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Credit Allocation Schemes: Perspectives from Credit Providers and Regulatory Regimes in Kenya

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Abstract

This study analyses the credit channel of monetary policy transmission via major credit providers in Kenya before and during interest rate controls. Focusing on the period 2009M3-2018m3 and employing a structural vector-autoregressive model, the study establishes whether controls on interest rates triggered a shift in credit allocation via a spectrum of providers; commercial banks, savings & credit cooperatives, and micro-finance banks. Findings show that the strength of policy signals in influencing credit allocation generally reduced, and the reductions varied from one provider to another. However, shares in total credit seem not to have changed substantially over time indicating no significant shifts in consumer preferences. A continued effort to review the interest rate capping rule is justified in improving overall credit allocation in the economy.

JEL classification: C32 ; E51 ; E58 ; 011

Keywords: Credit channel, Monetary Policy Transmission, SVAR, Interest rate controls

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All views expressed in this paper are his and any errors and omissions are fully owned.

1.0 Background

The credit channel of monetary policy transmission emphasizes how asymmetric information and enforcement of contracts create agency problems in financial markets. It is primarily analysed through two avenues; the balance sheet (broad credit) and the bank-lending or narrow credit channel (Bernanke & Gertler, 1995; Ireland, 2010).[1]

The bank lending channel, which is evident in many developing economies with relatively underdeveloped capital markets, focuses on the possible influence of monetary policy actions on the supply of loans by depository institutions. Essentially, the bank-lending channel is predicated on the view that banks play a unique role in the financial system since they are well-equipped to deal with certain types of borrowers, especially small firms, where the problem of asymmetric information is significant (Mishkin, 1995; Bernanke & Gertler, 1995).

In theory, the proponents of the bank-lending channel (see Bernanke & Blinder, 1988; Mishkin 1995; Ireland, 2010) focused on the monetary base targeting framework of monetary policy through the banking system and assumed on one hand that, there is imperfect substitutability between credit and other financial assets in the banks' balance sheet, and on the other, between bank credit and other forms of financing on firms' and households' balance sheets. The imperfect substitutability enhances the effectiveness of the credit channel by ensuring that when the monetary authority / central bank takes undertakes a given policy stance, the accompanying open market operations result in desirable adjustments in bank reserves, which induce banks to also adjust their lending accordingly. This induces households' and businesses'/firms' to also alter their consumption and investment spending, affecting domestic demand, total demand and eventually output. In the bank-lending channel's foundational stage, Bernanke and Blinder (1988) hypothesized that (i) the income elasticities of credit demand and money demand are the same, and (ii) the interest rate elasticity of credit demand

1 Mishkin (1995) argues that analyses of the balance sheet channel require rich firm-level data that is mostly present in well-developed capital and financial markets.

equals that of credit supply, i.e. there exists some symmetry in the adjustment of bank credit due to changes in interest rates. A relaxation of, particularly hypothesis (ii) perhaps triggered by structural or policy changes such as the introduction of controls on interest rates, implies that bank- lending channel may not necessarily deliver desirable/anticipated credit outcomes (Kierzenkowski, 2005a; 2005b).

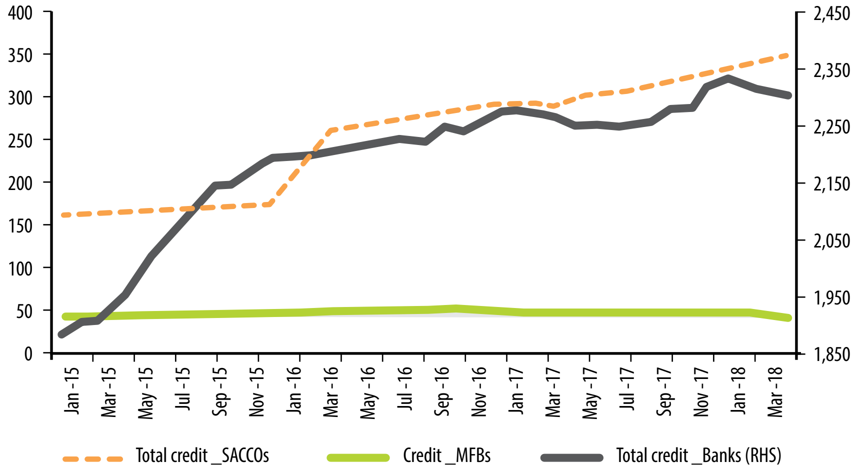
In empirical literature, the channels of monetary policy transmission are argued to depend largely on the institutional arrangements in the economy (Bernanke & Gertler, 1995; Mishkin, 1995, Ireland, 2010). In fact, Bernanke and Gertler (1995) and Ireland (2010) as well as Davoodi *et al.* (2013) content that major institutional changes can potentially render the bank-lending channel implausible, at least as traditionally conceived. Through time, the influence of Bernanke and Blinder (1988) propositions has been persistent with most of the analyses on monetary policy transmission primarily focusing on the bank lending channel. However, the majority of the past studies focus on the developed markets, with particular emphasis on prices and little on quantities (Sichei & Njenga, 2010; Davoodi *et al*., 2013). For developing markets, there are arguments that monetary policy signals are best transmitted through quantities rather than prices, attributed largely to weak institutional frameworks, oligopolistic banking structures, shallow financial markets, and widespread central bank interventions (Sichei & Njenga, 2010; Christiano *et al*. 2010; Mishra *et al*., 2010).

A number of studies have been conducted on monetary policy transmission in Kenya (see Cheng, 2006; Buigut, 2009, 2010; Misati *et al.*, 2010; Sichei & Njenga, 2010; Davoodi *et al*., 2013 and Mwega, 2013). These studies sought to examine the impact of monetary policy on its ultimate targets- inflation and output and provided hardly any analyses of the dynamics along the path of transmission. However, Sichei and Njenga (2010) using bank-level data (2001-2008) provided an in-depth analysis, via a 3-stage least squares methodology, of the bank lending channel focusing on whether the monetary policy had differential effects on banks and, whether the credit channel was more operational through loan demand or supply. Findings indicated strong evidence for the bank lending channel as banks were found to contract loan supply in response to monetary adjustments, thus reflecting credit rationing schemes. However, it is unlikely that the parameters that upheld this conclusion have not changed particularly after the interest rate determination framework was reviewed in late 2016.

Kenya's credit market continues to be dominated by banks, but other providers have emerged-particularly the MFBs and SACCOs. One feature in the trend of bank credit is the deceleration in credit post-September 2015 and a further slowdown from the end of 2016. There also seems to a stronger pick-up in SACCO credit from January 2016 onwards, perhaps an indication of consumer substitution of the source of credit out of banks (Chart 1). The share of banking sector credit in total financial sector credit declined steadily from

91.0 per cent in September 2015 to 85.5 per cent by March 2018. The decline reflects the growth of credit extended by other financial institutions –mainly SACCOs, as MFBs' credit remained largely unchanged (Chart 2).

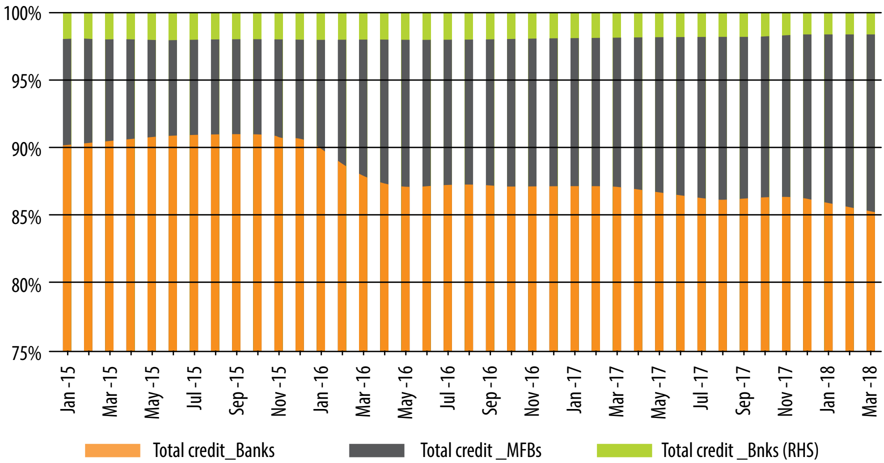
Chart 1: Trends in Credit Expansion via Banks, SACCOs and deposit-taking MFBs (Ksh. Billions)



Source: CBK, SASRA and AMFI

Lending models employed by these credit providers are characteristically different particularly with regard to pricing of risk. While banks face information asymmetry in lending, SACCOs, are by their institutional arrangement members' clubs with clear rules of lending known to both lenders and borrowers. The latter have a clearer framework of collateralizing the loans and the collateral perfection process is much easier and better understood by both the *agents* and *principals* in the lending contract. In between the banks and SACCOs are the MFBs that serve a better-understood clientele, based on risk characteristics, than that faced by banks. Despite this differentiation, some of the overarching features that characterise the financial sector in Kenya include the relatively weak legal and institutional arrangement for enforcement

Chart 2: Shares of Credit Extended (%)



Source: CBK, SASRA and AMFI

of contracts which has partly made the supply of loans collateral-centred, with lending rates that are sticky downwards. Such challenges justify the need to continue exploring potency of the credit channel of monetary policy transmission (Buigut 2010; Sichei & Njenga, 2010; Mwega, 2013). Currently, the preoccupying debate is on the decelerating private sector credit, which has largely been attributed to the interest rate capping law that has been operational since late 2016 (CBK, 2018).

Despite the fact that bank loans have traditionally been considered the main source of finance in Kenya, there are, however, arguments and indeed eyeball evidence from Charts 1 and 2, indicating that the non-bank financial intermediaries, such as SACCOs are gaining consumer preference (KNBS, 2018).[2] Against this information, could there be a chance that substitutability of bank credit with other forms of finance continues to grow against the foundational arguments of the bank-lending channel?. This draws

2 The KIHBS (2015/16) Report indicates that commercial banks are ranked 5th after merchant shops, self-groups / Chamas, relatives /friends, neighbours, and SACCOs as the preferred sources of credit.

some policy interest to review the impact of some of the key regulatory changes that have occurred in the financial system in Kenya-most importantly, the interest rate capping law that was instituted in September 2016 following an amendment of the Banking Act.[3] The law affected not only the interest incomes –on lending rates, but also the cost of funds- deposit rates. An introduction of interest rate controls, through its effects on the assessment of risk, may potentially tamper with Bernanke and Blinder's (1988) hypothesized equality of credit supply and credit demand interest rate elasticity. In fact, it is argued that in an environment of interest rate controls, bank lending does not focus on interest rate per se, but rather the spread between lending rate and bond rates. As banks explore the opportunity costs of lending to the private sector (whenever bond rates are attractive), the private sector may also opt to secure the necessary funding from alternative sources – thus triggering a shift out of bank credit. This has implications on the effectiveness of monetary policy since lending patterns from the alternative sources may have weaker links with overall monetary conditions in the economy (Kierzenkowski, 2004).

Based on the foregoing, this study analyzes the intervening adjustments in choices of consumers or suppliers of credit before credit affects economic growth and prices. Monetary policy transmission via the credit channel requires an established lending structure so that a policy move would impact on overall financial system reserves and thus credit allocation process. Banks are well-structured and positioned to appropriate this policy transmission since they are the primary participants in the open market operations (that operationalizes policy changes) and have the muscle to handle the entire economy's demand for credit. The question then is, what happens if there is a stronger (or growing) preference (by quantum and shares) of alternative sources of credit? Of policy interest is an empirical confirmation of this scenario, which has adverse implications on the effectiveness of monetary policy, especially if the alternative credit providers have limited capacity to serve a larger spectrum of the economy. Additionally, if the alternative credit providers are outside the regulatory armpit of the central bank, prudential assessment of systemic risks would be impaired.

This study broadly seeks to analyse credit expansion patterns via three main credit providers; Banks, SACCOs, and MFBs to empirically establish whether there have been significant shifts in consumer (borrowers) preferences from one provider to another and across two different interest rate regulatory regimes; before and during the interest rate controls. Changes in consumers' preferences are measured as revealed through credit uptake via these providers.

3 The law capped the maximum lending rate at a maximum of 4% above the Central Bank reference rate (actively the CBR) and the minimum deposit rate at 70% of the CBR.

Specifically, the study aims to answer two main questions:

- Did the interest rate capping law reinforce or weaken the credit channel of monetary policy via the varied credit providers?

- Is there evidence of asymmetric effects of credit expansion via the varied spectrum of credit providers (by quantum and shares)? And, did this structure change post interest rate capping? This provides evidence for, or against shifting consumer preferences across different credit providers and interest rate regulatory regimes.

2.0 Empirical Approach

Traditionally, monetary policy transmission mechanisms are analysed using a Vector Autoregression (VAR) approach pioneered by Sims (1980) because of its usefulness in dealing with short data series with evident instabilities and structural changes that make use of structural models implausible.

The approach treats every variable in a system as endogenously determined by a set of exogenous variables as well as the lagged values of other endogenous variables. The approach explicitly recognizes the simultaneity between monetary policy and macroeconomic developments (reaction function) as well as the dependence of economic variables on monetary policy (Dabla-Norris & Floerkemeier, 2006). Most studies in low-income countries as reviewed by Mishra *et al*. (2010) and Davoodi *et al.* (2013) have used structural recursive VAR that facilitates analysis of impulse responses and forecast error variance decomposition. The approach assumes a recursive relationship between errors of reduced form VAR.

This study analyzes, particularly, the first stage of the transmission of monetary policy signals to the intermediate variable - credit to the private sector. It examines the impact of central bank monetary policy signals (CBR and bank reserves adjustments) on lending patterns via banks, SACCOs, and MFBs using a recursive structural VAR assuming that the variables of interest are endogenously determined. The underlying assumption is that policy signals directly or indirectly influence the level of reserves held by these three institutions and thus their lending decisions. [4]

The variables of interest here include, the central bank policy rate (*CBR*) whose changes represent monetary policy impulses, real GDP

4 Effect of policy change on reserves of SACCOs and MFBs is assumed to be affected indirectly via changes in commercial banks' reserves.

(*RGDP*) and consumer price index (*CPI*) to control for macroeconomic shocks originating from other sources other than monetary policy, credit to private sector (via BANKS, SACCOs and MFBs) (*Credit*)[5], the nominal exchange rate (*NER*) to control for external economy conditions[6], the Nairobi Stock Exchange 20-share Index (*NSE*) to control for stock market developments, and bank reserves (*Reserves*) to capture availability of loanable funds and at the same time reflect the *de facto* stance of monetary policy. Specifically, the set of variables (all in logarithms except the CBR) in the VAR are jointly represented as follows:

$$X_t = [RGDP_t, CPI_t, CBR_t, \mathrm{Re}serves, Credit_t, NER_t, NSE_t] \qquad (1)$$

Transmission of policy signals via the three credit expansion channels (Banks, SACCOs and MFBs) are clearly mapped out through analyses of impulse response functions (IRFs) and forecast error variance decompositions (VDs), as proposed by Enders (2006).[7] Both IRFs and VDs are sensitive to the ordering of the variables in the VAR specification. The study employs theoretical arguments and the operational realities in the conduct of monetary policy in Kenya to guide variable ordering in our analyses, as in Model (1). *RGDP* is ordered first since it is assumed not to react contemporaneously to shocks from other variables in the system. Second is the *CPI*, which is assumed not to react contemporaneously to shocks from all other factors except RGDP. Third in the ordering is the short-term policy rate (*CBR*). Fourth in the order are *bank reserves* to capture the first host of policy shocks (operationalised via open market operations) in the credit channel as well as the source of shocks to reserves held by SACCOs and MFBs. Fifth is *credit* extended to the private sector (via Banks, SACCOs, and MFBs, used one at a time) which is placed after reserves because it is assumed that supply of loans by the private sector depends on the availability of funds via the credit providers.[8] Sixth in the order is *NER* since it is assumed to respond contemporaneously to shocks from all variables listed in the system, except NSE. The NSE index is ranked last assuming it responds contemporaneously to shocks from all other variables in the system.

This ordering is convenient to allow a loosening of monetary policy to be transmitted to credit expansion via the different credit providers. Analyses are

5 Credit represents a vector of credit extended to private sector via Banks, SACCOs and MFBs.

6 Since Kenya operates a floating exchange rate regime

7 This is done once multi-collinearity patterns have been dealt with via granger causality analyses (Enders, 2006)

8 Here, it is assumed that credit supply post capping of interest rates was constrained by the banking sector (that the law directly targeted) and not constrained by the alternative sources.

clustered in different interest rate regimes through a split of the sample periods into two; before and during interest rate controlled episodes. The following system of equations (2) represents the structural VAR specification of the model (1).

$$X_t = a_{i0} - \sum_{i,j=1}^{5} a_{ij} \bar{X}_t + \sum_{i,j=1}^{6} A_{ij} X_{t-p} + \varepsilon_t^X \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(2)}$$

where ε_t^X represents a vector of uncorrelated structural disturbances, the vector X_t represents a vector of endogenous variables excluding the variable set as the dependent variable, and *p* captures the appropriate lag length.[9] Since VAR models are estimated in their standard/ reduced form, this study considers a transformation of the above structural representation into a reduced form, by shifting the contemporaneous effects to the left-hand side of the respective equations. This in matrix form can be represented as:

$$AX_t = \Gamma_0 + \Gamma_1 X_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots \text{(3)}$$

Assuming that the inverse of A (matrix of coefficients capturing contemporaneous effects between variables) exists, then equation (3) can be represented as

$$X_t = A^{-1}\Gamma_0 + A^{-1}\Gamma_1 X_{t-1} + A^{-1}\varepsilon_t \ \ldots\ldots \text{(4)}$$

Which can further be simplified as

$$X_t = \alpha_0 + B_1 X_{t-1} + e_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(5)}$$

where $\alpha_0 = A^{-1}\Gamma_0, B_1 = A^{-1}\Gamma_1$ and $e_t = A^{-1}\varepsilon_t$. Equation (5) is a reduced-form representation of (3). The matrix e_t is a vector of reduced form disturbances, assumed to have zero mean, constant variance, zero auto-covariance and its variance-covariance matrix is given as $\sum_e = Ee_t e_t^{'}$.

Once consistent estimates of B_1, α_0 and $\sum$ have been obtained, the structural parameters can be recovered by pre-multiplying the reduced-form parameters by the non-singular matrix A. The structural disturbances are assumed to be uncorrelated with each other, implying that $\Sigma_\varepsilon = E\varepsilon_t\varepsilon_t^{'}$ is diagonal. The relationship between the structural disturbances e_t and the reduced-form disturbances e_t is described by $\Phi\varepsilon_t = Ae_t$.

9 For robustness, the optimal lag length of the VAR estimation is selected using five standard tests, namely sequential modified LR test (LR), Final Prediction error (FPE), Akaike Information Criteria (AIC), Schwarz Information Criteria (SIC) and Hannan-Quinn information criteria (HQ).

However, this model would be unidentified if restrictions are not placed on the parameters of A and Φ. This study proposes to identify the model using the recursive approach as proposed by Sims (1980), which requires that the matrix A is restricted to a lower triangular matrix with unit diagonal, and the matrix Φ is an identity matrix. This implies a decomposition of the variance-covariance matrix of the form given as $\sum_e = A^{-1}\Sigma_\varepsilon(A^{-1})^{'}$.
This is generated from the Cholesky decomposition $\sum_e = PP^{'}$ by defining a diagonal matrix φ which has the same diagonal as P and by specifying $A^{-1} = P\varphi^{-1}$ and $\Sigma_\varepsilon = \varphi\varphi^{'}$, i.e. the elements of the main diagonal of φ and P are equated to the standard deviation of the respective structural shock.

Since the objective of this study is to investigate how policy signals have impacted on the credit channels of monetary policy transmission via the three main providers, the study considers undertaking analyses using credit extended via the three providers, one at a time in quantum (in logarithms) as well as shares (percentages). The comparison of the results provides an indication of shifting preferences weighted by market shares across providers and two main interest rate regulatory regimes.

3.0 Data

The study uses monthly data spanning 2009m3 to 2018m3 of the following variables: RGDP (interpolated from quarterly data using the Cubic spline approach that preserves the underlying business cycles in the series), CPI, policy rate, credit to private sector (by Banks, SACCOs and MFBs), bank reserves, NSE index and nominal exchange rate.

While real GDP and CPI data is obtained from the Kenya National Bureau of Statistics, NSE index is picked from the Nairobi Securities Exchange, and monetary data on credit, bank reserves and the nominal exchange rate are collected from the Central Bank of Kenya databases.

As in many VAR studies, the analysis is done in level variables as recommended by Sims (1980) even when the variables contain a unit root. This is because the goal of the VAR analysis is to determine interrelationships among the variables, not parameter estimates. Differencing is known to throw away important information concerning the co-movements in the data such as the possibility of cointegrating relationships (Enders 1995). For normalization, all the variables (except the interest rates) are expressed in logarithms. Before estimation is carried out, data on real GDP, CPI and credit are seasonally adjusted using the *US Census X-12 (multiplicative option)*[10] approach popularly recommended in the literature, to remove the seasonal effects that would potentially bias results.

The critical steps involved in SVAR estimation process involve establishing the optimal lag structure of the VAR system. Once estimates of the SVAR have been generated, the stability of the system is tested by observing the sizes of the inverse roots of the lag polynomial so that stability is guaranteed if all the roots lie within the unit circle.

10 Multiplicative option is recommended particularly when the series involved carries a unit root.

4.0 Empirical Results

Figure 1 in the appendix shows the endogenous data used in the SVAR analysis. They conform to what is known about their evolution. Tables A1-A3 in the appendix show that the optimal lag length recommended (by a majority of the information criteria) for use across the three different credit models (via banks, SACCOs and MFBs) is at most 2 months.

In this regard, recursive SVAR estimates are generated using the recommended lag length. In each of the estimation, credit provided by the alternative sources is assumed to be exogenous-implying that the credit expansion models across the different providers would be directly unrelated.

To establish whether the interest rate capping law reinforced or weakened the credit channel of monetary policy transmission across the alternative credit providers, we split the sample period into two separated by the period when interest rates controls were introduced, i.e. September 2016. Then we estimate the bank-lending channel before and after caps, via each of the three credit providers. Figure 2 shows that the inverse roots of the characteristic polynomial for each of the three models of the recursive SVAR are less than unity-implying stability. We then proceed to compare the impulse response functions and forecast error variance decompositions of credit provided via the three channels. The models are estimated separately but each of the alternative credit providers' credit expansion behaviour is assumed to be exogenous.

Table 1 shows the effect of a 1% positive shock in the CBR on credit provided via the three alternative providers.[1] It is evident that in pre-interest rate controls period; the response of bank credit was stronger in magnitude at impact and over the full length of the transmission than SACCO credit and MFBs credit. It is established that 32.7 per cent

1 The rest of the results are not reported, but are available upon request.

of the variation (in this case reduction) in bank credit to the private sector would be accounted for by changes in the CBR. This would take effect about 1 month after the shock and would last up to the 2nd month. As a result of a 1 percentage point (or about 100 basis points) increase in the CBR, bank credit reduces by between (0.40-1.20 per cent). However, only 17.4percent and 18.5percent of the variations (reductions) in SACCO credit and MFBs credit to the private sector would be accounted for by changes in the CBR, respectively. This effect would be felt significantly 1 month after the policy change. In terms of the magnitude of changes, SACCO credit would reduce by between 0.36-0.80 per cent as MFBs credit would vary by a wider margin; between 0.04-1.68 per cent. These results are assessed on the basis of a 5 per cent level of significance. It is therefore established that there were differential reactions of the quantity of credit extended by the various channels to changes in monetary policy stance.

Table 1: IRFs and VDs of Credit (assuming a 1% positive shock on the policy Variable-CBR)
(Before and During Interest Rate Controls)

Variable	Measure	Transmission lag (Months)	Impact (%)	Variance Decomposition (%)
Before Interest Rate controls (2009M3-2016M8)				
Growth in Credit to private sector (via banks)	Volume (Decline)	1-2	0.40 - 1.20	32.7
	Share	1-6	0.08 – 0.16	19.5
Growth in Credit to private sector (via SACCOs)	Volume (Decline)	1	0.36 – 0.80	17.4
	Share	1-6	0.08 – 0.16	20.8
Growth in Credit to private sector (via MFBs)	Volume (Decline)	1	0.04 -1.68	18.5
	Share	1-6	0.08 – 0.16	17.0
During Interest Rate controls (2016M9 – 2018M3)				
Growth in Credit to private sector (via banks)	Volume (increase)	4	0.01 – 0.03	6.1
	Share (increase)	1-3	0.01 – 0.03	17.6

Variable	Measure	Transmission lag (Months)	Impact (%)	Variance Decomposition (%)
Growth in Credit to the private sector (via SACCOs)	Volume	(Not significant)		
	Share (decrease)	1	0.02 – 0.04	7.5
Growth in Credit to private sector (via MFBs)	Volume	1-2	0.04 - 0.11	8.7
	Share (No change)	(Not significant)		

Note: A 1% positive shock in the CBR and 1% positive shock in bank reserves are taken as monetary policy impulses in the period before and after caps were instituted, respectively. IRFs for credit based on quantities and shares are displayed in Figure 3 in the appendix.

Before interest rate caps, it is evident that there were minimal changes in the shares of credit to private sector extended by each of the providers following a monetary policy shock. This is indicated by the same magnitude of changes in the respective shares. However, the adjustments in the share of Sacco credit in total credit were slightly higher (at 20.8%) than banks credit (19.5%), as MFB credit reflected the smallest variation (17.0%) following a 1 % positive shock in the CBR.

In the period after interest rate caps were instituted, we acknowledge the fact that there was only one adjustment in the CBR (in September 2016); impeding a proper analysis of a monetary policy shock. In this regard and in recognition that monetary policy is operationalised through open market operations that directly impact on bank reserves, we assume that changes in reserves in the period would be consistent with the stance of monetary policy. In the post-caps period, therefore, a shock in the bank reserves is used as a monetary policy impulse.

From the results on the response of credit volume to a 1 per cent increase in bank reserves, bank credit adjusts, but only when assessed based on the 10 per cent level of significance. It is established that bank credit increases by between 0.01-0.03 per cent only after 4 months. Changes in bank reserves account for about 6.1 per cent of the variations in bank credit. This represents a much lower impact of monetary policy on bank credit during the period of interest rate controls. The adjustment in bank credit appears relatively higher than Sacco and MFB credit since the share of bank credit in total credit increases by about 0.01 to 0.03 per cent. Changes in bank reserves account for about 17.6 per cent of variations in the share of bank credit in total financial system credit.

Changes in bank reserves do not seem to cause a significant change in the volumes of credit extended by SACCOs, but do account for 7.5 per cent of changes in the share of Sacco credit in total market credit. This represents adjustments of between 0.20 to 0.40 per cent in the share of Sacco credit in total credit). It is also established that 8.7percent of variations in MFBs credit to the private sector is sensitive to changes in the monetary policy conditions; increasing by 0.04 to 0.11 per cent following a 1 per cent increase in bank reserves, after 1 month following the policy change. However, the share of MFBs credit in total credit does not seem to vary following changes in the monetary policy conditions.

5.0 Conclusions

This study aimed at establishing whether the interest rate capping law reinforced or weakened the credit channel of monetary policy, via the traditional banking channel as well as via its close alternatives – SACCOs and MFBs.

It is established that for banks, the transmission period has been delayed from 1-2 months to a lag of 4 months, and the impact of a policy change has been diminished. However, the share of bank credit in total credit does not seem to change substantially in the period under interest rate controls to warrant any policy attention.

The study also aimed at establishing whether there was evidence of asymmetric effects of credit expansion via the SACCOs and MFBs. Bank credit continues to respond to policy signals, albeit by much smaller margins. However, it is also established that Sacco credit lost its sensitivity to policy changes in the period under interest rate controls and the adjustments in its share in total credit accounted for by changes in monetary policy conditions also became smaller. MFBs credit volume continues to respond to policy signals but by smaller margins in the period under caps, and variations in its shares in total credit accounted for changes in policy conditions have also diminished.

Based on this study's findings, despite the fact that there are slower adjustments in credit (by time lags and magnitude of changes) following the institution of interest rate caps, these changes have not caused significant adjustments in the shares of credit provided through the banks, SACCOs and MFBs. This finding confirms the absence of shifting consumer preferences across different credit providers following the introduction of interest rate capping.

Banks continue to remain the primary source of credit with significant control of the total credit allocation process. In this regard, policies that affect bank credit have far-reaching implications on the economy-wide supply of credit. In this case, this study's conclusion re-establishes the need to review the constraints projected by the existing interest rate controls if a significant upturn in credit expansion is desired.

Appendix

Figure 1: DATA FOR THE SVAR

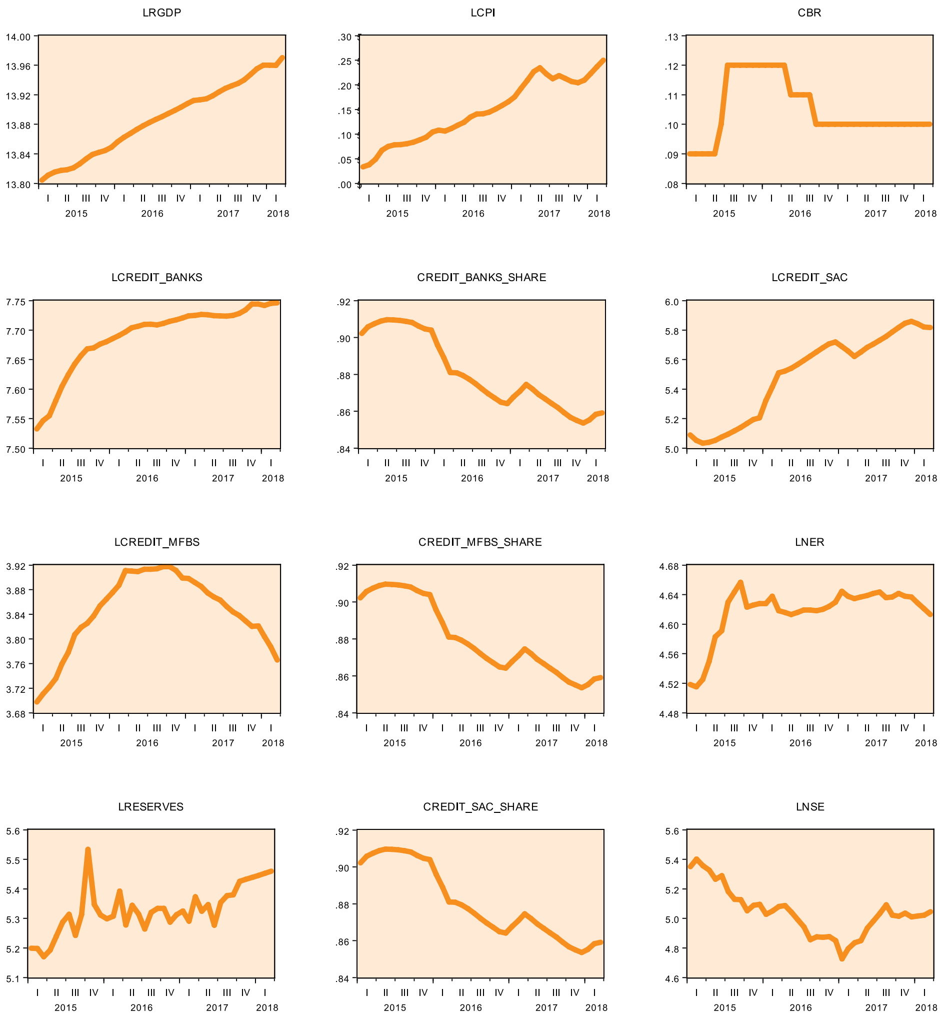


Table A1: Lag Selection (Bank credit Model)

VAR Lag OrderSelection Criteria						
Endogenous variables: LRGDP LCPI CBR LRESERVES LCREDIT_BANKS LNER LNSE						
Exogenous variables: C LCREDIT_MFBS LCREDIT_SAC LOIL				**Sample:** 2015M01 2016M08		
Date: 07/22/18		**Time:** 14:35		**Included observations:** 18		
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	438.4967	NA	3.86e-29	-45.61075	-44.22573	-45.41977
1	649.9457	164.4603*	2.14e-36*	-63.66064	-59.85183	-63.13545
2	2751.559	0.000000	NA	-291.7288*	-285.4962*	-290.8694*
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Table A2: Lag Selection (SACCO credit Model)

VAR Lag Order Selection Criteria

Endogenous variables: LRGDP LCPI CBR LRESERVES LCREDIT_SAC LNER LNSE

Exogenous variables: C LCREDIT_SAC LCREDIT_BANKS LOIL | **Sample:** 22015M01 2016M08

Date: 07/22/18 | **Time:** 14:38 | **Included observations:** 18

Lag	LogL	LR	FPE	AIC	SC	HQ
0	400.2545	NA	2.71e-27	-41.36161	-39.97658	-41.17063
1	548.7108	115.4660*	1.64e-31*	-52.41231	-48.60350	-51.88713
2	2871.832	0.000000	NA	-305.0924*	-298.8598*	-304.2330*

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

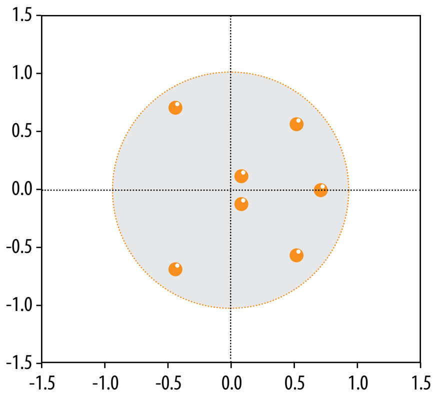
SC: Schwarz information criterion	
HQ: Hannan-Quinn information criterion	

Table A3: Lag Selection (MFB credit Model)

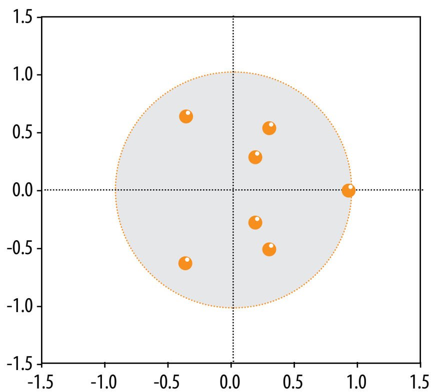
VAR Lag Order Selection Criteria			**Endogenous variables:** LRGDP LCPI CBR LRESERVES LCREDIT_MFBS LNER LNSE			
Exogenous variables: C LCREDIT_SAC LCREDIT_BANKS LOIL				**Sample:** 2015M01 2016M08		
Date: 07/22/18			**Time:** 14:39	**Included observations:** 18		
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	440.2764	NA	3.17e-29	-45.80849	-44.42347	-45.61751
1	577.4725	106.7081*	6.73e-33*	-55.60805	-51.79924	-55.08287
2	2848.733	0.000000	NA	-302.5259*	-296.2933*	-301.6665*

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

Inverse Roots of AR Characteristic Polynomial



Inverse Roots of AR Characteristic Polynomial



a) Bank Credit Model

b) Sacco credit Model

Inverse Roots of the Lag Polynomials

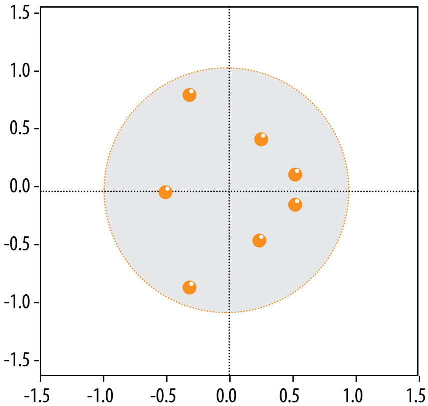
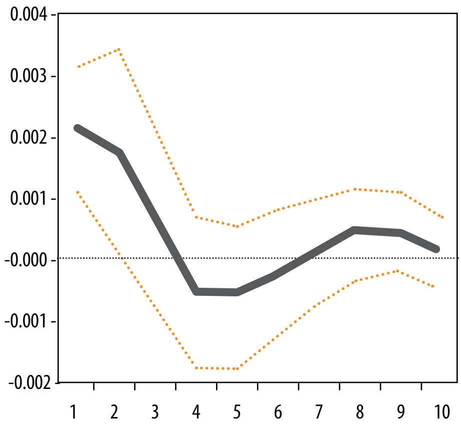
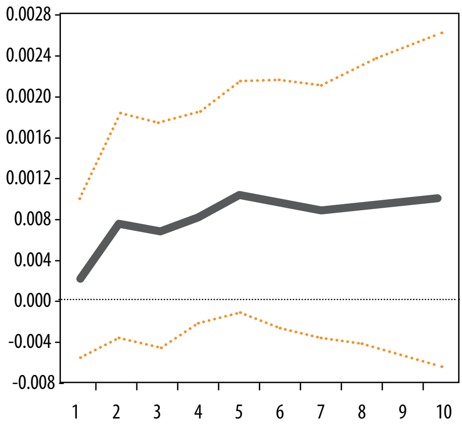


Figure 2: Inverse Roots of the Lag Polynomials

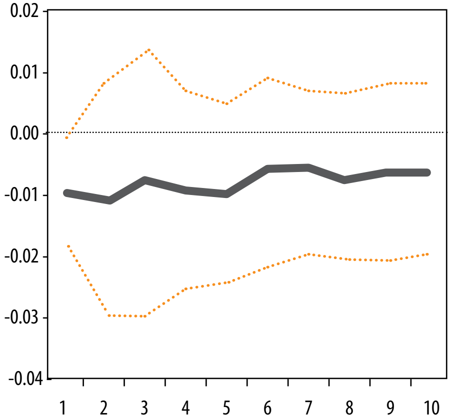
Response of LCREDIT_BANKS to Structural One S.D. Shock 3



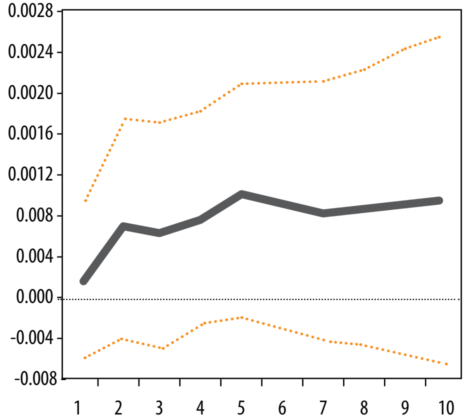
Response of LCREDIT_BANKS_SHARE to Structural One S.D. Shock 3



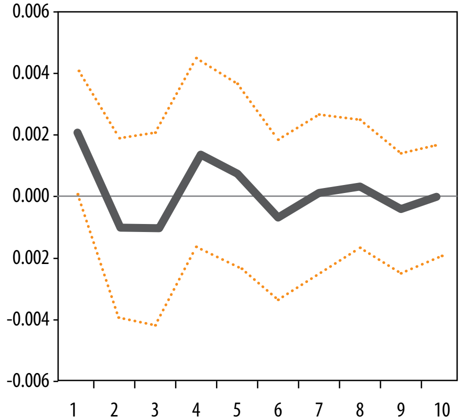
Response of LCREDIT_SAC to Structural One S.D. Shock 3



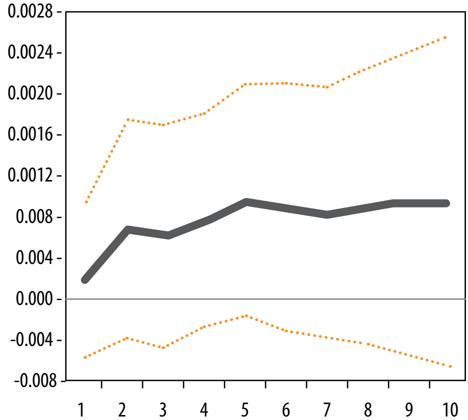
Response of LCREDIT_SAC_SHARE to Structural One S.D. Shock 3



Response of LCREDIT_MFBS to Structural One S.D. Shock 3



Response of LCREDIT_MFBS_SHARE to Structural One S.D. Shock 3



c) MFBs credit Model

Figure 3: IRFs of Credit following a 1std deviation shock in the CBR

Table A4: Forecast error variance decomposition of Bank Credit

Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7
1	0.001145	0.668091	48.70515	30.90470	0.735526	18.98653	2.04E-29	2.17E-31
2	0.001589	11.27952	39.02158	32.73813	3.003537	13.85301	0.102426	0.001799
3	0.001790	14.27070	39.81944	30.14259	3.133954	12.50402	0.103721	0.025574
4	0.001902	14.36088	40.29019	29.17818	3.534329	12.38307	0.213867	0.039477
5	0.001964	14.47455	38.88254	29.02462	3.406859	13.25736	0.916649	0.037417
6	0.001987	14.23006	38.32439	28.67141	4.000956	13.39455	1.339541	0.039092
7	0.002000	14.19117	38.33248	28.63267	4.018293	13.40536	1.381011	0.039016
8	0.002008	14.16591	38.05396	28.96504	3.997599	13.39841	1.378976	0.040101
9	0.002010	14.08401	37.82094	29.29724	3.968797	13.41245	1.376532	0.040019
10	0.002012	14.05633	37.77137	29.25422	4.076264	13.40801	1.393806	0.040004
Factorization: Structural								

Table A5: Forecast error variance decomposition of Sacco Credit

Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7
1	0.001082	0.931403	11.72884	17.36913	1.837939	68.13268	1.57E-30	3.97E-33
2	0.001571	1.340148	6.835340	22.41522	12.51048	56.68973	0.206509	0.002576
3	0.002136	1.116433	9.357729	24.25122	11.28557	53.06994	0.894578	0.024536
4	0.002592	1.378393	9.186163	28.52665	9.952521	49.37741	1.546147	0.032721
5	0.002936	1.272381	8.307844	33.02575	9.559589	46.26221	1.540380	0.031840
6	0.003224	1.755553	7.822207	33.43859	9.438081	45.92756	1.587677	0.030329

7	0.003450	1.833565	7.390935	33.82458	9.242548	46.07865	1.598776	0.030945
8	0.003643	1.811633	6.964984	34.91011	9.295824	45.42145	1.566525	0.029472
9	0.003820	1.814128	6.731485	35.53676	9.175436	45.10708	1.607051	0.028058
10	0.003974	1.776980	6.512001	36.20001	8.997395	44.84241	1.643652	0.027546
Factorization: Structural								

Table A6: Forecast error variance decomposition of MFBs Credit

Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7
1	0.001292	9.326512	0.000484	18.52741	10.49830	61.64729	2.02E-31	2.56E-32
2	0.001898	19.68423	5.167921	16.62164	14.29412	43.63993	0.327926	0.264233
3	0.002003	17.37458	11.00321	17.70363	14.65876	38.50912	0.511204	0.239504
4	0.002048	18.43595	10.43682	21.35858	13.51929	35.42994	0.529369	0.290053
5	0.002066	18.27828	10.36367	22.16160	13.31541	35.05321	0.521924	0.305897
6	0.002084	18.06937	10.13833	22.99954	13.60291	34.38152	0.508536	0.299790
7	0.002087	18.04871	10.14961	22.95261	13.66555	34.34043	0.513172	0.329921
8	0.002089	18.02700	10.11695	23.09088	13.75942	34.16493	0.512183	0.328635
9	0.002092	18.07393	10.06792	23.37274	13.69548	33.94967	0.508690	0.331584
10	0.002092	18.08285	10.05648	23.35873	13.74272	33.91209	0.509838	0.337295
Factorization: Structural								

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