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The Impact of Monetary Policies on Nigeria's Unemployment: Lessons for Poverty Reduction in Nigeria

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ABSTRACT

The problem of unemployment in Nigeria is gaining popularity on daily basis both in the national and international arena. Lots of research has been done on how to curb this menace, yet it seem like much has not be done. This study on the impact of monetary policies on Nigeria's unemployment, has investigated the relationship between monetary policy variables (Treasury bill rate, money supply, monetary policy rate, exchange rate) and unemployment using the regression method of analysis. The unit root (Augmented Dickey Fuller) test was used to determine the stationarity of the variables. Drawing from the recent development in co-integration analysis and the error correction model (ECM), the study found as follows: that Treasury bill rate and money supply have positive relationship with unemployment in Nigeria, that there is a negative relationship between monetary policy rate and exchange rate with unemployment in Nigeria. The study concludes that there is a significant negative impact of monetary policies on Nigeria's unemployment, which if not checked will continue to hinder the success of the fight against poverty in the nation.

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1. Introduction

The effect of unemployment on the Nigerian economy has attracted the interest of researchers and policy makers alike on this menace. According to Egbulonu and Amadi (2016), the insurgency in the Northern and militancy in the Niger Delta regions of Nigeria are all consequences of unemployment. Nigeria has severally made and is still making attempts at solving the unemployment problem in the country. Some of those attempts include the 1986 Babangida's National Directorate of Employment (NDE), the rural banking scheme, family support programme, Agricultural Development programme, etc.

Nevertheless, these attempts have not yielded the desired decrease in unemployment rate but rather increased it from 16.20% in the second quarter to 18.80% in the third quarter of 2017, which goes to justify Obayori (2014) opinion that "the reduction in the rate of unemployment is the most difficult challenge facing any country in the developing world where on the average, majority of the population is considered poor". Gbosi (2015) in support, asserts that the number of people in poverty in Nigeria keeps increasing because the increase in level of poverty is directly linked with rate of unemployment.

Cottarelli (2012) argues that the high rate of unemployment witnessed in the developing economies reveals the cyclical conditions and deep rooted weaknesses seen in their labour markets and monetary policies. According to CBN (2006), "Monetary Policy refers to the specific actions taken by the Central Bank to regulate the value, supply and cost of money in the economy with a view to achieving Government's macroeconomic objectives".

Monetary policy reflects the relationship between price of borrowing and the rate of money supply in an economy (Sunday et al, 2016). Monetary policy can be expansionary or contractionary (Engler, 2011), but it is seen to have

a dual mandate, which is to guarantee high employment rate and price stability geared at positioning the economy for growth. Agents of economic development have used monetary policy for many purposes major of which is economic growth and low level unemployment (Sellon, 2004; Choudhry, 2013).

On this note, this study intends to review the impact of monetary policies on Nigeria's unemployment, with special interest in drawing lessons that will help at poverty reduction. Specifically, the study seeks to assess the impact of Treasury bill rate, broad money supply, exchange rate and monetary policy rate on unemployment in Nigeria.

2. Literature Review

2.1 Theoretical Framework

There are many theories that explain the relationship between monetary policy and unemployment in Nigeria major of which are the Monetarist view, the business cycle theory and the Keynesian monetary policy and this study is anchored on the Keynesian theory.

According to economist of the Keynesian school, monetary policy is a key tool of economic management. They emphasize the important role of government's regulating bodies in maintaining the economy at the full employment. They argue that this is achieved by managing the level of aggregate demand to achieve full employment for the economy. The government in order to achieve full employment can increase taxes on goods that are not locally produced as a means of increasing revenue. On the other hand, government can give tax concession to local entrepreneur which will encourage increase in export volume to pay for increased imports, as well as encourage local production and employment creation.

The Keynesian economists further explain that employment depends on effective demand; demand encourages output; output on the other hand creates income while income provides employment. So they saw the relationship between monetary policy and unemployment as a vicious circle because he regarded employment as a function of income. Keynes (1934) therefore argues that the aggregate demand function is what is needed to fight depression and unemployment.

2.2 Empirical Literature

Many studies abound on the relationship between monetary policies and unemployment both in the developing and the developed economies. Monacilli et al. (2010) in a VAR model estimation investigated the effect of fiscal policy on labour market variables in the United States. The study reports that increase in government spending of 1 percent of GDP generated output and unemployment multiplier around 1.3 and 0.6 respectively which indicates that each percentage point increase in GDP will lead to an increase in employment of about 1.3 million jobs. They added that employment also rise significantly in response to a government spending stock.

Anthanasios (2013) looked at the effect of fiscal policy on unemployment in Greece using the SVAR methodology. Their findings reveal that reduction in government purchases, particular in government consumption can have high effect on unemployment.

They also found tax hikes to reduce output and increase unemployment and that monetary policy impacts output and unemployment rate in a more sizeable manner when it has to do with the post crisis period of Greece economy.

Investigating the effect of monetary policy in the Netherlands, Umut (2015) used the VAR technique to arrive at the conclusion that fiscal shocks exert significant impact on GDP, Unemployment rate, Consumption and Investment. Their argument is that when there is fiscal contraction, unemployment rises and it falls when there is fiscal expansion.

In Iran, Samira and Khalil (2015) studied the effect of government civil expenditures on unemployment rate between 1997 and 2007. They used the generalized ADF unit root test, Johansen co integration test, (VAR) method and VEM. The study realized that in a long term relationship, a negative and meaningful relationship between total government civil expenditure and unemployment.

Holden and Sparrman (2016), in an estimation of the effect of government purchases on unemployment in 20 OECD countries, for the period 1980-2007, reports that an increase in government purchases will equal 1% of GDP and a reduction of unemployment by about 0.3% in the same year. They argued that the effect is more persistent in less "employment-friendly" labour market institutions as well as in a fixed exchange rate regime than in a floating regime.

In Nigeria, Muhammad (2011) studied the role of unemployment on Nigerian Gross Domestic Product (GDP) for the period 2000-2008. The study used regression analysis, and the findings showed that unemployment has over 65 percent effects on crime, and a significant effect on the making of the Nigerian GDP and an inverse relationship between unemployment and the GDP. That is to say an increase in unemployment leads to decrease in the GDP and vice versa.

Auerbach and Gorodnichenko (2012a) studied the relationship between government purchases and unemployment in Nigeria. They used the error correction modeling technique to establish a significant negative relationship between government purchases and unemployment, which explains that an increase in government purchases will lead to a reduction in unemployment rate.

Nwosa (2014) examined the impact of government expenditure on unemployment and poverty rates between 1981 and 2011. They used the Ordinary Least square (OLS) estimation technique to arrive at the conclusion that government expenditure has positive and significant impact on unemployment rate, while it has a negative and insignificant impact on poverty rate. Egbulonu and Amadi (2016) on their part investigated the impact of monetary policy on unemployment for the period 1980-2007. The study concluded that "the extent to which hysteresis occurs in the aftermath of recessions depend on monetary policy reactions".

3. Methodology

Model

Using the econometric model

$Y = f(x)$

unemployment rate= f (treasury bill rate, money supply, monetary policy rate, exchange rate)

Therefore, the model follows that:

$$\text{Log (unemp)} = \beta_0 + \beta_1 \log(TBR) + \beta_2 \log(MSP) + \beta_3 \log(MPR) + \beta_4 \log(FXR) + \mu \ldots\ldots\ldots\ldots (3.1)$$

with μ =unexplained variable or stochastic term

β_1, β_2, β_3, β_4 are parameter estimates of TBR, MSP, MPR and FXR

b_0 = intercept of UNEMP model

Method of Data Analysis

In verifying the relationship, the regression analysis was adopted to find out the relationship between the variables. Given that most economic variables are not stationary or provide spurious result, the researcher intends to employ the unit root (Augmented Dickey Fuller) test to determine the stationarity or otherwise of the variables. The estimation procedure in this study draws on the recent development in co-integration analysis and the error correction model (ECM) that have been used to explore several economic phenomena.

4 Results and discussion

4.1 Analysis of Data

Data collected are depicted in table 1 (as shown in appendix one) which comprises of Treasury bill rate, money supply, monetary policy rate, exchange rate from 1981-2016.

Table 2: OLS Analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.959447	1.139056	1.720237	0.0954
LOG(TBR)	0.970099	0.336324	2.884422	0.0071
LOG(MSP)	0.385939	0.135434	2.849648	0.0077
LOG(MPR)	-1.511688	0.540204	-2.798364	0.0088
LOG(FXR)	-0.396933	0.172704	-2.298337	0.0284

R-squared	0.679992	Mean dependent var	1.721084
Adjusted R-squared	0.638701	S.D. dependent var	0.709268
S.E. of regression	0.426328	Akaike info criterion	1.261031
Sum squared resid	5.634425	Schwarz criterion	1.480964
Log likelihood	-17.69856	Hannan-Quinn criter.	1.337794
F-statistic	16.46815	Durbin-Watson stat	1.353084
Prob(F-statistic)	0.000000		

Table 2 above shows that TBR and MSP have positive relationship with UNEMP. That is, the higher the treasury bill rate and money supply, the higher the unemployment. It seems to suggest that a higher treasury bill rate increases investment in government bills which lower private investment while higher money supply may lead to inflation and reduce employment. The two variables have significant impact on unemployment rate as indicated by the t-statistics (TBR=2.884422, MSP=2.849648). MPR and FXR have negative relationship with UNEMP, that is, the lower the monetary policy rate and exchange, the higher the unemployment rate. This suggests that an attempt for CBN to raise the MPR will lead to lower unemployment rate which is contrary to expectation since lowering MPR reduces the cost of obtaining loans from banks which will increase investment and create job opportunities. The negative exchange rate implies that when exchange value increases unemployment reduces which conforms to expectation as a stable and high value of the naira helps improve output of the productive sectors and also increase the demand of locally made goods by the local and international markets. The result however shows that the two variables have significant impact on unemployment rate as indicated by the t-statistics (MPR=-2.798364, FXR=-2.298337).

The R^2 at 67.99% indicates that the variables are strongly fitted. The adjusted R^{-2} is 63.87% implying that 63.87 percent of the total variation found in unemployment rate is explained by the proxies. The F-test indicates that F-cal is 16.46815 implying that the overall regression is statistically significant. However, the D-W statistic is approximately 1.353084 which shows the presence of positive auto-correlation, this means that our parameter estimate must be accepted with caution because of the possibility of spurious regression results and therefore the need for examining further, the time-dependent characteristics of the model.

Data presented in table 3 presents the summary results of the ADF Unit root tests carried out on the variables of our model. It is evident that all the variables are integrated of order 1 meaning that they become stationary after the first difference.

Table 3: Summary of Augmented Dickey Fuller

Variables	ADF Unit Root Statistics at 1st difference	Order of integration
Log(UNEMP)	-6.827854	1 (1)
Log(MPR)	-6.916868	1 (1)
Log(MSP)	-3.297546	1 (1)
Log(fxr)	-5.02240	1 (1)
Log(TBR)	-6.699984	1 (1)
Critical values: 1%=-3.639407, 5%=-2.951125, 10%=-2.614300		

Source: *Author's computation*

Data presented in Table 4 (as presented in appendix) shows Autoregressive Conditional Heteroskedascity used to test the normality of the variables, and the result indicates that all the variables are significant and normally distributed except treasury bill rate which may be attributed to the fact that this policy is used occasionally to mop up excess liquidity in the economy. It also suggests that monetary policy can be used to influence unemployment rate in Nigeria if the tools are effectively used.

The trace result indicates in table 5 (Johnson Co-integration test) as presented in the appendix reveals that there is 1 co-integrating equation among all the variables while Maxeigen value test shows that no cointegration exist as all the independent variables at insignificant 5% level of significance. The data was further subjected to error correction to capture the short-run deviations that might have occurred in estimating the long-run co-integrating equation.

Table 6: ECM Result (Appendix)

The error correction estimates (ECM result) presented in table 6 (please refer to appendix) shows that the coefficient of the estimate carries the normal negative sign (-0.587598 approximately) which implies that our result is reliable. It is also fairly statistically significant at 5 percent level. The negativity of the ECT signals that the system is stable enough and is capable of converging to the long run equilibrium after some shocks/disturbances in the system. The R^{-2} value of 44.96% implies that about 44.96 percent of variation in UNEMP is accounted for by variations in monetary policy proxies. This means that the speed of adjustment is very sluggish for long run equilibrium to be fully restored after some major shocks in the monetary policy.

From the F-Statistics is 3.376125 implying that we accept the null hypothesis is rejected that there is long run significant relationship between monetary policy proxies (exchange rate, treasury bill rate, Monetary Policy Rate, money supply) and unemployment.

Conclusion

This study has x-rayed past literatures on the subject of discourse and has found lots of research report on the concept of monetary policy; others have related it to unemployment, while little or none have looked at the capacity of this relationship to impact on poverty reduction in Nigeria. The study has also looked at schools of thought on monetary policy and has anchored on the Keynesian theory which explains the role of government and regulating bodies at managing the level of aggregate demand to achieve full employment for the economy.

Based on this theorizing, the study analysed the collected data, to assess the impact of Treasury bill rate, broad money supply, exchange rate and monetary policy rate on unemployment in Nigeria. The result of the analysis shows that Treasury bill rate and money supply have positive relationship with unemployment in Nigeria, because an increase in Treasury bill rate and money will lead leads to an increase in unemployment. The study also reveals a negative relationship between monetary policy rate and exchange rate with unemployment which means that if the regulating bodies reduce monetary policy and exchange rate, it will lead to increase in unemployment rate. Therefore, the impact of monetary policies on unemployment should be a course for concern to stakeholders.

Recommendations

Having assessed the impact of monetary policy on unemployment in Nigeria and seen the

result to have a significant negative impact, in relation to other unemployment rate impacting variables, the study recommends as follows:

The CBN and other regulating bodies should be wary of falling monetary policy rate. Since it is established that a raise in monetary policy rate will lead to lower unemployment rate, it therefore follows that to fight poverty in Nigeria, the government and all relevant stakeholders in the fight, should work with the CBN to ensure that monetary policy rate is raised and maintained.

The study's result shows that a high value of the naira will improve output of the productive sector and increase the demand for locally made goods and consequently empower the sector for more employment opportunities. This will put food on the table of the employed. Therefore, the factors that increase exchange rate and reduce the value of the naira should be discouraged.

The study recommends that since a higher treasury bill will increase investment in government bills and lower private investments, that the government should then use other means to encourage private investment for a higher employment rate. The government can use the exchange rate factor as suggested above to increase the value of naira in order to reduce the production cost for the productive sector, so they can expand and create opportunities for employment.

Since higher money supply may lead to inflation and higher unemployment rate, it is therefore recommended that the regulating bodies should employ all standard methods of checking inflation by targeting equilibrium between money supply, Treasury bill rate and exchange rate, and maintaining same.

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APPENDIX

Table 1: Data

	UNEMP	TBR	MSP	MPR	FXR
1981	6.4	5.000000	14.47117	6.000000	0.610000
1982	6.1	7.000000	15.78674	8.000000	0.672900
1983	7.1	7.000000	17.68793	8.000000	0.724100
1984	6.6	8.500000	20.10594	10.00000	0.764900
1985	6.1	8.500000	22.29924	10.00000	0.893800
1986	5.3	8.500000	23.80640	10.00000	2.020600
1987	7.0	11.75000	27.57358	12.75000	4.017900
1988	5.3	11.75000	38.35680	12.75000	4.536700
1989	4.5	17.50000	45.90288	18.00000	7.391600
1990	3.5	17.50000	52.85702	18.00000	8.037800
1991	3.1	15.00000	75.40118	14.50000	9.909500
1992	3.4	21.00000	111.1123	17.50000	17.29840
1993	2.7	26.90000	165.3387	26.00000	22.05110
1994	2.0	12.50000	230.2926	13.50000	21.88610
1995	1.8	12.50000	289.0911	13.50000	21.88610
1996	3.4	12.25000	345.8540	13.50000	21.88610
1997	3.2	12.00000	413.2801	13.50000	21.88610
1998	3.2	12.95083	488.1458	14.30000	21.88610
1999	3.1	17.00000	628.9522	18.00000	92.69340
2000	4.7	12.00000	878.4573	13.50000	102.1052
2001	4.2	12.95000	1269.322	14.30807	111.9433
2002	3.0	18.88000	1505.964	19.00000	120.9702
2003	3.1	15.02000	1952.921	15.75000	129.3565
2004	2.8	14.21000	2131.819	15.00000	133.5004
2005	2.9	7.000000	2637.913	13.00000	132.1470
2006	12.3	8.800000	3797.909	12.25000	128.6516
2007	5.3	6.910000	5127.401	8.750000	125.8331
2008	5.8	6.910000	8008.204	9.812500	118.5669
2009	11.8	6.130000	9411.112	7.440000	148.8802
2010	19.7	10.25000	11034.94	6.130000	150.2980
2011	21.4	16.75000	12172.49	9.190000	153.8616
2012	27.4	17.20000	13895.39	12.00000	157.4994
2013	24.7	13.34000	15160.29	12.00000	157.3112
2014	6.9	15.99000	17679.29	13.00000	158.5526
2015	11.4	15.90000	18901.30	11.00000	193.2792
2016	14.2	20.11000	21607.68	14.00000	253.4923

TABLE 2: OLS Result

Dependent Variable: LOG(UNEMP)
Method: Least Squares
Date: 03/01/18 Time: 10:23
Sample: 1981 2016
Included observations: 36

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.959447	1.139056	1.720237	0.0954
LOG(TBR)	0.970099	0.336324	2.884422	0.0071
LOG(MSP)	0.385939	0.135434	2.849648	0.0077
LOG(MPR)	-1.511688	0.540204	-2.798364	0.0088
LOG(FXR)	-0.396933	0.172704	-2.298337	0.0284

R-squared	0.679992	Mean dependent var	1.721084
Adjusted R-squared	0.638701	S.D. dependent var	0.709268
S.E. of regression	0.426328	Akaike info criterion	1.261031
Sum squared resid	5.634425	Schwarz criterion	1.480964
Log likelihood	-17.69856	Hannan-Quinn criter.	1.337794
F-statistic	16.46815	Durbin-Watson stat	1.353084
Prob(F-statistic)	0.000000		

TABLE 4: ARCH Result

Dependent Variable: LOG(UNEMP)
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 03/01/18 Time: 10:29
Sample: 1981 2016
Included observations: 36
Convergence achieved after 80 iterations
Presample variance: backcast (parameter = 0.7)
GARCH = C(6) + C(7)*RESID(-1)^2 + C(8)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	1.887164	0.012643	149.2629	0.0000
LOG(TBR)	1.085889	0.556985	1.949585	0.0512
LOG(MSP)	0.336455	0.080938	4.156973	0.0000
LOG(MPR)	-1.533439	0.530467	-2.890737	0.0038
LOG(FXR)	-0.354768	0.113858	-3.115880	0.0018
	Variance Equation			
C	0.003278	0.021111	0.155268	0.8766
RESID(-1)^2	-0.235782	0.241690	-0.975556	0.3293
GARCH(-1)	1.260759	0.437438	2.882147	0.0039

R-squared	0.670189	Mean dependent var	1.721084
Adjusted R-squared	0.627633	S.D. dependent var	0.709268
S.E. of regression	0.432809	Akaike info criterion	1.121225
Sum squared resid	5.807025	Schwarz criterion	1.473119
Log likelihood	-12.18206	Hannan-Quinn criter.	1.244046
Durbin-Watson stat	1.275128		

TABLE 5: Cointegration Result

Date: 03/01/18 Time: 12:36
Sample (adjusted): 1984 2016
Included observations: 33 after adjustments
Trend assumption: Linear deterministic trend
Series: LOG(UNEMP) LOG(TBR) LOG(MSP) LOG(MPR) LOG(FXR)
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.602643	73.77540	69.81889	0.0233
At most 1	0.528391	43.31907	47.85613	0.1250
At most 2	0.267787	18.51612	29.79707	0.5281
At most 3	0.163774	8.230556	15.49471	0.4411
At most 4	0.068123	2.328304	3.841466	0.1270

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.602643	30.45634	33.87687	0.1214
At most 1	0.528391	24.80295	27.58434	0.1090
At most 2	0.267787	10.28556	21.13162	0.7174
At most 3	0.163774	5.902252	14.26460	0.6258
At most 4	0.068123	2.328304	3.841466	0.1270

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LOG(UNEMP)	LOG(TBR)	LOG(MSP)	LOG(MPR)	LOG(FXR)
-3.548768	5.408604	-1.292007	-19.67399	2.178457
-1.833843	-5.170539	2.384114	8.750685	-2.432487
2.585466	-5.270575	0.506610	7.934278	-0.842750
-1.266661	1.514499	1.764015	0.351903	-2.685672
-1.315415	3.393020	3.117736	0.712416	-3.651683

Unrestricted Adjustment Coefficients (alpha):

D(LOG(UNEMP))	0.165578	0.141796	0.003215	-0.029266	-0.029000
D(LOG(TBR))	0.046760	-0.091185	0.067800	0.021284	-0.037484
D(LOG(MSP))	-0.041708	0.019704	-0.009647	-0.009806	-0.011049
D(LOG(MPR))	0.005314	-0.106611	-0.006753	0.027525	-0.019707

D(LOG(FXR))	-0.039193	0.035195	0.015286	0.099353	-0.028031

1 Cointegrating Equation(s): Log likelihood 71.56955

Normalized cointegrating coefficients (standard error in parentheses)

LOG(UNEMP)	LOG(TBR)	LOG(MSP)	LOG(MPR)	LOG(FXR)
1.000000	-1.524079	0.364072	5.543892	-0.613863
	(0.39810)	(0.22077)	(0.89686)	(0.28081)

Adjustment coefficients (standard error in parentheses)

D(LOG(UNEMP))	-0.587598
	(0.21029)
D(LOG(TBR))	-0.165941
	(0.18607)
D(LOG(MSP))	0.148011
	(0.05257)
D(LOG(MPR))	-0.018858
	(0.13859)
D(LOG(FXR))	0.139085
	(0.21354)

2 Cointegrating Equation(s): Log likelihood 83.97102

Normalized cointegrating coefficients (standard error in parentheses)

LOG(UNEMP)	LOG(TBR)	LOG(MSP)	LOG(MPR)	LOG(FXR)
1.000000	0.000000	-0.219840	1.924329	0.066952
		(0.20650)	(0.60868)	(0.26943)
0.000000	1.000000	-0.383125	-2.374917	0.446705
		(0.11454)	(0.33764)	(0.14945)

Adjustment coefficients (standard error in parentheses)

D(LOG(UNEMP))	-0.847630	0.162383
	(0.20188)	(0.37815)
D(LOG(TBR))	0.001277	0.724383
	(0.19378)	(0.36298)
D(LOG(MSP))	0.111877	-0.327458
	(0.05663)	(0.10607)
D(LOG(MPR))	0.176650	0.579977
	(0.12529)	(0.23470)
D(LOG(FXR))	0.074543	-0.393954
	(0.23840)	(0.44656)

3 Cointegrating Equation(s): Log likelihood 89.11380

Normalized cointegrating coefficients (standard error in parentheses)

LOG(UNEMP)	LOG(TBR)	LOG(MSP)	LOG(MPR)	LOG(FXR)
1.000000	0.000000	0.000000	4.149581	-0.244676
			(0.61947)	(0.07281)
0.000000	1.000000	0.000000	1.503116	-0.096380
			(0.85794)	(0.10083)
0.000000	0.000000	1.000000	10.12212	-1.417516
			(2.29820)	(0.27011)

Adjustment coefficients (standard error in parentheses)

D(LOG(UNEMP))	-0.839319	0.145439	0.125759
	(0.24045)	(0.46250)	(0.13940)
D(LOG(TBR))	0.176571	0.367039	-0.243462
	(0.21983)	(0.42284)	(0.12745)
D(LOG(MSP))	0.086934	-0.276611	0.095975
	(0.06671)	(0.12831)	(0.03867)
D(LOG(MPR))	0.159190	0.615571	-0.264460
	(0.14908)	(0.28676)	(0.08643)
D(LOG(FXR))	0.114066	-0.474522	0.142290
	(0.28353)	(0.54537)	(0.16438)

4 Cointegrating Equation(s): Log likelihood 92.06493

Normalized cointegrating coefficients (standard error in parentheses)

LOG(UNEMP)	LOG(TBR)	LOG(MSP)	LOG(MPR)	LOG(FXR)
1.000000	0.000000	0.000000	0.000000	-0.344417
				(0.13253)
0.000000	1.000000	0.000000	0.000000	-0.132510
				(0.05583)
0.000000	0.000000	1.000000	0.000000	-1.660816
				(0.24531)
0.000000	0.000000	0.000000	1.000000	0.024036
				(0.04263)

Adjustment coefficients (standard error in parentheses)

D(LOG(UNEMP))	-0.802249	0.101116	0.074134	-2.001557
	(0.24683)	(0.46503)	(0.16414)	(1.15046)
D(LOG(TBR))	0.149612	0.399273	-0.205917	-1.172459

	(0.22634)	(0.42642)	(0.15051)	(1.05493)
D(LOG(MSP))	0.099355	-0.291462	0.078676	0.912978
	(0.06822)	(0.12853)	(0.04537)	(0.31797)
D(LOG(MPR))	0.124325	0.657258	-0.215905	-1.081361
	(0.15141)	(0.28527)	(0.10069)	(0.70573)
D(LOG(FXR))	-0.011780	-0.324053	0.317549	1.235303
	(0.27330)	(0.51489)	(0.18174)	(1.27381)

TABLE 6 Error Correction Model

Vector Error Correction Estimates
Date: 03/01/18 Time: 12:35
Sample (adjusted): 1984 2016
Included observations: 33 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LOG(UNEMP(-1))	1.000000
LOG(TBR(-1))	-1.524079
	(0.39810)
	[-3.82837]
LOG(MSP(-1))	0.364072
	(0.22077)
	[1.64906]
LOG(MPR(-1))	5.543892
	(0.89686)
	[6.18148]
LOG(FXR(-1))	-0.613863
	(0.28081)
	[-2.18606]
C	-12.17422

Error Correction:	D(LOG(UNEMP))	D(LOG(TBR))	D(LOG(MSP))	D(LOG(MPR))	D(LOG(FXR))
CointEq1	-0.587598	-0.165941	0.148011	-0.018858	0.139085
	(0.21029)	(0.18607)	(0.05257)	(0.13859)	(0.21354)
	[-2.79417]	[-0.89180]	[2.81544]	[-0.13607]	[0.65134]
D(LOG(UNEMP(-1)))	-0.172506	0.028814	0.016760	-0.012469	-0.147341
	(0.14389)	(0.12732)	(0.03597)	(0.09483)	(0.14611)
	[-1.19887]	[0.22632]	[0.46592]	[-0.13149]	[-1.00843]
D(LOG(UNEMP(-2)))	-0.341761	0.004715	0.069560	0.035772	-0.160478
	(0.14769)	(0.13068)	(0.03692)	(0.09733)	(0.14997)
	[-2.31404]	[0.03608]	[1.88402]	[0.36754]	[-1.07008]
D(LOG(TBR(-1)))	-1.298153	0.085524	-0.006390	0.217555	0.438217
	(0.41445)	(0.36672)	(0.10361)	(0.27313)	(0.42084)
	[-3.13222]	[0.23321]	[-0.06168]	[0.79653]	[1.04128]
D(LOG(TBR(-2)))	-0.179140	-0.125479	0.299305	0.389788	0.272342
	(0.53257)	(0.47123)	(0.13314)	(0.35097)	(0.54079)
	[-0.33637]	[-0.26628]	[2.24810]	[1.11059]	[0.50360]
D(LOG(MSP(-1)))	0.403269	0.154355	0.154110	-0.154465	0.052043
	(0.73458)	(0.64997)	(0.18364)	(0.48410)	(0.74591)
	[0.54898]	[0.23748]	[0.83922]	[-0.31908]	[0.06977]
D(LOG(MSP(-2)))	-0.267511	-0.706989	0.061917	-0.752116	-0.895782
	(0.66106)	(0.58492)	(0.16526)	(0.43565)	(0.67126)
	[-0.40467]	[-1.20869]	[0.37467]	[-1.72644]	[-1.33449]
D(LOG(MPR(-1)))	2.099410	-0.224083	-0.501796	-0.549828	-0.863962
	(0.89833)	(0.79487)	(0.22457)	(0.59201)	(0.91219)
	[2.33701]	[-0.28191]	[-2.23445]	[-0.92874]	[-0.94713]
D(LOG(MPR(-2)))	0.083569	0.192692	-0.603485	-0.592782	-0.425129
	(0.86868)	(0.76863)	(0.21716)	(0.57247)	(0.88208)
	[0.09620]	[0.25070]	[-2.77899]	[-1.03548]	[-0.48196]
D(LOG(FXR(-1)))	0.187723	0.025114	0.141458	0.003165	0.069983
	(0.21390)	(0.18926)	(0.05347)	(0.14096)	(0.21720)
	[0.87764]	[0.13269]	[2.64549]	[0.02246]	[0.32221]

D(LOG(FXR(-2)))	-0.112261	-0.005872	0.073400	0.036054	-0.057131
	(0.22357)	(0.19782)	(0.05589)	(0.14734)	(0.22702)
	[-0.50213]	[-0.02969]	[1.31330]	[0.24470]	[-0.25165]
C	-0.000860	0.147174	0.140444	0.205727	0.357878
	(0.17503)	(0.15487)	(0.04375)	(0.11534)	(0.17773)
	[-0.00491]	[0.95032]	[3.20982]	[1.78358]	[2.01364]
R-squared	0.638787	0.305602	0.605707	0.392309	0.185836
Adj. R-squared	0.449580	-0.058130	0.399173	0.073994	-0.240631
Sum sq. resids	2.433505	1.905234	0.152080	1.056869	2.509174
S.E. equation	0.340413	0.301207	0.085099	0.224337	0.345665
F-statistic	3.376125	0.840185	2.932721	1.232456	0.435756
Log likelihood	-3.806587	0.231425	41.94267	9.954768	-4.311830
Akaike AIC	0.957975	0.713247	-1.814707	0.123953	0.988596
Schwarz SC	1.502160	1.257432	-1.270523	0.668138	1.532780
Mean dependent	0.021004	0.031979	0.215392	0.016958	0.177520
S.D. dependent	0.458838	0.292816	0.109787	0.233128	0.310338

Determinant resid covariance (dof adj.)	8.62E-08
Determinant resid covariance	8.99E-09
Log likelihood	71.56955
Akaike information criterion	-0.398154
Schwarz criterion	2.549512