An Extreme Value Theory Framework for Determining the Effectiveness of Monetary Policy in Ensuring Interest Rates and Exchange Rates Stability – A Case for Kenya

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ABSTRACT

Interest rates and exchange rates in Kenya have witnessed significant volatility since liberation in 1991 and 1993, respectively. This raises questions on whether the CBK has been meeting its primary objective of formulating and implementing monetary policy to achieve and maintain price stability. This thesis uses the POT approach to derive a model for extremes in interest rates in the period 1991 to 2006, and exchange rates in Kenya in the period 1993 to 2006. The estimated POT models were used to determine the return period of specific extreme exchange rate returns and changes in interest rates, and trends in excess sizes and inter-arrival times of exceedances of respective thresholds. This information is vital in informing the formulation of long term monetary policy.

The analyses revealed three key results for exchange rate returns on the USD, Pound, Yen, and Euro. Exchange rate returns for these currencies are leptokurtic and positively skewed while those exceeding the thresholds 0.5, 1.0, 1.0, and 1.8, respectively, can be modelled by the GPD. The return period for exchange rate returns of 3.12, 2.74, 2.86 and 2.41 on the USD, Pound, Yen and Euro, respectively, is 100 days. Similarly, the return period for exchange rate returns of 7.74, 5.39, 6.18 and 3.73 on the USD, Pound, Yen, and Euro, respectively, is 1000 days. The results also showed a decreasing trend in the excess sizes while the inter-arrival times of the exceedances of the respective thresholds have decreased for returns on the USD and Pound, but increased for the Yen and Euro.

Analyses of the interest rates data revealed that interest rate changes exceeding thresholds of 0.6, 0.2 and 0.4 percent for the interbank rate, repo rate and Treasury bill rate, respectively, can be modelled by the GPD. The return period for interest rate changes of

2.82, 2.56, and 3.19 percent on the interbank, repo, and Treasury bill rates, respectively, are 100 days. Similarly, the return period for interest rate changes of 7.21, 5.09, and 7.39 percent for the interbank, repo and Treasury bill rates, respectively, is 1000 days. In addition, excess sizes of the changes in the repo and Treasury bill rates have been decreasing while there was no significant trend in excess sizes for changes in the interbank rate. However, the inter-arrival times of the exceedances of the respective thresholds have generally decreased for the repo rate, but remained stable for changes in the interbank and Treasury bill rates.

Overall, the results indicate that the volatility in the interest rates and exchange rates as well as occurrences of extreme movements in the data have decreased significantly. Consequently, we conclude that the CBK achieved the objective of ensuring stability in interest rates and exchange rates during the period.