



Monetary Instruments and Inflation in Nigeria: A Revisit of FAVAR

Emmanuel Akande¹; Adeniyi Adenuga²; Jeremiah Joshua³
^{1,2,3} Central Bank of Nigeria



Introduction

- Few studies have used FAVAR to explain the response of macroeconomic economic variables to monetary policy instruments in Nigeria.
- Mordi et al (2014) used FAVAR model to analyze the reaction of consumer prices, interest rates, and exchange rate, their results are mixed and "price puzzle" effect is observed.
- Obafemi et al (2014) also examined the transmission channel of monetary policy using FAVAR approach, the price and the liquidity puzzle effect are present at the early stage but disappear later.
- Our study, therefore, appeals to the flexibility of FAVAR by introducing the communality and uniqueness of Factor Analysis to reconcile the mixed results in monetary policy management in Nigeria. plain

Study Objective

The study capstone and objective is to re-examine and revisit the FAVAR approach in establishing the effectiveness of monetary policy instrument in Nigeria as discussed in Mordi et al (2014).

Methods and Data Description

It is a two-stage estimation.

- The extraction of the unobserved factors using principal component analysis (PCA),
- the identification and elimination of the factors with higher uniqueness errors and,
- the estimation of VAR on the variables with higher cummunality.

Data Description

- Quarterly data that spans from year 2000 to last quarter of year2019.
- 121 macroeconomic variables

Results

- The results revealed that about 67 percent of our variables has communality that is more than 40 percent.
- In essence, we re-caliberate our model by eliminating the variables with communality lower than 40 per cent and retaining the variables with larger amount variance shared with other factors.

Variance Decomposition

- The changes in the unobserved factor component of monetary aggregates in PC4 increasingly affects the variation in inflation.
- There is no evidence of impact of MPR on inflation in the first quarter.
- While the variation in inflation resulting from changes in CRR and TBR is low.

Table 1 MPR vs Unobserved Factors

	INFL	PC1	PC2	PC3	PC4	PC5	PC6	MPR
1	1	0	0	0	0	0	0	0
2	0.827	0.029	0.014	0.003	0.072	0.000	0.012	0.043
3	0.754	0.049	0.035	0.022	0.077	0.004	0.011	0.049
4	0.720	0.046	0.041	0.023	0.069	0.005	0.051	0.045
5	0.673	0.039	0.067	0.026	0.075	0.006	0.069	0.045
6	0.632	0.046	0.064	0.025	0.096	0.006	0.071	0.060
7	0.615	0.051	0.061	0.030	0.099	0.018	0.068	0.058
8	0.590	0.053	0.066	0.039	0.100	0.028	0.067	0.057
9	0.573	0.052	0.064	0.048	0.102	0.031	0.073	0.057
10	0.563	0.054	0.067	0.050	0.108	0.031	0.071	0.056
11	0.560	0.054	0.067	0.050	0.107	0.035	0.071	0.056
12	0.544	0.064	0.066	0.060	0.110	0.035	0.070	0.054

Table 2 TBR vs Unobserved Factors

	INFL	PC1	PC2	PC3	PC4	PC5	PC6	TBR
1	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.771	0.098	0.024	0.007	0.048	0.002	0.026	0.023
3	0.663	0.115	0.067	0.025	0.044	0.025	0.028	0.033
4	0.617	0.120	0.064	0.040	0.043	0.026	0.043	0.048
5	0.606	0.096	0.086	0.035	0.053	0.033	0.053	0.038
6	0.564	0.136	0.083	0.033	0.063	0.035	0.051	0.035
7	0.551	0.135	0.091	0.037	0.064	0.037	0.050	0.036
8	0.508	0.148	0.091	0.036	0.065	0.047	0.071	0.034
9	0.487	0.142	0.088	0.038	0.066	0.046	0.100	0.033
10	0.477	0.142	0.091	0.041	0.067	0.045	0.102	0.035
11	0.471	0.144	0.090	0.041	0.066	0.051	0.102	0.035
12	0.457	0.153	0.087	0.049	0.064	0.052	0.103	0.034

Table 3 CRR vs Unobserved Factors

	INFL	PC1	PC2	PC3	PC4	PC5	PC6	CRR
1	1.000	0	0.000	0.000	0.000	0.000	0.000	0.000
2	0.762	0.058	0.047	0.003	0.060	0.005	0.063	0.004
3	0.653	0.053	0.072	0.044	0.070	0.026	0.058	0.023
4	0.633	0.053	0.072	0.040	0.066	0.031	0.058	0.047
5	0.654	0.042	0.094	0.032	0.052	0.034	0.055	0.037
6	0.638	0.052	0.093	0.033	0.058	0.033	0.056	0.036
7	0.617	0.050	0.090	0.034	0.070	0.045	0.054	0.041
8	0.583	0.053	0.092	0.039	0.069	0.068	0.057	0.040
9	0.569	0.052	0.090	0.049	0.067	0.070	0.062	0.040
10	0.563	0.052	0.097	0.048	0.069	0.070	0.061	0.040
11	0.560	0.053	0.096	0.048	0.069	0.073	0.061	0.040
12	0.543	0.058	0.096	0.060	0.067	0.073	0.062	0.042

- While MPR has the highest impact on inflation in the sixth horizon, CRR and TBR have a highest impact in the fourth horizon thus, impact of CRR and TBR on inflation is earlier than impact of MPR.
- Impulse Response**
- Monetary policy shock to all the monetary instruments led to a more than 10 percent decrease in inflation.
- However, there exists a level of inflation persistence in response to a monetary shock to CRR after initial decrease than other two monetary instruments.
- Consequently, the "price puzzle" syndrome prevalent in VAR and FAVAR models are sterilized in our models.

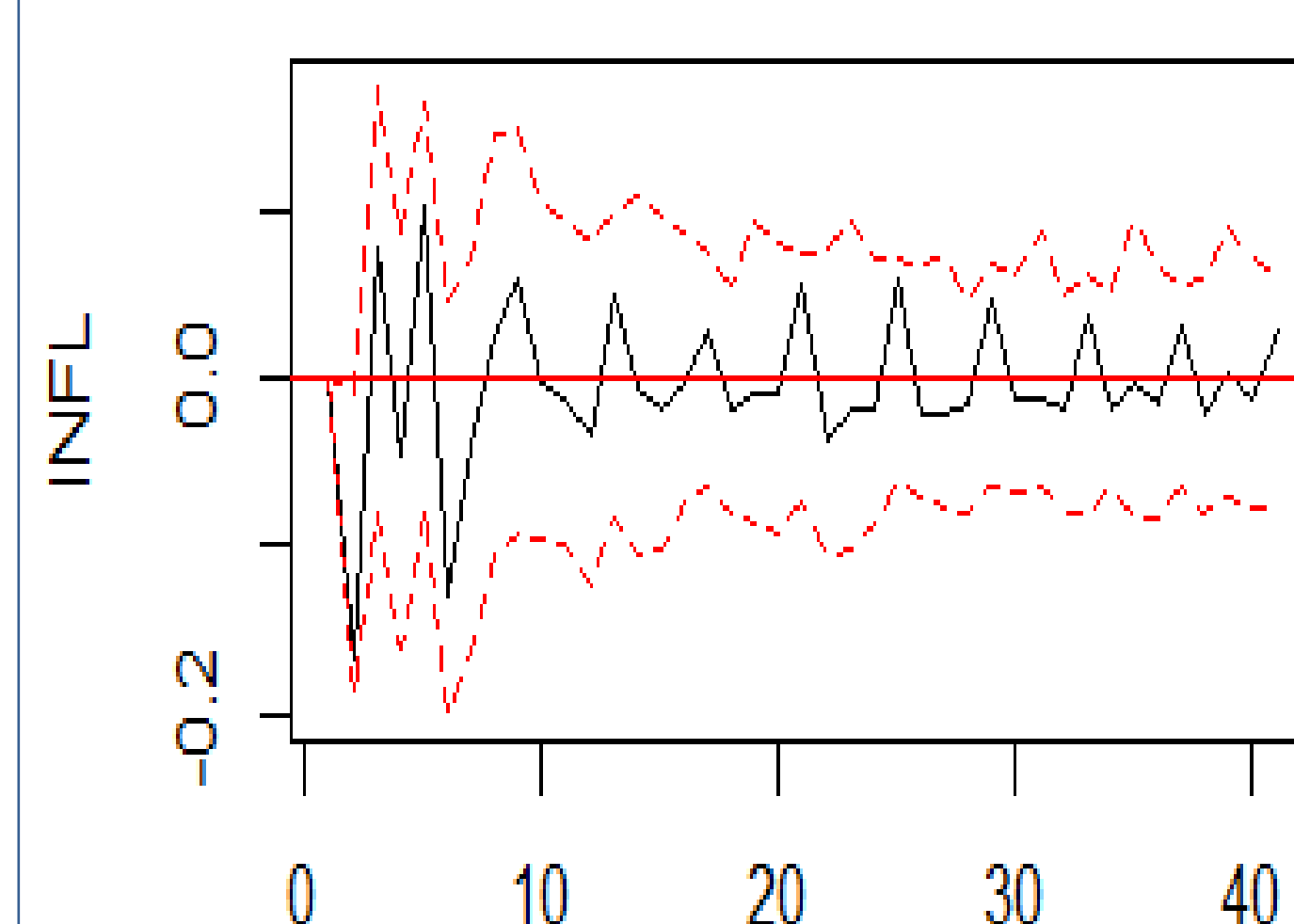


Figure 1 MPR on Inflation

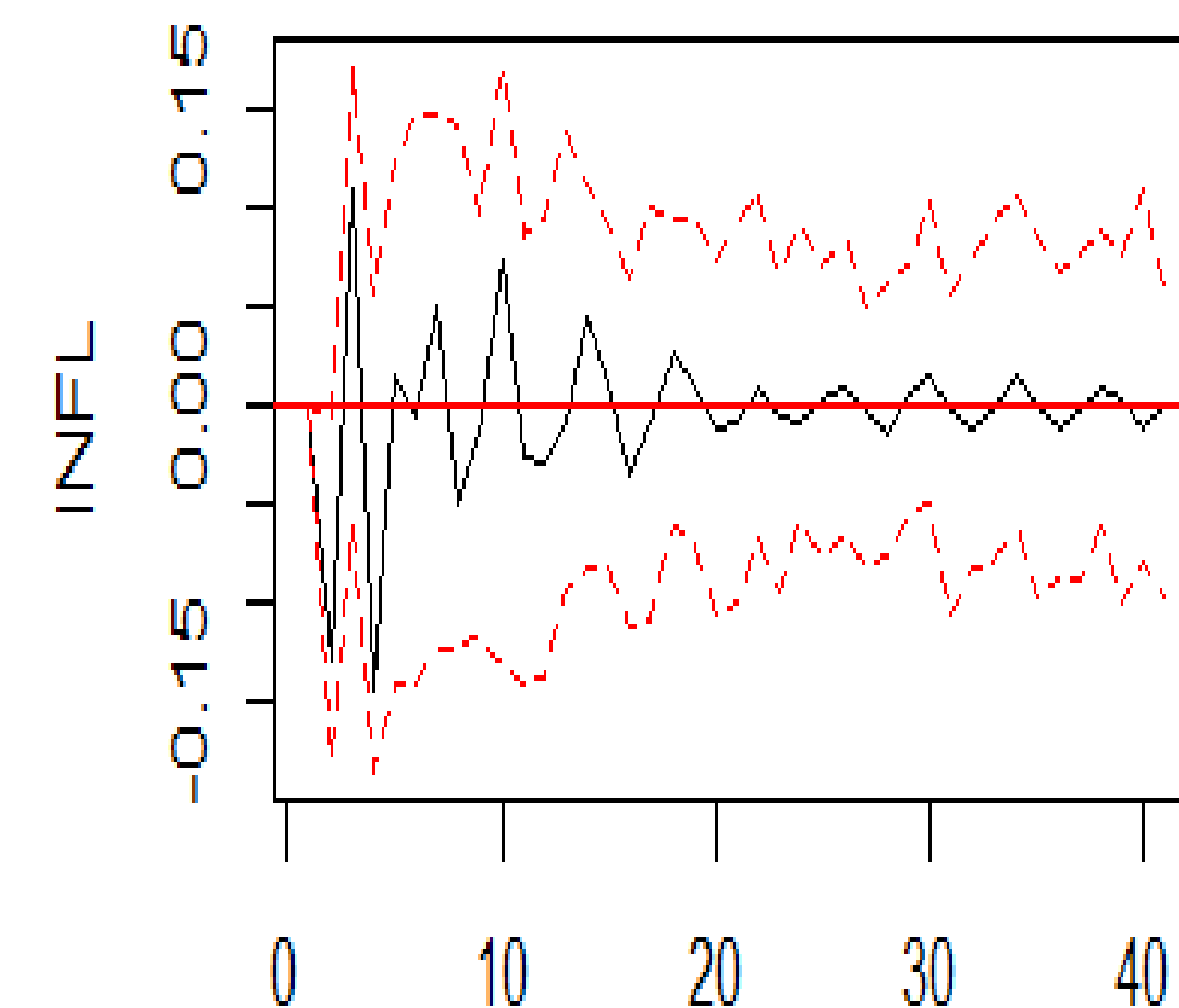


Figure 2. TBR on Inflation

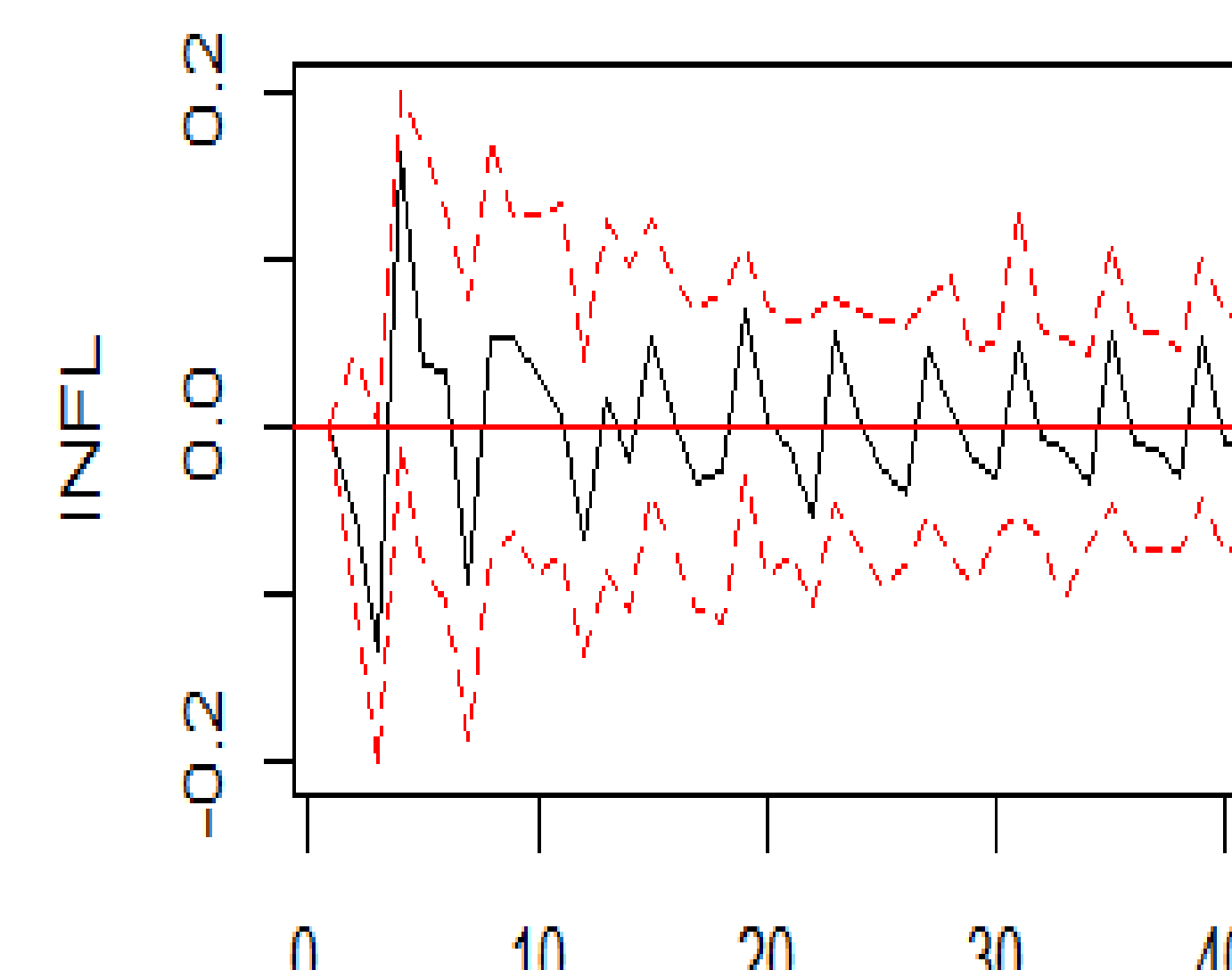


Figure 3 CRR on Inflation

Discussion

- Our results indicate a high impact of all the monetary instruments on Inflation.
- we find that the factor component of all the macroeconomic data indeed have some information that may affect inflation.
- The factor components of monetary and short-term interest rates as well as real outputs have a nontrivial impact on inflation as the quarter horizon increases.
- There exists some latent information extracted directly from operating and intermediate target that can be useful for price stabilization policy in Nigeria.

Conclusions

- extracting the communality of the macroeconomic variables to improve policy shock identification resolves price and liquidity puzzle effect.
- Our approach is useful for better measurement of Factor Analysis in VAR estimations
- Our results also show that through the operating targets, a contractionary monetary policy, reduces the short-term interest rates, increases credit to the private sector, and increases net domestic credit and industrial outputs.
- This channel is effective in encouraging real investment and real personal disposable income.
- Moreover, we show from our study that food CPI and food mostly drive the inflation.

Future Directions

We did not use any scientific method to determine a threshold for excluding variables with high uniqueness. Therefore, future studies can consider new grounds for policy shock identification that will yield a more robust estimations

Contact Information

Name: Emmanuel O. Akande
 Institution: Central Bank of Nigeria
 Email: eakande75@gmail.com
 Phone: +1-765-701-2935

References

- Mordi et al (2014), A Factor-Augmented Vector Autoregression (FAVAR) Model for Monetary Policy Analysis in Nigeria, Research Department, Central Bank of Nigeria (CBN).
- Obafemi and Ifere (2015), Monetary Policy Transmission mechanism in Nigeria: A FAVAR Approach, International Journal of Economics and Finance, 7(8).

Acknowledgements

The authors want to acknowledge the support of Research Department of the Central Bank of Nigeria for the provision of the data and some vital information that are not in the public domain.