OPTIMAL MONETARY POLICY WITH OUTPUT AND ASSET PRICE VOLATILITY IN AN OPEN ECONOMY: EVIDENCE FROM KENYA.

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Objectives and main Results

- Estimates optimal weights employed against instability in output, inflation and asset prices
- Analyse optimal response of monetary policy to output, inflation and asset price volatility

Main results:

- Monetary authority should respond with greater weight to deviation of output from the target compared to deviation of asset prices and inflation from their respective targets
  - This maximises welfare
- Commitment to a monetary policy rule leads to higher welfare than discretion.

Data and Period

- Quarterly data from 2000 to 2016 June.
- Source: Kenya National Bureau of Statistics and Central Bank of Kenya.

Motivation

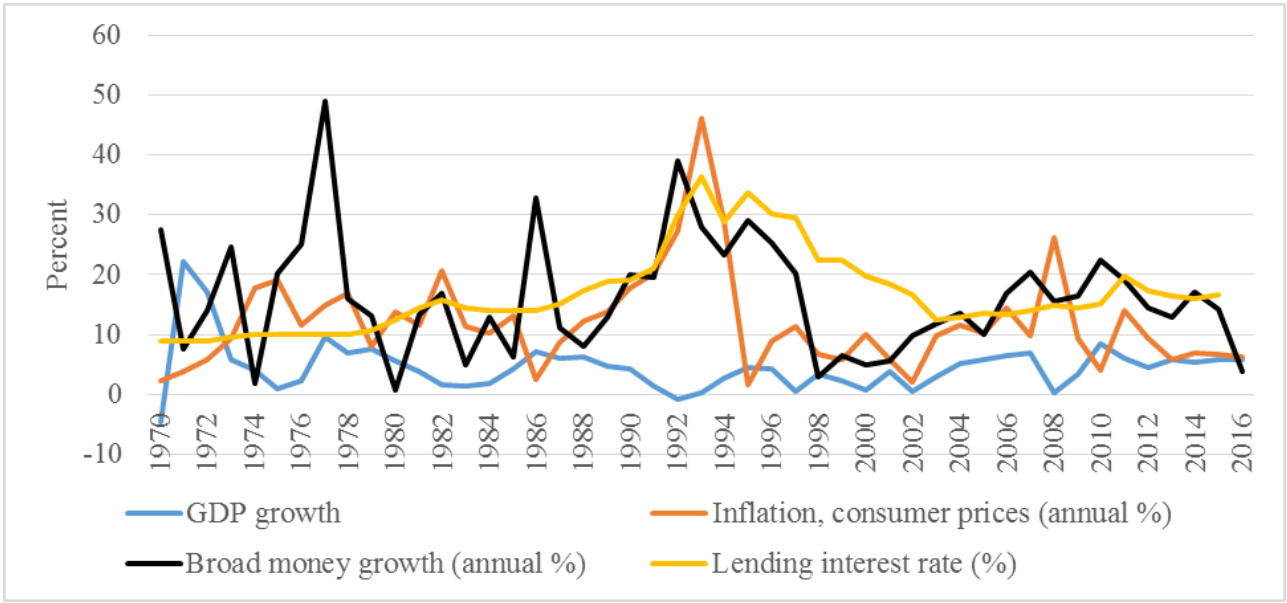
- Monetary authority in developing economies desire to hasten the rate of economic growth and maintain price stability simultaneously.
  - Stable prices are conducive for efficient allocation of resource in the economy, which is important for productive activities and growth
- However, low and stable prices, especially inflation, may be recessionary, due to high interest rate.
  - Asset price instability occur during or after extended period of low and stable inflation levels
  - In an small open economy with managed or floating exchange rate regime, monetary policy action aimed at stabilising output causes changes in exchange rate that undermine realising output stabilisation objective.

Motivation.....

So far the focus is on the effectiveness of monetary policy action against output and inflation and by extension exchange rate and rarely do asset price feature

- In light of competing and complementary monetary policy stabilisation targets, optimality of the monetary policy intervention is equally important
- Therefore:
  - There is need to establish weights employed by monetary authority against output, inflation and asset price instability
  - Establish optimal response monetary policy to output, inflation and asset prices

Monetary policy, Output, Inflation and Lending Rate in Kenya



Inflation rises after money growth for most years

Money growth and lending rate are counter-cyclical to GDP growth

- Suggesting that monetary policy can be used to stabilise output and inflation

Monetary policy, exchange rate and asset prices in Kenya

- Openness of the economy and substantial portfolio investment flows affect exchange rate
  - Nominal exchange rate movements influence price of imported goods and hence inflation
  - Foreign participation at the NSE

Why Kenya?

- Vibrant financial sector.
- Small open economy
- Kenya is an economic hub of East Africa.

Optimal Monetary policy in a small open economy

Several strands with respect to monetary policy intervention in the economy

- Laissez fair view: free market establish price that allocate resources efficiently
  - Monetary policy actions are distortionary
- Intervention view: Market economies are riddled with price distortions as a result of market power of agents and information asymmetry among agents during transactions
  - Prices in market economies are inherently unstable
- These undermines allocative and distributive functions of prices, compromising integrity of the market system and overal economic growth
- Therefore, monetary policy intervention is required for proper functioning of the market system and economic growth

Optimality of Monetary Policy Intervention/Reponse

There are competing monetary policy objectives and sometimes objectives may be complementary

- Discretionary
- Commitment to a rule

Few studies have investigated optimality of monetary policy actions
Optimal stabilisation with asset prices has not been accorded sufficient attention

Framework and Methodology

Optimal monetary policy action incorporates social objectives in the Central Bank's reaction function
The Central Banks takes the public's optimisation outcome as its objective function and it optimises accordingly
This results follow immediately that optimal monetary policy decision is the same the optimisation decisions of household and firms
The Central Bank maximises a social utility function or the quadratic loss function given the optimisation decisions of agents

- Therefore construction and estimation of the Central Bank reaction function based on optimisation decision of agents
- Maximising the quadratic loss function

Results

	Repo Rate	Repo Rate	Repo Rate	Repo Rate
	1	**2**	3	4
Output gap	-0.037*	-0.017**		
Output growth rate			-0.080*	-0.167*
Exchange rate	0.156*	0.138*	0.121*	0.165*
Equity prices	-0.015*	-0.012*	-0.004*	
Inflation	0.009	0.006	0.028*	0.011
Bond prices	0.0402*	0.003	0.007***	
Interest rate		0.312*	0.356*	0.383*
constant		2.080*	-0.068	
Volatility		0.005*	0.717*	
arch	2.205*	2.554*	2.383*	
garch	0.085*	0.003	0.122*	

Notes: In this regression the dependent variable is the deviation of repo rate from its trend, Output gap is the deviation of actual output from the potential output (the trend). Explanatory variables in the quadratic loss function are in deviation form. * 1%, ** 5% and *** 10%.

Implications of results..

Monetary policy intervention is intended to:

- Reduce volatility in the monetary policy objective variables: output, exchange rate, inflation, asset prices
  Response to output is counter-cyclical , therefore it is possible for monetary policy to stabilise inflation and output
  - Equity and bond prices are also stabilised, without prejudice to inflation and output stability
  - Significance of interest rate suggests that by changing interest rate, monetary policy is capable of achieving its objectives

Optimality of a monetary response: Optimal weights

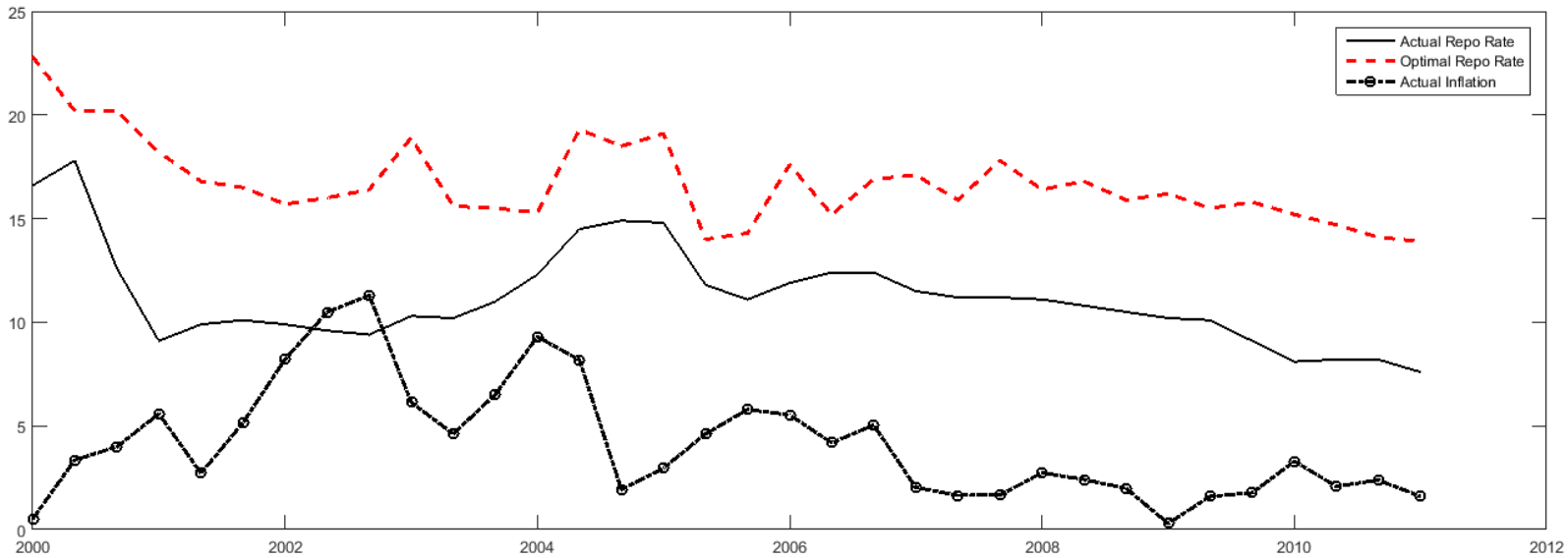
Table: **Quadratic Loss function**

Output growth rate	0.0965
Exchange rate	0.000
Equity prices	0.0221
Inflation	0.0358
Bond prices	0.0018
Interest rate	0.0223

- Output growth is prioritised, followed by inflation.
- Exchange has no weights. Intervention in the foreign exchange market reduces welfare, suggesting either a managed floating or free exchange rate regime.

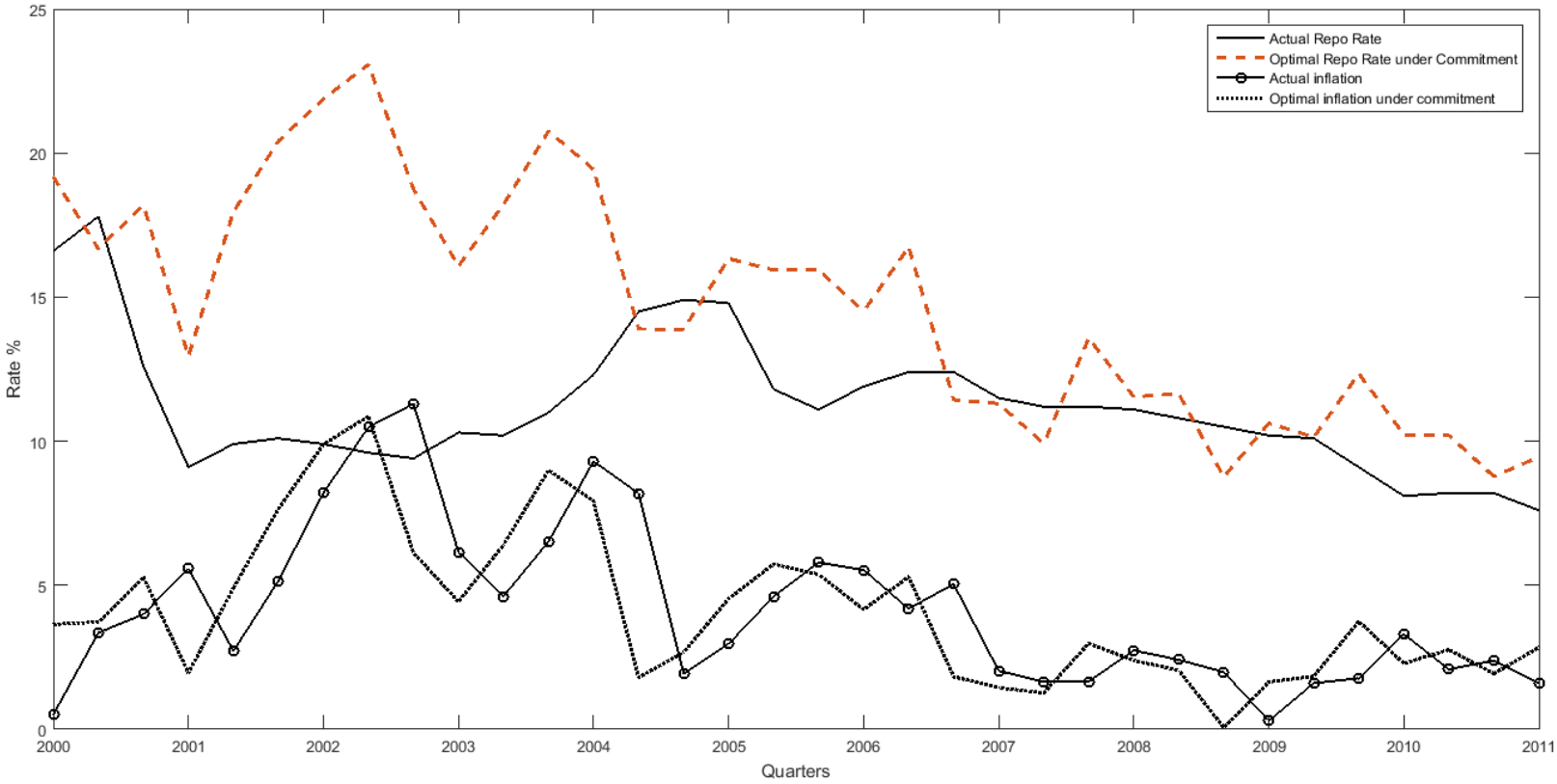
Discretion is recessionary.....

Figure: **Interest rate Path rule under Discretion**



Commitment-higher output and welfare

Figure: **Path of interest rate rule under Commitment**



Conclusion

- Optimal response requires that output should have greatest weight, followed by interest rate, inflation and asset prices
- Consistent monetary policy yields the greatest welfare compared to discretionary monetary policy

Thank You

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Results.

Table: **Quadratic Loss function**

	Repo Rate	**Repo Rate**	**Repo Rate**	**Repo**
	1	2	3	4
Output gap	-0.073		-0.037*	-0.017
	(0.100)		(0.011)	(0.008
Output growth rate		-0.078		
		(0.162)		
Exchange rate	0.320***	0.312*	0.156*	0.138*
	(0.039)	(0.038)	(0.008)	(0.006
Equity prices	-0.018	-0.012	-0.015*	-0.012
	(0.011)	(0.009)	(0.001)	(0.001
Inflation	0.019	0.019	0.009	0.006
	(0.033)	(0.032)	(0.008)	(0.005
Bond prices	0.031***	0.025	0.0402*	0.002

Thank You

$$V_t = E_t \sum_{t=0}^{\infty} \beta^t [\frac{C_t^{1-\sigma}}{1-\sigma} - \frac{N_t^{1+\gamma}}{1+\gamma} + \frac{M_t^{1-\eta}}{1-\eta}] \tag{1}$$

$$P_t C_t + E_t [\Psi_{t,t+1} B_{t+1}] + P_t \int_0^1 Q_t(i) Z_{t+1} \partial i + I_t + \frac{M_{t+1}}{(1+i_t)P_{t+1}} = W_t N_t + r_t K_t +$$

(2)

$$y_t = E_t y_{t+1} - \sigma [i_t - \varepsilon_t - E_t \pi_{t+1} - r_t + \delta].$$