** significant at 5 percent level of significance, ***
significant at 1 percent level of significance.

Robustness tests

We use the serial correlation LM test to verify whether the residuals from the ARDL model are serially uncorrelated. We fail to reject the null hypothesis that the residuals are serially uncorrelated since the F-statistic probability value of 0.1891 is not statistically significant at the 1 percent, 5 percent and 10 percent levels of confidence (Table 7). We therefore conclude that the residuals are serially uncorrelated. We also fail to reject the null hypothesis that the residuals are homoscedastic i.e. the error term is the same for all the values of the independent variables since the F-statistic probability value is 0.5959, which is not statistically significant at all the three levels confidence. The bounds test for cointegration has a statistic value of 12.35187 which is greater than the I(1) critical value bound, thus we reject the null hypothesis that there is no long run equilibrium relationship amongst the variables.

7   Conclusion and Recommendations

Using the standard method for fiscal sustainability analysis, the Present Value Budget Constraint (PVBC) model, we fail to reject the null hypothesis of stationarity for the primary balance including grants for the periods 1993 to 2013, 2013 to 2017 and 1993 to 2022, which includes projections in the medium term expenditure framework. The results of the unit root test for the period 2013 to 2017, which is the outturn period following the fiscal reform implemented from 2012/13 and the scale up of public expenditure on infrastructure projects beginning 2014/15, suggest that there was a deterioration in fiscal solvency as the series become more non-stationary as evidenced by the higher order of integration. However, the results would need to be validated by a longer time series as the period 2013 to 2017 provides only five observations.

We also find evidence of a long run cointegrating relationship between the primary balance and the public debt with a negative and statistically coefficient on the public debt. This is contrary to the theory which postures that the government should run a primary surplus in response to increases in the public debt. The results suggest fiscal insolvency and unsustainable fiscal policy in Uganda over

the periods analyzed. This result implies that Uganda will have to run primary surpluses sooner than projected in the medium term expenditure framework in order to improve its public debt dynamics and increase the fiscal space within which Government will be able to respond to fiscal shocks without great cost to the economy. This calls for increased domestic revenue mobilization, and an improvement in the implementation and productivity of government projects to spur economic activity and generate more revenue.

The government of Uganda has targeted an annual increase of 0.5 percent to GDP in the domestic revenue (MoFPEDb, 2017). However; this paper suggests that a significantly higher increase is required as evidenced by the average debt stabilizing primary balance to GDP of 1.6 percent compared to the average of the projected primary deficit to GDP of 3.5 percent.

The limitation of the study is that the outturn period after the fiscal reform and the scale up of public expenditure on infrastructure projects is quite short for the time series analysis and may not provide an accurate assessment of the impact of these events on fiscal solvency. In addition, the PVBC approach is largely an indicator of solvency i.e. the ability of the government to repay its debt, which does not address the issue of continuously rising debt and the fiscal risk that this poses. The fiscal reaction function provides a stronger empirical test for fiscal sustainability by establishing the response of the primary balance to changes in the public debt to GDP ratio. However, it does not take into account the uncertainty in the public debt path. Future research should utilize a probabilistic approach as in Frank and Ley (2008)to provide more insights on the public debt dynamics and fiscal policy sustainability analysis in Uganda.

References

Abbas, S. M. A. (2005) Public debt sustainability and growth in Sub-Saharan Africa (post-HIPC): The role of domestic debt. *GDN Project on Macroeconomics of Low Income Countries.*

Abbas, S. A., Belhocine, N., ElGanainy, A., and Horton, M. (2010). A Historical Public Debt Database. *IMF Working Paper*. WP/10/245.

Barro, R. J. (1979). On the Determination of Public Debt. *Journal of Political Economy* LXXXVII, 940-971.

_____.(1989). The Ricardian Approach to Budget Deficits. *Journal of Economic Perspectives*. Volume 3, Number 2—Spring 1989—Pages 37–54.

Blanchard, O. J., Dell'Ariccia, G., and Mauro, P. (2010). Rethinking Macro Policy. *IMF Staff Position Note.* SPN/10/03, February 12, 2010

Blanchard, O. J. (1990). Suggestions for a New Set of Fiscal Indicators. *OECD Economics Working Paper* 79.

Bohn, H (1998). The Behavior of U.S. Public Debt and Deficits. *Quarterly Journal of Economics* 113: 949–63.

Burger, P., Stuart, I., Jooste, C., and Cuevas, A. (2011). Fiscal sustainability and the fiscal reaction function for South Africa. *IMF Working Paper.* WP/11/69.

Burnside, C. (2004). Some Tools for Fiscal Sustainability Analysis. Fiscal Sustainability in Theory and Practice: A Handbook. World Bank.

Chalk, N., and Hemming, R. (2000). Asessing Fiscal Sustainbility in Theory and Practice. *IMF Working Paper*. WP/00/81.

Ejalu, R. (2016). Fiscal Sustainability and Monetary Policy in Uganda and Neighboring Countries (Doctoral Dissertation). Retrieved from https://grips.repo.nii.ac.jp/?action=repository_action_common_download&item_id=1528&item_no=1&attribute_id=25&file_no=3.

Fedelino, A., and Kudina, A. (2003). Fiscal Sustainability in African HIPC Countries: A Policy Dilemma? *IMF Working Paper.* No. 03/187.

Frank, N., Ley, E. (2008). Refinements of the Probabilistic Approach to Fiscal Sustainability Analysis. *Policy research working paper* No. 4709.

Ghatak, S. and Sánchez-Fung, J. R. (2007). Is Fiscal Policy Sustainable in Developing Economies?. *Review of Development Economics*, 11: 518–530. doi:10.1111/j.1467-9361.2006.00358.x

Hamilton, J. D., and Flavin, M. A. (1986). On the Limitations of Government Borrowing: A Framework for Empirical Testing. *American Economic Review* 76 (4): 808–19.

Ikikii, S. M. (2017). Fiscal Policy Reaction Function for Kenya. Accessed from: https://www.researchgate.net/publication/31823013_Fiscal_Policy_Reaction_Function_For_Kenya

International Monetary Fund (IMF). (2015). Public Debt Vulnerabilities in Low-Income Countries: The Evolving Landscape. Staff Report.

Langford, B., and Namanya, R. A. C. (2014). Financing Fiscal Deficits in Uganda: Options and Strategy. *International Growth Centre.* Working Paper.

Mafusire, A. (2015). Assessing Swaziland's Fiscal Sustainability and Policy Options. *Economics Research International*. 2015. 1-10. 10.1155/2015/435639.

Ministry of Finance, Planning and Economic Development (MoFPED). (2017a). Background to the Budget (BTTB) Fiscal Year 2017/18: Industrialization for Job Creation and Shared Prosperity.

_____. (2017b). Debt Sustainability Analysis Report.

_____. (2017c). Budget Framework Paper.

_____. (2014) Background to the Budget (BTTB) Fiscal Year 2014/15: Maintaining the Momentum: Infrastructure Investment for Growth and Socio-Economic Transformation.

Nzaramba, L. (2015). Measuring Fiscal Sustainability Of African Economies (Masters Dissertation). Retrieved from http://wiredspace.wits.ac.za/jspui/bitstream/10539/19156/1/Measuring%20Fiscal%20Sustainability%20of%20African%20Economies.pdf.

Romer, D. (2011). What Have We Learned about Fiscal Policy From the Crisis. *IMF Conference on Macro and Growth Policies in the Wake of the Crisis,* March 2011.

Salsman, R. M. (2017). The Political Economy of Public Debt: Three Centuries of Theory and Evidence. Cheltenham, UK: Edward Elgar Publishing.

Tsoulfidis, L. (2007). Classical economists and public debt. Classical Economists and Public Debt. *International Review of Economics.* 54(1):1-12.

Uganda National Planning Authority (NPA). (2013). Vision 2040. Retrieved from http://npa.ug/wp-content/themes/npatheme/documents/vision2040.pdf.

Zaaruka, B. B., Ndove, T., and Tjipe, T. (2004). Central Government Debt Sustainability. Bank of Namibia, Research Department Working paper.

3. The Effects Of Public Domestic Debt On Growth In Sub-Saharan Africa

By Frank Mashodo

ABSTRACT

This paper seeks to empirically investigate the impact of public domestic debt on GDP per capita growth in Sub-Saharan Africa. The General Methods of Moments (GMM) has been applied on 13 SSA countries over the period 2001 to 2015. The results indicate that the domestic debt in SSA has an impact on GDP per capita growth. On average, this study conclude that in SSA, an increase in domestic debt by 1% of GDP leads to 0.09% increase in growth per capita. The study also proved the existence of the laffer curve relationship between debt and GDP. On the basis of these findings, it is recommended that, countries in SSA can use domestic debt as a potential sources of funds for development programmes and prudently manage their debt portfolios, taking into account maximum levels, since excessive borrowing is discouraged.

Key Words: Domestic Debt, GDP per capita growth, Sub-Saharan Africa (SSA).

1 INTRODUCTION

Public domestic debt in Sub-Saharan Africa (SSA) has been increasing over the last three decades, from an average of 11% of GDP in 1980-1989, to an average of 17.5% of GDP in 2010-2013, and by additional 3% points in 2015 to close at 20.4% of GDP although there is a wide disparity in the size of domestic debt among SSA countries (Regional Economic Outlook, SSA, 2016 and Adelegan and Radzewicz-Bak, 2009). This increase was as a result of limited fiscal space and huge infrastructure spending (Mbate 2013), the need, "to avoid…unsustainable external debt indebtedness" (Adelegan and Radzewicz-Bak, 2009) as well as to develop the alternative source of funding given the limited concessional financing from the traditional donors. Domestic debt, however, constitutes the large part of the financial sources in the domestic markets in SSA (Christensen, 2004).

At the same time, real GDP growth in SSA has been impressive since 2000, "with some of its countries among the fastest growing economies in the world", (Zamfir, 2016), with growth rates exceeding 5% per year. In addition, the continent has been resilient during and after the global

financial crisis on the basis of macroeconomic and good fiscal situation as well as low economic interconnectivity with the rest of the world.

However, it remains unproven whether public domestic borrowing contributed to growth in GDP for SSA. Looking at the debt dynamics equation (Law of motion of Government debt to GDP ratio by Ley, 2010), where current level of debt is negatively associated with GDP growth, it could be prudent to also test whether debt (domestic in particular) is a factor that influence growth. There could also be a reverse causality between debt and real GDP growth. There is no consensus in the already limited existing body of literature regarding the effects of domestic debt on real GDP growth. This paper seeks to empirically investigate whether this increase in domestic debt has positively influenced real GDP growth in SSA, which is critical for poverty alleviation. Moreover, IMF Regional Economic Outlook (2015) pointed out sharp decline in oil prices and other commodities prices as driver to slow growth in recent years. Furthermore, the widening deficits and tighter global financing with limited external financing were pointed to be key risks for real GDP growth in SSA.

The debt thresholds under the country debt sustainability analysis have been limited to external debt. These thresholds guide countries in that, if public debt is not managed within appropriate levels, it could present challenges to Governments as has been witnessed in many developing countries. As with external debts, domestic debt needs to be managed within limits to stimulate growth (the Laffer curve relationship). However, the growing level of domestic debt, where a specific limit that spurs growth does not exist, calls for development of standard thresholds on domestic debt as is the case with external debt. It is therefore ideal to develop a limit to serve as a policy guide under which Governments can use domestic financing, beyond which, if breached, would cause debt distress. The limit could also take into account the cost of borrowing, to ensure that there is a balance on the level of domestic debt which promotes growth and sustainable debt.

The specific objectives of this paper are therefore two-fold, that is:

i) To determine the relationship between public domestic debt and economic growth in Sub-Saharan Africa over the period 2001-2015;

ii) To determine if domestic debt level in relation to GDP has a maximum point (Laffer curve relationship); and

iii) To estimate and propose the indicative limit of domestic debt/GDP ratios under which countries in Sub-Saharan Africa can borrow in the domestic market.

The study will inform debt managers, policy makers and governments on policy issues relating to domestic debt management and growth, including domestic debt limit that would be ideal for developing countries in the region and promote development.

1.1 Review Of Domestic Debt Trends In Sub-Saharan Africa

As indicated earlier, public domestic debt in Sub-Saharan Africa (SSA) has been increasing over the last three decades, from an average of 11% of GDP in 1980-1989, to an average of 17.5% of GDP in 2010-2013, and by additional 3% points in 2015 to close at 20.4% of GDP although there is a wide disparity in the size of domestic debt among SSA countries (Regional Economic Outlook, SSA, 2016 and Adelegan and Radzewicz-Bak, 2009).

Focusing on the period under review (2001 to 2014) for the sample in this study, SSA domestic debt averaged 16% of GDP, which is highly significant based on the 1980 -1989 trends. At the same time, GDP per capita growth improved in the period under review from 1.8% to 2.7%. The graph below shows the trend in domestic debt (PLCDD) and per capital growth (GDP).

Average Trends in SSA: Per Capita Growth and Domestic Debt
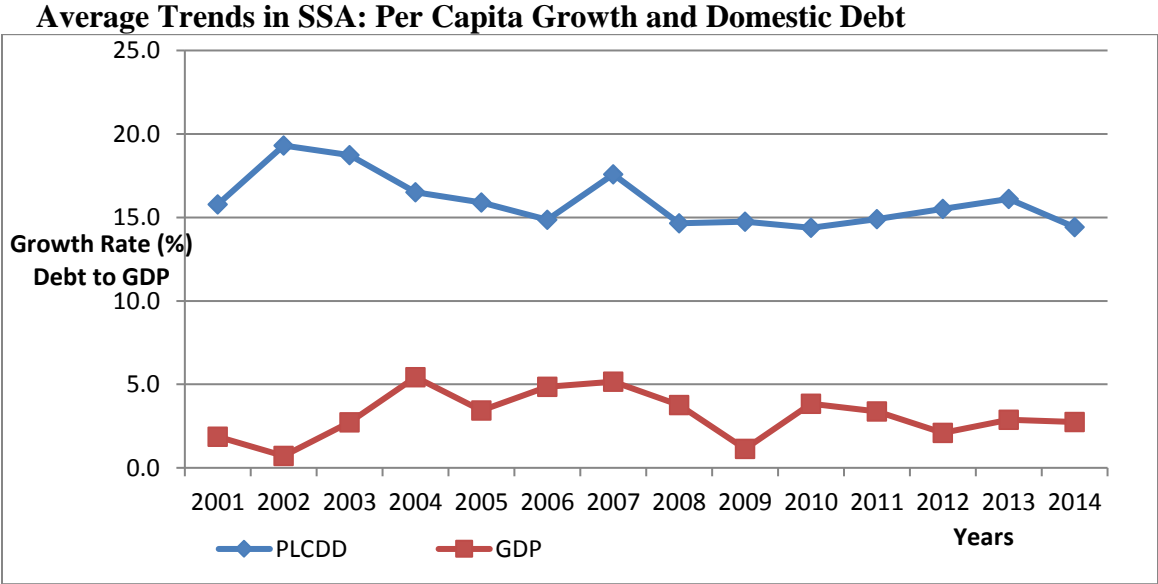
It is interesting to note that some countries in SSA have been stable in issuing domestic debt. For the period under review (2001-2014), the following five countries have domestic debt to GDP as follows: South Africa (30% of GDP),) Nigeria (12% of GDP), Mauritius (40% of GDP), Ghana (21% of GDP),

and Kenya (20% of GDP). These countries have also maintained reliable and stable data on domestic debt front.

Key emerging countries, whose domestic debt have shown positive trends are shown of the graph below:

5 Year Trend: Domestic Debt Selected Countries

Legend: ■ 2003 ■ 2008 ■ 2013
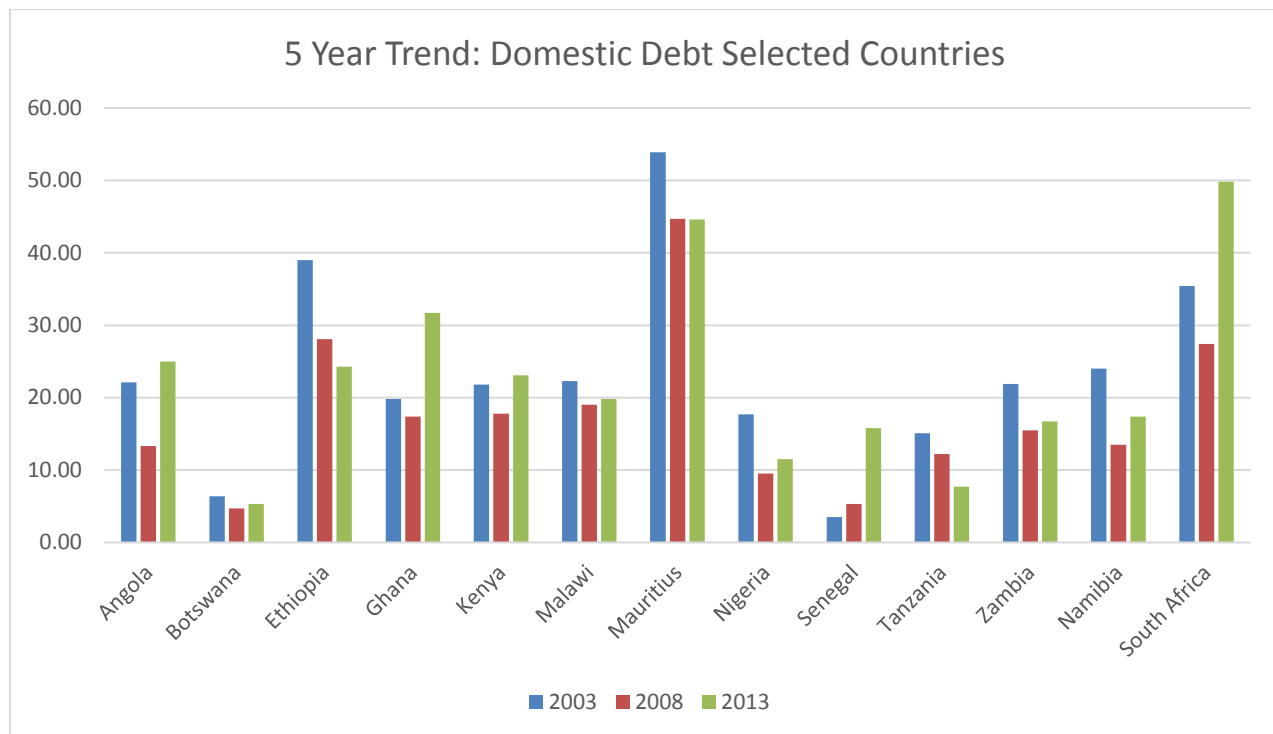
1.2 Literature Review

This section reviews the existing literature on domestic debt, starting with theoretical and then empirical review.

The need to issue domestic debt arises from a variety of reasons in SSA, chief among them being budget deficit financing. Among others, Drazen (1996) and Abbas & Christensen (2007) have identified the following important factors behind issuance of domestic debt:

i) It enhances the volumes of investment through the provision of financial assets and strengthening money (improves liquidity);

ii) It improves the efficiency in domestic capital markets and enhances political accountability, thus building credibility on Government's track record on policies and stability;

iii) There is "Home Bias", (Drazen, 1996) – where the knowledge of domestic market conditions enhances lower transaction cost;

iv) It taps into the private savings and is attractive to domestic residents who are subject to restrictions on international trading of financial assets (barriers to entry on the trading of financial assets among countries).

1.3 Theoretical Review

The oldest school of economics, the neo-classical, perceives employment and economic output to be modest and self-adjusting, believing that changes in aggregate demand result in production, price and wage movements, which will automatically lead to output changes through the investment channel.

Keynesian Economics

Keynesian theory (Jahan, at el. 2014) suggests that Government intervention stimulates the economy through countercyclical fiscal policies that act against the undesired direction of the business cycle. The Keynesian approach argues that governments should solve problems in the short run rather than wait for market forces to fix the constraints over the long run (Jahan, at el. 2014). The Keynesian approach supports government borrowing as the basis for financing deficit to stimulate growth in the economy.

There is no consensus on the time lags between policy actions and actual economic adjustments against which fiscal stimulus is applicable. Therefore, the economic theories can be summarised sequentially as follows: (1) the Government use debt to finance current budget deficit, (2) the economic growth is realised through the multiplier effect as government spending is increased (expansionary fiscal policy), (3) increase in GDP promotes welfare development and average incomes for citizens increase, and (4) future generations with improved income have the capacity to pay taxes for the previous public sector borrowing as well as higher private sector savings and spending, resulting in enhanced growth.

Debt Overhang Hypothesis

Debt Overhang Hypothesis postulates that if a firm has huge debt, its new investments' returns are totally used up to pay existing debt, which will not improve the firm's assets, leading to fewer

prospects for investment and growth, Myers (1977). In a related development, Krugman (1988), applying the concept at country level, examined the trade-offs facing creditors between forgiving debts and refinancing for countries in debt overhang. As in Meyers' theory of the firm, Krugman (1988) concluded that a country's new investments will only benefit the new creditors, thus indebted countries are not motivated to new borrowing and investment and growth.

On the other hand, the debt overhang hypothesis, suggests that, "negative impact of high debt on growth operates both through a strong negative effect on physical capital accumulation and on total factor productivity growth" Pattillo et al. (2004) (p4).

Debt Laffer Curve

The debt laffer curve, as introduced by Sachs (1989) and Krugman (1988) under the 'debt overhang' explained above indicate that the obligation of servicing debt will act like a high marginal tax rate when a country has accumulated too much debt. It logically states that the impact of debt on growth is nonlinear which depends on the magnitude of the initial debt stock. The hypothesis has three distinct categories: (1) where growth is an increasing function of the debt when debt is used to promote development in the Keynesian way, (2) economic growth can either be high or low, thus any increase in debt will not stimulate growth, and (3) where debt is affecting growth as under the neo-classical economists. Specifically, the economy will exhibit high growth equilibrium for a lower debt-to-GDP ratio and low growth equilibrium for a higher debt-to-GDP ratio. The lower growth is due to the higher debt service payments when there is high debt.

Patillo et al. (2004) is among the previous studies that has explored the nonlinear effect of external debt on economic growth. As suggested by Patillo et al. (2004), doubling the debt ratio for a country with average indebtedness will reduce growth by one third to a half percentage point after controlling for endogeneity. The findings also suggest that the average impact of debt becomes negative at about 160 – 170 per cent of exports and 35 – 40 per cent of GDP.

Neo-classical Economic Theory

The classical economics proponents David Hume, Adam Smith and David Ricardo argued against government borrowing. The theorists believed that public borrowings will burden the community and the economy at large. They criticized debt financing because, they argued, domestic debt will crowd

out private capital creation (Tyagi, 2002). Svaljek (1999) explained that debt is financed through taxation, of which the rational present generation bears the burden and adjusts consumption. In addition, future generations will reduce either current consumption or savings if not both to finance taxes. This implies a reduction in capital endowments for future generations.

Svaljek (1999) concur with Tyagi, (2002) on crowding out as the author pointed out that, "the classists public debt necessitates a transfer of resources from the private sector to the government in the form of additional taxation". Some viewpoints on the classicals are summarized as follows: (1) Debt is more than taxation for public expenditure financing since it has interest payments; (2) Debt transfers a tax burden from one generation to another; and (3) Debt may undermine government credibility if not well redeemed. Tsoulfidis (2007) on public debt pointed out that, "the ideas of classical economists on public debt might be more relevant nowadays than is commonly thought". Therefore, this author will pay attention to this view since Tsoulfidis (2007) argues that empirical evidence suggest that public debt has no effects on growth.

Savings are a major source of domestic debt and subsequently economic growth based on the theoretical analysis under Neoclassical and Keynesian schools. The Chenery and Strout (1966)'s Two-Gap model pointed out that the utilisation and expansion of existing productive capacity has constrained savings, which have been relatively unnoticeable in the 1980s, but have been growing from the 1990s. The model makes a critical assumption that the market for government bonds does not exist. Building from this model, SSA has registered progress on the financial developments front. Mlachila, et al (2016), as in the loanable fund theories, pointed out that financial development is important for "the increase in deposits and loans [including] their accessibility and improved financial sector efficiency". In addition, "it helps mobilize savings and direct funds into productive uses".

It is critical to note that in each model, there is general consensus that higher savings lead to higher investments and growth. This author theoretically agrees the following: (1). Savings are critical and available domestically through financial development; (2). Loanable funds in the banking sectors are borrowed by government; and (3). Government's expansionary fiscal policy induced by domestic debt lead to GDP growth through the fiscal multiplier effect.

Adom and. Elbahnasawy (2014) summarized African savings by indicating that most countries heavily relied on overseas development assistance (ODA) for investment financing. However, these countries have since realized the need for domestic financing as a sustainable model for development and capital financing.

The above theoretical literature suggest that for effective growth, domestic borrowing can be useful in the economy, to some extent, whereby borrowing could be usefully managed up to certain limit levels. Beyond such levels borrowing could become a burden to economic growth

2 *Empirical Review*

The empirical literature on the impact on growth, of domestic public debt is ambiguous; positive or negative. To test if domestic debt has significant impact on growth in SSA as well as to determine the applicable limit of domestic debt, the following empirical literature is reviewed:

Babu et al. (2015) analysed the effect of domestic debt on growth on a panel of East African Community (EAC) Partner States (Kenya, Rwanda, Uganda, Tanzania) over the period 1990 to 2010 using the panel fixed effects model. Their study concluded that domestic debt had positive impact on growth. However, the study could not establish the threshold of domestic debt under which positive impact is realised, and that level, if exceeded, could cause debt distress. Christensen (2004) investigated the role of domestic debt markets for 27 SSA countries over the period 1980 to 2000 and found that domestic debt did not have significant impact on growth in SSA. Acknowledging data limitations as a challenge, the results of the paper may be biased since research was based on qualitative analysis and no scientific quantitative data analysis was undertaken.

Abbas and Christensen (2007) investigated the growth impact of domestic debt covering 93 low-income countries and emerging markets over the period 1975–2004. Their results suggested that moderate levels of non-inflationary domestic debt exerted a positive impact on economic growth. Their study further pointed that at, "above a ratio of 35 per cent of bank deposits, domestic debt begins to undermine growth". Focusing on 19 developing countries, Zouhaier and Fatma (2014) also empirically tested the dynamic model of debt and growth over the period 1990 to 2011 using Arrellano-Bond dynamic panel data estimator. The results showed that there was a negative impact of debt on growth. Though the study focused on developing countries, it could provide some inference on the impact of debt in SSA.

Bilan and Ihnatov (2015) analysed the impact of public debt on growth for 33 European countries over the period 1990 to 2011. The study focused on investigating the non-linearity (quadratic) relationship between debt and growth to establish the maximum level of debt these countries could bear. Their study concluded that public debt below 94% of GDP had a positive effect on growth, while above this ratio it became negative. This was done using the General Methods of Moments (GMM) estimator to solve endogeneity problems (reverse causality). This study is relevant from a methodological point which was used by Bilan and Ihnatov (2015) on developing the limit for debt.

Presbitero (2010), factoring the institutions and polices of different countries discussed the relationship between debt and growth in low and middle income countries. They applied the two stage systems GMM over the period 1990 to 2007, to take into account country specific fixed effects, solve endogeneity and exploit additional moment conditions, including taking the non-linear quadratic model to measure debt limits. The study concluded that, "public debt [both domestic and external] has negative impact on output growth up to a threshold of 90 percent of GDP, beyond which the effect becomes irrelevant". This paper intents to single out SSA to investigate if domestic debt has impact on growth, using the methodology (GMM) used by Presbitero (2010).

Putunoi and Mukutu (2013) examined the impact of domestic debt on growth using quarterly time series data in Kenya over the period 2000 to 2010. Their study applied an error correction model to capture both short-run and long-run dynamics and found that domestic debt in Kenya (part of SSA) had a positive effect on growth. Bakare et al. (2016) empirically analysed domestic debt effects on growth for Nigeria using data from 1981 to 2012 using Ordinary Least Squares (OLS). They also concluded that domestic debt had a positive impact on growth

Anning et al. (2016) investigated the impact of government debt (both external and domestic) on the economic growth of Ghana using OLS covering 1990 to 2015. The research findings revealed that there is a negative relationship between debt and growth in the economy in Ghana. Sheikh et al. (2010) analysed the impact of domestic debt in Pakistan on the basis of low tax base and twin deficits, where, "capital flows are not easily accessible but domestic capital flows are approachable at all times". They applied the OLS method over the period 1972 to 2009 and found a positive causality between domestic debt and economic growth in Pakistan. In addition, Karaki et al. (2016) for Jordan investigated the impact of domestic debt on economic growth using the OLS technique spanning from

2000 to 2014. They found domestic debt statistically significant and positively stimulating economic growth.

In conclusion, the literature suggests that the effects of domestic debt on growth is ambiguous and remains largely an empirical issue from country to country. This study seeks to add to the existing body of literature by examining whether domestic debt has impact on economic growth in SSA, establish if there is a maximum point of domestic debt and what level of domestic debt positively affects GDP growth, if the relationship is positive. The objective of the study is to address the research question, by testing the hypothesis that: (1) public domestic debt has positive impact on real GDP growth in Sub-Saharan Africa, and (2) there is a maximum limit under which domestic debt affects growth.

3 Methodology

The study follows Bilan and Ihnatov (2015), Abbas and Christensen (2007), Babu, at el (2015), and Presbitero (2010), in which the non-linear empirical model (Laffer curve relationship) allows for the determination of maximum point. The baseline econometric model on the relationship between domestic debt and growth will be as follows:

$$GDPG_{it} = \alpha + \beta_1 PLCDD_{it} + \gamma X_{it} + \varepsilon_t -----------(1)$$

Where
- **$GDPGt$** = Real Gross Domestic Product Growth Rate at time t,
- **$PLCDDt$** = Public Domestic Debt, and
- **Xit** = vector of other control variables including trade, inflation, investment and domestic credit to the private sector at time t.
- **$\alpha, \beta, \gamma,$ and** ε are the constant, parameter measuring the relationship between the two variables and the error term (including the unobserved country effects and unobserved time in-variant effects) respectively.

The estimation methodology follows the General Methods of Moments, which has been deemed appropriate based on the two-way characteristics of the relationship under investigation, in order to empirically establish the relationship between domestic debt and real GDP per capita in Sub-Saharan Africa (SSA).

4 Data

The data employed on this study consist of a panel of 13[7] countries in Sub-Saharan Africa. This sample selection was based on data availability especially on domestic debt and is not random. The data gathered covers 15 years over the period 2001 to 2015. The time was also chosen based on the data availability, since comprehensive reporting on domestic debt started after 2000 for most low income countries, thus data remains a significant challenge.

The recent growth studies have pointed to this set of explanatory variables in Sub-Saharan Africa that have shown to be consistently associated with growth. The explanatory variables are explained in Table 1 below:

Table 1: Description of variables

Name	Description	Source
GDP per capita Growth	GDP per capita growth (Constant)	World Development Indicators
FDI	Foreign Direct Investment as percentage of GDP	
Current Account	Measured by difference between the exports and imports of goods and services (% of GDP).	
Private Domestic Credit	Domestic credit to private sector (% of GDP)	
Inflation	Inflation, GDP deflator (annual %)	
Savings	Gross domestic savings (% of GDP)	
Public External Debt	External Debt (units)/Nominal GDP (units)	
Financial Development	Broad money (% of GDP)	
Government Effectiveness	Quality of public services, and degree of its independence from political pressures, the quality of policy formulation, implementation, and credibility of commitment to such policies.	Worldwide Governance Indicators
Regulatory Quality	Ability of the government to formulate and implement sound policies and regulations that permits and promotes private sector development.	
Rule of Law	Extent to which agents have confidence in and abide by the rules of society, including contract enforcement, property rights, the police, and the courts.	

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7 Countries included are Angola, Botswana, Ethiopia, Ghana, Kenya, Malawi, Mauritius, Namibia, Nigeria, Senegal, South Africa, Tanzania, Zambia

Public Domestic Debt	Public Domestic Debt as a percentage of GDP	IMF Article IV Reports[8]

4.1 Estimation Methodology

Following Bilan and Ihnatove (2015), the study applies the general and widely used panel data analysis that consists of either Fixed Effects (FE) or Random Effects (RE) estimation methods depending on Hausman specification test. Hausman specification test assumes that both RE and FE estimators are consistent and evaluates them under the null hypothesis that the RE estimator is more efficient. If the results cannot reject this null hypothesis, the RE method is preferred, and if the data can reject it, the FE method is preferred (Hausman, 1978; Wooldridge, 2012).

These two techniques can solve individual as well as time effects and can adjust for heteroscedasticity. The shortcomings of RE and FE is that they are centred on country-specific effects and do not consider stationarity, dynamics and endogeneity. In this empirical case, where domestic debt is evaluated on growth; endogeneity cannot be ignored particularly based on economic theory. Governments raise debt, to finance government deficit, which depends on other macroeconomic variables, which include revenues, expenditures, GDP growth, exchange rates, inflation and balance of payments (debt dynamics equation) among others. Therefore, there is a strong argument that domestic debt is theoretically endogenous.

In this regard, this paper adopted the General Methods of Moments (GMM) in order to solve endogeneity, (reverse causality/simultaneous bias, measurement errors and omitted variable bias) and stationarity. The GMM estimator, "uses the levels equation … to obtain a system of two equations: one differenced and one in levels" Mileva, (2007); thereby increasing efficiency of the estimators. The validity of the GMM model is checked under the Hansen's J-Statistic to investigate whether the model is correctly specified with valid instruments.

In order to determine the maximum point under which SSA countries could borrow and maintain sustainability, mathematical formula under the non-linear equation (quadratic) for establishing a

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8 The use of IMF Article IV reports is supported by Abbas and Christensen (2007) who pointed out that, "reliable [domestic debt] data has been, and still is, a serious problem in [low income countries] and some emerging markets".pp9

maximum point has been used, (see annex for simple mathematical workings). The maximum point will be determined by the coefficient $-\beta_{debt}/2\beta_{debt}^2$ as used by Bilan and Ihnatov (2015).

The robustness checks are done by introducing another sample which consist of 13 Countries in SSA, and South Africa is removed, as it is perceived to be well developed and depends much on the domestic market. The same methodology applied above will be done in that sample.

4.2 Results And Interpretation

The panel data analysis used in this paper took into account the Hausman specification tests and the results indicated that the null-hypothesis could not be rejected. The more efficient random effects method is preferred for both the non-linear and linear equations (See annex for Hausman results in annex). This also applies to robustness check sample which excludes South Africa.

Focusing on the random effects results (results in annex), the effect of public domestic debt on growth is not significant in all four equations, in each sample case, where South Africa is included and excluded. However, given the endogeneity of the domestic debt, the results cannot be conclusive. This suggests that further analysis is required thus the GMM results will be discussed.

The Hansen's J-Statistic approves the validity of the instruments used in this study except for equation (3) in table 2 below. This implies the significance of external debt among the regressors. To this end, the focus conclusive equation in this study in (4), where external debt is included in a non-linear model. (The sample selected includes all countries. The robustness checks results are available in annex and depicts similar trends). Public domestic debt in SSA has been found to have a significant impact on per capita GDP growth. The non-linear equation (4), which has been used to evaluate the impact of public domestic debt on economic growth shows that, at 1% level, public domestic debt is positive and significant for growth per capita in SSA. This would mean, on average, any increase in domestic borrowing by 1% of GDP would lead to 0.09% per capita GDP growth, holding all other things constant.

GENERAL METHODS OF MOMENTS EQUATIONS

DEPENDENT VARIABLES	GDP per Capita Growth			
	(1)	(2)	(3)	(4)
Public Domestic Debt	0.0169**	0.0234***	0.0450*	0.0895***
	(0.00822)	(0.00877)	(0.0260)	(0.0316)
Private Domestic Credit	-0.00716**	-0.0109***	-0.00739**	-0.0132***
	(0.00298)	(0.00374)	(0.00306)	(0.00404)
Current Account	0.0279***	0.0166	0.0347***	0.0263**
	(0.00993)	(0.0116)	(0.00975)	(0.0111)
FDI	0.0324	0.0266	0.0318	0.0244
	(0.0240)	(0.0239)	(0.0231)	(0.0231)
Inflation	-0.00223	0.000487	-0.00397	-0.00241
	(0.00562)	(0.00456)	(0.00576)	(0.00450)
Financial Development	-1.15e-05	4.78e-05	-1.05e-05	5.33e-05
	(1.44e-05)	(4.07e-05)	(1.47e-05)	(3.96e-05)
Public External Debt		-0.0133*		-0.0150**
		(0.00769)		(0.00756)
Public Domestic Debt (Square)			-0.000511	-0.00107**
			(0.000366)	(0.000426)
Constant	0.965***	1.170***	0.735**	0.611*
	(0.188)	(0.213)	(0.315)	(0.356)
Observations	172	172	172	172

Robust standard errors in parentheses - *** p<0.01, ** p<0.05, * p<0.1

Instruments - *Public Domestic Debt, Private Domestic Credit, Current Account, FDI, Inflation, Financial Development, Public External Debt, Public Domestic Debt (Square), Government Effectiveness, Regulatory Quality and Rule of Law.*

In addition, the results above indicate that Current Account balance which has been used to measure openness is significant at 1% and positive. The domestic credit to private sector and external debt at 5% level of significance were found to be significant and negative, implying the existence of

crowding out and fatigue on external debt in SSA. On the other hand, inflation, although negative is not significant for growth. Financial development and FDI although positive are not significant for economic growth in SSA.

In order to determine the maximum point, non-linear equation (2) is used. This equation tests the significance of the public domestic debt in the non-linear form and finds it at 5% level to be positive and significant for per capita GDP growth in SSA. In addition, the coefficient of the square of domestic debt (debt^2) is negative and significant at 5%, confirming that domestic borrowing follows a Laffer curve in SSA, which could imply that there is threshold for domestic debt.

Inferring at 5% level of confidence, from the results of table 2, equation (4), the debt maximization formula discussed above, suggest a threshold of 41.8% of GDP, on average [-0.0895/(2*-0.00107)]. Therefore, the results from this study would suggest a maximum threshold for domestic debt taking into account external debt. This maximum point derived assumes that external debt would be limited while the portfolio of debt is skewed towards domestic borrowing. The limit however is not conclusive owing to the fact that this paper did not establish the limit for external debt, but the paper authoritatively argues that domestic debt follows the laffer curve.

The results in this paper are in support of evidence provided by Babu, at el (2015), Abbas and Christensen (2007), Bilan and Ihnatov (2015), Putunoi and Mukutu (2012), Bakare, et al. (2016) and Sheikh, at el (2010), on the impact of domestic debt on growth in general, although this paper emphasises the importance of domestic debt in SSA. The results of these studies had found domestic debt and in some cases total debt to be significant for economic growth. However, the threshold for domestic debt has been developed for other regions (EU), for which the 41% of GDP found in this study is applicable for countries in SSA.

4.3 Conclusion And Recommendations

This study aimed at examining the impact of public domestic debt on GDP growth per capita in Sub-Saharan Africa (SSA) and develops a threshold limit of domestic debt to GDP under which SSA economies can borrow while promoting economic growth and maintain sustainability of debt. The General Methods of Moments (GMM) have been used on 13 SSA countries where data on public

domestic debt was accessible from the IMF Article IV reports. The research covers 15 years from 2001 to 2015. The results suggest that public domestic debt has a positive and significant effect on growth per capita in the region, which is welcome as an alternative source of financing for development vis-a-vis the traditional external debt which has been found to be negatively associated with growth. On average, this study conclude that in SSA, every 1% increase in domestic debt as a ratio of GDP leads to 0.09% increase in growth per capita.

The study also proved the existence of the laffer curve relationship between debt and GDP. It concludes that domestic debt is good for growth only up-to a certain threshold, which has been inferred to be 41% of GDP. Under this level, governments can utilise domestic debt to enhance growth. However, governments need to consider this maximum point taking into account that their portfolios have external debt which has been proven to negatively affect growth.

On the basis of the findings of this study, it is recommended that, countries in SSA should utilise domestic debt as a potential source of financing for development and economic growth. In doing so, as domestic debt has been proven to be significant for growth, prudent debt management must be implemented in SSA, which takes into account external debt effects. Excessive borrowing is discouraged by this study. Prudent debt management would involve ensuring that domestic debt which follows a laffer curve is kept at relatively lower levels, at the same time being used for development. The rate of debt accumulation should be cognisant of the fact that at some point domestic debt will negatively affect growth. In addition, domestic debt developments in SSA are a threat to private sector development given evidence of crowding out effect. Countries are recommended to optimally use domestic debt sparingly to allow private sector credit.

ANNEX: TABLES AND RESULTS

Table 3: Summary Statistics

	(1)	(2)	(3)	(4)	(5)
VARIABLES	**N**	**Mean**	**SD**	**Min**	**Max**
Year	195	2008	4.332	2001	2015
Public Domestic Debt	180	20.38	12.99	0	66.60
Private Domestic Credit	188	34.64	37.61	2.75	160.1
Current Account	194	-2.762	8.718	-22.4	32.54
FDI	195	3.612	3.740	-5.977	25.21
Inflation	195	12.88	20.97	-7.41	196.5

Financial Development	188	231.9	1858	10.48	18347
Government Effectiveness	195	-0.236	0.602	-1.46	1.049
Regulatory Quality	195	-0.238	0.604	-1.799	1.127
Rule of Law	195	-0.258	0.658	-1.663	1.077

Hausman Specification Test

Test: Ho: difference in coefficients not systematic

$$\text{chi2}(6) = (b\text{-}B)'[(V\_b\text{-}V\_B)^{(-1)}](b\text{-}B)$$
$$= 7.77$$
$$\text{Prob>chi2} = 0.4558$$

The results indicate that the differences in coefficients are not systematic, meaning the Random Effects equations is preferred. This applies to both cases, were additional variables were added and sample size was reduced for robustness check purposes.

J-Statistic Test

The Hanse's J statistic was used to check whether they are uncorrelated with the errors, which is a critical condition needed in GMM model. The test statistic has a $\chi 2$ distribution under the null hypothesis that the instruments are valid (assuming that the model is otherwise correctly specified).

Test of over-identifying restriction

Hansen's J chi2 (4) = 6.95123
Prob> = 0.1385

The results in all samples indicate that we fail to reject the null hypothesis that the instruments are valid. However, in equation 3 and 7, the results indicate otherwise, although at 10% level, implying that ignoring external debt in the model would incorrectly specify the model.

Mathematical Maximisation Formula

Given the general quadratic equation:

$$y = \alpha x^2 + \beta x + \varepsilon$$

The first derivative of the equation

$$\frac{dy}{dx} = 2\alpha x + \beta$$

At maximum/minimum,

$$\frac{dy}{dx} = 0$$

Thus solving the equation, maximum/minimum is

$$-\beta/2\alpha x$$

Determining whether it is maximum second derivative of the equation of the equation must be negative.

$$d^2y/dx^2 = 2\alpha$$

Therefore, if the coefficient of debt^2 (α) is negative, the maximum point exits.

Table 4: FIXED EFFECTS (FE) AND RANDOM EFFECTS (RE) EQUATIONS: ALL COUNTRIES

DEPENDENT VARIABLES	GDP per Capita Growth							
	(RE)	(FE)	(RE)	(FE)	(RE)	(FE)	(RE)	(FE)
Public Domestic Debt	0.0162	-0.0616	0.0255	-0.0406	0.0824	-0.0877	0.130	0.0208
	(0.0275)	(0.0632)	(0.0294)	(0.0497)	(0.0839)	(0.134)	(0.101)	(0.148)
Private Domestic Credit	-0.0190**	-0.0388	-0.0250**	-0.0525	-0.0204**	-0.0378	-0.0282**	-0.0553
	(0.00927)	(0.0299)	(0.0121)	(0.0413)	(0.00912)	(0.0296)	(0.0122)	(0.0434)
Current Account	0.101**	0.110	0.0920*	0.110	0.110**	0.108	0.100**	0.114
	(0.0477)	(0.0684)	(0.0528)	(0.0668)	(0.0491)	(0.0681)	(0.0493)	(0.0664)
FDI	0.0774	0.0658	0.0469	0.0432	0.0693	0.0665	0.0356	0.0406
	(0.101)	(0.109)	(0.0841)	(0.0912)	(0.0990)	(0.109)	(0.0841)	(0.0900)
Inflation	-0.0202	-0.0338**	-0.0157	-0.0317***	-0.0223	-0.0335**	-0.0165	-0.0323***
	(0.0136)	(0.0113)	(0.0122)	(0.00968)	(0.0138)	(0.0119)	(0.0128)	(0.0102)
Financial Development	5.38e-05	4.24e-05	0.000176**	0.000240**	4.89e-05	4.39e-05	0.000179*	0.000244*
	(6.65e-05)	(7.57e-05)	(7.99e-05)	(0.000110)	(6.80e-05)	(7.64e-05)	(8.47e-05)	(0.000112)
Government Effectiveness	3.257	2.173	3.257	1.730	3.237	2.152	3.242	1.763
	(2.591)	(3.139)	(3.104)	(3.462)	(2.553)	(3.135)	(2.924)	(3.464)
Regulatory Quality	-4.392*	-4.570	-4.727*	-5.174	-4.456**	-4.479	-4.837**	-5.409
	(2.261)	(4.148)	(2.498)	(4.108)	(2.246)	(4.219)	(2.309)	(4.005)
Rule of Law	-0.549	-3.260	-0.455	-4.450	-0.304	-3.300	-0.0895	-4.401
	(1.249)	(4.411)	(1.316)	(4.199)	(1.217)	(4.537)	(1.197)	(4.172)
Public External Debt			-0.0286*	-0.0403**			-0.0297*	-0.0418**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(0.0161)	(0.0164)					(0.0170)	(0.0180)
Public Domestic Debt (Square)					-0.00121	0.000428	-0.00178	-0.000996
					(0.00117)	(0.00196)	(0.00142)	(0.00209)
Constant	6.018***	7.655***	6.697***	8.214***	5.544***	7.889***	5.893***	7.690***
	(0.919)	(1.899)	(0.939)	(1.928)	(1.234)	(2.144)	(1.138)	(2.053)
Observations	172	172	172	172	172	172	172	172
R-squared		0.107		0.154		0.107		0.155
Number of code	13	13	13	13	13	13	13	13

Robust standard errors in parentheses - *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 5: FIXED EFFECTS (FE) AND RANDOM EFFECTS (RE) EQUATIONS: EXCLUDING SOUTH AFRICA

DEPENDENT VARIABLES	GDP per Capita Growth							
	(RE)	(FE)	(RE)	(FE)	(RE)	(FE)	(RE)	(FE)
Public Domestic Debt	0.0225	-0.0544	0.0355	-0.0313	0.0772	-0.0859	0.147	0.0339
	(0.0328)	(0.0650)	(0.0361)	(0.0491)	(0.0915)	(0.137)	(0.117)	(0.158)
Private Domestic Credit	-0.0261	-0.0491	-0.0458	-0.0681	-0.0287	-0.0466	-0.0564*	-0.0741
	(0.0243)	(0.0532)	(0.0352)	(0.0650)	(0.0237)	(0.0534)	(0.0337)	(0.0704)
Current Account	0.109**	0.112	0.105*	0.111	0.114**	0.110	0.107**	0.115
	(0.0523)	(0.0691)	(0.0589)	(0.0675)	(0.0519)	(0.0686)	(0.0512)	(0.0670)
FDI	0.0852	0.0746	0.0556	0.0508	0.0815	0.0754	0.0454	0.0480
	(0.101)	(0.109)	(0.0775)	(0.0888)	(0.100)	(0.110)	(0.0784)	(0.0875)
Inflation	-0.0235*	-0.0359***	-0.0219**	-0.0344***	-0.0246*	-0.0354***	-0.0223*	-0.0354***
	(0.0129)	(0.0103)	(0.0102)	(0.00801)	(0.0135)	(0.0108)	(0.0114)	(0.00866)
Financial Development	5.13e-05	4.57e-05	0.000191**	0.000249**	5.07e-05	4.78e-05	0.000194**	0.000253*
	(6.68e-05)	(7.86e-05)	(7.94e-05)	(0.000112)	(7.03e-05)	(7.97e-05)	(8.53e-05)	(0.000115)
Government Effectiveness	3.509	2.512	3.627	2.170	3.511	2.454	3.675	2.275
	(2.627)	(3.226)	(3.266)	(3.291)	(2.499)	(3.223)	(2.829)	(3.242)
Regulatory Quality	-4.673*	-5.169	-4.981*	-5.760	-4.666**	-5.090	-4.910**	-5.946
	(2.428)	(4.553)	(2.812)	(4.392)	(2.325)	(4.575)	(2.408)	(4.261)
Rule of Law	-0.465	-3.445	-0.373	-4.761	-0.318	-3.475	-0.0872	-4.754
	(1.427)	(4.434)	(1.604)	(4.053)	(1.321)	(4.546)	(1.254)	(3.980)
Public External Debt			-0.0331*	-0.0417**			-0.0346*	-0.0434**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			(0.0174)	(0.0167)			(0.0188)	(0.0186)
Public Domestic Debt (Square)					-0.000922	0.000526	-0.00165	-0.00108
					(0.00122)	(0.00197)	(0.00155)	(0.00224)
Constant	6.140***	7.195**	7.280***	7.742**	5.731***	7.430**	6.484***	7.285**
	(0.998)	(2.605)	(1.262)	(2.521)	(1.250)	(2.687)	(1.235)	(2.409)
Observations	157	157	157	157	157	157	157	157
R-squared		0.118		0.170		0.119		0.171
Number of code	12	12	12	12	12	12	12	12

Robust standard errors in parentheses - ** p<0.01, ** p<0.05, * p<0.1

Table 6: GENERAL METHODS OF MOMENTS EQUATIONS

DEPENDENT VARIABLES	GDP per Capita Growth							
	ALL COUNTRIES (1-4)				**EXCLUDING SOUTH AFRICA (5-8)**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Public Domestic Debt	0.0169**	0.0234***	0.0450*	0.0895***	0.0188**	0.0282***	0.0370	0.0916***
	(0.00822)	(0.00877)	(0.0260)	(0.0316)	(0.00896)	(0.0107)	(0.0260)	(0.0341)
Private Domestic Credit	-0.00716**	-0.0109***	-0.00739**	-0.0132***	-0.00824*	-0.0149**	-0.00806*	-0.0186***
	(0.00298)	(0.00374)	(0.00306)	(0.00404)	(0.00429)	(0.00584)	(0.00437)	(0.00585)
Current Account	0.0279***	0.0166	0.0347***	0.0263**	0.0292***	0.0190*	0.0344***	0.0290**
	(0.00993)	(0.0116)	(0.00975)	(0.0111)	0.0339	(0.0115)	(0.0101)	(0.0111)
FDI	0.0324	0.0266	0.0318	0.0244	(0.0244)	0.0299	0.0327	0.0275
	(0.0240)	(0.0239)	(0.0231)	(0.0231)	(0.0781)	(0.0241)	(0.0237)	(0.0232)
Inflation	-0.00223	0.000487	-0.00397	-0.00241	-0.00254	-0.000552	-0.00370	-0.00365
	(0.00562)	(0.00456)	(0.00576)	(0.00450)	(0.00584)	(0.00479)	(0.00595)	(0.00482)
Financial Development	-1.15e-05	4.78e-05	-1.05e-05	5.33e-05	-1.16e-05	4.95e-05	-1.01e-05	5.38e-05
	(1.44e-05)	(4.07e-05)	(1.47e-05)	(3.96e-05)	(1.45e-05)	(4.16e-05)	(1.47e-05)	(4.01e-05)
Public External Debt		-0.0133*		-0.0150**		-0.0139*		-0.0156**
		(0.00769)		(0.00756)		(0.00796)		(0.00777)
Public Domestic Debt (Square)			-0.000511	-0.00107**			-0.000346	-0.000986**
			(0.000366)	(0.000426)			(0.000349)	(0.000442)
Constant	0.965***	1.170***	0.735**	0.611*	-1.16e-05	1.187***	0.814***	0.675*
	(0.188)	(0.213)	(0.315)	(0.356)	(1.45e-05)	(0.222)	(0.302)	(0.356)
Observations	172	172	172	172	157	157	157	157

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Instruments

The used the following instruments: Public Domestic Debt, Private Domestic Credit, Current Account, FDI, Inflation, Financial Development, Public External Debt, Public Domestic Debt (Square), Government Effectiveness, Regulatory Quality and Rule of Law.

REFERENCES

Abbas, A. S. M and Christensen, J. E. (2007):"The Role of Domestic Markets in Economic Growth: An Empirical Investigation of Low-income Countries and Emerging Markets".IMF.

Adelegan, O. J and Radzewicz-Bak, B. (2009). What determines Bond Market Development in Sub-Saharan Africa? International Monetary Fund. IMF Working Paper 09/213.

Adom, A. D., and Elbahnasawy, N. G. (2014). Saving-Investment Gap and Economic Growth in Developing Countries: Simulated Evidence from Selected Countries in Africa. British Journal of Economics, Management & Trade 4(10): 1585-1598, 2014

Anning, L., Ofori, C. F., and Affum, E. K. (2016). The Impact of Government Debt on the Economic Growth of Ghana: A Time Series Analysis from 1990-2015. International Journal of Innovation and Economic Development Volume 2, Issue 5, December 2016, Pages 31-39.

Asfaw, H. A. (2015). Trade policy and Economic Growth in Sub-Saharan Africa: A Panel Data Approach. American Journal of Trade and Policy, Vol. 2. No. 1/2015.

Babu, O. J., Kiprop, Kalio. A. M. and Gisore. M (2015): "Effect of Domestic Debt on Economic Growth in the East African Community, America Journal of Research Communication Vloume3 (9)"

Bakare, I. A., Ogunlana, O. F, Adeleye, O., and Mudasiru, A. (2016). Empirical Analysis of the Effects of Domestic Debt on Nigerian Economic Growth. International Journal of Science and Humanities Review. Vol. 6. No. 1. (2016).

Bilan. I. and Ihnatov. I., (2015)."Public Debt and Economic Growth: A Two Sided Story" International Journal of Economic Science.

Chenery, H. B., and Strout, A. M. (1965). Foreign Assistance and Economic Development. Aid Discussion Paper number 7. http://pdf.usaid.gov/pdf_docs/PNABQ351.pdf

Christensen, J. (2004). Domestic Debt Markets in Sub-Saharan Africa. International Monetary Fund. IMF Working Paper 04/46.

Drazen,A.(1996),"Towards a Political-Economic Theory of Domestic Debt."University of Maryland and NBER USA

Druker, M. and Lederman, D. (2012). Trade Causes Growth in Sub-Saharan Africa. Policy Reseach Working Paper 6007. The World Bank.

Ghazanchyan, M. and Stotsky, J. G. (2013). Drivers of Growth: Evidence from Sub-Saharan African Countries. IMF Working Paper WP/13/236. International Monetary Fund.

Hausman, J. A. 1978. "Specification tests in econometrics". Econometrica 46 (6): 1251–1271.

IMF (2015). Regional Economic Outlook, Sub-Saharan Africa, (2015). Navigating Headwinds. World Economic and Financial Surveys. International Monetary Fund.

IMF (2016). Regional Economic Outlook, Sub-Saharan Africa, (2016). Time for a Policy Retest. World Economic and Financial Surveys. International Monetary Fund.

Jahan S, Mahmud A S and Papageorgiou C (2014): What Is Keynesian Economics? IMF Back to Basics Finance and Development Magazine September 2014 Edition, page 54, International Monetary Fund.

Karaki. B. A. et al. (2016): Domestic Debt and Economic Growth in Jordan: An Empirical Analysis, Journal of Economics and Sustainable Development, Jordan. Vol. 7, No. 10.

Krugman, P. (1988). Financing Vs. Forgiving a Debt Overhang. NBER Working Paper Series No. 2486, National Bureau of Economic Research (NBER).

Ley, E. (2010). Fiscal (and External) Sustainability. Economic Policy and Debt Department, PREM. The World Bank. Version: July 18, 2010.

Mbate, M. (2013). Domestic Debt, Private Sector Credit and Economic Growth in Sub-Saharan Africa. African Development Review. Vol. 25. Issue 4.

Mileva, E. (2007). Using Arellano – Bond Dynamic Panel GMM Estimators in Stata. Tutorial with Examples using Stata 9.0.

Mlachila, M, et al. (2016). Commodity Price Shocks and Financial Sector Fragility. International Monetary Fund. IMF Working Paper, WP/16/12

Munyeka, W. (2014). The relationship between economic growth and inflation in the South African Economy. Mediterranean Journal of Social Sciences. Vol. 4. No. 15.

Myers, S. C. (1977). Determinants of Corporate Borrowing. Journal of Financial Economics, 5 (1977), 147-175. North-Holland Publishing Company

Pattillo, C., Poirson, H., & Ricci, Luca. (2004). What Are the Channels Through Which External Debt Affects Growth? International Monetary Fund. Working paper WP/04/15.

Presbitero. A. F. (2010). "Total Public Debt and Growth in Developing Countries." Centro Studi Luca D'agliano Development Studies Working Papers.N.300.

Pollin, R. and Zhu, A. (2005). Inflation and Economic Growth: A cross –country Non-linear Analysis. Working Paper Series number 109. Political Economy Research Institute.

Putunoi, G. K and Mutuku, C. M (2013),"Domestic Debt and Economic Growth Nexus in Kenya." Current Research Journal of Economics Theory (1)1-10, 2013.

Sheikh. M R, Faridi M. Z, Tariq K (2010): Domestic Debt and Economic Growth in Pakistan: An Empirical Analysis. Pakistan Journal of Social Sciences, Pakistan. Vol. 30, No 2, pp. 373-387

Švaljek S. (1999), Public Debt Boundaries: A Review of Theories and Methods of the Assessment of Public Debt Sustainability, Croatian Economic Survey, Institute of Economics, Zagreb

Tsoulfidis R.L. (2007). Classical Economists and Public Debt Volume 54, No. 1, 1-12 Department of Economics University of Macedonia, Greece

Tyagi B.P (2002). Public Finance, Jaiprakash Nath and Co. 24th edition, Pg.24.

Woodridge, J. M. (2012). Introductory econometrics: A Modern Approach, 5e. Mason, OH: South-Western CENGAGE Learning.

Zahonago, P. (2017). Trade and economic growth in developing countries: Evidence from Sub-Saharan Africa. Journal of African Trade, 2017.

Zamfir, I. (2016). Africa's economic growth: Taking off or slowing down? European Parliamentary Research Service, January 2016 — PE 573.891

Zouhaier H., and Fatma M., (2014) Debt and Economic Growth, International Journal of Economics and Financial Issues 4 (2), 440-448.

4. Determinants of Inclusive Growth in Uganda: Auto-Regressive Distributed Lag Approach

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Abstract

Despite episodes of positive economic growth in Uganda, the country has not recorded meaningful reductions in poverty, unemployment and income inequality, suggesting that the quality of growth has not translated inclusive growth over the years. This paper uses the Auto-Regressive Distributed Lag (ARDL) bound testing approach to analyse the determinants of inclusive growth in Uganda between 2007 and 2016. The findings reveal that, in the long run, financial deepening, human capital, and foreign direct investment have significant impact and are positively related to inclusive growth, while trade openness, and macroeconomic instability negatively affect it. Development expenditure has no impact on inclusive growth in the long run. In the short run, the results indicate that only financial deepening and human capital do not have any impact on inclusive growth in Uganda. Going forward, the authorities in Uganda have a challenge to rebuild momentum for continued high and inclusive growth and recognise the potentially negative social, economic, and political consequences of these trends.

1. INTRODUCTION

The concept of Inclusive Growth (IG) has received considerable attention in the last decade among developed and developing countries alike *(see* Rodríguez and Tselios, 2015; Singh *et. al,* 2014; Kaplinsky, 2013; Ranieri and Almeida, 2013; Levine, 2012; Kelkar, 2010; Hatlebakk, 2008 and Kurian, 2008). This focus is in some ways an attempt to address the deficiencies of prioritising solely economic growth, and to ensure that the benefits of growth are more broadly experienced. In addition, the significance of Inclusive Growth is increasingly being recognised and embedded in work plans and policies of international institutions such as the International Monetary Fund (IMF), World Bank and the African Development Bank (AfDB).

The IMF (2011) defines Inclusive Growth as both the pace and distribution of economic growth, while the World Bank (2009) suggests that Inclusive Growthshould create an equal opportunity for all, by addressing employment creation, market, consumption, production, and provide a platform for poor people to access good living conditions. By the same token, the AfDB (2011) views Inclusive Growthas growth that results in a wider access to sustainable socio-economic opportunities for a broader number of people, regions or countries, while protecting the vulnerable, all being done in an environment of fairness, equal justice, and political plurality. The Inclusive Growth debate presents the awareness that while efforts to tackle inequality and poverty is crucial, promoting growth can be mutually reinforcing and this connection is not automatic. These debates are occurring alongside parallel deliberations on sustainability, co-benefits and trade-offs of sustainable and inclusive growth. It is for this reason that the inclusive growth is associated with the reduction in poverty and income inequality, non-discriminatory growth that allows for participation and contribution for all members of the society and pro-poor improvements in social opportunities (*see*, Ravillion, 2016; Dollar *et al.*, 2015; Van der Weide and Milanovic, 2014; Corak, 2013; Ravillion and Chen, 2013; Rauniyar and Kanbur, 2010; Ali and Zhuang 2007 and Ali and Son, 2007).

Some authors (such as Edet, 2015; Page and Shimeless, 2015; Forbes, 2000 and Ravallion, 1995) identified three problems that even the high record levels of growth have failed to tackle in many countries and these are poverty, unemployment and inequality. These authors highlighted the need to address the quality of growth, in particular to improve its inclusiveness. Uganda is not immune to this problem as it witnessed average positive economic growth of 6.7 percent and real per capita Gross Domestic Product (GDP) growth of 3.4 percent between 2000/01 and 2014/15 as reported by the Bank of Uganda Annual Reports (2000/01- 2014/15).

Poverty levels have reduced in the last two decades. For instance, the percentage of Ugandans living in poverty using both the national and international poverty lines reduced by more than 50 percent from 1993 to 2013 (World Bank, 2016). In recent years, even though the economy has grown and poverty levels have fallen, the country still faces socio economic challenges of unemployment and income inequity. Unemployment[1] was recorded to be highest in the youth age bracket at 16.8 percent (Uganda Bureau of Statistics, 2017). Income inequality measured by the GINI Index[2] has also increased from 0.365 in 1992/93 to 0.395 in 1999/2000 and 0.426 in 2009/10. As at 2014, income inequality stood at 0.47 (Oxfam, 2017). Rising levels of inequalities are believed to inhibit growth, discourage the evolution of the economic and political institutions, and undermine civil as well as social life that sustains effective collective decision making (Birdsall, 2007). In addition to these worsening indicators, the 2017 Inclusive Growth and Development Report of the World Economic Forum has ranked Uganda 64 out of 74 developing countries on the Inclusive Development Index[3] (World Economic Forum, 2017).

This situation warrants several questions: What determines Inclusive Growth in Uganda? What can be done to reduce income inequality and unemployment in Uganda while maintaining a high level of economic growth? It is against this background that this paper seeks to answer these questions by examining the determinants of Inclusive Growth in Uganda over the period 2007 – 2016 using the Autoregressive Distributive Lag (ARDL) approach developed by Pesaran *et al.* (1999) and advanced by Pesaran et al. (2001). This approach is preferred as opposed to the traditional cointegration techniques such as Engle-Granger (1987), Phillips and Ouliaris (1990), Park (1990), or Johansen (1991; 1995) multivariate cointegration procedure specifically for its ability to accommodate both I(1) and I(0) series or series that are mutually integrated. In addition, the methodology is suitable for small sample sizes.

Since Inclusive Growth remains critical in advancing equitable opportunities for economic participants during economic growth and creates an opportunity to increase the welfare of the

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[1] As at end of 2016/17, unemployment rate was estimated at 9 percent as indicated from the National Household Survey. It further revealed that more females were unemployed (13 percent) compared to their male counterparts (6 percent).

[2] Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. An index of zero represents perfect equality and 100, perfect inequality.

[3] The Inclusive Development Index scores are based on a 1-7 scale: 1=worst and 7=best. Uganda recorded a score of 3.28

society, it is therefore, important to analyse factors that determine Inclusive Growth with a view of improving the living standards of Ugandans. However, studies like that of Raheem *et al.* (2016);Tella and Alimi (2016), and Kraay (2006) provide the empirical investigation of Inclusive Growth in developing countries and further suffer from methodological problems related to cross-country analyses such as the influence of outliers and the heterodoxity of sample countries under study. Therefore, by analysing the determinants of Inclusive Growth in Uganda, this paper contributes to empirical literature on the subject matter in Uganda from a time series perspective. To our knowledge, there is no study that has employed the ARDL cointegration technique to examine the determinants of Inclusive Growth in Uganda. Furthermore, the findings of this study could help policy-makers in Uganda to better understand some of the fundamental developments affecting the country's broad based growth. The paper proceeds as follows. Chapter 2 gives selected economic indicators for Uganda. Chapter 3 reviews literature while chapter 4 provides an empirical analysis. The fifth chapter presents the results and chapter 6 concludes the study with some recommendations.

a. SELECTED ECONOMIC DEVELOPMENTS IN UGANDA

*Growth and Structural Adjustment Programmes*

Uganda has gone through various economic and political transformations over the years. The political and civil strife that plagued the country during the 1970s and early 1980s led to the significant contraction of the economy resulting in dissaving, physical and human capital flight, and reduced productivity (Collier and Reinikka, 2001). Following the need for post-war reconstruction, the country negotiated donor support for an Economic Recovery Programme in 1987, which was followed by a sequence of Structural Adjustment Programs. These were aimed at rehabilitating the economy and realising economic growth, sustainable balance of payments, financial stability and low and stable inflation rates. To some extent these reforms translated in positive economic growth rates over these periods. Between 1997 and 2007, the Poverty Eradication Action Plan (PEAP) was the overarching national planning framework used to guide medium term sector plans and the budget process. The PEAP, which was established on four major pillars[4] was directed at sustaining and translating the high economic growth rates into poverty reduction, (Ministry of Finance and Economic Development, 2000).

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[4] The pillars include; creating a framework for economic growth and transformation; ensuring good governance and security; directly increasing the ability of the poor to raise their incomes; and directly increasing the quality of the life of the poor.

The priorities of PEAP were guided by detailed plans of action contained in the respective sector development plans that included the Education Sector Investment Plan, the Health Sector Plan, Plan for Modernisation of Agriculture, the Social Development Sector Strategic Plan and the Road Sector Development Plan.

In 2007, the PEAP was replaced by the Comprehensive National Development Planning Framework policy which provides for the achievement of a 30 year Vision, to be implemented through six 5-year National Development Plans. This was done to consolidate and accelerate the growth process. The country has since maintained its impressive economic performance that is above the average for Sub-Saharan Africa (excluding high income countries). On average, the economy registered a growth rate of about 5.7 percent a year over the 2007-2015 as shown in Figures 1 and 2.

Figure 1: Annual GDP Growth Rate, Uganda and Sub Saharan Africa, 1983-2015
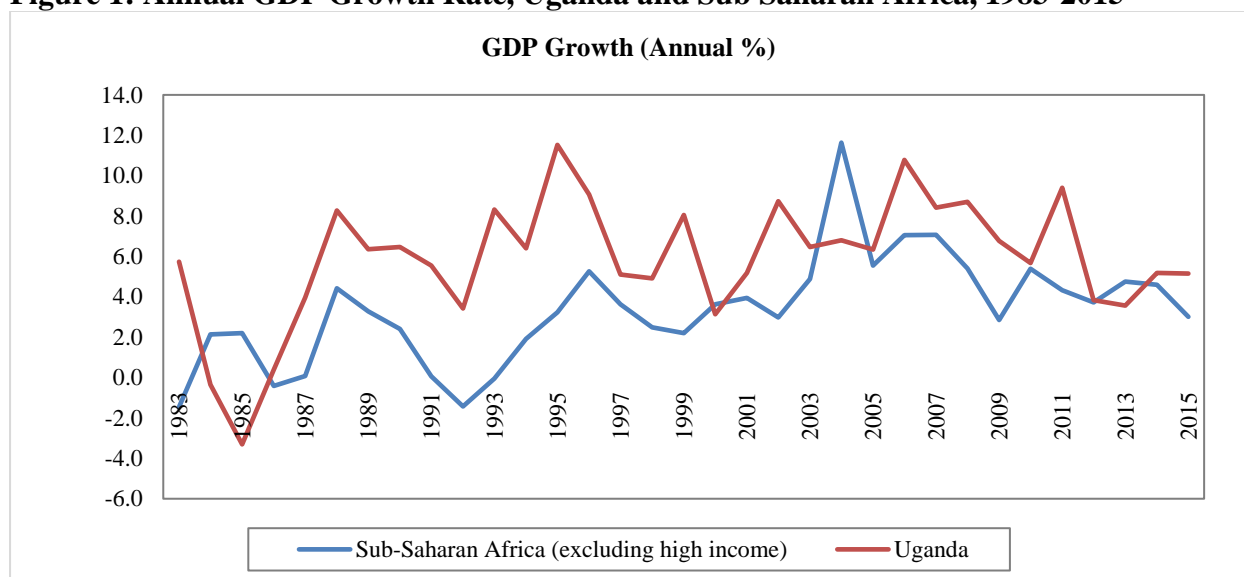
Source: World Development Indicators, 2017

Figure 2: GDP Per Capita Growth Rate, Uganda and Sub Saharan Africa, 1983-2015
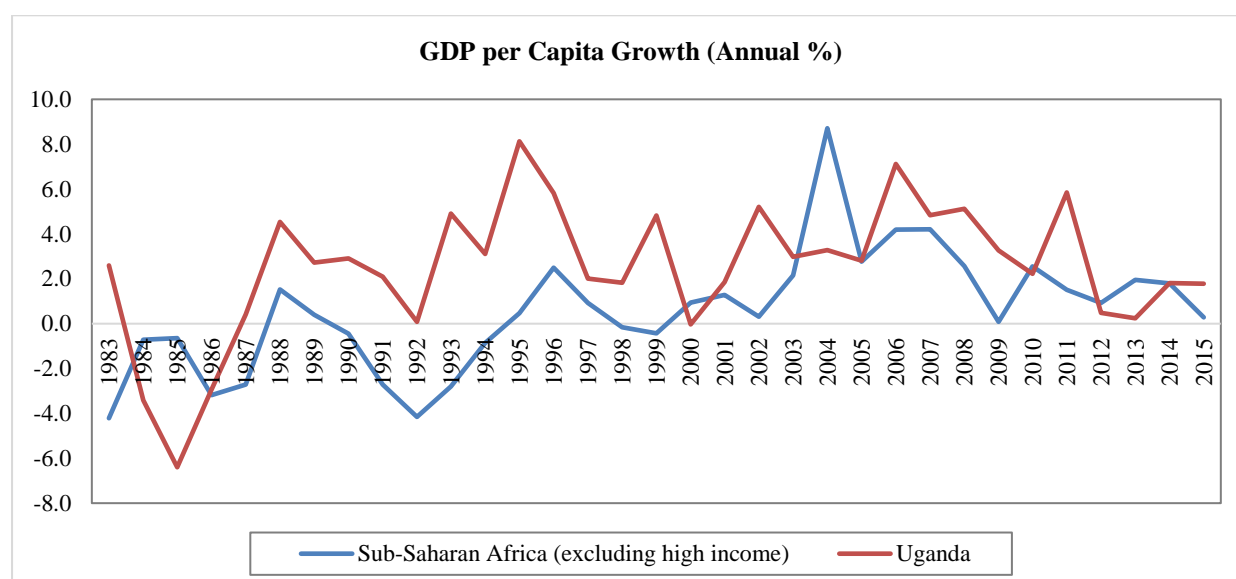
Uganda recorded average positive economic growth of 6.7 percent between 2000/01 and 2014/15. This growth was mainly driven by the services sector, particularly information and technology which on average grew by 4 percent over the years. The primary sector (mostly dominated by cash crops and fishing) and secondary (driven by the construction sector) also continued to play significant roles in Uganda's economic activity (Bank of Uganda Annual Reports, 2014/15). Table 1 presents sectoral economic activity for some selected years.

Table 1: Sectoral Contribution to GDP, 2011 – 2015

	2011	**2012**	**2013**	**2014**	**2015**
Agriculture	26.3	26.0	24.7	24.7	23.5
Industry	21.0	20.3	20.3	19.7	19.8
Services	46.0	46.9	47.7	48.1	48.8

Poverty Levels

Uganda has also recorded impressive rates of poverty reduction in the last two decades. The proportion of the Ugandan population living in poverty, whether measured using the national poverty line or the international poverty line, has more than halved from 1993 to 2013 (Figure 3). In addition, the proportion of the population living below the national poverty line declined

from 56.4 percent in 1993 to 19.7 percent in 2013 while the proportion of the population living below the international extreme poverty line of US$1.90 a day (2011 prices) fell from 68.1 percent in 1993 to 34.6 percent in 2013.

Figure 3: Headcount Poverty Rate, National and International Poverty Line, 1993-2013
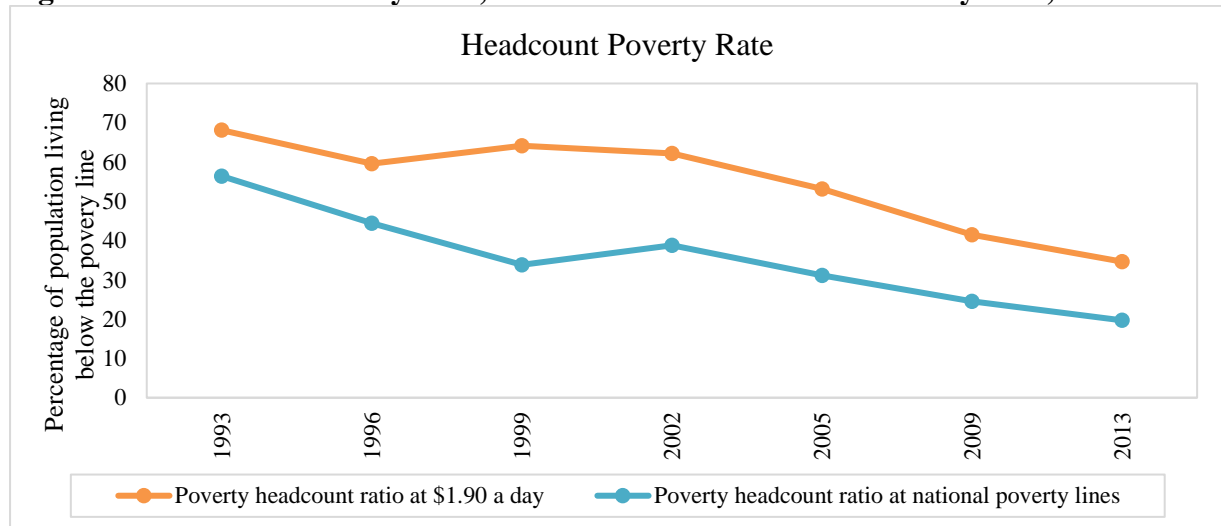
Source: World Development Indicators, 2017and Uganda Bureau of Statistics, 2014

The proportion of people living on less than US$1.90 per person per day fell by 2.7 percentage points per year between the period 2003 to 2013, the second fastest percentage point reduction in poverty per year in Sub-Saharan Africa, after Chad (World Bank, 2016). The World Bank Poverty Report of 2016 also suggest that even though poverty rates in the Africa have declined over the years, these numbers may not be telling the real story since economic growth has been accompanied by growing population rates. This indicates that there may be more people living in poverty than anticipated.

Demographics

The country has a relatively young population of about 60 percent below 18 years of age out of a total population estimated at 34.6 million people, with an age dependency ratio of 103.3. The average household size is 4.7 persons per household and 79 percent of the population lives in rural areas (Uganda Bureau of Statistics, 2014). With a population annual growth rate of 3.0 percent, this is above the average population growth rate for Sub Saharan Africa of 2.7 percent.

Income Inequality

Turning to income inequality, Uganda has set out an agenda for its future in the form of Vision 2040. This vision foresees a middle-income country with the majority of its citizens living in urban areas, having smaller families, and earning income in non-agricultural sectors. To achieve this vision, income inequality which has risen over the years (Figure 4) need to be reduced. The rise in this inequality has been mainly due to a combination of various factors such as the labour market skills mismatch, jobless growth and large income disparities. This failure to match the skills needed in the economy creates a gap in the human capital which is critical for economic and social transformation (Government of Uganda, 2013).In this regard, the GINI index measure of inequality displays an upward trend, rising from 0.365 in 1992/93 to 0.395 in 1999/2000 and to 0.426 in 2009/10 and further widened to 0.47 in 2013/14.

Figure 4: Gini Index, 1992/93 – 2013/14
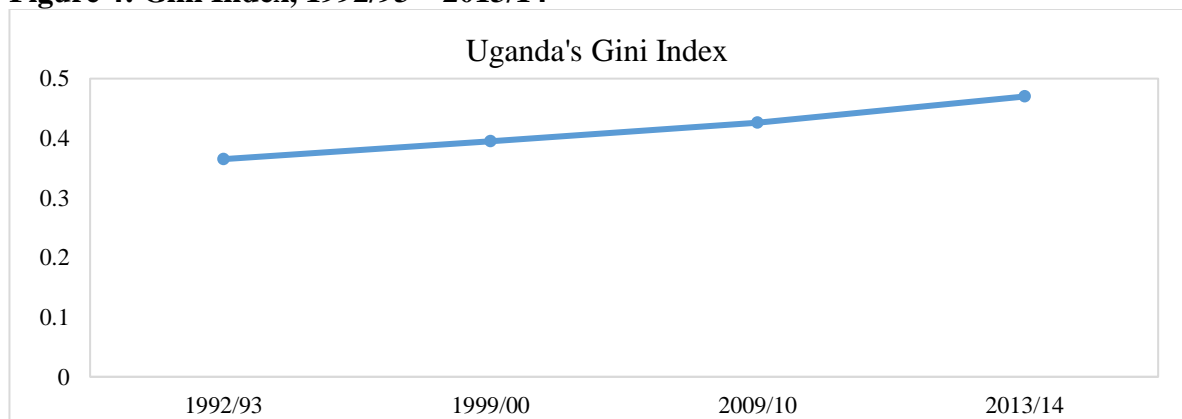
Source: Oxfam 2017

Unemployment

The mismatch between the contribution of the different sectors to GDP and the proportion of the population that derives its livelihood from the sectors also has serious implications for the level of unemployment and underemployment in Uganda. Although the contribution of agriculture to overall GDP has remained lower than that of services or industry, its share in employment remains high. Services, which account for almost half of GDP, employ only about 24 percent of the population. Employment in industry, which accounts for more than a quarter of GDP, is also very minimal, at about 8 percent of the population.

Uganda's impressive growth has failed to create enough jobs for the ever-increasing labour force. This increasing labour force is characterised by large under or unemployed due to

inappropriate skills and the slow absorptive capacity of the economy. This has bred a large number of unemployed youth who are becoming a social and economic threat. Table 2 shows that the population that is neither in employment nor education/training was 57.7 percent in 2014. The table also shows that the majority of the population aged 14-64 years not working were full time students.

Table 2: Population neither in Employment nor Education/Training (NEET) by Selected Characteristics

Characteristics	Full time	NEET (%)	Total
Residence			
Urban	44.4	55.6	100
Rural	41.2	58.7	100
Sex			
Male	52.8	47.2	100
Female	34.8	65.2	100
Age Groups			
14	68.3	31.7	100
15-19	60.9	39.0	100
20-24	34.3	65.8	100
25-29	9.1	91.0	100
30-34	2.0	98.0	100
35-39	0.1	99.9	100
40-59	0	99.9	100
60-64	0	100.0	100
Total	**42.3**	**57.7**	**100**

Source: Uganda Bureau of Statistics, 2014

Other Indicators

Although there has been significant increase in primary enrolment rates, as a result of the Universal Primary Education programme that was introduced by the Government in 1997, this is yet to translate into substantial improvements in educational outcomes. According to the National Population and Housing Census that was carried out in 2014, only 58 percent of the population aged 6 years and above had attained primary education. The 2017 Inclusive Growth and Development Report of the World Economic Forum scored Uganda at 3.28 from a possible overall score of 7. In addition, the country is ranked 68 out of 75; and 63 out of 73 on the measure of inclusiveness and intergenerational equity, respectively. This is suggestive of the extent to which economic growth in Uganda may not be beneficial to all.

2. LITERATURE REVIEW
i. Theoretical Literature

The analysis of economic growth weakened after the late 1960s. Then, after a lapse of two decades, this work became forceful again in the 1980s. It commenced with models of the determination of long-run growth, a part that is now called endogenous growth theory. Other recent research stretched the older, neoclassical growth model, especially to convey the empirical inferences for convergence across countries. These researches noted that growth has vital implications for the welfare of people. Classical economists, (see Adam Smith (1776), David Ricardo (1817), and Thomas Malthus (1798), and, much later, Frank Ramsey (1928), Allyn Young (1928), Frank Knight (1944), and Schumpeter (1934)), provided many of the rudimentary ingredients that appear in present concepts of economic growth. These thoughts comprise the basic methods of competitive behavior and equilibrium dynamics, the role of diminishing returns and its relation to the accumulation of physical and human capital, the interplay between per capita income and the growth rate of population, the effects of technological progress in the forms of increased specialisation of labour and discoveries of new goods and methods of production, as well as the role of monopoly power as an incentive for technological advance.

The point of departure for modern growth theory is Ramsey (1928), with work that was numerous years revolutionary. Ramsey's handling of household optimisation over time goes far beyond its application to growth theory; it is hard now to discuss consumption theory, asset pricing, or even business-cycle theory without invoking the optimality conditions that Ramsey introduced. Ramsey's intertemporal separable utility function is as extensively used in recent times as the Cobb–Douglas production function. The economics profession did not, however, accept or widely use Ramsey's approach until the 1960s. Harrod (1939) and Domar (1946) attempted to integrate Keynesian analysis with elements of economic growth. They used production functions with little substitutability among the inputs to argue that the capitalist system is inherently unstable. Although these contributions triggered a good deal of research at the time, very little of this analysis plays a role in today's thinking. In addition, Solow (1956) and Swan (1956) developed a model which is a neoclassical form of the production function, a specification that assumes constant returns to scale, diminishing returns to each input, and some positive and smooth elasticity of substitution between the inputs.

The production function is combined with a constant-saving-rate rule to generate an extremely simple general-equilibrium model of the economy. One prediction from these models is conditional convergence, where it is assumed that income levels of poor countries will converge toward those of rich countries, if saving rates for both physical and human capital as a share of output were similar in poor countries. Another prediction of the Solow–Swan model is that, in the lack of ongoing advances in technology, per capita growth must eventually cease. This prediction, which is similar to the one of Malthus (1798) and Ricardo (1817), also comes from the assumption of diminishing returns to capital.

The neoclassical growth theorists of the late 1950s and 1960s observed the modelling deficiency and usually strengthened it up by predicting that technological progress happened in an exogenous way. They merge the theory with a positive, possibly constant per capita growth rate in the long run, while holding the prediction of conditional convergence. The noticeable deficiency, however, is that the long-run per capita growth rate is determined wholly by the rate of technological progress which is outside of the model. Barro and Sala-i-Martin (1995) asserts that in the long run, the world economy will be driven by those countries whose main source of growth is productivity improvements manifested by increases in technological progress. The long-run growth rate of the level of output also depends on the growth rate of population, another element that is exogenous in the standard theory.

Cass (1965) and Koopmans (1965) carried Ramsey's analysis of consumer optimisation back into the neoclassical growth model and thus catered for an endogenous determination of the saving rate. This addition permits for richer transitional dynamics but tends to preserve the hypothesis of conditional convergence. The endogeneity of saving also does not remove the dependence of the long-run per capita growth rate on exogenous technological progress. Arrow (1962) and Sheshinski (1967) built models in which ideas were unintended by-products of production or investment, a mechanism described as learning by doing. Romer (1986) exhibited later that the competitive framework can be retained in this case to determine an equilibrium rate of technological advance, but the resulting growth rate would typically not be Pareto optimal. More generally, the competitive framework breaks down if discoveries depend in part on purposive Research and Development (R&D) effort and if an individual's innovations spread only gradually to other producers. In this realistic setting, a decentralised theory of technological progress requires basic changes in the neoclassical growth model to incorporate an analysis of imperfect competition. These additions to the theory did not come

until Romer's research in the late 1980s. After the mid1980s, research on economic growth experienced a boom, beginning with the work of Romer. The inspiration for this work was the thought that the determinants of long-run economic growth are crucial issues, than the mechanics of business cycles or the countercyclical effects of monetary and fiscal policies. But acknowledgment of the importance of long-run growth was only an initial step to supplement, one had to avoid the straight jacket of the neoclassical growth model, in which the long-term per capita growth rate was pegged by the rate of exogenous technological progress. Thus, the current additions regulate the long-run growth rate within the model; hence, the designation, endogenous growth models.

4.1 Empirical Literature

For economic growth to be inclusive, it requires productive employment. The concept of productive employment as an essential component of Inclusive Growth was also stressed by Bhalla (2007), who expressed concern with the growth and distribution of employment growth. While numerous low and middle-income countries have weathered the economic crisis since 2008 well, and economic growth rates have remained high or have recovered, many of the imbalances that caused the crisis and remain responsible for persistent deprivation continue to exist. At the core of this global challenge is a need to enhance populations and particularly poor and marginalised groups. There is a need for economic development with access to productive opportunities, decent jobs and businesses opportunities. The nature of these challenges is different in each country and region. With the departure of the equity from these debates and rise of definition of absolute pro-poor growth, modern theorists have postulated that growth is not an end in itself. But it has to make it possible to attain other vital purposes of individuals and societies and spare people from poverty and drudgery.

McKinley (2010) provided a single index for inclusive growth by applying weights and scores to different aspects of growth and inclusion in the areas of growth, productive employment and economic infrastructure, income, poverty and equity, human capabilities and social protection. The insertion of several aspects that individually are more or less easily measured, makes the index rather complex and somewhat arbitrary. The index is very demanding in terms of data, and data limitations can possibly make it hard to compare the scores across countries, if the subcomponents are not based on the exact same measures. Likewise it is not possible from the index alone to identify exactly what each subcomponent consist of, or in which area the development has been inclusive. To mitigate these problems, Ramos *et al* (2013) introduced

an index between zero and one, but based solely on poverty rates, inequality and employment. They used min-max normalisation and the index is therefore highly based on comparisons between countries. Countries with a poverty rate above 65 per cent are considered non-inclusive and for these countries only the poverty rate and inequality measure is included in the index to avoid misinterpretation of underemployment. The result is that the foundations of the index are not the same for all the countries compared in the study, and for the poorest countries only benefit sharing is included in the index.

Anand *et al* (2015) used an even more simple definition of inclusive growth moving it towards the absolute definition of pro-poor growth. They constructed a social mobility function based on growth rates and income distribution and analysed the movements in the curve over time. The largest advantage of their approach is the high data accessibility. The caution is that it resembles pro-poor growth to an extent where the two concepts become indistinguishable.

Muhammad and Sardar (2012) inspected the nature of relationship between the macroeconomic and social development indicators by using a Multiple Regression Framework and Vector Autoregression Model to determine the direction of causality between the key macroeconomic variables of Pakistan over the period of 1997/98 to 2009/10. They concluded that low spending on health and education, promote growth in agriculture and rural development for sustained and Inclusive Growth. They also advised policymakers in Pakistan to explore the myths and realities of Inclusive Growth strategies to identify and prioritise the Pakistan specific constraints.

Anand *et al*. (2013) estimated a unified measure of Inclusive Growth for emerging markets by assimilating their economic growth performance and income distribution outcomes. They calibrated country distributions by merging GDP per capita in Purchasing Power Parity (PPP) US$ terms and income distribution from survey data and applied the microeconomic concept of a social mobility function at the macroeconomic level to measure Inclusive Growth that is closer to the absolute definition of pro-poor growth. They found out that macroeconomic stability, human capital, and structural changes are foundations for achieving Inclusive Growth. This was also confirmed by Berg *et al*. (2011), Bhalla (2007) and Anand *et al.,* (2013) who also concluded that the role of globalisation could also be positive with Foreign Direct Investment (FDI) and trade openness fostering greater inclusiveness, while Financial Deepening (FD) and technological change have no discernible effect. Barro (1996) found the same results in a cross country study on determinants of economic growth.

5. EMPIRICAL ANALYSIS

In examining the determinants of Inclusive Growth in Uganda, this study uses ARDL bounds testing approach to cointegration and Error Correction Model (ECM) based on ARDL procedure developed by Pesaran and Shin (1999) and advanced by Pesaran *et al.* (2001). This approach is preferred over other similar approaches such as Johansen (1988, 1995) and Engle and Granger (1987) because it can be employed irrespective of whether the underlying regressors are integrated of order I(0) or I(1), and can be suitable for small sample sizes (Pesaran et al, 2001).

To model the Inclusive Growth equation in Uganda, the study formulates the following linear model following the work by Oluseye and Gabriel (2017) and Anand *et al.* (2013) where inclusive growth is determined by, amongst others, FDI, Trade Openness (open), government expenditure on education and health i.e. Human Capital (HC), Consumer Price Index (CPI), Development Expenditure (DEV), and Financial Deepening.

$$lIC_t = \alpha_0 + \beta_1 lFDI_t + \beta_2 lOP_t + \beta_3 lCPI_t + \beta_4 lDEV_t + \beta_5 lHC_t + \beta_6 lFD_t + \varepsilon_t \quad ,\ldots\ldots(1)$$

5.1 The Data

The quarterly dataset used in the analysis is obtained from the Bank of Uganda, Ministry of Finance, Planning and Economic Development, and Uganda Bureau of Statistics for the period 2007 to 2016. The variables used in the specified model and their expected signs are summarised in Table 3.

Table 3: Data Series, Sources and Expected Sign

Variable	Descriptor	Database/Source	Expected Sign
FD	Financial Deepening (total credit to household)	Bank of Uganda	Positive
HC	Government Expenditure on Education and health	Ministry of Finance, Planning and Economic Development.	Positive
DEV	Development Expenditure	Ministry of Finance, Planning and Economic	Positive
OP	Trade Openness ((Imports + Exports)/GDP))	Uganda Bureau of Statistics	Ambiguous
CPI	Consumer Price Index	Uganda Bureau of Statistics	Negative
FDI	Foreign Direct Investment	Bank of Uganda	Positive

The natural logarithm of all the regressors, FDI, CPI HC, OP, POP, DEV and FD, is employed. Financial Deepening is measured as credit to the household sector as a share of GDP. The availability of credit to households is linked to the economic opportunities and outcomes. Credit to households can lead to financial smoothing and an improvement in investment in education and health which is vital for the achievement of Inclusive Growth. Financial deepening is therefore an important element of Inclusive Growth. This study expects a positive relationship between Financial Deepening and Inclusive Growth. Government expenditure in all forms of education and health such as enrolment in early, basic, vocational, tertiary education, access to health services as well as the availability of training services, provides an opportunity for the society to participate in economic activities. Human Capital therefore plays an important role of reducing income inequalities and poverty levels, which is key for the achievement of Inclusive Growth. This study therefore, expects a positive relationship between human capital and Inclusive Growth.

Moreover, growth is assumed to be inclusive when it is able to provide and improve the access of the population to basic socio economic infrastructure (McKinley, 2010). In most developing economies, this type of infrastructure is normally provided through government development expenditure. In this regard, the size of government development expenditure plays a significant role in the overall attainment of Inclusive Growth. A positive relationship between the development expenditure and Inclusive Growth is expected in this study.

Trade Openness is measured as the ratio of the sum of export and imports to GDP and captures the degree of openness in an economy. Barro (2008) found that a more open economy will worsen the income inequality. On the contrary, IMF (2013) associated trade openness with a decrease in inequality. In this regard, the relationship between inclusive growth and trade openness can either be positive or negative in this study. Consumer Price Index is used to measure some degree of domestic macroeconomic stability. A rapid increase in prices leads to macroeconomic instability, discourages investment and inhibits sustainable economic growth, which is vital for inclusive growth. The rapid increase in prices also deteriorates income distribution (Li and Zou 2002). The relationship between CPI and Inclusive Growth is expected to be negative.

Foreign Direct Investment as a share of GDP in a host country has various benefits such as the potential to create employment and the adoption of latest technology, which leads to improvement in economic growth. For this study, the relationship between FDI and inclusive growth is expected to be positive.

5.2 Empirical Framework

The long-run and ECM are estimated using ARDL framework as follows:

$$x_t = \alpha_0 + \sum_{i=1}^{m} \varphi_1 \, x_{t-i} + \sum_{i=0}^{n} \varphi_2 \, y_{t-i} + \mu_t \tag{2}$$

$$\Delta x_t = \alpha_0 + \sum_{i=1}^{m} \vartheta_1 \, \Delta x_{t-i} + \sum_{i=0}^{n} \vartheta_2 \, \Delta y_{t-i} + \vartheta_3 ECT_{t-1} + \mu_t \tag{3}$$

Where μ_t is an error term and $\varphi's$ and $\vartheta's$ are the parameters to be estimated, m and n are the lag lengths and ϑ_3 is the coefficient of the lagged Error Correction Term (ECT_{t-1}), which measures the speed of adjustment to long-run equilibrium following a shock to the system. x_t represents a vector for dependent variables and y_t is a vector for regressors.

Specifically, a representation of the long run and ECM using the ARDL methodology in order to analyse the determinants of Inclusive Growth in Uganda is shown in equation 4.

$$\Delta lIC_t = \alpha_0 + \beta_1 lIC_{t-1} + \beta_2 lCPI_{t-1} + \beta_3 lHC_{t-1} + \beta_4 lOP_{t-1} + \beta_5 lFDI_{t-1} + \beta_6 lFD_{t-1} + \beta_7 lDEV_{t-1} + \sum_{i=1}^{p} \delta_1 \Delta lIC_{t-i}$$

$$\sum_{i=0}^{p} \delta_2 \Delta lCPI_{t-i} + \sum_{i=0}^{p} \delta_3 \Delta lHC_{t-i} + \sum_{i=0}^{p} \delta_4 \Delta lOP_{t-i} + \sum_{i=0}^{p} \delta_5 \Delta lFDI_{t-i} + \sum_{i=0}^{p} \delta_6 \Delta lFD_{t-i} + \sum_{i=0}^{p} \delta_7 \Delta lDEV_{t-i} + \theta Z + \varepsilon_t$$

(4)

Where p is the lag length, α_0 is the drift component and ε_t is the random error term. t is the time period, $\beta_1 - \beta_7$ are the coefficents explaining the elasticities of explanatory variables in the long run, $\alpha_1 - \alpha_7$ are the coefficents explaining the elasticities of explanatory variables in the short run. ln are logarithms in order to have more reliable and unbiased results and Δ is the first difference operator. IC_t is the measure of Inclusive Growth as proxied by per capita income. A variety of approaches have been used to measure Inclusive Growth in the literature. These include: the social opportunity function (see Asghar and Javed, 2011); macro mobility social

function (see Anand *et al*, 2013); gross domestic product per person employed (see Oluseye and Gabriel, 2017; Tella and Alimi, 2016) and Poverty Equivalent Growth Rate (see Domonkos *et.al*, 2013; and Kakwani and Son, 2008); and gross value added per capita just to mention a few. This study uses per capita income as a proxy for inclusive growth in Uganda. This approach is similar to Ali and Son, 2007 and Raheem *et al,* (2016) who highlighted that per capita income maintains the effectiveness of economic growth by considering the impact of the population and its growth.

5.3 Hypothesis Testing

In this framework, the long-run relationship between the underlying variables is assessed by testing the null hypothesis in equation 4; H_0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = 0$ against the alternative hypothesis; H_1: $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq \beta_7 \neq 0$. The *F*- statistic derived from this test is compared with two sets of asymptotic critical values (lower and upper bound values) for a given level of significance reported in Pesaran *et al.* (2001) and Nayaran (2005) for large samples and small sample sizes, respectively. The lower bound values assume that all variables in ARDL model are $I(0)$ while the upper bound values assume that the variables are $I(1)$.

Therefore, on the one hand, if the computed F-statistic is less than the lower bound value, the null hypothesis of no cointegration cannot be rejected. On the other hand, if the computed *F*-statistic is greater than the upper bound value, the null hypothesis of no cointegration is rejected and it is concluded that the variables are cointegrated. Nonetheless, the test becomes inconclusive in cases where the computed *F*-statistic falls between the two critical bound values.

5.4 EMPIRICAL RESULTS
5.4.1   Unit Root Results

Table 4 shows that all the variables are integrated to the first order except trade openness and foreign direct investment using both Augmented Dickey–Fuller (ADF) tests and Phillips–Perron (PP) test as a complementary test. This is because ADF has been found to have low power in certain circumstances and PP corrects for any serial correlation and heteroskedasticity in the errors by directly modifying the test statistics and does not require specification of lag length (Molapo, 2017). The combination of I(0) and I(1) makes it appropriate for the ARDL econometric approach to be used for the estimation of the model. Augmenting lags are included

in unit-root tests in order to purge autocorrelation from the series. To decide on the number of lags in unit root testing the lowest Akaike Information Criterion (AIC) complemented by Schwartz Bayesian Criterion (SBC) are used for better fit. The AIC and SBC estimate the quality of each model, relative to each of the other models and help for the choice of parsimonious model because there is a penalty to adding higher lags.

Table 4: ADF and PP Unit Root Test Results

	H_o: non-stationary in levels		H_o: non-stationary in first difference		Order of Integration
Variable	ADF-Statistic	PP Statistic	ADF-Statistic	PP Statistic	
FD	-2.510191 (0.1209)	-2.339724 (0.1652)	-6.683175 (0.0000)*	-6.741289 (0.0000)*	*I(1)*
HC	-1.326059 (0.6078)	-1.047290 (0.7265)	-7.800454 (0.0000)*	-11.35271 (0.0000)*	*I(1)*
DEV	-0.717330 (0.8300)	0.033664 (0.9560)	-9.695669 (0.0000)*	-19.30417 (0.0001)*	*I(1)*
OP	-11.68724 (0.0000)*	-8.808367 (0.0000)*			*I(0)*
CPI	-2.233387 (0.1983)	-2.125036 (0.2364)	-6.433726 (0.0000)*	-6.782465 (0.0000)*	*I(1)*
FDI	-7.019440 (0.0000)*	-7.001023 (0.0000)*			*I(0)*

Note: Values in brackets are are P-values. The asterisks *, ** and *** denote significance level at 1 per cent, 5 per cent and 10 per cent, respectively.

5.5 Bounds Testing Results

Table 5 presents bound test results for cointegration between inclusive growth and Foreign Direct Investment, Consumer Price Index (CPI), Human Capital (HC), Trade Openness, Development Expenditure, and Financial Deeping (FD). The statistical inference for the long run estimated results are found to be valid since the F-statistic of 4.0 is above the critical value at 5 percent significant level. Therefore, there is a stable and unique long-term relationship between inclusive Growth, FDI, CPI, HC, Trade Openness DEV, and FD in Uganda.

Table 5: Bound test for Cointegration Results

Bound test for Cointegration					
Critical Value bounds of the F statistic: Intercept and no trend					
90 percent level		95 percent level		99 percent level	
I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
2.218	3.314	2.618	3.863	3.505	5.121
F- Statistics: **4.036080** Sample Size: 39					

Number of regressors: 6

5.6 Results of the Long- Run ARDL Model on the Determinants of Inclusive Growth

Since there is evidence of long run cointegration between variables, equation 2 is estimated and the results are presented in table 6 and their associated diagnostic tests. In terms of diagnostic tests, the model fits the data well since about 82 of the variation in the Inclusive Growth is explained within the model. The Jarque-Bera (JB) and Durbin-Watson (DW) tests for normality of errors and serial correlation, respectively, also indicate that the residuals are white noise.

Table 6: Long Run- Model Estimation Results

Estimated Long-Run determinants of Inclusive growth Model				
Variable	**Coefficient**	**Std. Error**	**t-Statistics**	**P-Value**
lFD	0.839962	0.3070638	2.7354634	0.0134**
lHC	0.65526	0.3486358	1.8527843	0.0784***
lDEV	0.222673	0.2210193	1.0074818	0.5885
lOP	-0.923619	0.0061140	-151.06537	0.0000*
lCPI	-0.303467	0.0973504	-3.1172649	0.0072*
lFDI	0.839962	0.3070638	2.7354634	0.0134*
Diagnostics Tests				
R-squared = 0.853246 *Adj R-squared = 0.8269514* *Durbin-Watson = 1.89654* *Jarque-Bera = [1.488332] (0.598547)* *Wald Test =[4.036080] (0.0000)** *Breusch-Godfrey Serial Correlation LM Test = [0.89584] (0.3154)* *Heteroskedasticity Test: Breusch-Pagan-Godfrey = [1.42275] (0.3645)*				

*Note: Values in brackets are F-statistics while values in parentheses are p-values. The asterisks *, ** and *** denote significance level at 1 per cent, 5 per cent and 10 per cent, respectively.*

The structure of the ARDL model that is estimated is ARDL (1, 1, 1, 0, 1, 1, 1, 1) .All the estimated coefficients, with an exception of growth of Development Expenditure are not only statistically significant but also consistent with the theory in the long run. Financial inclusion has been identified as a priority sector in the government's efforts to make the growth process more equitable and inclusive, and technology is playing a pivotal role in this process by reducing the cost of delivery while increasing the sector's efficiency and productivity (Shah and Dubhashi, 2015). The positive coefficient for financial deepening implies that, ceteris paribus, a percentage increase in financial deepening raises inclusive by 0.8 percent in Uganda. In addition, a percentage increase in the government expenditure on education and health spurs inclusive growth by about 0.6 percent. Wilson and Briscoe (2004) also concluded that the

impact of investment in education and training on national economic growth is positive and significant for all European Union (EU) Member States. The FDI has been lauded for its positive spillovers to host countries in terms of skills transfer, employment creation and eradicate poverty and it also plays a significant role in Uganda. However, high inflation and growth of openness negatively affect Inclusive Growth in Uganda.

5.7 Error Correction Model for the Determinants of Inclusive growth

Table 7: Short Run- Model Estimation Results

Variable	Coefficient	Std. Error	t-Statistics	P-Value
D(lFD)	0.056621	0.0864271	0.65512	0.6302
D(lHC)	0.049527	0.0760164	0.65153	0.6530
D(lDEV)	0.057478	0.024954	2.30326	0.0370**
D(lOP)	-0.989253	0.0037243	-265.6273	0.0000*
D(lCPI)	-0.063797	0.0123818	-15.2550	0.0000*
D(lFDI)	0.364193	0.0614613	5.15230	0.0000*
ECT(-1)	0.056621	0.0864271	-5.9256	0.0000*

*Note: The asterisks *, ** and *** denote significance level at 1 per cent, 5 per cent and 10 per cent, respectively.*

The study estimates the ECM in order to get an insight into the short-run relationship between inclusive growth and FDI, CPI, HC, Trade Openness, Development Expenditure, and FD. Table 7 presents the ECM estimation results. In the short run, all other coefficients of the endogenous and exogenous variables are statistically significant, excluding for the growth of FD and HC. The short run results indicate that inclusive growth in Uganda is significantly and positively influenced by development expenditure and foreign direct investment. On the other hand, trade openness, and CPI have worsened the prospects of ig in Uganda. The Error Correction Term also bears the correct (negative) sign and is statistically significant at the 1 percent level. This ensures the attainment of long-run equilibrium following a shock in the system. As shown in the appendix 1, the CUSUM and the CUSUM sum of squares falls within the 5 percent significant levels indicating the model is stable. This gives us some level of comfort in the results and conclusions of the model.

6. CONCLUSION AND POLICY RECOMMENDATIONS

The economic challenges of the 21st century remain vast. Poverty has tumbled in recent decades as economies have grown, at times very quickly, but at all income levels, many countries have experienced mounting inequality. Economies will need to be transformed if they are to ensure

sustained improvements in living standards for all the world's citizens (Barro, 2008). This paper seeks to understand the key determinants behind inclusive growth in Uganda by examining the role played by FDI, CPI, HC, trade openness, development expenditure and FD over the period 2007 – 2016 using the ARDL approach developed by Pesaran *et al.* (2001).

The findings from the co-integration analysis reveal that FDI, HC and FD are positively related to inclusive growth in the long-run. This suggests that while the banking sector remains well capitalized in Uganda, more intrusive supervision can enhance financial stability in long run. Development expenditure is found to have no significant effect on inclusive growth. However, in the short run, FD and HC has been found to insignificantly affecting Inclusive Growth.

On the other hand, there is a negative relationship between Inclusive growth and trade openness, and the price level. The inflation targeting framework introduced in 2011 has served Uganda well by bringing much needed price stability, and predictability, thus providing a climate that is more favourable to sound, sustained economic growth and job creation. This suggests that low inflation is not just a necessary condition for economic activity and inclusive growth, but also a sufficient condition for macroeconomic stability. In this regard, the study recommends that policymakers need to keep in mind that low inflation is a pre-condition for economic activity, and also that high inflation affects mostly the welfare of the poor. While the concept of openness brings more benefits such as open market access and is widely accepted as major catalyst of economic growth, it could bring high competition that can lead to corporate restructuring, imbalances in trade and dependency on global markets. Therefore policymakers should focus their efforts on easing restrictions on international trade and design strategic trade policies that can further open up the markets for Ugandan exports.

The most daunting task in Uganda is to provide employment not only to the growing labour force every year, but also to reduce the backlog of the unemployed from the previous years. Uganda has made remarkable economic achievements over the past decades registering considerable growth rates in per capita GDP and poverty. The performance was underwritten by sound macroeconomic policies and institutions, and a reliance on the private sector as the engine of growth by bringing much needed FDI (IMF, 2011). The country's challenge going forward is to rebuild momentum for continued high and inclusive growth and recognising the potentially negative social, economic, and political consequences of these trends and Uganda should pay particular attention to the factors identified in the study, as these will have

implications for the attainment of Inclusive Growth and sustainability of the economy in the long run.

REFERENCES

African Development Bank (2011). Africa: Inclusive Growth. Occasional Series, Vol. 1, Issue 1, September.

Ali, I., & Son, H. H. (2007). Measuring inclusive growth. *Asian Development Review*, *24*(1), 11.

Ali, I., & Zhuang, J. (2007). *Inclusive growth toward a prosperous Asia: Policy implications* (No. 97). ERD Working Paper Series.

Anand, R., Mishra, M. S., & Peiris, S. J. (2013). Inclusive growth: Measurement and determinants. IMF working Paper WP/13/135. International Monetary Fund.

Anand, R., Kochhar, K., & Mishra, S. (2015). Make in India: Which Exports Can Drive the Next Wave of Growth?.

Andrew, B. G., and Ostry. J. D., 2011. Inequality and Unsustainable Growth: Two Sides of the Same Coin*?" IMF Staff Discussion Note SDN/11/08.*

Arrow, K. (1962). Economic welfare and the allocation of resources for invention. In *The rate and direction of inventive activity: Economic and social factors* (pp. 609-626). Princeton University Press.

Asghar, S., & Javed, S. A. (2011). On measuring inclusiveness of growth in Pakistan. *The Pakistan Development Review*, 879-893.

Bank of Uganda Annual Report (2015/16). Available at https://www.bou.or.ug/bou/bou-downloads/publications/Annual_Reports/Rprts/All/Annual-Report-2015-2016.pdf

Bank of Uganda Annual Report (2014/15). Available at https://www.bou.or.ug/bou/bou-downloads/publications/Annual_Reports/Rprts/All/Annual-Report-2014-2015.pdf

Bank of Uganda Annual Report (2013/14). Available at https://www.bou.or.ug/bou/bou-downloads/publications/Annual_Reports/Rprts/All/Annual-Report-2013-2014.pdf

Bank of Uganda Annual Report (2012/13). Available at https://www.bou.or.ug/bou/bou-downloads/publications/Annual_Reports/Rprts/All/Annual-Report-2012-2013.pdf

Bank of Uganda Annual Report (2011/12). Available at https://www.bou.or.ug/bou/bou-downloads/publications/Annual_Reports/Rprts/All/Annual-Report-2011-2012.pdf

Bank of Uganda Annual Report (2010/11). Available at https://www.bou.or.ug/bou/bou-downloads/publications/Annual_Reports/Rprts/All/Annual-Report-2010-2011.pdf

Bank of Uganda Annual Report (2009/10). Available at https://www.bou.or.ug/bou/bou-downloads/publications/Annual_Reports/Rprts/All/Annual-Report-2009-2010.pdf

Bank of Uganda Annual Report (2008/09). Available at https://www.bou.or.ug/bou/bou-downloads/publications/Annual_Reports/Rprts/All/Annual-Report-2008-2009.pdf

Bank of Uganda Annual Report (2007/08). Available at https://www.bou.or.ug/bou/bou-downloads/publications/Annual_Reports/Rprts/All/Annual-Report-2007-2008.pdf

Bank of Uganda Annual Report (2006/07). Available at https://www.bou.or.ug/bou/bou-downloads/publications/Annual_Reports/Rprts/All/Annual-Report-2006-2007.pdf

Bank of Uganda Annual Report (2005/06). Available at https://www.bou.or.ug/bou/bou-downloads/publications/Annual_Reports/Rprts/All/Annual-Report-2005-2006.pdf

Bank of Uganda Annual Report (2004/05). Available at https://www.bou.or.ug/bou/bou-downloads/publications/Annual_Reports/Rprts/All/Annual-Report-2004-2005.pdf

Bank of Uganda Annual Report (2003/04). Available at https://www.bou.or.ug/bou/bou-downloads/publications/Annual_Reports/Rprts/All/Annual-Report-2003-2004.pdf

Bank of Uganda Annual Report (2002/03). Available at https://www.bou.or.ug/bou/bou-downloads/publications/Annual_Reports/Rprts/All/Annual-Report-2002-2003.pdf

Bank of Uganda Annual Report (2001/02). Available at https://www.bou.or.ug/bou/bou-downloads/publications/Annual_Reports/Rprts/All/Annual-Report-2001-2002.pdf

Bank of Uganda Annual Report (2000/01). Available at https://www.bou.or.ug/bou/bou-downloads/publications/Annual_Reports/Rprts/All/Annual-Report-2000-2001.pdf

Barro, R. J. (1996). Determinants of economic growth: a cross-country empirical study. *National Bureau of Economic Research.* No. w5698

Barro, R. J. (2008). Inequality and growth revisited (No. 11). *ADB Working paper series on regional economic integration*

Barro, R. and Sala-I-Martin, X. (1995),Economic Growth, New York, McGraw-Hill

Beegle, K., Christiaensen, L., Dabalen, A., and Gaddis, I (2016) . Poverty in a Rising Africa. Washington, DC: World Bank. Available at https://openknowledge.worldbank.org/handle/10986/22575

Berg, A. G., & Osrty, J. D. (2013). Inequality and unsustainable growth: two sides of the same coin?. *International Organisations Research Journal*, *8*(4), 77-99.

Birdsall, N. (2007). Reflections on the Macroeconomic Foundations of Inclusive Middle-Class Growth. *Center for Global Development. Working Paper*, (130).

Bhalla, K. N. (2003). Microtubule-targeted anticancer agents and apoptosis. *Oncogene*, *22*(56), 9075.

Bhalla, S. (2007). Inclusive growth? Focus on employment. *Social Scientist*, 24-43.

Carrasco, E., del Rosal, S., Racero, J. C., & García-Gimeno, R. M. (2012). A review on growth/no growth Salmonella models. *Food research international*, *47*(1), 90-99.

Cass, D. (1965). Optimum growth in an aggregative model of capital accumulation. *The Review of economic studies*, *32*(3), 233-240.

Christiansen, B. (Ed.). (2015). *Handbook of Research on Global Supply Chain Management*. Inclusive Growth Global.

Collier and Reinikka (2001). Uganda's Recovery: The Role of Farms, Firms and Government. *World Bank Regional and Sectoral Studies Series, March.*

Corak, M. (2013). Income inequality, equality of opportunity, and intergenerational mobility. *The Journal of Economic Perspectives, 27(3),* 79-102.

Cournède, B., Denk, O., & Hoeller, P. (2015). Finance and inclusive growth.

Dollar, D., Kleineberg., T and Kraay, A. (2015). Growth, inequality and social welfare: cross-country evidence. *Economic Policy*, Volume 30, Issue 82, 335-377

Domar, E. D. (1946). Capital expansion, rate of growth, and employment. *Econometrica, Journal of the Econometric Society*, 137-147.

Domonkos. T., Jánošová. M., and Ostrihoň. F. (2013). Analysing Inclusive Growth: Empirical Evidence from the Slovak Republic. *Ekonomický časopis,* 61, č. 9, s. 918 – 933

De Haan, A. (2015). Inclusive growth: Beyond safety nets?. *The European Journal of Development Research*, *27*(4), 606-622.

Edet, L.,(2015). The Paradox of Economic Growth without Development in Nigeria. *Journal of Humanities and Social Science. Volume 20*, 64-77

Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica: journal of the Econometric Society*, 251-276.

Forbes, K. J. (2000). A Reassessment of the Relationship between Inequality and Growth. *American economic review*, 869-887.

Government of Uganda. (2013). Vision 2040 Document.

Government of Uganda. (2015). National Development Plan (II).

Hatlebakk, M. (2008). Inclusive growth in Nepal. *CMI, Bergen, Norway*.

Harrod, R. F. (1939). An essay in dynamic theory. *The economic journal*, *49*(193), 14-33.

Johansen, S. (1995). Identifying restrictions of linear equations with applications to simultaneous equations and cointegration. *Journal of econometrics*, *69*(1), 111-132.

Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. *Econometrica: Journal of the Econometric Society*, 1551-1580.

Kakwani, N. and Son, H. H. (2008). Poverty Equivalent Growth Rate. *Review of Income and Wealth*, *54*, No. 4, pp. 643 – 655

Kaplinsky, R. (2013). What contribution can China make to inclusive growth in sub-Saharan Africa?. *Development and Change*, *44*(6), 1295-1316.

Kelkar, V. (2010). Financial inclusion for inclusive growth. *ASCI Journal of Management*, *39*(1), 55-68.

Kim, D. K., Lee, J., Kim, S. R., Choi, D. S., Yoon, Y. J., Kim, J. H., ... & Kim, S. H. (2014). EVpedia: a community web portal for extracellular vesicles research. *Bioinformatics*, *31*(6), 933-939.

Knight, F. H. (1944). Realism and Relevance in the Theory of Demand. *Journal of Political Economy*, *52*(4), 289-318.

Koopmans, T. C. (1965). On the concept of optimal economic growth.

Kraay, A. (2006). When is growth pro-poor? Evidence from a panel of countries. *Journal of development economics*, *80*(1), 198-227.

Kurian, N. J. (2008). Inclusive growth in India: Agriculture, poverty and human development. *Social Change*, *38*(2), 340-342.

Levine, R. (2012). Finance, regulation and inclusive growth. *Promoting inclusive growth: Challenges and policies*, 55-75.

Li, H., & Zou, H. F. (2002). Inflation, growth, and income distribution: A cross-country study. *Annals of Economics and Finance*, *3*(1), 85-101.

Malthus, T. R. (1798). *An Essay on the Principle of Population, as it Affects the Future Imporvement of Society, with Remarks on the Speculations of Mr. Godwin, M. Condorcet, and Other Writers*. The Lawbook Exchange, Ltd..

Martin, R. (2004). Pro-poor growth: A primer. Policy Research Working Paper Series.

McKinley, T. (2010). Inclusive growth criteria and indicators: An inclusive growth index for diagnosis of country progress.

Ministry of Finance and Economic Development. (2000). Poverty Reduction Strategy Paper. Available at http://siteresources.worldbank.org/INTPRS1/Resources/Country-Papers-and-JSAs/Uganda_IPRSP.pdf

Molapo. S. (2017). Analysis of public expenditure growth on infrastructure in Lesotho. Macroeconomic and Financial Management Institute of Eastern and Southern Africa

Muhammad, A. S., & Sardar, M. (2012). Inclusive Growth Strategies for Pakistan: Myth or Reality for Policymakers!.

Narayan, P. K. (2005). The saving and investment nexus for China: evidence from cointegration tests. *Applied economics*, *37*(17), 1979-1990.

Oluseye, I. C., & Gabriel, A. A. (2017). Determinants of Inclusive Growth in Nigeria: An ARDL Approach. *American Journal of Economics*, *7*(3), 97-109.

Oxfarm (2017) WHO IS GROWING? Ending Inequality in Uganda.

Page, J., & Shimeles, A. (2015). Aid, employment and poverty reduction in Africa. *African Development Review*, *27*(S1), 17-30.

Park, J. Y. (1990). Testing for unit roots and cointegration by variable addition. *Advances in econometrics*, *8*(2), 107-133.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, *16*(3), 289-326.

Pesaran, M. H., Shin, Y., & Smith, R. P. (1999). Pooled mean group estimation of dynamic heterogeneous panels. *Journal of the American Statistical Association*, *94*(446), 621-634

Phillips, P. C., & Ouliaris, S. (1990). Asymptotic properties of residual based tests for cointegration. *Econometrica: Journal of the Econometric Society*, 165-193.

Raheem. D.I., Ibrahim D., Isah. O.K., and Adedeji. A.A. (2016). Inclusive growth, human capital development and natural resource rent in SSA. *Econ Change Restruct.* Published on line at *https://link.springer.com/content/pdf/10.1007%2Fs10644-016-9193-y.pdf*

Ramsey, F. P. (1928). A mathematical theory of saving. *The economic journal*, *38*(152), 543-559.

Ranieri, R., & Almeida Ramos, R. (2013). *Inclusive growth: Building up a concept* (No. 104). Working Paper, International Policy Centre for Inclusive Growth.

Rauniyar, G., & Kanbur, R. (2010). Inclusive growth and inclusive development: a review and synthesis of Asian Development Bank literature. *Journal of the Asia Pacific Economy*, *15*(4), 455-469.

Ravallion, M. (2016). Are the world's poorest being left behind?. *Journal of Economic Growth, 21(2),* 139-164.

Ravallion, M. (1995). Growth and poverty: Evidence for developing countries in the 1980s. *Economics letters*, *48*(3), 411-417.

Reinikka, R., & Collier, P. (Eds.). (2001). *Uganda's recovery: the role of farms, firms, and government*. World Bank Publications.

Ricardo, D. (1817). On foreign trade. *Principles of political economy and taxation*.

Rodríguez-Pose, A., & Tselios, V. (2015). Toward inclusive growth: Is there regional convergence in social welfare?. *International Regional Science Review*, *38*(1), 30-60.

Romer, P. M. (1986). Increasing returns and long-run growth. *Journal of political economy*, *94*(5), 1002-1037.

Schumpeter, J. A. (1982). The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle (1912/1934). *Transaction Publishers.–1982.–January*, *1*, 244.

Shah, P., & Dubhashi, M. (2015). Review Paper on Financial Inclusion-The Means of Inclusive Growth. Chanakya International Journal of Business Research, 1(1), 37-48.

Shakoor, R., Hassan, M. Y., Raheem, A., & Wu, Y. K. (2016). Wake effect modeling: A review of wind farm layout optimization using Jensen′s model. *Renewable and Sustainable Energy Reviews*, *58*, 1048-1059.

Sheshinski, E. (1967). Balanced growth and stability in the Johansen vintage model. *The Review of Economic Studies*, *34*(2), 239-248.

Singh, A., Jain-Chandra, S., and Mohommad, A. (2014). Inclusive growth, institutions, and the underground economy. *Human dignity and the future of global institutions*, 103-122.

Solow, R. M. (1956). A contribution to the theory of economic growth. *The quarterly journal of economics*, *70*(1), 65-94.

Smith, A. (1937). The wealth of nations [1776].

Swan, T. W. (1956). Economic growth and capital accumulation. *Economic record*, *32*(2), 334-361.

Tella, S. A., & Alimi, O. Y. (2016). Determinants of Inclusive Growth in Africa: Role of Health and Demographic Changes. *African Journal of Economic Review*, *4*(2), 138-146.

United Nations Development Programme (2016) Human Development Report.

Uganda Bureau of Statistics (2014). National Population and Housing Census Report.

Uganda Bureau of Statistics (2016). Statistical Abstract.

Uganda Bureau of Statistics (2017). National Household Survey

Van der Weide, R., & Milanovic, B. (2014). Inequality is Bad for Growth of the Poor (But Not for that of the Rich). *World Bank Policy Research Working Paper No. 6963*

Van Vliet, O., Beblavy, M., Caminada, K., Domonkos, S., Drahokoupil, J., Goudswaard, K., & Murphy, G. (2013). Labour Relations and Modes of Employment.

Wilson, R. A., & Briscoe, G. (2004). The impact of human capital on economic growth: a review. Impact of education and training. Third report on vocational training research in Europe: background report. Luxembourg: EUR-OP.

World Bank (2017). World Development Indicators.

World Bank (2016). The Uganda Poverty Assessment Report 2016.

World Bank (2009). What is Inclusive Growth. *World Bank, Washington DC*.

World Economic Forum, (2017). The Inclusive Growth and Development Report 2017.

Young, A. A. (1928). Increasing returns and economic progress. *The economic journal*, *38*(152), 527-542.

Appendix 1
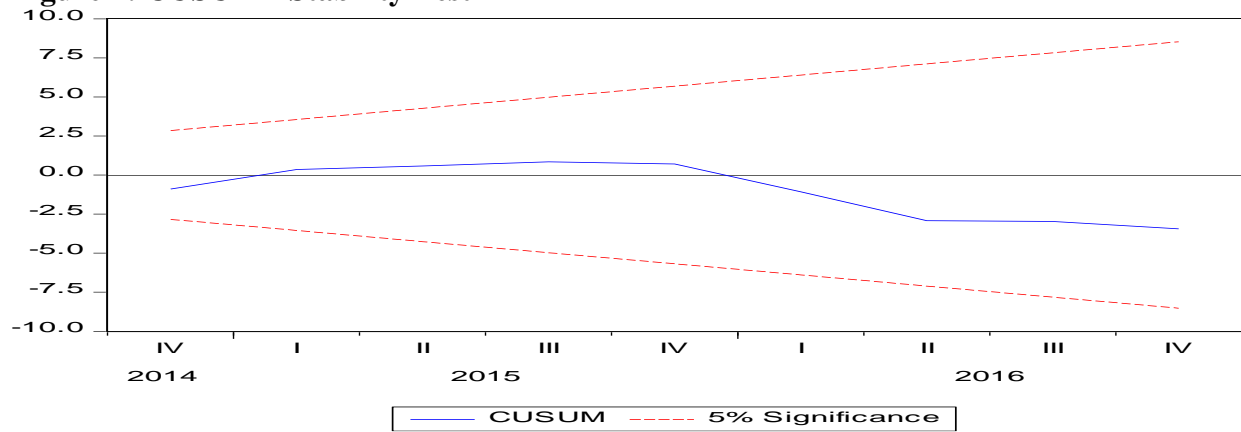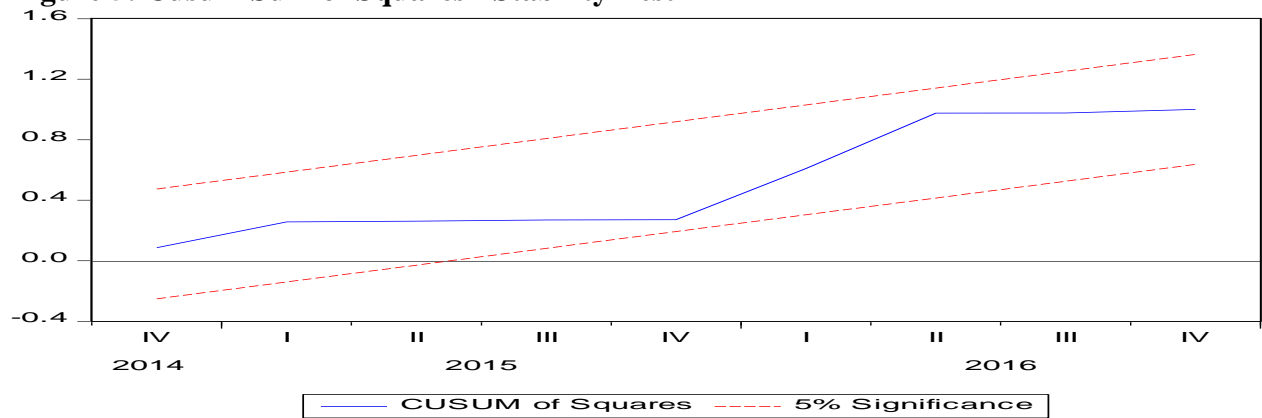
Figure 4: CUSUM - Stability Test

Figure 5: Cusum Sum of Squares - Stability Test

5. Does Gender Matter For Financial Inclusion In Malawi?

By Moffat Sinkanako Banda[5], Wytone Jombo[6] and Onelie Nkuna[7]

Reserve Bank of Malawi

Abstract

Financial inclusion has been widely cited in literature as one of the necessary conditions for an all-inclusive growth, particularly in the developing countries. While the importance of financial inclusion in supporting economic growth has been widely recognised in the literature, the jury is still out on whether being a male or female can affect one's probability of being financially included. Given that women constitute over 50 percent of Malawi's population, the existence of significant gender gap would mean inequitable economic growth in the country. Using cross sectional data from 2014 Baseline Survey on Financial Literacy and Consumer Protection conducted by the Financial Support Technical Project (FSTAP) in Malawi, the study investigated the effects of gender on financial inclusion. Specifically, the thrust of this study was two-fold. Firstly, the study investigated the relationship between financial inclusion and gender. Financial inclusion was measured by dummy variables that capture ownership of at least one financial product. Thus, financial inclusion takes a value of 1 if an individual owns at least one financial product and 0 if otherwise. Financial products included in the study are saving account, credit account, financial investment, insurance, remittances and mobile money. Results suggest a gender gap in favour of women. Compared to men, women are more likely to be financially included in Malawi.

Secondly, using a multivariate probit model, the researchers assessed the effect of gender on ownership of the individual financial products. The use of the model was guided by a chi-square test for correlation of the error terms from the individual equations of ownership of the products. Results showed that a gender gap in favour of women for ownership of savings accounts, credit accounts and investment. One possible explanation of the reverse gender gap in financial inclusion in Malawi is the role of microfinance institutions in the financial landscape in Malawi. These institutions tend to serve women more than men and hence have played a major role in ensuring financial inclusion of women in the country.

To ensure good fit, the following control variables were included in the model; financial capability, age of respondents, marital status, education, employment, household size, income, and variables capturing residency of the respondents.

The study therefore recommends repackaging of the financial products offered by microfinance institutions to ensure that they serve not only the interests of women but those of men as well.

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Further, we recommend government increased effort towards universal education and also amendment of the primary and secondary school curricula by including financial topics to harness the efforts already made in the area of financial inclusion. Elimination of gender inequality in economic activities is also vital to further improve financial inclusion.

Key Words: Financial Inclusion, Financial products, Gender, Malawi, Probit.

3 INTRODUCTION

Financial inclusion has been widely cited in literature as one of the necessary conditions for an all-inclusive growth, particularly in the developing countries (Burgess and Pande 2005; Bruhn and Love 2014; Sahay *et. al*. 2015). Increasing access to and use of quality financial products and services is essential for inclusive economic growth and poverty reduction (Holloway, Niazi, & Rouse, 2017). More specifically, studies suggest that when people participate in the financial system, they are better able to manage risk, start to invest in a business, and fund large expenditures such as ducation and home improvement (Ashraf, Karlan, & Yin 2010; Dupas & Robinson 2013; Cull, Robert, Tilman, & Nina 2014).

Therefore, financial inclusion is a necessary ingredient for inclusive growth and, certainly, sustainable development. This is why Chibba (2009) pointed out that financial inclusion is an important tool for eradicating poverty and narrowing income inequality. As such it is an integral part of inclusive development and a building block for poverty reduction strategies. Burgess, Pande and Wong (2005) found that state-led branch expansion into rural unbanked locations and the enforcement of directed bank lending in India led to reduction in poverty through increased bank borrowing among the poor, in particular among low cost and tribal groups. While the importance of financial inclusion in supporting economic growth and reducing poverty has been widely recognised in the literature, it is still not clear whether being a male or female can affect one's probability of accessing and utilising formal financial products and hence financial inclusion.

Women form a disproportionately large share of the world's unbanked population (Karlan & Morduch 2009) hence not financially included. The status quo has not improved much even

after increasing awareness by international agencies, donors, governments and the private sector of the benefits of women's full financial inclusion. The gender gap in financial services uptake and usage persists as 2014 Global Findex found that 58 percent of women have an account compared to 65 percent of men, reflecting a gender gap of 7 percentage points globally (Demirguc-Kunt, Klapper, Singer & Oudheusde 2015). Similarly, the International Finance Corporation (IFC) (2011) estimates that women-owned businesses have up to US$320 billion in unmet financing needs worldwide. United Nations Women (2015) points out that increasing women's financial inclusion is especially important as women disproportionately experience poverty, stemming from unequal divisions of labour and a lack of control over economic resources. Many women remain dependent upon their husbands, and about one in three married women from developing countries have no control over household spending on major purchases (United Nations Women, 2015). In addition, women often have more limited opportunities for educational attainment, employment outside of the household, asset and land ownership, the inheritance of assets, and control over their financial futures in general.

Within the Southern African region, the gender gap prevails even in countries with the highest financial inclusion. Fin Mark Trust (2016) reports that the gender gap in bank account ownership is highest in Botswana, Swaziland, and Mauritius. South Africa is the only country with a positive gender gap. All the indicators of financial inclusion suggest a negative gender gap in Malawi (Fin Mark Trust, 2016).

Given that women constitute over 50 percent of Malawi's population (National Statistics Office, 2008), the existence of a significant gender gap would mean inequitable economic growth in the country. This study therefore investigates whether gender significantly determines one's probability of being financially included or not in Malawi. The study uses cross sectional data from the 2014 Baseline Survey on Financial Literacy and Consumer Protection conducted by the Financial Support Technical Project (FSTAP) in Malawi. Section 2 gives an overview of financial inclusion in Malawi; section 3 provides literature review in the study area; the methodology is covered in sections 4 and 5, while section 6 highlights the discussion of the results, and section 7 gives the recommendations and conclusion.

4   Financial Inclusion in Malawi and Beyond: A snapshot

2.1 The Malawian Financial Inclusion Landscape

Malawi's population is estimated at 17.8 million in 2017 (United Nations, 2016). About 9 million of the population are adults and 81 percent of the adults reside in the rural areas. About 40 percent of the adult population are under the age of 30 years while 76 percent of the adults have primary education or less (Finscope Survey, 2014). The country has three major regions: northern, central and southern region with 28 districts. Twenty (20) percent of all financial access points are concentrated in Lilongwe District, making it the main hub of financial services in Malawi. Northern region is the least covered area in terms of the country's total access points. Commercial banks and microfinance institutions (MFIs) together constitute 80% of the country's total access points. Karonga district has the highest number (0.81) of access points per 10,000 adults (18+ years) among all districts in Malawi.

According to the Human Development Report of 2011, about 90.4 percent live on less than US$2 a day and three quarters of these live below the World Bank poverty line of US$1.25 per day. As expected, most people in Malawi do not have access to formal financial services (Mandiwa, 2014). While financial services for the poor cannot solve all the problems caused by poverty, they can help put resources and power into the hands of poor and low income people themselves, allowing them to chart their own paths out of poverty. The poor are usually placed at a disadvantage in accessing financial services due to the remote areas they reside in. In addition, lack of formal education reduces the interest of formal financial institutions to provide services for them. Considering that a large part of the population in Malawi live below the poverty line, development of a favourable and inclusive financial system becomes significant. Despite this revelation, Figure 1 suggests that overall, financial exclusion has only declined by 4percentage points from 2008 to 2014, in Malawi.

Figure 1: Access to Financial Services in Malawi—little progress in the past decade
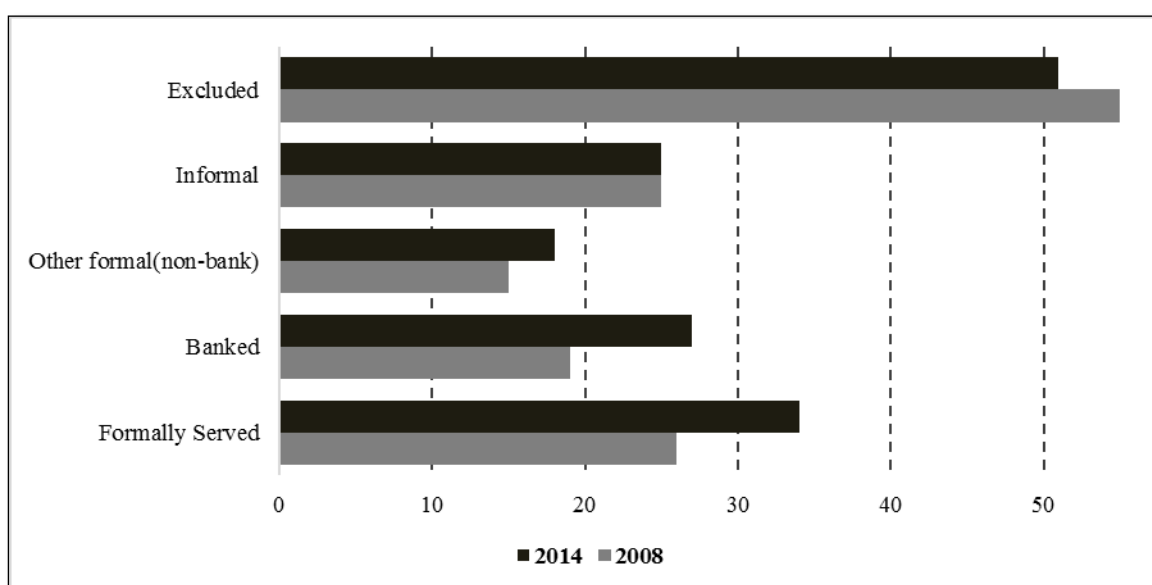
Source: FinScope 2008, 2014

2.2 Financial Inclusion in the SSA

Sources of finance in Sub-Saharan Africa(SSA) can be both formal and informal and can range from banks, near banks, non-banks, community organizations to friends and family. However, lack of access to finance is common in the Macroeconomic and Financial Management Institute of Eastern and Southern Africa (MEFMI) region, Southern African Development Community (SADC) region and the larger sub-Saharan region. Figure 2 shows that as at 2009, 63 percent and 33 percent of eligible people in Zambia and Botswana, respectively, were financially excluded. By 2011, Zimbabwe, Lesotho, Swaziland, and Namibia had banked populations estimated at 24, 38, 44, and 62 percent of the national total, respectively. The statistics are not inspirational as they are in stark contrast to accumulating evidence that shows a positive effect of financial inclusion on accelerating economic growth, reducing income disparities, and poverty. Thus, given the importance of access to safe, easy and affordable credit and other

financial services by the poor and vulnerable groups as well as disadvantaged and lagging sectors, the statistics point to the challenges the SSA region has to surmount. Clearly, access to a well-functioning financial system, by creating equal opportunities, enables economically and socially excluded people to integrate better into the economy and actively contribute to economic development. Furthermore, the financially included are better placed to protect themselves against economic shocks and this is one of the fundamental tenets of inclusive growth.

Figure 2: Financial Inclusion in some MEFMI countries
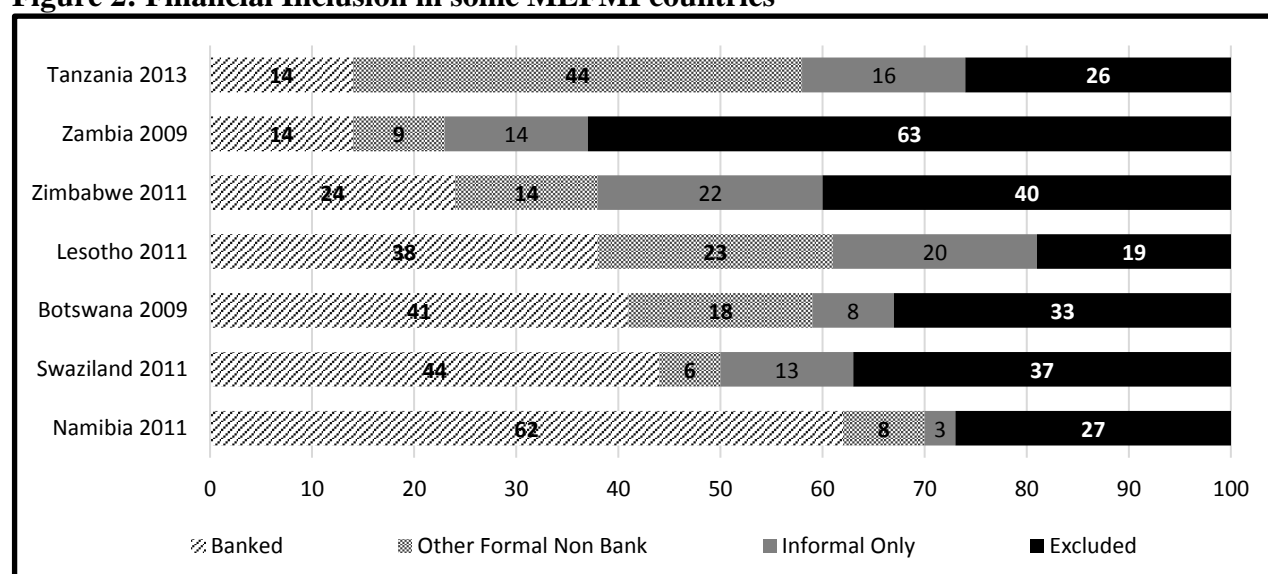
Source: FinScope 2014

2.3 Gender and Financial Inclusion

Increasing women's financial inclusion is important as women disproportionately experience poverty, stemming from unequal divisions of labour and a lack of control over economic resources (Holloway *et. al*. 2017). Despite important advances in expanding access to formal financial services in the developing world in recent years, a significant access gap remains between men and women. This is illustrated through a basic measure of financial inclusion: account ownership. In fact, Allen *et. al* (2016) found that greater ownership and use of accounts is associated with a better enabling environment for accessing financial services, such as lower account costs and greater proximity to financial intermediaries. Globally, only 58 percent of women hold an account in a formal financial institution, compared to 65 percent of men (Demirguc-Kunt *et. al*., 2015). This gender gap is even more pronounced between men and women in developing markets, with the largest gap, 18 percentage points, observed in South

Asia (Figure 3). The financial inclusion gender gaps are also noticeable in the Sub-Saharan region as shown in Figure 4.

Figure 3: Gender and Financial Inclusion globally (% of age+15)
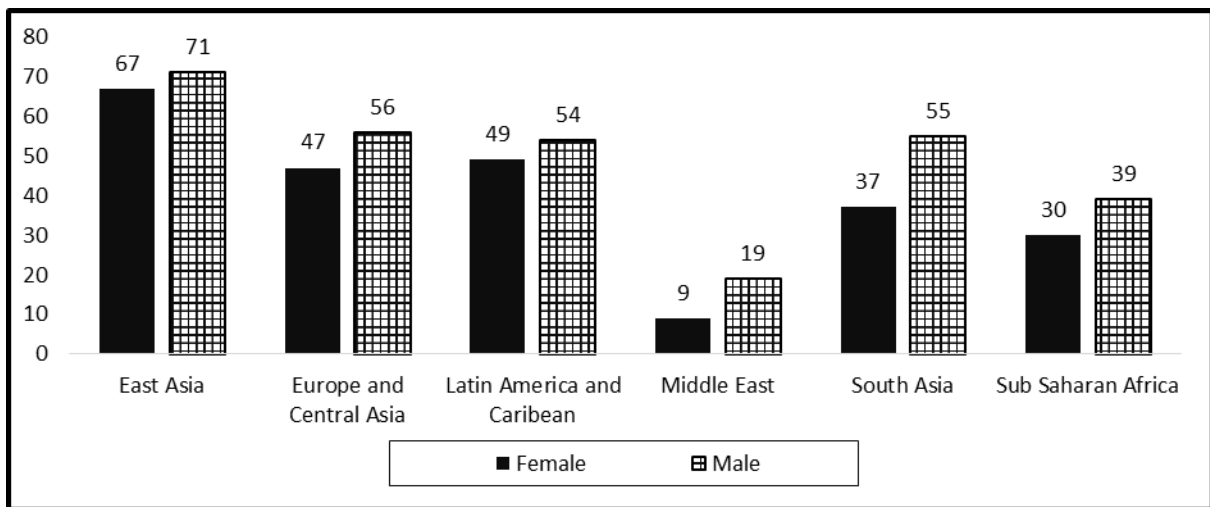
Source: Global Findex Database (2014)

Figure 4: Account Ownership by Gender in SSA

Source: FinScope (2014)

2.4 Determinants of Financial Inclusion

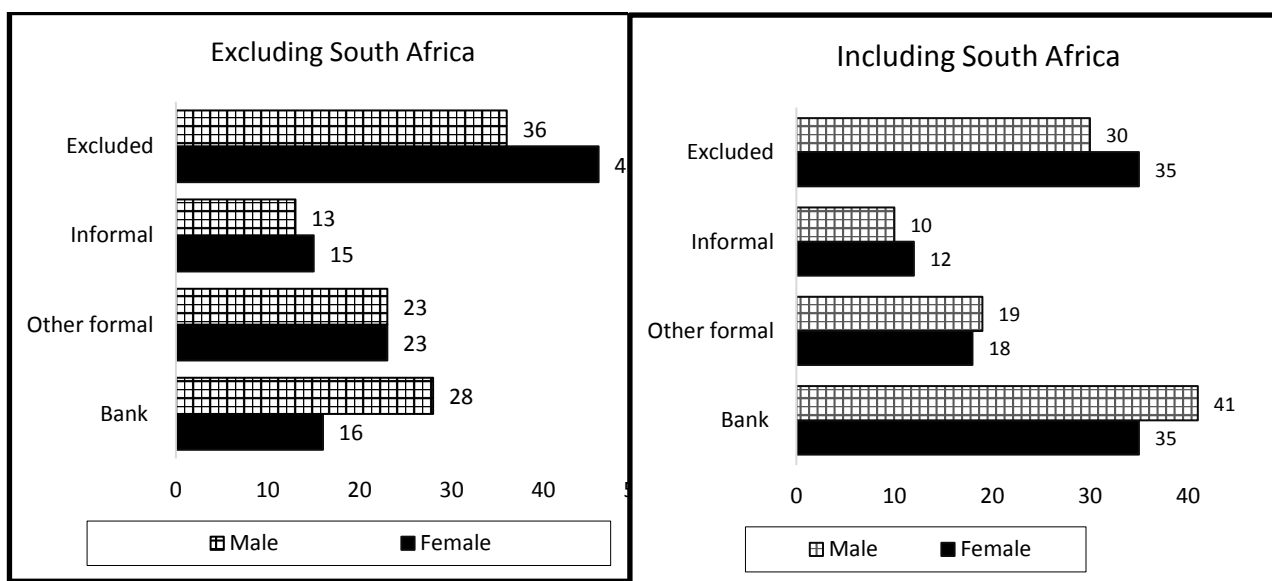The literature suggests that factors such as gender, education, family upbringing and childhood experiences, income, wealth levels and health status, influence financial inclusion. According to Hoyo, Peña and Tuesta (2013), insufficient or variable income and self-exclusion are the most important factors, and are influenced by variables denoting individual vulnerability such as gender, the level of income, education and occupation. Allen, Demirgüç-Kunt, Klapper and Peria (2016), found that the probability of owning an account at a formal financial institution is higher for richer, more educated, older, urban, employed, married or separated individuals.

Zins and Weill (2016) also used the World Bank's Global Findex database on 37 African countries to perform probit estimations and found similar results to Allen *et. al*. (2016) that being a man, richer, more educated and older favor financial inclusion with a higher influence of education and income. In the SADC region, FinMark Trust (2016) found that gender affects financial inclusion even after controlling for individual characteristics such as household size, age, education, place of residence, marital status, employment status, income, and level of education, implying that financial services are biased against females.

While there is an apparent consensus in the literature on determinants of financial inclusion elsewhere, it remains an empirical question for Malawi. Precisely, the question on whether gender may matter on one's probability of being financially included can never be generalised for two reasons. Firstly, Malawi has its distinct cultural terrain that might influence how people make financial decisions (Hernandez & Cervantes, 2012). Secondly, there could be some institutional factors in Malawi that could provide different results. This research investigated the relationship between gender and financial inclusion in Malawi. Further, the research assesses the effect of gender on ownership of individual financial products.

3   Objectives of the study

The overall objective of the study was to examine the effect of gender on financial inclusion in Malawi. Specifically, the study aimed at:
- Investigating the relationship between financial inclusion and gender; and

- To assess the effect of gender on the ownership of individual financial products.

4 Methodology
4.1 Analytical Framework

Figure 5 presents a framework that conceptualizes the individuals' ownership of financial products and motivates the empirical discussion of this paper. According to this framework, the basic building block of financial inclusion is capital base or financial resources. People with financial resources demand information about ways in which the resources can be used and stored. This includes demand for knowledge and skills, attitude towards risks and general financial behaviour and this improves the financial capability of the individuals (World Bank, 2013). However, social (demand side) and environmental (supply side) factors have influence on the financial capabilities of individuals or consumers. Demand side factors include personal and family characteristics and among these, gender is one of the important factors. Others include education levels, family sizes, intra-household resource allocation rules and the extent of social capital (networks and associations).

On the other hand, environmental factors relate to the architectural structure of the financial system and the institutions (rules of the game) in the financial sector and include ease of access to finance and rules governing such access, the stage of development of the formal financial sector and institutions for the protection of consumers from unfair practices in the financial system.

Figure 5 Analytical Framework of Financial Inclusion
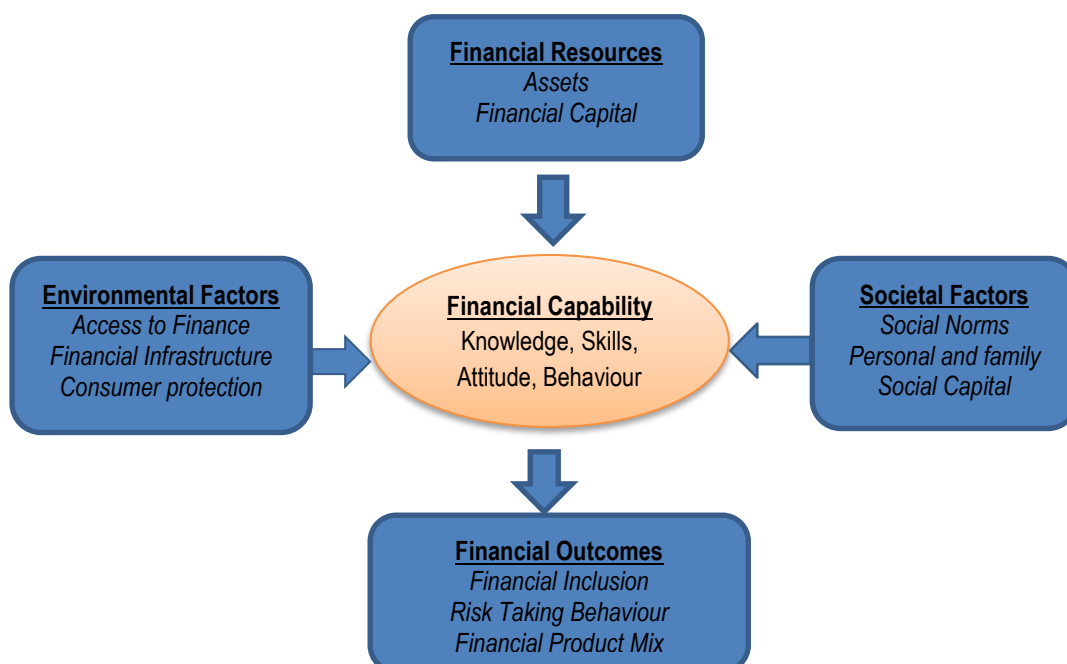
Source: Adapted from World Bank (2013)

Financial capability is expected to result into several financial outcomes. First, financial capability can lead to financial inclusion. With knowledge of the available financial products, decision makers can decide on alternative ways of engaging with the financial system, such as short-term, medium-term and long-term financial savings and investment products, loan products, insurance products and other financial services. These financial services entail different levels of risk and financial capabilities can lead to risk taking behaviour. Financial capability can also lead to different levels of financial diversification or financial product mix, involving a mix of products with different term structure and different risk profiles.

4.2 Empirical Specification
4.2.1 Relationship between Gender and Financial Inclusion

The study uses probit model to analyse the relationship between financial inclusion and gender. A binary variable is created as a proxy of financial inclusion and takes a value of 1 if an individual owns at least one financial product and zero otherwise. Following Clamara *et. al.*, (2014), we assume that the decision to own a financial product depends on an underlying but unobservable (latent) variable y^* which is influenced by a set of independent variables x^i such that;

$$y_i^* = x_i' \beta_i + \mu_{i,} \qquad \mu \sim N(0,1) \tag{1}$$

In probits, we observe only y such that

$$y_i = 1 \; if \; y_i^* > 0; \; y_i = 0 \; if \; y_i^* \leq 0 \tag{2}$$

where the subscript i represents individual respondents, β is a vector of parameters to be estimated and μ is a normally distributed error term with mean 0 and variance 1. Therefore, the probability that an event occurs is given by;

$$P(y_i = 1 | x) = P(y_i^* > 0)$$
$$= P(+\mu_i > 0)$$

$$= P(\mu_i > -x_i'\beta_i)$$

If the errors are independently distributed according to the unit-normal distribution, $\mu \sim N(0,1)$, then
$$P(y_i = 1|x) = F(x_i'\beta)$$
(3)

F is the cumulative distribution function of a normal variable. The independent variables (x^i) include gender and other control variables such as financial capability, household size, education, income, employment status, marital status, urban and region of residence.

4.2.2   Relationship between Gender and Ownership of Individual Financial Products

To assess the effect of gender on the ownership of individual financial products, the authors used multivariate probit. Since the individual has to make a choice on the financial products, the decision to own one product or another are related. According to Huguenin, Pelgrin and Holly (2008), the multivariate probit is the best model of choice behaviour because it allows a flexible correlation structure for the unobservable variable.

In terms of specification, a binary variable is created for ownership of individual products and takes a value of 1 if an individual owns the particular product and zero otherwise. An M equation model is formulated as follow;

$$P(y_{im} = 1|x) = P(y_{im} \leq y_{im}^*)$$
(4)

Both the normal probit and the multivariate probit models are estimated using the Maximum Likelihood Estimation technique. The marginal effects on the latent variable are then computed from the coefficients estimated in the model. These represent the change in the probability of financial inclusion when there is a unit change in the regressors included for continuous variables. Stata version 13.1 was used to estimate both the probit and multivariate probit models.

4.2.3   Definition of Variables
4.2.3.1 Dependent Variable

The dependent variable is financial inclusion. It is measured as ownership of at least one of these financial products; savings account, credit account, investment in stocks, mutual funds

etc, insurance, international remittances and mobile money. Other empirical studies on financial inclusion have used the same definition (Tuesta *et. al*., 2015).

4.2.3.2 Independent Variables

Gender of Respondent: Gender is a very complex construct and refers to the socially constructed characteristics of women and men such as norms, roles and relationships of and between groups of women and men. For purposes of this study, the sex of the respondent is a dummy variable which takes a value of 0 if the respondent is female and 1 if male. Gender of the respondent is expected to be positively related with financial inclusion. In general, men tend to have more financial responsibilities compared to women and hence are likely to engage with the financial system. A number of studies have also found that females or female-owned firms face more financial constraints than their male counterparts as women are unfavourably treated when it comes to accessing finance (Henderson, 2015; Beck, T., and Honohan, P. (2008). Further, Demirguc-Kunt *et. al* (2013) note that economy-wide legal discrimination against women and gender norms can explain the gender gap. In terms of legal discrimination, women are less likely than men to own, manage, control, or inherit property, which in turn might affect women's demand for financial services. Gender norms such as the level of violence against women, the incidence of early marriage for women, and women's rights also explain the gender gap in financial inclusion.

Financial Capability: Financial capability is a continuous variable constructed using Multiple Component Analysis (MCA) from the indicators of financial knowledge, behaviour and attitude. From the World Bank (2013) conceptual framework, financial capability is expected to be positively related to financial inclusion.

Age of respondent: This is measured as the actual number of years of the respondent and is a continuous variable. Age can either have positive or negative impact on financial inclusion. Specifically, as a person grows old, more financial responsibilities surface and therefore push an individual to engage with the financial system to smoothen their consumption. However, beyond a certain age, the likelihood of financial inclusion falls. This is captured by age squared in the model and is expected to be negatively related with financial inclusion (Martinez and Krauss, 2015; Clamara *et. al*, 2014).

Household Size: Household size is measured by the number of individuals in a household. A prior, we expect the impact of household size on financial inclusion to be either positive or negative. On one hand, the larger the household size, the higher the financial burden which may result into ownership of a financial product to smoothen consumption. On the other hand, large household sizes may constrain savings behaviour.

Marital Status: Marital status is a dummy variable that takes the value 1 if the respondent is married (either in a monogamous, polygamous and informal union) and 0 otherwise. Marital status is expected to have a positive impact on financial inclusion. In general, married individuals tend to have more financial responsibilities and hence engage the financial system to smoothen their consumption (Fanta and Mutsonziwa 2016).

Education of Respondent: Education is a categorical variable with four categories, namely, no education, primary education, secondary education and tertiary education. The no education category was the reference category. We therefore expect education to be positively related to financial inclusion since individuals with higher levels of education are in a better position to technically assess financial products, to clear doubts and uncertainties associated with it and likely to own it. Empirical evidence has shown that low levels of financial inclusion are associated with lower levels of education (Clamara *et. al*, 2014; OECD/INFE, 2013; Neuberger, 2015, Mish, et.al, 2012).

Income: This is a continuous variable capturing monthly income of the respondent. Income is expected to have a positive impact on financial inclusion as income enables people to demand for financial products such as insurance and other financial assets and therefore directly related to financial inclusion (World Bank 2013).

Employment status: Employment status is a dummy that takes the value 1 if the respondent works for wage and 0 otherwise. Employment is expected to have a positive impact on financial inclusion in Malawi. One explanation is that most companies require their employees to have an account with a commercial bank for receipt of salaries and other work related payments, hence forcing them to be financially included.

Urban centre: This is a dummy variable that takes the value 1 if the respondent lives in an urban centre and 0 otherwise, where urban means Lilongwe, Blantyre, Mzuzu, and Zomba. It

is expected to have a positive impact on financial inclusion as most financial services outlets are concentrated in the urban centres.

Region: This is a categorical variable which captures the region of residence of the respondent. In terms of administration, Malawi has three regions, namely, the northern region, the central region and the southern region. Therefore, only two dummy variables were included in the model to avoid dummy variable trap. These dummy variables take a value of 1 if the observation belongs to a particular region and zero if it does not belong to that region. The northern region was the benchmark category.

The probit regression model is displayed as:

$$P(Financial\ inclusion) = \beta_1 + \beta_2 Gender + \beta_3 Financial\ Capability + \beta_4 Education + \beta_5 employment + \beta_6 Income + \beta_6 Household\ size + \beta_7 Age + \beta_8 Age\ Squared + \beta_9 Urban + \beta_{10} Region + \mu$$

4.3 Data

The data for this study was sourced from the World Bank Household Survey on financial inclusion in Malawi (Financial Sector Technical Support Project (FSTAP) Baseline Financial Literacy and Consumer Protection Household Survey 2014). The sample for the baseline survey was based on the 2008 Population Census data and projected population data obtained from the National Statistical Office (NSO). In total a sample of 5,000 individuals representing t households from urban-city, urban-district town, peri-urban and rural categorization was developed and it yielded a randomly drawn sample of 4,999 across Malawi. Of the 4,999 households; 599 were from urban – cities, 140 were from urban–district towns, 200 were from peri-urban and 4,000 were from rural areas (Chirwa, and Mvula, 2014). However, after data cleaning, 4988 individuals had all the information needed to conduct the study.

Using a semi-structured questionnaire administered to one randomly selected adult member of the household above the age of 18 years old (from 15 years where there were no adult members of the household above 18 years) quantitative interviews were conducted. The first part of the

questionnaire was aimed at identifying the respondents' individual characteristics. The second part included questions that were related to broad categories, including: money management; financial planning; financial services and products, financial literacy, household income estimation.

5 Empirical Results

5.1 Descriptive Statistics

Table 2 presents descriptive statistics of the independent variables used in this study. Out of the 4988 individuals sampled, 3,049 (61.1 percent) were females while 1,939 individuals (38.9 percent) were males. The data also shows that the average household size was 4.8 which is slightly higher than the national average of 4.4 persons per household as documented by NSO (2008). The minimum household size was 1 and the maximum was 19. In addition 967 respondents reported that they did not have any formal education, representing 19.4 percent of the sample size. A total of 2,986 individuals (59.9 percent of the sample size) reported that they had only primary education, 868 individuals (17.4 of the sample size) had secondary level education and 167 respondents (3.4 percent) had tertiary education. The data also shows that 463 respondents (9.3 percent) were wage earners. In terms of the geographical distribution of the respondents, 559 were from the northern region, 1923 were from the southern region and 2437 were from the southern region. This represented 11.21 percent, 38.4 percent and 48.9 percent of the sample size, respectively.

Table 1: Descriptive Statistics for the variables (N=4988)

Variable	Mean	Std. Dev.	Min	Max
Financial Inclusion			0	1
Financial Capability	0.0012	0.9994	-3.0041	2.1362
Gender			0	1
Age	38.8087	16.2177	18	98
Age Square	1769.0800	1549.5650	324	9604
Married			0	1
Primary Education			0	1
Secondary Education			0	1
Tertiary Education			0	1
Wage Employment			0	1
Household Size	4.8206	2.1262	1	19

Monthly Income	59026.3700	158440.3000	500.0	3600000.0
PSLC as Highest Education in H/H			0	1
Secondary as Highest Education in H/H			0	1
Tertiary as Highest Education in H/H			0	1
North			0	1
Centre			0	1
South			0	1
Rural			0	1
Peri Urban			0	1
Urban Districts			0	1
Urban Cities			0	1

5.1.1 Descriptive Statistics of the Dependent Variables

Data reveals that only 31 percent of the surveyed participants use banks and semi-formal financial institutions (Table 3). This is different from 2014 Finscope survey which showed that 55 percent use banks and semi-formal institutions but similar to 2008 Finscope survey which indicated 34 percent. The data further shows that out of the 31 percent that are included, the majority mainly use credit (26.0 percent) and saving products (17.5 percent). Contrary to expectations, only a very small proportion use mobile services (2.8 percent) and remittance services (1.8 percent).

Table 3: Distribution of Usage of Financial Inclusion Products and Services (N=4988)

Variable	Frequency	Percentage
Financial Inclusion		
No	3,445	69.07
Yes	1,543	30.93
Savings		
No	4,114	82.48
Yes	874	17.52
Investment		
No	4,920	98.64
Yes	68	1.36
Credit		
No	3,689	73.96
Yes	1,299	26.04
Insurance		
No	4,764	95.51
Yes	224	4.49
Remittances		

No	4,896	98.16
Yes	92	1.84
Mobile Money		
No	4,849	97.21
Yes	139	2.79

Source: Authors' compilation based on the World Bank Survey on Financial Inclusion in Malawi

5.2 Relationship between Gender and Financial Inclusion

Looking at the relationship between gender and financial inclusion , Figure 6 indicates that out of the sampled population, women are more included than men. Even when analysed relative to the sample size, the proportions of women are still higher than men, suggestive of the reverse gender gap.

Figure 6: Percentage distribution of the financially included by sex (sample weighted)

Chart 5: Percentage Distribution of the Financially Included by Gender (sample weighted)
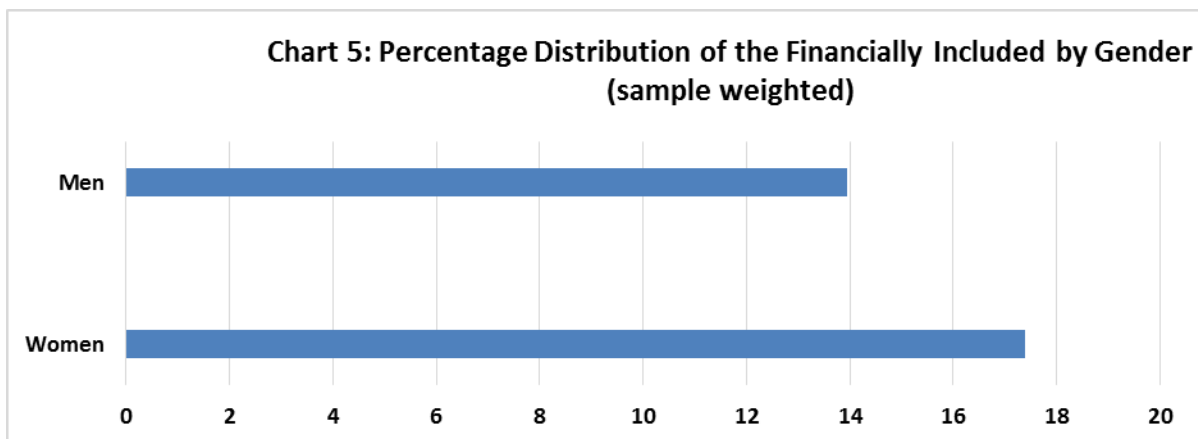
5.3 Discussion of Results

5.3.1   Relationship between Gender and Financial Inclusion

Table 4 gives results of a probit model on Relationship between gender and financial inclusion. Results show that females are more likely to be included than males. Specifically, an average Malawian male is 4.1 percentage points less likely than a female to be financially included, suggesting a reverse gender gap. The results are contrary to what is reported by a number of studies that found that men are more included than female. For example, Fanta and Mutsonziwa (2016) found that there is gender gap in financial inclusion in favour of men in Malawi and the gap is wider for usage than access. Nevertheless, the finding of reverse gender gap is in line with the result of the World Bank (2015) for Philippines. Since our definition of financial inclusion includes microfinance institutions and these are widely spread, one possible explanation for the higher probability of financial inclusion for women would be the bias in microfinance products towards women (Oxford 2009).

For the control variables, most of them are statistically significant at conventional levels and have the expected sign. Financial capability is significant and has the highest marginal effect on financial inclusion. Specifically, financial capability increases the likelihood for an individual to be financially included by 12.4 percent. Thus the more one is able to successfully manage financial products and making informed choices about personal finances, the more likely one is to be included. Further, financial inclusion is found to increase with age, albeit beyond a certain age, financial inclusion starts to decline (this is captured by age squared which has a negative sign). Being married (whether in monogamous, polygamous or informal union) increases the likelihood of being included. This is not surprising as individuals that are married are more likely to have increased responsibilities hence increased need for using financial products. Fanta and Mutsonziwa (2016) in their study of financial inclusion of Women in SADC, also affirmed to this notion that married individuals have more financial responsibilities than the non-married, hence increased demand for the financial services and products.

Table 4: Marginal Effects of the Probit Model of Financial Inclusion (Robust Standard Errors in Parenthesis)

Dependent Variable	Coefficient	Std. Error	Z-Statistic	Marginal Effects
Gender	-0.1204	0.0463	-2.60	-0.0411**
Financial Capability	0.3567	0.0250	14.26	0.1229*
Household Size	-0.0074	0.0119	-0.62	-0.0025
Age	0.0387	0.0075	5.17	0.0133*
Age Squared	-0.0004	0.0000	-4.59	-0.0001*

Married	0.1455	0.0524	2.77	0.0492**
Primary Education	0.3361	0.0776	4.33	0.1133*
Secondary Education	0.4670	0.0976	4.78	0.1714*
Tertiary Education	1.3461	0.2023	6.66	0.4975*
PSLC as Highest Education in H/H	-0.2991	0.1123	-2.66	-0.0981*
Secondary as Highest Education in H/H	-0.1607	0.1097	-1.47	-0.0551
Tertiary as Highest Education in H/H	0.1160	0.1200	0.97	0.0406
Wage employment	0.1784	0.0761	2.34	0.0637
Monthly income	0.0000	0.0000	3.29	0.0000*
Urban Cities	0.2818	0.0580	4.86	0.1010*
Centre	-0.1274	0.0642	-1.98	-0.0435***
South	-0.3024	0.0630	-4.80	-0.1037*
Log pseudo likelihood				-2438.8489
Wald chi2 (17)				912.20
Significance Level				0.0000
Pseudo R2				0.2130

* Statistically significant at 1 percent level ($p < 0.01$); ** statistically significant at 5 percent level ($p < 0.05$); *** statistically significant at 10 percent level ($p < 0.10$).

Source:Author's estimations

The study further finds a positive relationship between income and financial inclusion. The result suggests that an individual's income increases the likelihood of owning a financial product. Education also plays a key role in financial inclusion. For locational factors, the estimated results suggest that compared to an average person living in rural area, an individual who resides in urban-cities has a higher probability of being financially included. This result reflects the fact that financial institutions are mostly located in urban centres, hence individuals living in urban areas are able to access and use financial products. The estimated results also suggest that the region where one resides plays a role in financial inclusion with central and southern region residents having 5.5 and 11.4 percentage points less probabilities of financial inclusion compared to the northern region residents.

5.3.2   Effect of Gender on the Ownership of Individual Financial Products

Table 5 presents results of the Multivariate probit model for the relationship between gender and financial inclusion. The model was estimated on the assumption that binary responses of the individual products are correlated. With a probability chi squared of (0.0000) we reject the null that the binary responses are independent and conclude that the responses of these individual products are correlated. The results reveal that the reverse gender gap observed in the overall definition of financial inclusion also exists for probabilities of ownership of savings accounts, credit accounts and investment. Specifically, compared to men, women are more likely to own savings accounts, credit accounts and investment. For ownership of other products, however, the results suggest that gender does not matter.

Table 5: Results of the Multivariate Probit on ownership of Financial Products (Standard Errors in Parenthesis

	Savings	Credit	Investment	Insurance	Remittances	Mobile Money
Financial Capability	.5508658* (.0346372)	.3629691* (.0261832)	-.0101707 (.0585484)	.1739184* (.0455468)	.2099465* (.0523485)	.2681724* (.0496207)
Male	-.1057696*** (.0577334)	-.0841275*** (.0476479)	-.2318567** (.1139971)	-.0445919 (.0787628)	-.019697 (.096504)	.0265765 (.0903161)
Age	.0286881* (.0105281)	.0358424* (.0077871)	.0717541* (.0202228)	.019318 (.0137294)	-.0040777 (.016183)	.0050719 (.0173128)
Age Squared	-.000226*** (.0001153)	-.0003551* (.0000832)	-.0007462* (.0002223)	-.0000901 (.0001434)	.0000233 (0001739)	-.0000826 (.0001993)
Married	.2447697* (.0689588)	.1260358** (.0540519)	.2467747*** (.1332393)	.1139881 (.0922339)	-.1064445 (.1063121)	-.1168901 (.0998703)
Primary Education	.3912778* (.1095558)	.2757755* (.0821177)	.4511338*** (.2517435)	.1096174 (.1573427)	-.1318758 (.1880272)	.4174079*** (.2510353)
Secondary Education	.6181487* (.1274693)	.2982327* (.1020244)	.78604** (.3151736)	.3712031** (.175517)	.2543522 (.2050534)	.5640073** (.2712869)
Tertiary Education	1.481396* (.2226788)	.6889144* (.1721992)	1.544377* (.3747943)	.9985294* (.2086826)	.4752359*** (.2709528)	1.036608* (.3003687)
Wage employment	.3368523* (.088188)	.0642924 (.0768768)	.0706727 (.1697574)	.7066609* (.0944434)	.0293752 (.1384735)	.4328862* (.1068335)
Household Size	.0157762 (.0149905)	-.0114551 (.0115459)	-.0145406 (.0282139)	.001236 (.0176713)	.0283917 (.0210805)	.0138957 (.0197486)
Monthly income	2.30e-06* (5.91e-07)	1.76e-06* (4.26e-07)	3.98e-07* (1.86e-07)	7.55e-07* (1.74e-07)	5.22e-07* (1.58e-07)	5.23e-07* (1.53e-07)
PSLC as Highest Education in H/H	-.0214687 (.2113264)	-.349421* (.1175951)	-.2503365* (.3100819)	.2225706 (.2992141)	-.2365139 (.2854388)	.0110486 (.3959895)
Secondary as Highest Education in H/H	.2855298 (.2031849)	-.1791678 (.1159094)	-.4070689 (.3174116)	.3884542 (.2967402)	.0111262 (.2540218)	.0523709 (.3767272)
Tertiary as Highest	.7306517* (.2096736)	.07176 (.1262271)	-.3448906 (.3678593)	.6841498** (.3019532)	.0879989 (.2688046)	.1372869 (.3965241)

Education in H/H						
Urban Cities	.4656022*	.2074559*	.0121673*	.1538723***	.1338193	.1016304
	(.0629021)	(.0577976)	(.118346)	(.0873847)	(.106386)	(.0985159)
Centre	-.0871545	-.1967262*	.9825054*	.3979359*	.4343467**	-.1911829
	(.0734335)	(.0662374)	(.32627)	(.1286153)	(.1855665)	(.1171113)
South	-.1202184	-.3819089*	.9485527*	.3234314**	.4707446**	-.2607364*
	(.0722814)	(.0651932)	(.3255152)	(.1308396)	(.1838014)	(.1183167)

Likelihood ratio test of rho21 = rho31 = rho41 = rho51 = rho61 = rho32 = rho42 = rho52 = rho62 = rho43 = rho53 = rho63 = rho54 = rho64 = rho > 65 = 0

chi2(15)	580.6010
Significance Level	0.0000

* Statistically significant at 1 percent level ($p < 0.01$); ** statistically significant at 5 percent level ($p < 0.05$); *** statistically significant at 10 percent level ($p < 0.10$). Robust Standard Errors in Parenthesis.

Source:Author's Estimations

The estimated results also indicate that for the use of savings and credit accounts (column 2 and 3), most variables are significant and have signs similar to the determinants of financial inclusion as indicated in Table 1. The likelihood of owning these products increases with age, level of education, income, being married and living in an urban area. Similar results were obtained by Tuesta *et. al* (2015) for Argentina.

The probability of having an investment in stocks, mutual funds and other financial products is affected positively by age, being married, education levels and income. In particular, those who have tertiary education have the highest likelihood of owning an investment, saving and mobile money products in the formal financial system compared to those with no formal education, those with only primary education and those with secondary education only.

Lastly, having insurance, making remittances and mobile money transactions seem to be affected by financial capability, education levels and income. According to the results, those with more financial knowledge are more likely to have an insurance arrangement and make international remittances and mobile money transactions. In terms of education, the higher the level of education, the higher the likelihood of owning an insurance product and making

international remittances and mobile money transactions. Income, though statistically significant, has very small impact on these variables.

6 Conclusions and Recommendation

The objective of the paper was to assess whether gender matters in financial inclusion in Malawi. Using normal and multinomial probit models, the study analysed the relationship between gender and financial inclusion and gender and ownership of individual financial products in Malawi, respectively. The study finds that about 31 percent of the surveyed respondents are financially included, with most of them using savings and credit products.

The study further finds a reverse gender gap in overall financial inclusion and ownership of individual financial products in Malawi. One possible explanation for this is the proliferation of microfinance institution which tends to service women more than men. Actually, this could be the important evidence that the financial interventions that target women have started paying dividends in Malawi. For the control variables, the study finds that financial capability, age, employment, income and marital status increase the probability of financial inclusion. Further, individuals residing in urban areas and northern region of the country are more likely to own financial products and services than those in rural areas and other regions, respectively.

Given the critical role that financial inclusion plays in ensuring equitable and inclusive growth, it is imperative that government ensures improvement of men inclusion in the formal and semi-formal financial agencies while at the same time harnessing the strides that have already been made to improve women financial inclusion. The government must continue creating conducive environment for men to be able to participate in the financial system. This can be done through repackaging the products of microfinance institutions to ensure that they not only serve the interests of women but also those of men.

Further, the finding that education plays a role in financial inclusion calls for government to strengthen its effort in ensuring universal education for its citizenry. This will have a pass-through effect to financial inclusion and hence economic growth. The study further recommends amendment of curricula at primary and secondary level to ensure that financial concepts and topics are embedded in the curricula. This will result into increased financial

knowledge and hence financial capability of the students and in the end improve financial inclusion.

References

Allen F, Demirgüç-Kunt A, Klapper L, Peria M.S.M. (2016). *The foundations of financial inclusion: understanding ownership and use of formal accounts* J. Financ. Intermed. Volume 27, 1–30.

Ashraf, N., Karlan, D., and Yin, W. (2010). Female Empowerment: Impact of a Commitment Savings Product in the Philippines. World Development 38(3), 333:344.

Beck, T., and Honohan, P. (2008). Finance for All? Policies and Pitfalls in expanding access (Vol.42792). World Bank Publications.

Burgess, R., Pande, R., & Wong, G. (2005). Banking for the poor: Evidence from India. *Journal of the European Economic Association*, 3(2-3), 268-278.

Chibba, M. (2009). Financial inclusion, poverty reduction and the millennium development goals. *European Journal of Development Research*, 21(2), 213-230.

Chirwa, E.W. and Mvula, P. (2014) Malawi: Baseline Financial Literacy and Consumer Protection Household Survey, Final Report prepared for the Financial Sector Technical Assistance Project (FSTAP), Lilongwe: Reserve Bank of Malawi.

Clamara, N., Peña, X. and Tuesta, D. (2014) Factors that Matter for Financial Inclusion: Evidence from Peru, *Working Paper No. 14/09*, Madrid: BBVA Research.

Cull R, Robert J., Ehrbeck T., and Holle N. (2014). "Financial inclusion and development: Recent impact evidence." CGAP Focus Note 92.

Demirguc-Kunt A., Klapper L., Singer D., and Oudheusden P (2015). "The Global Findex Database 2014: Measuring Financial Inclusion around the World." Policy Research Working Paper 7255, World Bank, Washington, DC.

Demirgüç-Kunt, A., Klapper, L., Singer D. (2013) The Global Findex Database. Note Number 9. World Bank. Available at http://siteresources.worldbank.org/EXTGLOBALFIN/Resources/8519638-1332259343991/N9gender.pdf.

Dupas, P., & Robinson, J. (2013). Savings Constraints and Microenterprise Development: Evidence from a Field Experiment in Kenya. *American Economic Journal: Applied Economics*, 5(1), 163:192.

Dupas, P., Karlan, D., Robinson, J., and Ubfal, D., (2016). Banking the Unbanked: Evidence from Three Countries. *Center for Global Development*, Working Paper 440.

Fanta and Mutsonziwa (2016). Gender and Financial inclusion: An analysis of Financial Inclusion of Women in SADC. Finmark Trust. Policy Research Paper 1 (2016).

Finmark Trust (2016). Gender and financial inclusion: Analysis of financial inclusion of women in the SADC region. Policy research paper No. 01/2016.

FinScope, 2014. FinScope Consumer Survey Malawi 2014. [Online] Available at: http://www.finmark.org.za/wp-content/uploads/pubs/Broch_Consumer_Malawi_2014.pdf

Henderson,L., Herring,C., Horton H.D, and M. Thomas (2015). Credit where credit is Due? Race, Gender, and Discrimination in the Credit Scores of Business Startups. The Review of Black Political Economy, 42(4), 459-479.

Hernandez, C and Cervantes M. (2012). *Does Culture Affect in the Financial Decision Making of Rational Man? Chinese vs. Anglo-Saxon Perspective*. Global Review Vol. 6, pp. 67-75.

Holloway, K. Niazi Z., and Rouse., R (2017). Women's Economic Empowerment Through Financial Inclusion: A Review of Existing Evidence and Remaining Knowledge Gaps. *Innovations for Poverty Action.*

Hoyo, Peña & Tuesta (2013). "Demand Factors that Influence Financial Inclusion in Mexico: Analysis of Barriers Based on ENIF". BBVA Research Working Paper 13/36.

Huguenin J., Pelgrin F. and Holly A. (2008) Estimation of Multivariate Probit Models by Exact Maximum Likelihood. Institute of Health Economics and Management (IEMS) Working paper N. 09 02. < http://www.chuv.ch/bdfm/cdsp/77989.pdf>.

International Finance Corporation (2011). Access to Credit Among Micro, Small, And Medium   Enterprises <http://www.ifc.org/wps/wcm/connect/1f2c968041689903950bb79e78015671/AccessCredit MSME-Brochure-Final.pdf?MOD=AJPERES>

Karlan, D. and J. Morduch. 2009. "Access to Finance." In Handbook of Development Economics, vol. 5, edited by D. Rodrik and M. Rosenzweig, 4703–84. Elsevier.

Mandiwa M. (2014). Access to Financial Services in Malawi: Policies and Challenges. Ministry of Finance, Economic Planning and Development. Government of Malawi.

National Statistics Office (2008). 2008 Population and Housing Census main report. Zomba. Malawi.

Oxford (2009). Supply Side Study of Financial Inclusion In Malawi Final Report <www.mamn.mw/index.php?option=com/financial-inclusion/malawi>

Tuesta, D., Sorensen, G., Haring, A. and Cámara, N. (2015) Financial Inclusion and its Determinants: the Case of Argentina, *Working Paper No 15/03*, Madrid: BBVA Research

United Nations Women (2015). Gender and Financial Inclusion Through the Post. New York: UN women

World Bank (2013) Financial Capability Surveys around the World: Why Financial Capability is Important and How Surveys Can Help, *Policy Brief*, Washington, DC: The World Bank

Zins, A and Weill, L 2016. *The determinants of financial inclusion in Africa*. Review of Development Finance. Volume 6, Issue 1, Pages 46-57. http://data.un.org/ accessed on 8 June 2017.

Appendices

Appendix 1

Table 1: Description of Variables

Endogenous Variables (Financial Inclusion)	Description
Financial Inclusion	Ownership of at least one of these financial products; savings account, credit account, investment in stocks, mutual funds etc, insurance, international remittances and mobile money
Savings account	Individuals responding in the affirmative when asked whether they had a savings account at a bank
Credit account	Individuals responding in the affirmative when asked whether they had a credit account at a bank or microfinance institution
Investment	Individuals responding in the affirmative when asked whether they had an investment in a financial product
Insurance	Individuals responding in the affirmative when asked whether they had an insurance arrangement
international remittances	Individuals responding in the affirmative when asked whether they make international remittances
mobile money	Individuals responding in the affirmative when asked whether they make mobile money transactions.

Exogenous Variables	Description
(i) Financial Capability	Include the following indicators **Financial Knowledge**: knowledge of simple arithmetic, basic financial concept such as inflation, simple interest, compound interest, discount, insurance and risk diversification).

	Behaviour: In terms of Money Management (this include budgeting, not overspending, living within means, monitoring expenses) and Long Term Planning (this includes savings behaviour, planning for old age expenses, planning for unexpected expenses).
(ii) Individual Characteristics and Welfare Factors Age	**Attitude:** This includes attitude towards the future, non-impulsiveness achievement orientation.
	number of years of the respondent
Male	Dummy that takes the value 1 if the respondent is a man and 0 otherwise
Household Size	Number of people in the household
Married	Dummy that takes the value 1 if the respondent is married (monogamous, polygamous and informal union) and 0 otherwise
Primary Education	Dummy that takes the value 1 if the respondent has primary education and 0 otherwise.
Secondary Education	Dummy that takes the value 1 if the respondent has secondary education and 0 otherwise.
Tertiary Education	Dummy that takes the value 1 if the respondent has tertiary education and 0 otherwise.
Wage employment	Dummy that takes the value 1 if the respondent works for wage and 0 otherwise
Income	Respondent monthly income
(iii) External Factors	
Urban Centre	Dummy that takes the value 1 if the respondent lives in an urban centre and 0 otherwise.
Centre	Dummy that takes the value 1 if the respondent lives in central region and 0 otherwise.
South	Dummy that takes the value 1 if the respondent lives in southern region and 0 otherwise.

6 Impact Of Financial Inclusion On The Interest Rate Transmission Channel Of Monetary Policy

By Martin Brownbridge, Thomas Bwire[8], Doreen K. Rubatsimbira & Grace A. Tinyinondi

ABSTRACT

Many African countries are characterised by a high level of financial exclusion. Insights from theoretical models indicate that the presence of a substantial share of financially excluded consumers within the population might impede the transmission mechanism of an inflation targeting policy. This paper uses a panel vector error correction (PVEC) methodology for the period 2001Q1 to 2016Q4 to test the hypothesis that economies with lower levels of financial inclusion have weaker monetary policy transmission mechanisms than economies with higher levels of financial inclusion. This hypothesis is tested using four African countries (Ghana, Mauritius, South Africa and Uganda) which have adopted inflation targeting monetary policy frameworks. These are divided into two groups differentiated by their level of financial inclusion, with panel vector auto-regressions (PVARs) on each group estimated to assess the strength of the impulse response of inflation to the monetary policy variable. The results suggest that economies with higher levels of financial inclusion exhibit stronger impulse responses, although this does not necessarily imply that higher levels of financial inclusion are the cause of stronger monetary transmission mechanisms as the degree of financial inclusion may be correlated with other aspects of development which also affect the monetary transmission mechanism.

Keywords: Financial Inclusion, Monetary Policy, Monetary Policy Transmission Mechanism

1. Introduction

Financial inclusion (FI), is generally defined in the literature to mean the ease of access, availability, and usage of financial services - credit, savings, payments, and insurance, provided by the formal financial system to the working age population of an economy (Sarma, 2008; Demirguc-Kunt et al., 2014; Global Partnership for Financial Inclusion, 2016). FI is at present one of the leading subjects of policy discussions globally, but even more so in developing countries as increasing the poor's access to financial services is considered an effective tool to reduce poverty and lower income inequality (Young & Mercado, 2015).

The World Bank Global Findex database provides indicators of financial inclusion across the world. The latest Global Findex (2014) shows that although Sub-Saharan Africa (SSA) is still significantly below the world averages, improvements have been made. Between 2011 and 2014 the percentage of the population aged 15 and above that held accounts in financial institutions in SSA grew from 23.9 percent to 28.9 percent compared to 50.6 percent and 60.7 percent for the world in 2011 and 2014, respectively (Table 1). SSA, however, dominates the

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world in mobile accounts with 11.5 percent of the population aged 15 and above holding mobile accounts in 2014 compared to the world average of 2.0 percent.

Table 1: Indicators of Financial Inclusion for selected African countries and major country groups

Country/Region	Account at a financial institution (% age 15+)		Borrowed from a financial institution (% age 15+)		Saved at a financial institution (% age 15+)		Mobile account (% age 15+)
	2011	**2014**	**2011**	**2014**	**2011**	**2014**	**2014**
Ghana	29.4	34.6	5.8	8.1	16.1	18.6	13.0
Mauritius	80.1	82.2	14.3	17.1	30.8	35.5	0.9
South Africa	53.6	68.8	8.9	12.1	22.1	32.7	14.4
Uganda	20.5	27.8	8.9	15.7	16.3	16.8	35.1
Sub-Saharan Africa (developing only)	23.9	28.9	4.8	6.3	14.3	15.9	11.5
World	50.6	60.7	9.1	10.7	22.6	27.4	2.0
Low- Middle Income Countries	28.7	41.8	7.3	7.5	11.1	14.8	2.5
Low Income Countries	21.1	22.3	11.7	8.6	11.5	9.9	10.0
Upper-Middle Income Countries	57.4	70.4	7.9	10.4	25.1	32.2	0.7

Source: World Bank Global Financial Inclusion database 2014

Table 2 provides data on commonly used indicators of financial depth for the four countries which are the focus of the empirical research in this paper. Two of the three indicators of financial inclusion in Table 1, with the exception of the percentage of the population with a mobile money account, are correlated with the indicators of financial depth shown in Table 2, in that South Africa and Mauritius both have higher levels of financial inclusion and financial depth than Ghana and Uganda.

Table 2: Indicators of Financial Depth for Inflation Targeting African countries

Country	Domestic credit to private sector (% of GDP)		Broad money (% of GDP)		Market capitalization (% of GDP)	
	2015	**2016**	**2015**	**2016**	**2015**	**2016**
Ghana	20.4	19.6	34.0	34.2	41.2	31.2
Mauritius	102.7	96.4	106.9	110.0	61.9	62.2
South Africa	147.7	144.4	73.5	72.6	231.7	322.0
Uganda	14.8	14.5	22.3	22.9	29.5	24.2

Source: World Bank Indicators database

Most of the research on financial inclusion has focused on issues of distribution, inclusive growth and poverty reduction. However, the degree to which private sector agents have access to financial services, especially services which allow for saving and borrowing at a market interest rate, is potentially relevant for monetary policy and in particular the strength of the monetary transmission mechanism. Inflation targeting monetary policy frameworks utilize a policy interest rate as the main policy instrument. The rationale for the use of this instrument is that aggregate demand is inversely related in the short term to the real interest rate. However, theoretical considerations, discussed in section 2, suggest that the magnitude of the relationship between the real interest rate and aggregate demand might be affected by the extent of financial inclusion among consumers, among other factors. In SSA, four countries South Africa, Mauritius, Ghana and Uganda currently operate an inflation targeting (IT) monetary policy regime. As shown above in Table 1, among the four SSA countries with an IT regime, South Africa and Mauritius generally have higher financial inclusion indicators than Ghana and Uganda; however, the latter two have registered higher usage of the mobile money service. This difference is consistent with the trend for the World Bank's low income and upper middle income country groupings in which South Africa and Mauritius are classified as upper middle income and Ghana and Uganda are classified as low-middle income and low-income respectively.

In standard neo-Keynesian macroeconomic models (which are used by central banks for policy analysis and forecasting) the transmission of monetary policy depends on private expenditures being interest elastic, so that a rise (fall) in the policy interest rate induces (with a lag) a fall (rise) in private expenditures, which in turn affects real output and inflation. Implicitly, consumers have a permanent income consumption function, in which consumers can optimally allocate their consumption inter-temporally. The market interest rate in any period, which reflects the price of saving in that period relative to other periods, influences the intertemporal allocation of consumption and savings. The intertemporal allocation of private investment is also influenced by the market interest rate in each period, as this affects the user cost of capital. Most standard neo-Keynesian macroeconomic models contain no explicit modeling of the financial system. Implicitly, it is assumed that private agents (e.g. consumers) have access to financial services at the going market interest rate for these services: i.e. they can borrow and save at market interest rates (Berg et al, 2006; Clarida et al, 1999; Svensson, 1998).

The assumption that all consumers can borrow and save at market interest rates is hardly tenable in many developing economies, where there are large sections of the population who are excluded from access to financial services and especially from access to credit. Consumers who cannot borrow to smooth their consumption in the face of income shocks are sometimes referred to as "non-Ricardian" or "rule of thumb" consumers. In principle, a large share of financially excluded private agents in the population would reduce the interest elasticity of private spending and thereby weaken the interest rate transmission of monetary policy, although other channels of monetary policy transmission, such as the exchange rate and expectations of future inflation, might not be affected.

An important premise of practical monetary policy is the "Taylor principle" which states that monetary policy will stabilize inflation provided that, when inflation rises, the central bank raises the nominal interest rate by more than the rise in inflation so that real interest rates rise, and vice versa when inflation falls (e.g. Woodford, 2001). The Taylor principle underlies the interest rate rules used by many central banks as a guide to the setting of policy interest rates. However, the validity of the Taylor principle is undermined if private sector spending and hence aggregate demand is not interest elastic. Even if the Taylor principal still holds, a low interest elasticity of aggregate demand implies that a central bank would have to implement more aggressive changes in the policy interest rate to achieve a desired change in the target variables. Hence the issue of whether the degree of financial inclusion affects the monetary policy transmission mechanism has important consequences for the conduct of monetary policy in SSA and elsewhere. This study combines insights from the theoretical literature on the implications of financial excluded consumers for the monetary policy transmission mechanism with empirical research utilizing a panel vector error correction model (PVECM) econometric methodology. PVECM is increasing becoming a popular time series methodology where a cross section of countries is involved. We deploy the technique to investigate the monetary policy transmission mechanism empirically.

A critical issue however is how to introduce financial inclusion in the estimation framework given that it is a structural factor, changing only very slowly over time and cannot as such explain the variation in short term innovations in variables such as inflation and output. This paper takes exception and assumes that the degree of financial inclusion influences the way in which the endogenous variables e.g. inflation and output respond to innovations in other variables such that one then expects variations across countries depending on the degree of financial inclusion. We test this by dividing the countries into two sub-samples, one with a high level of financial inclusion (South Africa and Mauritius) and the other, (Ghana and Uganda) with low level of financial inclusion. The hypothesis is then that countries with a high level of financial inclusion exhibit stronger responses of target variables e.g. inflation and output to innovations in monetary policy variables. We then estimate PVARs for both groups and compare the impulse response functions of inflation to a change in the policy interest rate.

The remainder of the paper is structured as follows: Relevant literature is reviewed in Section 2 while Section 3 discusses the econometric methods and the data used in the paper. Empirical results are given in section 4 while conclusions are drawn in Section 5.

2. Review of the Literature

2.1 Theoretical literature

Most of the theoretical literature examining the implications of financial exclusion for the monetary policy transmission mechanism has involved the construction and calibration of dynamic stochastic general equilibrium models which explicitly model the behavior of optimizing economic agents. These models are then calibrated and used to explore the

consequences of monetary policy changes on macroeconomic variables. Instead of a single representative consumer who has access to financial assets and liabilities at market interest rates, researchers have constructed models for different types of consumers; Ricardian and non-Ricardian, and explored the consequences of changing the relative shares of these two types of consumers in the total population of consumers.

A seminal paper by Gali, Lopez-Salido and Valles (2004) explored the implications of non-Ricardian consumers for the properties of interest rate monetary policy rules at a theoretical level. The authors model monetary policy using a conventional neo-Keynesian model with sticky prices, but incorporate non Ricardian consumers alongside their conventional Ricardian counterparts. They found that the stabilizing properties of interest rate rules based on the Taylor principle do not necessarily apply when there is a significant presence of non-Ricardian consumers. In particular, they found that, when the share of non-Ricardian consumers exceeds a certain threshold, the implementation of an interest rate rule satisfying the Taylor principle may not guarantee a unique equilibrium of outcomes and that, as a result, the central bank may have to pursue a more aggressive anti-inflationary policy than would be the case in the absence of non-Ricardian consumers (i.e. larger changes in the interest rate are required to stabilize inflation).

Several researchers have built on the work of Gali et al. (2004) to analyze further, using theoretical models, the implications for monetary policy of the presence of non-Ricardian consumers. Bartolomeo and Rossi (2007) use a new Keynesian Dynamic Stochastic General Equilibrium (DSGE) model with both Ricardian and non-Ricardian consumers. They find that a larger share of the non-Ricardian consumers actually makes monetary policy more effective. Although an interest rate change does not directly affect the consumption of the non-Ricardian consumers, it does affect their real wages (through its impact on the consumption of the Ricardian consumers and thereby on output). The standard Keynesian effects of changes in income on the consumption of the non-Ricardian consumers outweigh the lack of interest rate induced changes in the inter-temporal allocation of their consumption, hence strengthening the interest rate channel of monetary policy.

Colgiago (2011) constructs a New Keynesian model and finds that, despite the presence of non-Ricardian consumers, the impact of the Taylor principle is restored if nominal wages are sticky (which dampens the consumer spending of non-Ricardian consumers in response to an output shock). Bilbie (2008) introduces into a standard dynamic general equilibrium model two classes of consumers; one which participates in asset markets and one which does not; the latter consumes current income. If the share of non-asset market participants is small enough, the model has standard new Keynesian properties with respect to the impact of the real interest rate on aggregate consumption. But as the share of non-asset market participant consumers rises, the interest elasticity of consumption demand rises but once it passes a certain threshold, higher real interest rates have a positive effect on consumption (reversing the slope of the IS curve).

2.2 Empirical Literature

The empirical literature on financial inclusion and monetary policy transmission in developing countries is rather limited, but growing. A review of the literature on financial inclusion and monetary policy over the period 2007 to 2015 by Agoba, Sare & Bugiri-Anarfo (2017) revealed that most studies on monetary policy had focused on the determinants and that there was still a "wide research gap" on the relationship it has with financial inclusion, innovation and financial development. Agoba et al. found that only a few studies such as Mehrotra and Yetman (2014) and Mehrotra & Yetman (2015) had attempted to investigate the effect of financial inclusion on monetary policy. Mehrotra and Yetman (2014) using a PVAR found that the ratio of output volatility to inflation volatility increased in the share of financially included consumers in the economy when monetary policy was conducted optimally, which was consistent with the theory on limited asset market participation that only financially included households are able to smooth their consumption in response to income volatility. Mehrotra & Yetman (2015) highlighted the potential effects of financial inclusion on monetary policy. The authors arrived at two key conclusions, first, that increased financial inclusion facilitates consumption smoothing, as households have easier access to instruments for saving and borrowing, which makes output volatility less costly and thus may support the central banks' monetary policy. Secondly, they conclude that growing financial inclusion is likely to increase the importance of the interest rate channel of monetary policy transmission as a greater share of economic activity is brought under the influence of interest rates.

Mbutor and Uba (2013) developed a simple model of the relationship between financial inclusion and monetary policy for Nigeria using data for the period 1980 and 2012, which they estimated using the VAR approach. Their model linked the inflation rate to a vector of financial inclusion indicators covering the number of bank branches, total number of loans and advances of commercial banks as a percentage of GDP and aggregate share of rural bank branches of deposits and loans. The model included commercial banks' average lending rate and the foreign exchange rate of the naira as control variables. Their key result was that a 1 percent increase in the ratio of total loans and advances by the commercial banks reduced inflation by 0.01 percent, suggesting that financial inclusion supports the attainment of monetary policy objective of low inflation. However, the coefficient of the number of bank branches was positive, indicating that this particular financial inclusion indicator did not support monetary policy effectiveness but largely because bank's main objective for opening branches is to make profits and not necessarily financial inclusion. However, the model used by the authors lacks theoretical backing and therefore does not provide conclusive estimates of the relationship between financial inclusion and monetary policy.

Evans (2016) adopted the Vector Error Correction Model (VECM) to analyse financial inclusion and monetary policy effectiveness using panel data for 15 African countries: Algeria, Angola, Botswana, Cameroon, Ghana, Kenya, Libya, Malawi, Mali, Morocco, Namibia, Niger, Nigeria, Senegal and South Africa. The study used inflation as the proxy for monetary policy effectiveness and included money supply and interest rate as control variables alongside their measure of financial inclusion, the number of depositors with commercial banks (per 1,000

adults). Evans found evidence of a long run relationship between inflation and financial inclusion, however, the policy reaction to the positive financial inclusion shock was not significant and in the long-run, more than 45 percent of variations in policy effectiveness were explained by interest rate shocks. In addition, the Granger causality analysis revealed that there was a one-way causality from monetary policy effectiveness to financial inclusion. Based on these findings, the study concluded that financial inclusion is not a significant driver of monetary policy effectiveness in Africa, but rather that monetary policy effectiveness is the driver of financial inclusion. This study also lacks theoretical backing from which conclusive estimates of the relationship between financial inclusion and monetary policy can be drawn.

Lenka and Bairwa (2016) developed a structural model to estimate the effect of financial inclusion on inflation in 8 countries in the South Asian Association for Regional Cooperation (SAARC) (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka) using annual data for the period 2004 to 2013. The model was estimated using generalized least squares (GLS) estimation for Fixed Effects (FE), Random Effects (RE) and Panel-Corrected Standard Errors (PCSEs) models including a financial inclusion index constructed by the authors as one of the explanatory variables; the other control variables were the interest rate and exchange rate. The authors constructed their Financial Inclusion Index using financial access variables; geographic penetration (commercial bank branches per 1,000 km2, number of ATMs per 1,000 km2), demographic penetration (commercial bank branches per 100,000 adults, number of ATMs per 100,000 adults), and banking penetration (Outstanding loans from commercial banks (% of GDP) and outstanding deposits with commercial banks (% of GDP)). Their FE model estimated that a 1 percent increase in financial inclusion and the interest rate reduced inflation by 0.284 percent and 0.743 percent, respectively. Their results for the PCSEs model revealed that financial inclusion index and the interest and exchange rates were statistically significant and negatively associated with inflation with estimated coefficients of 0.015, 0.042 and 0.114 percent respectively.

In terms of monetary policy transmission mechanism, empirical estimates for South Africa suggest weak transmission of monetary policy impulses to the real economy. Using a structural VAR, De Vaal and Van Eyden (2012) estimated the effect of a shock to the monetary policy interest rate (repo rate) on the inflation rate to have a monetary policy lag of about 24 months (8 quarters). Gumata, Kabundi and Ndou (2013) used a Bayesian Vector Autoregressive model to investigate the channels of transmission of monetary policy shock in South Africa using data for the period 1990Q1 to 2012Q2. They found that the interest rate channel was the most important channel compared to the credit, interest rate, asset prices, exchange rate, and expectations channels. The prime overdraft and the three-month Treasury bill (TB) rates reacted contemporaneously by 0.43 percent and 0.38 percent, respectively to a one per cent rise in the repo rate. The effect on both rates was found to dissipate after only two quarters after the initial shock. In addition, the results revealed that the long-term interest rates were less responsive relative to the short-term rates.

The monetary policy transmission has also been found to be weak in the case of Mauritius. Tsangarides (2010) used a recursive VAR and a structural VAR to investigate the transmission mechanism of monetary policy on output and prices for Mauritius, using data for 1999–2009 and found evidence that a shock to the policy rate (repo rate) had a statistically significant effect on the headline CPI, but not on core CPI. The monetary policy shock had a small but statistically significant effect of 0.2 percent on inflation 4 quarters after the shock. Based on the difference in results depending on the measure of inflation, Tsangarides posited that different monetary policy rules should be considered depending on whether headline or core CPI is targeted; the Taylor-type rules would be more applicable for headline CPI, where the interest rate channel was found to be effective while the McCallum-type rules that target money supply could be more appropriate for core CPI.

Monetary policy transmission has also been estimated to be weak in Ghana. Kovanen (2011) and Akosah (2015) found evidence of pass-through of changes in the policy interest rate to the market interest rates (interbank and Treasury bill) in Ghana, and more so for the Treasury bill rates. Kovanen (2011) developed a structural model for the determinants of market and bank level interest rates to analyze the interest rate pass-through in Ghana for the period 2005 to 2010 and found that about one-half of the change in the policy interest rate (the prime rate) was reflected in the market interest rates with a month lag, while the long-term responses were more prolonged. The estimation results for the bank-level interest rates revealed that interest rates adjusted to changes in the market interest rates, but the speed was rather slow and the adjustment was incomplete in the long run. Akosah (2015) employed the VECM to estimate the effect of changes in the policy interest rate on market and bank level interest rates for the period 2002M1 to 2014M12 and found evidence of incomplete monetary policy transmission in both the short and long run. In the short run, the exchange rate shock had a larger influence on inflation than the policy interest rate which explained only 2.2 percent of the variation in CPI by the 12th month, and the commercial banks' lending rate provided relatively higher explanation to Variation in CPI than that emanating from the policy interest rate.

Mugume (2011) and Montiel (2013) found evidence of weak monetary policy transmission in the case of Uganda, which they attributed to a shallow and underdeveloped financial sector. Mugume (2011) used a SVAR with quarterly data for the period 1999Q1 to 2009Q1 and found that monetary policy had an effect on inflation and output, but with weak transmission channels. The results indicated that the credit and exchange rate channels of monetary transmission were not effective and that the interest rate channel was weak. The impulse responses indicated that a monetary contraction caused a decline in both inflation and output but that there was no effect from, and on, the exchange rate. Shocks to M2 had no significant effect on output growth and inflation and monetary policy had no significant effect on private sector credit, although private sector credit innovations significantly raised inflation. Montiel (2013) employed a VAR to examine the strength of the monetary policy transmission mechanism for Uganda using monthly data for the period December 2001 to June 2011 and found no evidence of strong impacts of the bank lending transmission channel of monetary policy on aggregate demand in Uganda. Specifically, positive shocks to the monetary base

resulted in statistically significant effects on the exchange rate and bank lending rate but not on the price level and real GDP.

However, Davoodi, Dixit and Pinter (2013) estimated a SVAR model to investigate whether changes in monetary policy affect inflation and output in the EAC and found that interest rate increases in Uganda reduced inflation under a Factor-augmented VAR (FAVAR) more than in the simple Structural VAR or Bayesian VAR (BVAR). One of their key findings was that monetary transmission mechanism tended to be generally weak when using standard statistical inferences, but somewhat stronger when using non-standard inference methods. They observed that while recursive SVARs are the most widely used models for monetary policy transmission analysis, they potentially suffer from the problems of over-parameterization and misspecification, which may undermine the robustness of the empirical results. The Bayesian estimation techniques provide an effective treatment for problems of over-parameterization by the use of prior information and the FAVARs allow for the use of information contained in other variables while simultaneously reducing the number of parameters in the VAR. The BVAR and FAVAR assume a larger information set is being used by central bankers, which assumption Davoodi et al. considered to hold in the case of Uganda, which explained the difference in their findings from those of Mugume (2011).

Although a search in the literature returned only a handful of studies (Mehrotra and Yetman, 2014; Mbutor and Uba, 2013; and Evans, 2016) on financial inclusion and monetary policy transmission in developing countries, none of these, to the best of four knowledge has investigated whether the degree of financial inclusion affects the strength of monetary policy transmission. A more fundamental issue is that the studies include and model explicitly an indicator of financial inclusion, but as we have argued, financial inclusion a structural factor, changing only very slowly over time and cannot as such explain the variation in short term innovations in variables such as inflation and output. We therefore aim to address this gap in the literature. Moreover, studies on monetary policy transmission mechanism have largely utilised VAR models, possibly because of their obvious advantages in modelling time series data, but this does not impose any economic structure on the system, making economic interpretation of shocks awfully misleading. Li et al. (2016) adds nuance, casting doubt on the effectiveness of VARs to uncover even a strong monetary policy transmission mechanism where data problems, such as short time series, measurement errors in variables and the need to estimate output gaps, are prominent, as is often the case in developing countries. The fact that this paper considers two heterogeneous IT groups, the PVARs are particularly suited to analyzing the transmission of idiosyncratic shocks across units and time and do not necessitate specification of the entire structure of the economy (Canova & Ciccarelli, 2013).

2.3 Theoretical framework, Methodology and Data

2.3.1   Theoretical Framework

The underlying theory for our study is the New Keynesian model consisting of three equations: the aggregate demand (IS) curve, aggregate supply (Philips) curve and the Uncovered Interest Rate Parity (UIP) equation.

The aggregate demand curve for an open economy can be represented as:
$$y_t = \alpha_1 y_{t-1} + \alpha_2 r_t + \alpha_3 rer + \varepsilon_t^y \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (1)$$
Where y_t is output, r_t is the real interest rate, rer is the real exchange rate, ε_t^y is an aggregate demand shock and coefficients α_1, α_2 and α_3 are the persistence of output, impact of the interest rate on output and the impact of the exchange rate on output respectively.

The aggregate supply curve can be defined as:
$$\pi_t = \beta_1 \pi_{t-1} + \beta_2 y_t + \beta_3 rer + \varepsilon_t^\pi \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2)$$
Where π_t is inflation, ε_t^π is an aggregate supply shock and coefficients β_1, β_2 and β_3 are the persistence of inflation, impact of output on inflation and the impact of exchange rate on inflation respectively.

The uncovered interest rate parity equation that captures the relationship of the domestic economy with the rest of the world can be represented as:
$$S_t = \gamma_1 S_{t-1} + (i_t^* - i_t) + prem + \varepsilon_t^s \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (3)$$
Where S_t is the nominal exchange rate, i_t is the domestic nominal interest rate, i_t^* is the foreign nominal interest rate, $prem$ is the risk premium, ε_t^s is the exchange rate shock and coefficient γ_1 is the persistence of exchange rate movement.

The real exchange rate can be derived as $rer_t = S_t * \dfrac{1}{p}\left[\prod_{i=1}^n p_i^{w^i}\right]$ where p is the domestic consumer price index, p_i is the consumer price index of country i, w^i is the weight attached to country i in the basket of countries that trade most with the domestic economy and n is the number of trading partners. The interaction of equations 1, 2 and 3 in the model is the basis upon which we select our variables namely, consumer price index (CPI), nominal exchange rate, nominal gross domestic product (GDP) and the policy interest rate. Consistent with the New Keynesian theory, a methodology that allows for interdependence between variables is appropriate, and the PVARs, which allows for heterogeneous groups, is preferred.

2.3.2 Panel Vector Error Correction Framework

Following from Mehrotra and Yetman (2014), we employ a maximum-likelihood-based panel test for the cointegrating rank (Larsson et al., 2001), in line with the standard rank trace statistic of Johansen (1995) – to test the hypothesis that financial inclusion enhances the effectiveness of the interest rate monetary policy channel. We consider a panel data set of N fixed cross-sections, each observed over a relatively long T time periods. In the notations (hereafter), *i-* is the index for the cross-section while *t* is the index for time dimension and *p* is the number of

variables in each cross-section. Following Anderson et al. (2006), the Panel VAR, in general, takes the form:

$$\mathbf{y}_{it} = \left(y_{it1}, y_{it2}, \dots, y_{itp} \right)'$$

(4)

Where $\mathbf{y}$ is a $p \times 1$ vector of cross section i, in period t. If we suppose $\mathbf{y}_{it}$ follows non-stationary process, a heterogeneous panel VAR (k_i) model would be:

$$\mathbf{y}_{it} = \delta_i \mathbf{d}_t + \sum_{i=1}^{k_i} \Phi_{ik} \mathbf{y}_{i,t-k} + \varepsilon_{it} \quad ; \qquad i = 1, 2, \dots, N$$

(5)

Where Φ_{ij} is a pXp coefficient matrix, ε_{it} is Gaussian white noise with a non-singular covariance matrix $\varepsilon_{it} \sim N_p(0, \Omega_i)$, and d_t is a vector of deterministic components; that is d_t =1 or (1, t)', and δ_i is a $pX1$ or $pX2$ matrix of parameters. Thus $\delta_i d_t$ is a $pX1$ vector with the *j-th* element equal to δ_{1ij} or $\delta_{1ij} + \delta_{2ij}t$ representing the deterministic component of the model. The panel vector error correction (PVEC) representation for eqn. 5 then becomes

$$\Delta \mathbf{y}_{it} = \delta_i d_t + \Pi_i \mathbf{y}_{i,t-1} + \sum_{j=1}^{k_t-1} \Gamma_{ik} \Delta \mathbf{y}_{i,t-k} + \varepsilon_{it} \quad ; \quad i = 1, 2, \dots, N$$

(6)

Where each of the $(n \times n)$ matrices $\Gamma_{ij} = -\sum_{s=j+1}^{k} \phi_{is}$ for j=1, 2,..., (k-1) and $\Pi_i = -\left(I_m - \sum_{j=1}^{k} \phi_{ij} \right)$

comprise coefficients to be estimated by Johansen Fisher panel cointegration test, following Johansen's (1988) sequential procedure for a $(t = 1, \dots, T)$ sample of data, $j = 1, \dots, k_t - 1$ is the number of lags included in the system.

In the reduced rank form, it is possible to write the Π_i matrix in the form $\Pi_i = \alpha_i \beta_i'$ where α_i and β_i are both $(n \times r_i)$ and r_i is the rank of Π_i corresponding to the number of linearly independent relationships among the variables in $\mathbf{y}_{it}$, which neatly facilitates economic interpretation to the PVECM in eqn. 6. The r columns of β_i represents the co-integrating vectors that quantify the 'long-run' (or equilibrium) relationships between the p variables in the N cross-section and the r columns of error correction coefficients of α_i load deviations from equilibrium (i.e. $\beta_i' \mathbf{y}_{i,t-k}$ into $\Delta \mathbf{y}_{it}$ for correction, thereby ensuring that the equilibrium is maintained. The Γ_{ik} matrices in eqn. 6 estimate the short-run or transient effect of shocks on $\Delta \mathbf{y}_{it}$ and thereby allow the short and long-run responses to differ.

In this panel cointegration test, our assumption is that all of the N cross-sections have at most r cointegrating relationships, defined by the standard Log likelihood ratio (LR) - bar statistic

for panel cointegration rank test[9] among the *p* variables. Where $r > 1$, and is not a result of some stationary *p* (Harris and Sollis, 2003) in the panel, issues of identification arise, but these are sufficiently addressed by means of imposing over identifying restrictions (Pesaran and Shin, 1995b).

In this study, the panel data set consists of four (4) cross-sections observed over 2000Q1 to 2016Q4 time periods for South Africa, Mauritius, Ghana and Uganda and considers four variables across each of these countries, namely consumer price index (CPI), nominal exchange rate, nominal gross domestic product (GDP) and the policy interest rate.

2.3.3   The Data

The study uses quarterly unbalanced panel data for the period: 2000Q1 to 2016Q4 of four African countries that have adopted an interest rate based monetary policy framework. These four countries are split into two sub-panels on the basis of their levels of financial inclusion, as either high or low. The distinction is based on the number of deposit accounts in commercial banks or another type of financial institution, including credit unions, cooperatives, or deposit taking microfinance institutions per 1,000 adults of age 15 and older. Various measures of financial inclusion have been used in the literature, but for reasons related to data availability for all the four countries in our sample, we use the number of deposit accounts in commercial banks. We argue, as in the 2014 Global Findex database and in Demirguc-Kunt et al, (2015), that having an account is a marker of financial inclusion because it eases the cost of paying bills and making money transfers. Furthermore, a deposit account provides a safe place to store money and thus can encourage saving and it opens up access to credit from a financial institution. Our consideration of deposit accounts excludes mobile money accounts - consisting mobile phone based services, largely because in the case of Uganda mobile money primarily facilitates sending or receiving money and/or paying bills, and not saving and credit – services that are interest rate bearing. Over the period 2005 to 2015, the average deposit accounts in commercial banks per 1,000 adults in South Africa and Mauritius were 1,064 and 2,176, respectively and they were 381 and 168 in Ghana and Uganda, respectively. This informs our categorization of the two sub-panels, with South Africa and Mauritius constituting high financial inclusion sub-sample, while Ghana and Uganda constitute the low financial inclusion sub-sample.

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[9] $\omega_{L\bar{R}}\{H(r)/H(p)\} = \dfrac{\sqrt{N}\left(\dfrac{1}{N}\sum_{I=1}^{N}\left(-T\sum_{j=r_i+1}^{p}\ln\left(1-\hat{\lambda}_{i,j}\right)\right)-E(Z_k)\right)}{\sqrt{Var(Z_k)}}$ Where $\hat{\lambda}_{i,j}$ is the jth eigenvalue of the ith

cross-section, in a fashion as to the eigenvalue problem in Johansen (1995); $E(Z_k)$ and $Var(Z_k)$ are the mean and variance of the asymptotic trace statistic Z_k.

For each of these countries, we utilise quarterly country level time series data on nominal GDP, CPI, nominal exchange rate and the policy interest rate. The data on GDP, CPI, exchange rate and policy rate are obtained from the World Bank Development Indicators Database, while the data on the number of deposit accounts is from the IMF Financial Access Survey database. All the variables except the monetary policy rates were transformed into natural logarithms. The idea is that financial inclusion has a key influence on monetary policy effectiveness so that one can expect a higher impact of monetary policy in countries with a higher level of financial inclusion.

There are key issues to note regarding the data used in this study. Firstly, the varying time of adopting an interest rate based monetary policy framework. To reflect this, we include dummies for Uganda and Ghana for the period 2011Q2 to 2016Q4 and 2007Q1 to 2016Q4 respectively, i.e. $d_{it} = \begin{cases} 1 \\ 0 \end{cases}$; if the time corresponds to the period when the framework was in place, zero otherwise.

Secondly, there were significant structural changes including the change of the policy rate from a bank rate to a repo rate in Mauritius, for which we include a dummy that takes the value 1 from 2007Q1 to 2016Q4, and zero otherwise.

2.4 Econometric Results

2.4.1 Panel unit root tests

As a precursor to panel cointegration analysis, the four data series are formally tested for the order of integration or non-stationarity of panel units using panel unit root tests proposed by Levin, Lin, and Chu (2002). As shown in **Annex Table 1**, the panel unit root tests indicate that all variables are nonstationary in levels, but are stationary in first difference at the conventional 1 percent level of significance. This inference is held even when the panel is subdivided into high and low financial inclusion sub-panels.

2.4.2 Panel cointegration

On the basis of unit root test results in **Annex Table 1**, where all the 4-series are order one unit root non-stationary, they could, in principal, be cointegrated. The unrestricted 4-dimensional panel vector autoregressive (PVAR) model is estimated with a restricted constant. The choice of the lag- length was determined as the minimum number of lags that merits the crucial assumption of time independence of the residuals, based on a Lagrange Multiplier (LM) test. We began with k=5 lags. Although Akaike information criterion (AIC) and Hannan-Quinn criterion (H-Q) chose 4 lags, Schwarz information criterion (SC) favored 3 lags, and with k=3, the LM test could not reject the null hypothesis of no serial correlation in the residuals. Thus, the underlying PVAR model is estimated using 3 lags.

Having determined the appropriate specification of the data generating process, existence of long-run equilibrium relation (s) was determined using the Johansen Fisher panel trace

cointegration test; following Johansen's (1988) sequential procedure. The resulting test results are reported in **Annex Table 2.** Consistent with Evans (2016), collectively, the presence of one long-run equilibrium (stationary) relation among the variables at the conventional 5 percent level of significance cannot be rejected. However, at country level, there are varying inferences. While for Ghana and Uganda, there is one stationary long-run relationship, there are two for South Africa and none for Mauritius. Nonetheless, country level trace test inconsistencies are inconsequential to the analysis herein as the focus is not country specific relationships, but rather relationships in a panel framework.

As our objective in assessing whether the degree of responsiveness of prices to monetary policy differs with the extent of financial penetration, unless otherwise noted, the only existing cointegrating relation is normalized for the quarterly change of CPI in order to interpret the estimated coefficients. The normalized results are reported in **Table 3**.

Table 3: Panel Vector Error Correction Model Estimates

		LCPI	LEXR	LGDP	P_rate
All countries	β'	-1.000	**0.202**	**0.161**	**-0.025**
			(7.463)	**(5.776)**	**(-2.007)**
	α	-0.005	-0.005	**-0.073**	0.378
		(-0.801)	(-0.508)	**(-8.265)**	(1.168)
	Dum_UG	0.009	0.008	**0.063**	-0.305
		(1.001)	(0.578)	**(4.762)**	(-0.627)
	Adj. R^2	0.06	0.08	0.61	0.07
High financial inclusion countries	β'	-1.000	**2.495**	**0.733**	**-0.362**
			(3.101)	**(2.791)**	**(-4.544)**
	α	0.000	0.004	**-0.010**	0.146
		(0.062)	(0.913)	**(-6.166)**	(2.128)
	Dum_MAU	-0.007	-0.013	**-0.032**	-0.397
		(-0.741)	(-1.017)	**(-5.885)**	(-1.777)
	Adj. R^2	0.01	0.06	0.90	0.06
Low financial inclusion countries	β'	-1.000	**0.554**	**0.333**	**-0.052**
			(4.198)	**(4.808)**	**(-7.914)**
	α	0.015	0.041	**-0.157**	9.853
		(0.933)	(0.987)	**(-3.261)**	(6.420)
	Dum_UG	0.005	0.019	0.038	**2.759**
		(0.792)	(1.086)	(1.864)	**(4.209)**
	Dum_GHA	0.070	0.213	**0.725**	**0.631**
		(1.036)	(1.191)	**(3.498)**	**(6.285)**
	Adj. R^2	0.13	0.08	0.48	0.50

Note: In parentheses are t-statistic values; and where dummies are not significant, results are not reported.

Ceteris paribus, estimates in Table 4 show a positive long run correlation of nominal exchange rate and GDP with CPI and a negative association with the policy rate. In the long-run, estimates, for all the four countries, show that a percentage point q-o-q depreciation in the nominal exchange rate and increase in GDP lead to about 0.20 and 0.16 percentage point change in CPI, respectively. A percentage point increase in the policy rate reduces CPI, on average by about 0.03 percentage points, suggesting in general fairly strong interest rate transmission channel of monetary policy.

The high financial inclusion countries post a higher long run impact of exchange rate depreciation, GDP and policy rate on CPI of 2.50, 0.73 and -0.36 percentage points, respectively. The impact in the low financial inclusion countries is slightly lower than that of the high financial inclusion countries though higher than for all the four countries in the panel - with depreciation, GDP and policy rate impacts of 0.55, 0.33 and -0.05 percentage points, respectively on CPI. Overall, the policy rate has a higher impact on inflation (-0.36) in the high financial inclusion countries than in the low financial inclusion countries (-0.05). These results are largely consistent with the findings in Mehrotra and Yetman (2014), where the ratio of output volatility to inflation volatility was found to increase with the share of financially included consumers in the economy.

The dummies for Uganda (DUM_UGA) and Ghana (DUM_GHA), which capture the change in the monetary policy framework to Inflation Targeting in 2011Q2 and 2007Q1, respectively, are positive and significant. This suggests this has had a positive impact on monetary policy in the two countries over the sample period considered here. The change in policy rate from a bank rate to a repo rate in Mauritius, captured by DUM_MAU dummy has had a negative and significant impact on the country's GDP over the sample period considered here. Across all country groups, equilibrium in the event of disequilibrium is re-instated within the GDP equation, with an adjustment speed of 7.3, 1.0 and 15.7 percent, respectively.

Note however that these are partial derivatives (by construction) predicated on the *ceteris paribus* clause (Lütkepohl and Reimers 1992), and have been interpreted in this light. Where variables in an economic system are characterized by potentially rich dynamic interaction (as is the case here), inference based on 'everything else held constant' is both of limited value and may give a misleading impression of the short- and long-run estimates. Therefore, since what we want is to actually estimate what might happen to all variables in the system following a perturbation of known size in the policy rate equation, impulse response analysis, which describes the resulting chain reaction of knock-on and feedback effects as it permeates through the system, provides a tractable and potentially attractive value of the policy rate pass-through providing no other shocks hit the system thereafter (see Johnston and DiNardo, 1997). This is discussed in the next section.

2.5 Impulse Responses

The results of the policy rate shock are shown in **Figure 1**. Specifically, the figure shows the impact of a one standard deviation shock, defined as an exogenous, unexpected, temporary increase in the policy rate with a 95 percent confidence level on domestic price inflation in period one for all, high and low financial inclusion countries. The solid line in each graph is the estimated response while the dashed lines denote a two standard error confidence band around the estimate. Since the data are in first differences of logarithms, the impulse response functions need to be regarded as measuring a proportional change in the rest of the macro variables due to one standard innovation (at the initial period) in the policy rate.

Figure 1: Response to Cholesky One S.D. Innovations $\pm$ 2 S.E
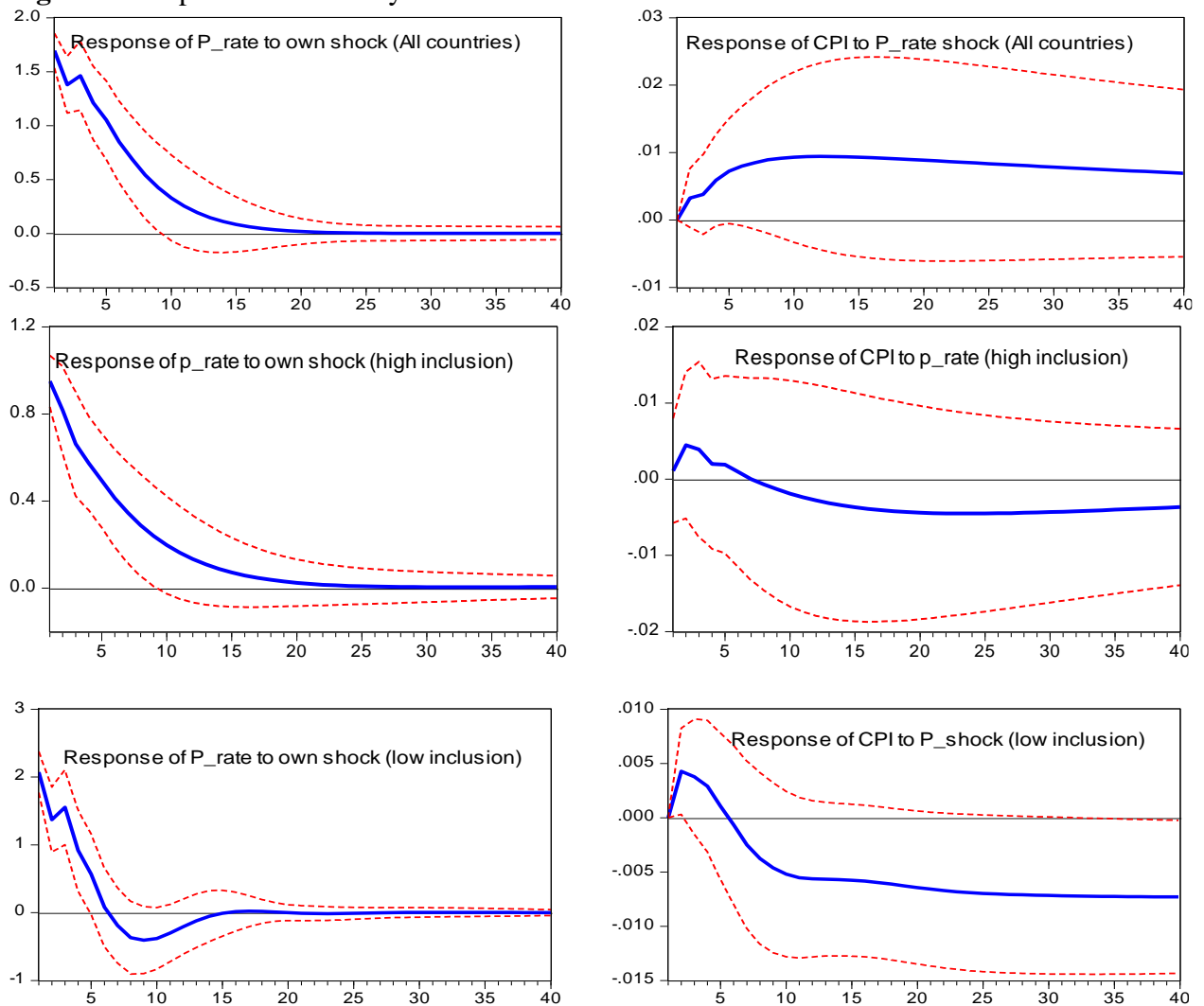
It is clear from the figure that the effect of a policy rate shock on CPI is gradual achieving stable inflation in about 4 to 8 quarters, depending on the level of financial inclusion. The initial effect of a structural one standard deviation shock to the policy rate on CPI, in the case of all countries is zero, but rises to 0.0019 (0.19 percent) in period 2. The impact of the shock

dissipates after the 8th quarter. For high financial inclusion countries, the initial impact of a structural one standard deviation shock to the policy rate on CPI is 0.001 (0.12 percent) and rises to a maximum of 0.005 (0.47 percent) in the 2nd quarter, thereafter it begins to dissipate. And it is 0.0003 (0.03 percent) for low financial inclusion countries category, rising to 0.001 (0.1 percent) in the second quarter, before dissipating thereafter.

Consistent with the PVECM results, the impact of policy shock is more pronounced for high financial inclusion countries, which suggests that economies with higher levels of financial inclusion have stronger monetary policy transmission mechanisms than economies with lower levels of financial inclusion. However, although the low financial inclusion economies display a weaker transmission mechanism, the speed of that mechanism is faster than in the high financial inclusion countries: a larger proportion of the overall impact of a monetary shock is felt in the first quarter after the shock in the low financial inclusion economies than in the high financial inclusion economies. This might reflect differences in the institutional structure of the two groups of countries which affect the pace at which prices change, for example, many prices (e.g. wages) in the more developed economies, which also have higher rates of financial inclusion, are determined through contractual arrangement, which makes them sticky in the short run.

2.6 Conclusion and Policy Implications

This study uses a Panel Vector Error Correction Model (PVECM) to examine the relationship between inflation, economic growth, exchange rate and the monetary policy rate for four African countries, from 2000 to 2016. The results broadly imply that the effect of tighter monetary policy, through higher interest rates, on inflation is negative and significant, in line with economic theory. Using the number of deposit accounts to distinguish between high and low levels of financial inclusion, we establish that the effect of monetary policy on inflation is greater for countries with a high level of financial inclusion. These results carry policy implications: that increased financial inclusion facilitates consumption smoothing and that it amplifies the effectiveness of interest rate transmission channel.

However, a caveat is in order. As shown in Tables 1 and 2, the share of the population holding bank accounts and saving with financial institutions, which are two important measures of financial inclusion, are correlated with other aspects of financial development, which also affect the monetary policy transmission mechanism, such as the level of financial depth and intermediation in the economy. As such, the stronger monetary policy transmission mechanism estimated in the high financial inclusion country sample might be the result of these other aspects of financial development, rather than only of financial inclusion. Higher levels of financial inclusion might strengthen the transmission mechanism of monetary policy by making private consumption expenditures more sensitive to changes in market interest rates. On the other hand, the level of private sector credit to GDP, rather than financial inclusion, is likely to effect the transmission of monetary policy through its impact on business investment expenditures. Unfortunately the research in this paper cannot distinguish between these

channels. Future research that includes other aspects of financial development could help to pinpoint with more clarity changes in monetary policy transmission that can be attributable to financial inclusion.

References

Agoba, M. A., Sare, Y. A., Bugri-Anarfo, E. (2017). Financial Inclusion and Monetary Policy: A Review of Recent Studies, *Ghana Journal of Development Studies*.
Akosah, N.K. (2015). Is the monetary policy rate effective?, Recent evidence from Ghana, *Graduate Institute of International and Development Studies Working Paper* no 14/2015.
Berg, Andrew, Milesi-Feretti, Karam Philippe and Laxton Douglas (2006). A Practrocal Model Based Approach to Monetary Policy Analysis-Overview, *Working Paper* WP/06/80, International Monetary Fund.
Bilbie, F. (2008). Limited assets market participation, monetary policy and (inverted) aggregate demand logic, *Journal of Economic Theory* 140(1), 162-196.
Buigut, S. (2009). Monetary Policy Transmission Mechanism: Implications for the Proposed East African Community (EAC) Monetary Union, Retrieved from http://www.csae.ox.ac.uk/conferences/2009-EdiA/paperlist.html
Canova, F., and Ciccarelli, M. (2013). Panel Vector Autoregressive Models: A Survey. *Working Paper Series* no. 1507, European Central Bank.
Cheung, Y-W., and Lai, K.S. (1993a). A Fractional Cointegration Analysis of Purchasing Power Parity, *Journal of Business and Economic Statistics* 11, 103-112,
_____. (1993b). Finite-Sample Sizes of Johansen's Likelihood Ratio Tests for Cointegration, *Oxford Bulletin of Economics and Statistics* 55, 313-328.
Clarida, Richard, Gali Jordi and Gertler, Mark (1999). The Science of Monetary Policy: A New Keynesian Perspective, *Journal of Economic Literature* 37(4), 1661-1707.
Colciago, A. (2011). Rule of Thumb Consumers Meet Sticky Wages, *Journal of Money, Credit and Banking* 43 (2/3), 325-355.
Davoodi, R. H., Dixit, S., and Pinter, G. (2013). Monetary Transmission Mechanism in the East African Community: An Empirical Investigation, *IMF Working Paper* WP/13/39, International Monetary Fund.
.Demirguc-Kunt, A., Klapper, L., Singer, D., and Van Oudheusden, P. (2014). The Global Findex Database: Measuring Financial Inclusion around the World, *Policy Research Working Paper*, World Bank.
De Vaal, Annari and Reneé van Eyden (2012). Monetary Policy and Inflation in South Africa: A VECM Augmented with Foreign Variables, *Working paper* no 316, Economic Research Southern Africa.
Di Bartolomero, G., and Rossi, L. (2007). Effectiveness of monetary policy and limited asset market participation: Neoclassical versus Keynesian effects, *International Journal of Economic Theory*. 3, 213-218.
Evans, O. (2016). The Effectiveness of Monetary Policy in Africa: Modeling the Impact of Financial Inclusion, *Iranian Economic Review* 20(3), 327-337.
Gali, J., Lopez-Salido, J. D., and Valles, J. (2004). Rule of Thumb Consumers and the Design of Interest Rate Rules, *National Bureau of Economic Research Working Paper* 10392.

Global Partnership for Financial Inclusion. (2016). Global Standard-Setting Bodies and Financial Inclusion: The Evolving Landscape. http://www.gpfi.org/sites/default/files/documents/GPFI_WhitePaper_Mar2016.pdf

Gumata, N., Kabundi, A., and Ndou, E. (2013). Important channels of transmission of monetary policy shock in South Africa, *South African Reserve Bank Working Paper* WP/2013/06. Pretoria. South African Reserve Bank.

Johansen, S. (1988). Statistical Analysis of Cointegration Vectors, *Journal of Economic Dynamics and Control* 12(2-3), 231-254.

_____. (1995). *Likelihood-Based Inference in Cointegrated Vector Autoregressive Models,* Oxford University Press, Oxford.

Johnston, J., and J. DiNardo (1997). *Econometric Methods*, 4th edition, Singapore: McGraw Hill.

Juselius, K. (2006). *The Cointegrated VAR Model: Methodology and Application*, Advanced Texts in Econometrics, Oxford University Press, Oxford.

Kovanen, A. (2011). Monetary Policy Transmission in Ghana: Does the Interest Rate Channel Work?, IMF *Working Paper* WP/11/275.

Larsson, R., Lyhagen, J., and L¿thgren, M. (2001). Likelihood-based cointegration tests in heterogeneous panels, *Econometrics Journal* 4, 109-142.

Lenka, K. S., and Bairwa, K. A. (2016). Does financial inclusion affect monetary policy in SAARC countries? *Cogent Economics & Finance* 4.

Levin, A., Lin, C. F., Chu, C-S.J. (2002). Unit Root Tests in Panel Data: Asymptotic and Finite Sample Properties. *Journal of Econometrics* 108, 1-22.

Lütkepohl, H., and Reimers, H. E. (1992). Impulse response analysis of cointegrated systems. *Journal of Economic Dynamics and Control* 16(1): 53-78.

Li, B-G., O'Connel, S., Adam, C., Berg, A., and Montiel, P. J. (2016). VAR meets DSGE: Uncovering the Monetary Transmission Mechanism in Low-Income Countries, *Working Paper* WP/16/90, International Monetary Fund.

Mishra, P., Montiel, P. J. and Spilimbergo, A. (2010). Monetary Transmission in Low Income Countries, *Working Paper*, International Monetary Fund.

Mbutor, M. O., and Uba, I. A. (2013). The impact of financial inclusion on monetary policy in Nigeria, *Journal of Economics and International Finance* 5(8), 318 - 326.

Mehrotra, A., and Yetman, J. (2014). Financial inclusion and optimal monetary policy, *Working Papers* No 476.

Mehrotra, A., and Yetman, J. (2015). Financial inclusion– issues for central banks, Bank for International Settlements, Quarterly Review (March).

Montiel. P. J. (2013). The Monetary Transmission Mechanism in Uganda, Retrieved from: *www.theigc.org/wp-content/uploads/.../Montiel-2013-Working-Paper.pd...*

Mugume, A. (2011). Monetary Transmission Mechanisms in Uganda, https://www.bou.or.ug/.../Monetary_Transmission_Mech...

Woodford, M. (2001). The Taylor Rule and Optimal Monetary Policy, *American Economic Review* 91(2): 232-237.

Sarma, M. (2008). Index of Financial Inclusion, *Indian Council for Research on International Economic Relations, Working paper* No. 215.

Sharma, S., & Chutoo, S. (2016). Assessment of the Effectiveness of Monetary Policy in Mauritius, *cmi.comesa.int/wp-content/uploads/2016/03/Mauritius.docx*

Svensson, Lars E. O. (1998). Open Economy Inflation Targeting, *Working Paper* 6545, National Bureau of Economic Research.

Tsangarides, M.C.G. (2010). Monetary policy transmission in Mauritius using a VAR analysis, *IMF Working paper* no. WP/20101/36, International Monetary Fund.

World Bank Financial Inclusion Database: http://datatopics.worldbank.org/financialinclusion/

Young, C. P., and Mercado, R.V. Jr. (2015). Financial Inclusion, Poverty, and Income Inequality in developing Asia, *Asian Development Bank Economics working paper series* No. 426.

Annex Tables

Table 1: *Panel unit root test results*

	Levin, Lin & Chu t* test		
Variables	Level	First difference	Inference
GDP_{it}	0.945 (0.828)	-2.452(0.007)	I(1)
CPI_{it}	-1.123 (0.131)	-4.773 (0.000)	I(1)
EXR_{it}	1.043 (0.852)	-11.534 (0.000)	I(1)
P_rate_{it}	-0.089 (0.464)	-11.579 (0.000)	I(1)

Notes: In parenthesis are p-values; T=264 for test in levels and N=4.

Table 2: *Panel cointegration rank Trace test*

	All countries	High financial Inclusion countries	Low financial Inclusion Countries
Hypothesized No. of CEs	Fisher Trace Stat.*	Fisher Trace Stat.*	Fisher Trace Stat.*
None	40.96 (0.000)	26.32 (0.000)	14.64 (0.006)
At most 1	22.24 (0.060)	14.03 (0.074)	8.205 (0.170)
At most 2	13.22 (0.105)	8.632 (0.104)	4.586 (0.333)
At most 3	9.692 (0.287)	7.380 (0.117)	2.312 (0.679)

Country by country Trace test Statistics

Country	$r = 0$	$r = 1$	rank
Ghana	53.392 (0.014)	29.112 (0.060)	1
Mauritius	39.649	18.3773	0
Uganda	48.041 (0.048)	22.4095	1
South Africa	78.780 (0.000)	23.685 (0.002)	2

In parentheses, in lower panel are probability values