THE INTERNATIONAL JOURNAL OF HUMANITIES & SOCIAL STUDIES

The Long-Run Analysis of Monetary Policy Transmission Channels on Inflation in Uganda (2000-2017): A VECM Approach

Sawuya Nakijoba
Research Fellow, United Nations Economic Commission for Africa, Ethiopia
Assistant Lecturer, Islamic University in Uganda Kampala
Lesego Selotlegeng
Research Fellow, United Nations Economic Commission for Africa, Ethiopia
Institute of Development Management (IDM) Botswana

Abstract:
In case of small open economy like Uganda, the conduct of monetary policy faces obstacles to achieve primary goals of price stability, due to high vulnerability to external shocks such as the changes in the international oil prices and weak policy frameworks. Therefore, this paper aims to analyze the effectiveness of monetary policy transmission channels in restraining inflation in case of Uganda for 2000-2017. The Augmented Dickey Fuller shows that all the variables with the exception of interest rate were non-stationary in levels.

The use of a Vector Error Correction Model yields evidence that money supply is the key determinant of high inflation. Additionally, the results suggest the exchange rate channel has a perverse effect on money supply there is also significant no causal relationship from exchange rate, interest rate ad private sector credit to inflation. However, empirical results fail to confirm the existence of relationship from exchange rate channel to any other variable.

The study recommends that the government should regulate money supply so as to reduce inflation. This is because inflation is found to granger cause interest rate and private sector credit

Keywords: *Inflation, Uganda, monetary policy transmission channels, VECM*

1. Introduction and Background to the Study

Monetary policy is viewed as the most important factor needed in the stabilization of the price. Monetary policy has the major responsibility for curbing inflation and currency instability and also can ensure long-term economic growth. The transmission mechanism of monetary policy reflects its impact and orients policy-makers to adjust it effectively. In some developing countries, there is a lack of standardized model to measure monetary policy effect because of monetary transmission process uncertainty which results from changes in economic structure (Tran ,2018).

An appropriate study of transmission process will assist National central/Reserve banks in implementing and fine-tuning monetary policies so as to achieve the intended national development goals necessary to promote economic growth and development. Moreover, since the inflation has been more challenging in case of developing economies like Uganda (Mishkin 2004), it is necessary to find out the most effective monetary transmission channel controlling inflation rate. Since 2011, Uganda has moved to inflation targeting just like Ghana, Mauritius, South Africa, Albania, Algeria, Dominican Republic, Jamaica, Guatemala, Croatia among others.

Inflation targeting (IT) has recently become the dominant monetary policy prescription for both developing and industrialized countries alike. Emerging market governments, in particular, are increasingly pressured to follow IT as part of their International Monetary Fund (IMF)-led stabilization packages and the routine rating procedures of the international finance institutions. Despite the registered success in controlling inflation**,** the inflation expectation is still highly sensitive to the increase in the price level. As such, the objective of controlling inflation is much more demanding to achieve a stable macroeconomic environment. In fact, the central bank of Uganda has implemented a contractionary monetary policy with the primary objective of price stability over the past few years.

The Bank of Uganda (BOU) introduced its inflation targeting (IT) monetary policy framework in July 2011, replacing a monetary targeting (MT) framework which had been in operation for two decades (BoU, 2017). In Uganda the IT frame work includes inflation, output, short term interest rate, secondary market operation, inflation forecast among others (Brownbridge and Kasekende, 2018). However, highly persistent inflation is still problematic. It is necessary to investigate the effectiveness of monetary policy transmission channels, and then to find out the solution to stabilize inflation in the long term and it is the

objective of this paper. Specifically, the study intends to ascertain whether there is a long run relationship among the set of monetary policy variables.

2. Theoretical and Empirical Literature Review

In theory, various researchers have debated about the influence of monetary policy on the economy over time. Most economists believe that monetary policy considerably affects economic growth and inflation in short term. To provide a more vivid explanation on the monetary policy transmission mechanism, Mishkin (2013) suggests the use of a structural model which captures the channels through which monetary policy decisions are transmitted to the real economy. There are a number of transmission channels of monetary policy, namely

2.1. The Traditional Interest Rate Channel (IRC)

This is the primary mechanism at work in conventional macroeconomic models, and hinges on the notion that the transmission of monetary policy depends on private expenditures being interest elastic. The basic idea is that given some degree of price stickiness, an increase in nominal interest rates, for example, translates into an increase in the real rate of interest and the user cost of capital – changes which in turn lead to a postponement in consumption or a reduction in investment spending and, hence, the output level and prices. It is important to note that, while the central bank on the contrary has direct hold only over the short-term nominal interest rate, effectiveness of monetary policy will depend on its ability to affect the real interest rate and the sensitivity of consumption and investment to changes in the price of intertemporal substitution. In this study interest rate was proxied by the 91 days' treasury bill. It is the short term (3 months) rate used by the central bank of Uganda

2.2. Exchange Rate Channel

This is an important element in conventional open-economy macroeconomic models. The chain of transmission here runs from interest rates to the exchange rate via the uncovered interest rate parity condition relating interest rate differentials to expected exchange rate movements. Thus, under floating exchange rate regime (like for Uganda) and perfect capital mobility, arbitrage between domestic and foreign short-term government securities causes incipient capital flows, which change the equilibrium value of the exchange rate required to sustain uncovered interest parity. With sticky prices, this change in the nominal exchange rate is reflected in a real exchange rate depreciation that induces expenditure switching between domestic and foreign goods. The effectiveness of this channel depends on the central bank's willingness to allow the exchange rate to move, on the degree of capital mobility, on the strength of expenditure switching effects (this depends on the commodity composition of production and consumption), on the importance of currency mismatches, and on the degree of exchange rate pass through. In this study we used the nominal effective exchange rate which is the units of Uganda shillings that can be exchanged for a unit of United States Dollar, that is UGX/USD

2.3. Money Channel

This channel effectively assumes changes in reserve money are transmitted to broad money via the money multiplier; that banks are in the business of creating inside money. The money view of monetary policy assumes aggregate demand and price levels moves in line with money balances used to finance transactions. It is this idea that forms the basis for broad money representing the intermediate target in many central bankers' money-focused monetary policies (Mishkin, 2004). We used the broad money supply (M2) in this study.

2.4. Credit Channel

Since Uganda's financial system is supposed to be bank-based, theoretical explanation is focused on bank lending channel. Bernanke and Gertler (1995) explain that tightening monetary policy reducing bank reserves would limit available amount of credit. Fewer loans are offered by bank system, meaning difficulty in funding investment and consumption. The relationship between the credit and interest rate channel is very close as lending rate is the key factor of credit amount. Hung and Pfau (2009) suggest that some part of credit is for private sector regardless of their financial positions. If credit is mainly provided without consideration of conducting monetary policy, the transmission mechanism via credit channel will be muted. This channel was proxied by the private sector credit

In reality, studies about the transmission mechanism of monetary policy in emerging markets also focus on these above channels. Though empirical results are varied, they are all useful in terms of policy amendment and interpretation. Arnostov_et al (2005) developed Vector Autoregressive (VAR) model to analyze the impact of monetary policy on Czech Republic economy as a case of small open economy. They suggest that there was a significant change in impact of exchange rate channel after regime shift from fixed exchange rate to inflation targeting and this is in line with the findings of Gerald Epstein & Erinc Yeldan (2008) about inflation targeting, employment creation and economic development: assessing the impacts and policy alternatives.

In general, there is a lack of conclusive evidence to find out which transmission channel of monetary policy plays a determinant role to control inflation. The difference between short-run and long-run effects of monetary policy also needs more considerations. To contribute to the literature on the assessment of monetary policy transmission channels in Uganda

particularly and small open economies generally, this study intends to analyze the dynamic effects of four main transmission channels of monetary policy by conducting Vector Error Correction Model (VECM).

3. Study Methodology

3.1. Data

Quarterly time series data on the Ugandan Macro-economic variables for the period 2000: QI to 2017: QIII is used in this study. All the variables were transformed into Natural logarithm before estimation to normalize them, reduce outliers and interpret as elasticities. The data were obtained from Bank of Uganda (2018) and Uganda Bureau of Statistics (2018).

3.2. Econometric Analysis

This study investigates the long-run analysis of monetary policy transmission channels on inflation in Uganda (2000-2017) using a VECM with the help of E-Views 9. A VECM is a restricted VAR model designed to test the cointegration in the system of I(1) series. The reduced-form of VAR model used in this study was adopted and modified form that of Tran (2018) and presented as follows:

$$Y_t = A_0 + \sum_{i=1}^{k} A_t Y_{t-i} + \emptyset X_t + \varepsilon_t \quad (1)$$

Where Y_t and Y_{t-i} are both (jx1) column vectors with j as number of endogenous variables, Yt includes observations at time t and Y_{t-i} includes i-th lagged value of endogenous variables. A_0 denotes a (jx1) vector of intercept terms, while Xt indicates an (mx1) column vector of m exogenous variables. ε_t is a (jx1) vector of disturbance terms. When I(1) variables are cointegrated, the VAR model can be expressed by first error correction form as below.

$$\Delta Y_t = A_0 + \pi Y_{t-i} + \sum_{i=1}^{k} A_i^* \Delta Y_{t-1} + \emptyset X_t + \varepsilon_t \quad (2)$$

where ΔYt is the first difference of Yt. π is coefficient matrix containing information on long-run relationship among Yt, and the rankπwritten as$\pi = \alpha\beta^1$ reflects the number of cointegrating relations (r). α and βare both (jxr) matrix. The coefficient α_i measures the speed of adjustment of ith variable towards the equilibrium, whileβi denotes the long-run estimator of that variable. Matrix A_i^* contains information on short-run dynamics in cointegrated system. The VECM has been a widely used tool in the analysis of monetary policy. There has been a large and growing literature of employing VECM to analyse the transmission channels of monetary policy in small open economy. For example, Mello and Pisu (2010) utilise VECM model to test the significance of bank lending channel in the transmission of monetary policy in case of Brazil. Their study reaches a conclusion of negative long-run relationship between loan supply and interbank deposit rate, implying that monetary policy has a significant impact on credit market by driving the borrowing rate faced by banks. Bhattacharya, Patnaik, and Shah (2011) take the sample of India as an emerging economy to find out the most effective channel through which monetary policy can control inflation. The authors suggest one cointegration between the exchange rate and price level. This means the exchange rate pass-through to domestic prices is statistically significant.

3.3. The Model

The group of endogenous variables Y includes the inflation rate (INF), interest rate (INR), the privates sector credit (PSC), the exchange rate (EXR) and Money supply (M2). The exogenous variable in this study is the international oil price (OILPX). It was used because Uganda is vulnerable to oil price as a result of oil importing nation. Rise in oil price can cause cost-push as well as imported inflation when costs of production and raw materials are higher. Moreover, increase in imports price together with high inflation may devalue Uganda's shillings. For those reasons, the inclusion of oil price as an explanatory factor is reasonable. OILPX affects other domestic variables Y, but there is no reverse impact of the latter on the former. It is a reasonable assumption of model for small economy like Uganda. Y= (INF, INT, PSC, EXR, M2) and X= (OILPX)

3.4. Unit Roots Test

The unit root test should be carried out before running the model to avoid spurious regression, as Brooks (2008) insists. A variable is considered to be stationary if the null hypothesis of a unit root is rejected. A time trend should be included, because the exchange rate and oil price seem to steadily rise over time. The standard Augmented Dickey-Fuller (ADF) and the Philip Peron (PP) unit root test will be used to examine the stationary properties for the long run relationship of the times series variables. The Augmented Dickey-Fuller (see Dickey and Fuller, 1979) test is based on the following equations:

$$\Delta Y_t = \alpha_0 + \beta_t + \alpha_1 Y_{t-1} + \sum_{j=1}^{k} d_j \Delta Y_{t-j} + \varepsilon_t \quad (3)$$

Where: ε is the white noise error term, Δ is the first difference operator, Y is the times series, α_0 is the intercept and k are the optimum number of lags of the dependent variable. Imposing the constraints that alpha and beta are equal to zero corresponds to modelling a random walk and using the constraint beta is equal to zero corresponds to modeling a random

walk with a drift.The variable is said to be stationary if the value of the coefficient α_1 is less than the critical values from ADF table.

3.5. Optimal Lag Length

In practice, when choosing the optimal lag-length (the lag at which the residuals are free from serial correlation), we want to reduce the number of lags as much as possible to get as simple a model as is possible, but at the same time we want enough lags to remove autocorrelation of the VAR residuals. The appropriate lag-length (ρ) of the VAR is chosen using the Akaike (AIC), Schwarz Bayesian (SBC) and Hannan Quinn (HQ) information criteria. These criteria have the same basic formulation, i.e. derive from the log likelihood ratio (LR).

	LINF	**LIR**	**LM2**	**LPSC**	**LEXR**	**LOILPX**
Mean	4.533809	2.312012	8.331890	8.024461	7.683566	4.031488
Median	4.510153	2.292660	8.416823	8.133119	7.596327	4.060067
Maximum	5.096762	3.096494	9.556724	9.415534	8.191777	4.804222
Minimum	4.029136	1.323312	6.922527	6.293926	7.326216	2.961392
Std. Dev.	0.358474	0.402574	0.834301	1.019755	0.248099	0.532659
Skewness	0.144242	-0.175429	-0.132045	-0.094794	0.708268	-0.209558
Kurtosis	1.506568	2.740236	1.587965	1.533786	2.299886	1.847215
Jarque-Bera	6.844288	0.563795	6.104778	6.466109	7.386171	4.451022
Probability	0.32642	0.754351	0.047246	0.39437	0.24895	0.108012
Sum	321.9004	164.1529	591.5642	569.7367	545.5332	286.2356
Sum Sq. Dev.	8.995236	11.34460	48.72404	72.79304	4.308728	19.86082
Observations	72	72	72	72	72	72

Table 1: Summary of Descriptive Statistics

Descriptive statistics for all variables are provided above with the number of observations being 72. They are defined in logarithmic form. There is a small deviation between the mean and the median hence most of the variables were normally distributed.

The unit root test should be carried out before running the model to avoid spurious regression, as Results of Augmented Dickey Fuller (ADF) and Phillips Perron (PP) unit root test yield a fairly similar result. All variables are integrated of order one I(1), except the case for interest rate

	Levels				**First Difference**				**Order of INT**
Variables	intercept		Inter& trend		intercept		Int & trend		
	Test stat	5%	Test stat	5%	Test stat	5%	Test stat	5%	
INFL	-0187	-3.528	-2.197	-3.476	-6.464	-2.904	-62.197	-3.476	I (1)
EXR	-0.047	-2.904	-2.021	-3.476	-6.464	-2.904	-6.460	-3.476	I (1)
M2	-1.219	-2.903	-0.833	-3.474	-9.311	-2.904	-9.480	-3.475	I (1)
IR	-3.30	-2.905	-4.988	-3.477					I (0)
PSC	-1.503	-2.902	-2.422	-3.474	-8.182	-2.904	-8.159	-3.475	I (1)
OILPX	-1.642	-2.902	-1.206	-3.475	-6.840	-2.904	-6.905	-3.476	I (1)

Table 2: ADF Unit Root Results

3.6. We Fail to Reject the Null If the Test Statistics of the ADF > 5% Critical Value

All variables (except the case for interest rate) are integrated of order one I (1). They turned stationary upon first differencing. Interest rate was stationary in levels hence I (0). It is important to note that regression of nonstationary series results into spuriousness

3.7. Determination of Lag Length for the VAR

The reduced form / traditional VAR is not economically intuitive hence estimated coefficients are not interpreted with economic sense. They are spurious with high R-Squared and very high t- ratios. Instead the results from this VAR aids us to get an appropriate VAR specification in terms of the number of lags. We used the Akaike information criterion (AIC), Schwarz information criterion (SBC) and the Hannan-Quinn information criterion (HQ)

Lag	LOGL	LR	AIC	SBC	HQ
0	166.9687	NA	-4.685634	-4.356575	-4.555424
1	552.9716	691.3484	-15.46184	-14.31013*	-15.00611
2	590.0974	60.95279	-15.82380	-13.84945	-15.04255*
3	617.2534	40.53137	-15.88816	-13.09116	-14.78138
4	647.0207	39.98589*	-16.03047*	-12.41082	-14.59817

Table 3: Optimal Lag Length

The criteria are based on different penalties hence they choose different lags. The SC chooses 1, the AIC chooses 4 while the HQ chooses 2 lags. SBC is preferred since it is superior. The study then tested for serial correlation in the residuals that is, the number of lags at which the residuals are free from serial correlation.

Lags	LM-Stat	Prob
1	43.71686	0.0117
2	39.77710	0.0307
3	30.28426	0.2138
4	22.23252	0.6223

Table 4: Serial Correlation LM Test

We find that either at lags 2 or lag one, there is no problem of serial correlation in the residuals. Since SBC is superior than the rest, this study uses 2 lags. Having found out that at lag 2, residuals are free from serial correlation, the study tests for the residual heteroscedasticity to ascertain whether the residuals are free from the problem of heteroscedasticity. The VAR Residual Heteroskedasticity Tests with no Cross Terms indicates that the chi square value is 387.8 with the probability of 0.156. This means that we fail to reject the null hypothesis that residuals are not heteroscedastic.

3.8. Johansen and Juselius Cointegration Test

Having obtained the optimal number of lags and confirming that most series are Non-stationary, the Johansen Co-integration test is used to find out the long run relationship between the study variables. The method was preferred to the Engle -Granger method which assumes single equation because of the nature of the variables in this study. All the Variables are endogenous with the exception of international oil price.

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.463639	126.9317	69.81889	0.0000
At most 1 *	0.424615	84.57121	47.85613	0.0000
At most 2 *	0.377000	46.98649	29.79707	0.0002
At most 3	0.135854	14.80831	15.49471	0.0633
At most 4 *	0.069242	4.879379	3.841466	0.0272
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.463639	42.36045	33.87687	0.0039
At most 1 *	0.424615	37.58472	27.58434	0.0019
At most 2 *	0.377000	32.17817	21.13162	0.0010
At most 3	0.135854	9.928934	14.26460	0.2166
At most 4 *	0.069242	4.879379	3.841466	0.0272

Table 5: Johansen and Juselius Cointegration Test Results
*Note: * Indicate That the Null Hypothesis Is Rejected at the 5% Level*

Both the trace and the Max Eigen values indicate that there are 3 cointegrating eqn(s) at the 0.05 level. This means that there is a long run relationship.

3.9. Vector Error Correction Model (VECM)

The existence of cointegration lead us to conducted a Vector Error correction model (VECM). The VECM to help us see the short run dynamics of the model. It enables us determine the speed of adjustment from short run to long run equilibrium. They directly estimate the speed at which a rate returns to equilibrium after a change in other variables.

Error Correction:	D(LINF)	D(LEXR)	D(LIR)	D(LM2)	D(LPSC)

CointEq1	-0.007135	-0.025688	-1.049270	0.022236	-0.281005
Std errors	(0.00848)	(0.03816)	(0.17295)	(0.02857)	(0.09853)
t-values	[-0.84128]	[-0.67318]	[6.06683]	[0.77826]	[2.85183]

Table 6: Vector Error Correction Model (Vecm)

The coefficient of the error correction term is -0. 0071 and it carries the correct(negative) sign and is statistically significant. When the inflation rate deviates from the equilibrium, its adjustment coefficient to bring it back to the equilibrium is 0.71 percent quarterly. In other words, 0.71 is the percentage of disequilibrium in the inflation rate that is correctly quarterly in Uganda.

After confirming the existence of co integration, the paper test for causality using the Granger Causality test.

Null Hypothesis	P-Value	Remark
EXR does not granger causes INF	0.7176	No granger causality
INF does not granger causes EXR	0.3653	No granger causality
IR does not granger causes INF	0.1030	No granger causality
INF does not granger causes IR	0.0304	granger causality
M2 does not granger causes INF	0.0029	granger causality
INF does not granger causes M2	0.1010	No granger causality
PSC does not granger causes INF	0.6458	No granger causality
INF does not granger causes PSC	0.0944	granger causality
IR does not granger causes EXR	0.4045	No granger causality
EXR does not granger causes IR	0.1485	No granger causality
M2 does not granger causes EXR	0.2543	No granger causality
EXR does not granger causes M2	0.0040	granger causality
PSC does not granger causes EXR	0.7785	No granger causality
EXR does not granger causes PSC	0.6270	No granger causality
M2 does not granger causes IR	0.9987	No granger causality
IR does not granger causes M2	0.4232	No granger causality
PSC does not granger causes IR	0.1359	No granger causality
IR does not granger causes PSC	0.0489	granger causality
PSC does not granger causes M2	0.9480	No granger causality
M2 does not granger causes PSC	0.0654	granger causality

Table 7: Granger Causality Test
Source: E-Views Output by the Author

From the table above, it can be seen that money supply causes inflation, inflation causes an increase in interest rate, exchange rate bids up money supply while private sector credit is caused by inflation, interest rate and money supply. The study found only a uni-directional causality across variables. It can be noted that exchange rate is not granger caused by any variable hence it is exogenous.

4. Conclusions and Policy Considerations

This paper investigates the effectiveness of four main transmission channels of monetary policy in controlling inflation in Uganda for the period from 2000 to 2017. It implements a restricted VECM to estimate the long-run impacts of the interest rate, exchange rate, money supply and private sector credit channels on inflation. The results can be summarized as follows. Majorly, this study supports the importance of money supply channel to inflation. Money supply is the key driver of inflation. We recommend the followings:

There is need to regulate money supply so as to reduce inflation. This is because the study confirmed the monetarists theory that inflation is always a monetary phenomenon.

Since the economy is undertaking an inflation targeting framework ever since 2011, the government should keep inflation at single digit. this can attract investment given the level of interest rate

This study supports the importance of private sector credit channel from inflation Expansionary credit is positively affected the inflation rate, implying that credit restrictions might perform as an effective end point of stabilized inflation. Credit is the key outcome of inflation, which raises concern about the level of investment efficiency hence there is need to control inflation

5. Acknowledgement

In the name of God, the Most Gracious and most Merciful, I wish to express my sincere gratitude to UNECA for giving me chance to be among the research fellows 2017/2018. I am also grateful to my supervisors Dr. Joseph Atta- Mensah, the principal policy advisor capacity development division. He gave me his most thoughtful professional help, ideas, suggestions and comments that have helped me to develop my skills during this research. I thank the director Dr. Stephen Karingi for the intellectual guidance offered during research fellowship. May God bless u all.

6. References

i. Abuka, C., Alinda, R.K., Minoiu, C., Peydro, J-L and Presbitero, A.F (2015) Monetary Policy in a Developing Country: Loan Applications and Real Effects, IMF working paper, WP/15/270
ii. Adam, C. and Walker, S.E.J. (2015), Mobile Money and Monetary Policy in East African Countries, University of Oxford
iii. Bernanke, B.S. and Gertler, M., (1995), Inside the black box: the credit channel of monetary policy transmission (No. w5146), National bureau of economic research
iv. Bernanke B., Gertler M. (1989), Agency costs, net worth, and business fluctuations, American Economic Review, American Economic Association, vol. 79(1), 14-31
v. Blanchard, O. 2004. "Fiscal Dominance and Inflation Targeting: Lessons from Brazil." NBER Working Paper Series 10389. Cambridge, MA: NBER
vi. Brooks, C. (2008) Introductory Econometrics for Finance. 2nd ed. Cambridge: Cambridge University Press.
vii. Bwire, T. (2018) Modelling and forecasting volatility in Financial markets using EViews, practical manual developed for COMESA central banks.
viii. Bwire, T., J. Opolot and F. L. Anguyo (2013), Exchange rate Pass- Through to Domestic Prices in Uganda: Evidence from a Structural Vector Auto-Regression (SVAR), Journal of Statistics and Econometric Methods 2(4), 41 – 68
ix. Enders, W. (2010) Applied Econometric Time Series. 3rd ed. New York: Hoboken, NJ: Wiley Chichester John Wiley
x. Fleming, M. 1962. "Domestic Financial Policies Under Fixed and Under Floating Exchange Rates." IMF Staff Papers 9: 369–380
xi. Gerald Epstein & Erinc Yeldan (2008) Inflation targeting, employment creation and economic development: assessing the impacts and policy alternatives, International Review of Applied Economics, 22:2, 131-144, DOI: 10.1080/02692170701880601
xii. Juselius, K. (2006) The Cointegrated VAR Model: Methodology and Applications, Advanced Texts in Econometrics, Oxford University Press, Oxford
xiii. Juselius (2003) The Cointegrated VAR model: Econometric Methodology and Macroeconomic Applications, manuscript
xiv. Kasekende, L. and Brownbridge, M., (2011), Post crisis Monetary Policy Frameworks in subSaharan Africa, African Development Review, 23(2), pp.190-201 Harris, R. and Sollis, R. (2005) Applied Time Series Modelling and Forecasting, John Wiley & sons Ltd
xv. Kateřina Arnoštová, Jaromír Hurník (2005), The Monetary Transmission Mechanism in the Czech Republic (evidence from VAR analysis) 1080/13547860.2018.1429199 CNB Working paper series
xvi. Martin brownbridge and louis Kasekende (2018). Inflation targeting in Uganda, what lessons can we learn in five years' experience, Oxford University Press
xvii. Mishkin, F.S., (2004), Can inflation target work in emerging market countries? (No. w10646), National Bureau of Economic Research
xviii. Montiel, P. (2013) The Monetary Transmission Mechanism in Uganda, S-43002-UGA-1
xix. Mugume, A. (2011) Monetary Policy Transmission Mechanisms in Uganda, Bank of Uganda Working Paper Series, BOUWPS/01/2011, Bank of Uganda
xx. Nampewo, D., Munyambonera, E. and Lwanga, M.M., (2013), Sectoral effects of monetary policy in Uganda, Journal of Statistical and Econometric Methods, 2(4), pp.17-40
xxi. Ngan Tran (2018) The long-run analysis of monetary policy transmission channels on inflation: a VECM approach, Journal of the Asia Pacific Economy, 23:1, 17-30, DOI: 10.
xxii. Opolot, J. (2013) Bank lending channel of the Monetary Policy Transmission Mechanism in Uganda: Evidence from Panel Data Analysis, Bank of Uganda Working Paper, BOUWPS 01/2013 Sims, C. (1980) Macroeconomics and Reality, Econometrical 48(1), 1-48
xxiii. Republic of Uganda, (2015), Ministry of Finance, Planning and Economic Development, Background to the budget Republic of Uganda, (2015), National Development Plan: Growth, Employment and Socio Economic Transformation for Prosperity
xxiv. Republic of Uganda, (2015), Ministry of Finance, Planning and Economic Development, Background to the budget Uganda Bureau of Statistics, (2015), Statistical abstracts