THE IMPACT OF FISCAL AND MONETARY POLICIES ON UNEMPLOYMENT PROBLEM IN NIGERIA (MANAGERIAL ECONOMIC PERSPECTIVE)

Nick Attamah*, Igwe Anthony**, Wilfred I. Ukpere***

Abstract

This paper investigates the impact of fiscal and Monetary Policies on Unemployment Problem in Nigeria and covers the periods 1980 to 2013. To achieve this, fiscal policy was captured here by government expenditures and revenues respectively while monetary policy was proxied by broad Money Supply (M2), Interest and Exchange rates respectively. The methodology adopted was econometric analysis employing OLS techniques and unit roots of the series were examined using the Augmented Dickey-Fuller after which the co-integration tests was conducted using the Engle Granger approach. Error correction models were estimated to take care of the short run dynamics. It was found that while government expenditure had a positive relationship with unemployment problem in Nigeria, the result of government revenue was negative and insignificant on unemployment problem. For monetary policy, it was found that money supply and exchange rate had positive and significant impact while interest rate has only a positive relationship on unemployment problem in Nigeria. This meets the a priori expectation. The study also revealed that increases in interest and exchange rates escalate unemployment by increasing cost of production which discourages the private sector from employing large workforce. On the other hand, national productivity measured by real GDP had a negative and significant impact on unemployment rate in Nigeria. This paper recommends that for an effective combat to unemployment problem in Nigeria, there should be a systematic diversion of strategies, thus more emphasis should be laid on aggressively pursuing entrepreneurial development and increased productivity. Again government should aggressively focus on investment, employment generation and economic growth that has mechanism to trickle does to the masses.

Keywords: Fiscal, Monetary, Unemployment Rate, Unit Root, Productivity Global Recession

**Economics Department, Enugu State University of Science and Technology (ESUT)*
***University of Nigeria, Enugu Campus*
****Department of Industrial Psychology and people Management, Faculty of Management, University of Johannesburg, South Africa*

1 Introduction

The economic thinking before 1930, generally referred to as the classical economics propounded that the economy will always be at full employment state without inflation. This is so because for them, the demand for labour will always equal the supply of labour at the prevailing money wage rate. For the classical economists, if for any reason, there was an in increase in labour supply the money wage will fall and more workers would be employed. Similarly, if there is a shortage of workers the money wage will rise thereby eliminating the shortage. However, with the great depression of the 1930s, this classical theory could not hold as there was wide spread unemployment.

Today, unemployment may be viewed as one of the most intractable problems facing Nigeria since 1960 and climaxing in these millennium years. It has become a cankerworm that is now eating deep into the fabric of the Nigerian economy. The existence of high unemployment in any economy is a source of concern to policy makers as well as the general citizenry. According to Layard, Nickell & Jackman (1994) unemployment generally reduces output and aggregate income. It increases inequality since the unemployed lose more than the employed. It erodes human capital and involves psychic costs. Though unemployment increases leisure, the pain of rejection largely offsets the value of this. Those who are unemployed sometimes feel as if the society does not need them.

According to Englama (2001), the issue of persistent unemployment is now frightening in Nigeria considering the fact that it is widening poverty, misery, and social unrest, ethnic cum religious crisis, robbery, kidnappings, terrorism and other social vices. These have posed a great challenge to policy makers/planners, human resource experts and persons dealing with unemployment programmes, planning and implementations. In recognition of the crucial role of and the need for manpower

development, the Federal Government of Nigeria appointed the Ashby commission in 1959 to look into Nigeria's needs in the field of post school certificate and higher education during the two decades 1960-1980. It is striking to note that the expiration of the planner's period covered by the report marked the beginning of mass unemployment in Nigeria.

Since the oil boom of the early 1970's the revenue base of Nigeria has depended largely on the oil sector which has provided more than 96 percent of total export earnings. The oil boom provided the opportunity for government to initiate gigantic expenditure programmes which reduced the rate of unemployment. Shortly after that, starting from mid-1981, the World oil market began to collapse and with it, a traumatic economic crisis emerged in Nigeria. The government then had to borrow both from internal and external sources which resulted into fiscal deficit. The fiscal deficit created economic instability with high inflation rate which reduced the gains previously made in reducing unemployment. In addition, inappropriate and ineffective policies of the past such as the Economic Stabilization (1982) and Economic Emergency (1985) measures aggravated the economic quagmire. In effect, these austerity measures dramatically reduced supply of new materials and spare parts to the import dependent industrial sector, resulting in extensive plant closure, substantial drop in capacity utilization and retrenchment of many workers (Anyanwu, Oyefusi , Oaikhenah, Dimowo, 1997).

In an effort to encourage employment generation using monetary policy, interest rates were liberalized (deregulated) and were also controlled on several occasions. The failure of these polices and the onward escalation of unemployment problem necessitated the government to introduced Structural Adjustment Programme (SAP) in July 1986 and also National Directorate of Employment which was mainly to encourage self-employment by granting loans to prospective individuals who want to be self-employed. The government also introduces the 6-3-3-4 system of education to arrest the problem of unemployment in Nigeria. Despite the introduction of these novel programmes, unemployment problem has remained intractable probably due to increases in population and the Proliferation of Secondary and Tertiary education in Nigeria. This paper investigates the impact of fiscal and monetary policies on unemployment problem in Nigeria from 1980 to 2013, which is a period of thirty three years which gives enough degree of freedom for a reliable estimation result.

2 Aim of the paper

The paper aims to investigate the impact of fiscal and monetary policies on unemployment problem in Nigeria from 1980-2013.

3 Structure of the paper

The paper is organized as follows: Section 1 is the introduction, while section 2 is the research objectives. Section 3 is the structure of the paper, while in section 4, we review pertinent literatures. Section 5 discusses the research methodology and data sources, while Section 6 is the data analysis and discussion of results. Conclusion and recommendations are contained in section 7.

4 Literature review

Adeyemi (2000) undertakes an analysis of the impact of Development plans on employment generation and offers some policy lessons. He opines that all post-independence plans as always had employment generation as one of their cardinal objectives. In addition, efforts have always been made through the national Manpower Board to ensure that employment sensitive manpower programmes are addressed. A number of key manpower development institutions were established between 1971 and 1986 to address some areas of manpower lapses. The challenge is that their programmes should be upgraded to meet the managerial and skill requirements to cope with challenges of globalizing world and it attendant competitive pursues. He concluded by arguing that these organization can play significant role to enhance knowledge utilization in the economy.

Damachi (2001) in his study of past policy measures for solving unemployment problems in Nigeria suggests that there is a strong need for institutional collaboration and improved coordination of policy measures for dealing with unemployment. He stated that while there are some discernable lapses, the overall policy direction for employment appears to be adequate. According to him, what is required is the political will to pursue the policy measures backed by adequate steps to make the polices work as well as transparency in programme implementation.

Okekukola (2006) in his study recommends that given the level of unemployment in Nigeria, the development of entrepreneurial skills and initiatives should be of paramount important especially in the higher education sector. This will facilitate employability of graduates who will increasingly be called upon to be not only job seekers, but above all to become job creators. He opined that emphasis should be placed on facilitating the acquisition of skills, competencies and ability which are required by employees of labour. He concluded that government has a pivotal role to play in an effort at finding real and lasting solution to this malaise.

Kahn (1993) offers some explanation for the high rate of unemployment in the United States of America (USA). Technological advancement is one explanation. The computers, which were introduced into the production process, were effectively utilized to their full capacity by 1990. The complete

absorption of computer technology into the factories may have resulted in a drastic cut in labour force. Again, the global recession has contributed somewhat to the unemployment rate now ravaging the US economy. The recession showed the economies of US trading partners and consequently reduced demand for its experts.

Yesufu (1984) in his study argues that higher labour productivity can reduce unemployment. This can be explained by the marginal productivity principle which says that employers will hire more labour up to the point where the value of marginal product of labour equals marginal labour cost (Okojie, 1995). Thus, an increase in marginal productivity labour indicates that employment of labour would have to increase in compliance with the marginal productivity principle. However, Diacharbe (1991) hold a contrary view which says higher productivity of labour may increase unemployment. This is because fewer workers can be used to achieve a given level of output, while the redundant workers may be laid off. According to Prokopenko (1992) a decline in the productivity of labour would always lead to economic deterioration and a consequent rise in unemployment rate.

Sanusi (1997) in his study titled stimulating investment through interest rate management reported that interest rate has positive relationship with unemployment that is, a lower interest rate encourages private investment spending which will increase the demand for labour and reduce unemployment. According to him, high interest rate (Prime Lending Rate) has characterized the Nigerian economy over the years and this has adversely affected the manufacturing sector which ought to significantly reduce unemployment. He concluded by urging the authorities to reduce the prime lending rate as this could reduce unemployment problem in the economy.

Adebusuyi (1997) studied the performance evaluation of small and medium enterprises in Nigeria. He recommends that SMEs will provide an engine for growth and prosperity and thereby create job opportunities. He cited example of Mauritius where the potential of SMEs for job creation was well demonstrated in the early 1980s, when economic recession led to high unemployment, however, SMEs reduced unemployment from 21.0 percent in 1983 to 1.6 percent in 1996.

Also in Thailand, SMEs constitute more than 90 percent of the total number of establishments in the manufacturing sector. They employ about 65 percent of the industrial workers and constitute about 47 percent of the total manufacturing value added. The Thai government uses SMEs as instrument to create employment, to harness and effectively use given natural resources and to narrow income gap. SMEs played critical role in Malaysia's industrialization programme through the strengthening of both forward and backward industrial linkages. It is the same story in Pakistan where SMEs constitute 90 percent of business and accounts for 80 percent of total employment and 30 percent of Gross Domestic Product (GDP).

Borishade (2001) in his study of restructuring the educational system as a long term solution to the unemployment problem in Nigeria concluded that education is the key with which to unlock the economic potential of the people as it empowers the individual to improve himself as well as equip him to participate in, contribute to, and drive benefits from the national economy. To him, the reinvigoration of the technical and vocational education is a worthy step in this direction. He however, concluded that the pluralistic nature of Nigerian society makes it imperative that all sectors of the country have to be carried along in the developmental process.

5 Methodology and data sources

5.1 Theoretical framework

From the reviewed literature, we illustrated that unemployment problem depends on a variety of factors. This study anchors on five identified factors to explain the unemployment problems in Nigeria. These factors include:

a. Government revenue,
b. Government expenditure,
c. Interest rate,
d. Money supply M_2, and
e. Exchange rate

Changes in government revenue and government expenditure are indicators of fiscal policy, while the monetary policy is proxied by changes in interest rate, money supply and exchange rate. An increase in government expenditure, all things being equal, leads to expansion in the production and workforce (Kahn, 1993, Keynes 1936). For studies that involve measurement of variables such as in this study, analytical method is the most appropriate method to be used. Hence this study is analytical in nature and econometric analysis was used employing OLS technique. Secondary data that captures unemployment, fiscal and monetary policy variables in Nigeria for the period 1980-2013 were also used in the study and were extracted from a secondary source (Central Bank of Nigeria Statistic Bulletin). The scope was limited to 2013 because it is the most recent annual data available based on the variables used in the analysis for the time of the research.

5.2 Model specification

The model adopted for the paper assumes an underlying relationship between unemployment, fiscal and monetary policies. The belief was informed by the Keynesian proposition that unemployment can be controlled and combated by the use of fiscal and monetary policy tools.

The model is specified implicitly below:

$$UN = f(GEX, GR, MS, IR, EXR, GDP)$$

The econometric form of equation (1) above is specified thus:

$$UNr = \Omega_0 + \Omega_1 GEX + \Omega_2 GR + \Omega_3 MS + \Omega_4 IR + \Omega_5 EXR + \Omega_6 GDP + \varepsilon_t$$

Where:
UN = Unemployment Rate
GEX = Government Expenditures
GR = Government Revenues
MS = Money Supply
IR = Interest Rate
EXR = Exchange Rate
GDP = Productivity Variable
ε_t = Stochastic Error Term

5.3 Unit root test

The estimation of variable-series that are non-stationary will thus lead to estimates that are spurious and thus render the coefficients unreliable for policy prescription and usage. This entails that the investigation will thus carry out the conventional unit-root tests on each of the variables to be used in this analysis. The stationarity test will be carried out with the application of Augmented-Dickey Fuller Statistic.

The following three models represent pure random walk, random walk with drift and random walk with drift and trend used in Augmented Dickey Fuller tests:

$$\Delta\psi_t = \Omega\psi_{t-1} + \sum_{i=1}^{p} \beta_i \Delta\psi_{t-1} + \varepsilon_t$$

$$\Delta\psi_t = \alpha_0 + \Omega\psi_{t-1} + \sum_{i=1}^{p} \beta_i \Delta\psi_{t-i} + \varepsilon_t$$

$$\Delta\psi_t = \alpha_0 + \Omega\Psi + \beta_2 t + \sum_{i=1}^{p} \beta_i \Delta\psi_{t-1} + \varepsilon_t$$

where: $\Omega = (\lambda - 1)$ The null hypothesis is $H_0 : \Omega = 0$ and the alternative hypothesis is $H_a : \Omega < 0$. If ADF test statistic (t-statistic of lagged dependent variable) is less than the critical value, we reject the null hypothesis and conclude that the series is stationary (there is no unit root).

5.4 Co-integration test

The co-integration test will be carried out which allows for the estimation of a long-run equilibrium relationship. Simply put, one can argue that various non-stationarity time series are co-integrated when their linear combination are stationary. Stationary derivations from the long run are allowed in the short run. Economically speaking two variables can only be co-integrated if they have long-term or equilibrium relationship between them.

5.5 Error correlation mechanism (ECM)

The error correlation mechanism is employed to tie the short-run dynamic behaviours of a variable to its long-run value. The error correlation mechanism (ECM), which was first used by Sargan and later popularized by Engle and Granger (1987) correct for disequilibrium. Given these dynamics, Engle and Granger suggested that adjustment should be involved through the (iterative) process to obtain a more parsimonious model. The ECM is stated as:

$$\Delta Y_t = \theta_0 + \theta_1 z_{t-1} + \sum \theta_{2i} \Delta X_{t-1} + \sum \theta_{3i} \Delta Y_{t-1} + \varepsilon_t$$

Where Δ denotes the first order time difference (i.e $\Delta y_t = y_t - y_{t-1}$) and where ε_t is a sequence of independent and identically distributed random variables with mean Zero and variance. Furthermore, they prove the converse result that an ECM generates cointegrated series.

6 Discussion of results

6.1 Unit root result

For a guide to an appropriate specification of the regression equation, the characteristics of the time series data used for estimation of the model were examined to avoid spurious regression. We begin by determining the under lying properties of the process that generate our time series variables, that is whether the variables in our model were stationary or non-stationary.

Macroeconomic data often possess stochastic trends that can be removed by differencing the variables. We therefore employ the Augmented Dickey Fuller (ADF) to test the order of integration of the variables.

The ADF results are displayed on the table below:

Table 1. Unit root result

Variables	ADF-statistics	Critical value	Order of inegration
Unemployment	-3.954425	-1.9521	I(1)
GEX	-2.460021	-1.9517	I(0)
GR	-2.579226	-1.9526	I(2)
MS	-2.753835	-1.9517	I(0)
IR	-5.462748	-2.9591	I(1)
EXR	-3.181917	-1.9521	I(1)
GDP	-8.538947	-1.9526	I(1)
RESIDUALS	-2.761750	-1.9517	I(0)

Note: the critical value is based on 5% level of significance

The stationary test result above shows that unemployment rate, Interest Rate (IR), Exchange Rate (EXR), and measure of Productivity (GDP) are stationary at first difference I(1), Government Revenue (GR) is stationary at second difference I(2) and Money Supply (MS) and residuals are stationary at level I(0).

Table 2. Regression results

Dependent Variable: D(UNR)
Method: Least Squares
Date: 01/28/15 Time: 17:30
Sample(adjusted): 1981 2013
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.947953	3.270256	-0.901444	0.3760
LOG(GOVTEXP)	0.349326	0.258793	1.349829	0.1892
DLOG(GOVTREV)	1.427962	1.130467	1.263161	0.2182
DLOG(MS)	1.235099	0.826547	1.494288	0.1476
DLOG(IR)	3.936966	2.181042	1.805085	0.0831
DLOG(EXR)	1.718592	1.940550	0.885621	0.3843
DLOG(GDP)	-9.032251	3.449686	-2.618282	0.0148
ECM(-1)	-0.455944	0.168034	-2.713402	0.0119
R-squared	0.455916	Mean dependent var		0.603030
Adjusted R-squared	0.303572	S.D. dependent var		3.259456
S.E. of regression	2.720090	Akaike info criterion		5.046424
Sum squared resid	184.9722	Schwarz criterion		5.409213
Log likelihood	-75.26599	F-statistic		2.992678
Durbin-Watson stat	2.489825	Prob(F-statistic)		0.020021

The regression result above shows that both the fiscal and monetary policy variables have no significant impact on unemployment problem in Nigeria. As clearly shown, their corresponding t-statistics yielded values absolutely less than 2 and with probability values exceeding 0.05 (5%). However the productivity variable which is measured with GDP is found to be statistically significant yielding a t-statistics of -2.713402 and a coefficient value of -9.032251. The negative coefficient however shows an inverse relationship that exists between national productivity and unemployment. This clearly conforms to economic growth a priori expectation because an increase in national productivity is expected to reduce the level of unemployment in the economy and vice-versa. The R-Squared Statistic which yielded 0.455916 entails that the explanatory power of the independent variables [Fiscal and Monetary Policy variables] is below average and hence not considered high and significant. The F-statistic which yielded 2.992678 and is seen to be less than absolute 3 entails that the test is statistically insignificant at the entire regression plane.

6.2 Cointegration test result/ECM

The Engle-Granger cointegration test results confirm the existence of long-run relationship among the variables by the stationarity of the residuals at level form, a seen in the appendix.

The results of the ECM shows that the short-run dynamics restores back to long-run equilibrium at 45.5%. This shows that the speed of the adjustment to long-run equilibrium is not fast but slightly below average.

7 Conclusion

The paper investigated the impact of fiscal and monetary policies on unemployment problem in Nigeria ranging from 1980-2013. To achieve this, we captured Fiscal Policy with Government Expenditures and Government Revenue, and the monetary policy was proxied with Money Supply (M_2), Interest Rate and exchange rate. The estimation of the model was estimated with the application of linear regression. It was found that while government expenditure had a positive relationship with unemployment problem in Nigeria, the result of government revenue was negative and insignificant on unemployment problem. For monetary policy, it was found that money supply and exchange rate had positive and significant impact while interest rate has only a positive relationship on unemployment problem in Nigeria. On the other hand, national productivity measured by real GDP had a negative and significant impact on unemployment rate in Nigeria.

In conclusion, fiscal and monetary policies have been more effective in general economic growth as evidenced in steady growth of the GDP. This is however ineffective in some other areas like unemployment generation, exchange rate etc. This paper therefore recommends that for an effective combat of unemployment problem in Nigeria, there should be a systematic diversion of strategies, thus more emphasis should be laid on aggressively pursuing entrepreneurial development and increased productivity. Again government should aggressively focus on investment, employment generation and economic growth that has mechanism to trickle down to the masses. More than that, foreign and domestic investors should be encouraged to invest in the key sectors like Agriculture and Manufacturing to help in diversifying the economy and hence increase the employment generation.

References

1. Anyanwu J.C, Oyefusi A, Oaikhenah. H, Dimowo F.A (1997), The structure of the Nigerian Economy. Onitsha, Joanee Educational Publishers Ltd.
2. Adeyemi J.O (1996) Impact of Development Plans on Employment Generation; Some Policy Lessons; in J.U Umo ed. (1996), Towards Full Employment Strategy in Nigeria: Lagos, Nigeria.
3. Borishade A, B (2001), Restructuring the Educational System as a Long-term Solution to the Unemployment Problem in Nigeria, in CBN Bullion Vol. 25 No 4.
4. Damachi N.A (2001) Evaluation of Past Policy Measures for Solving Unemployment Problems, in CBN Bullion vol. 25 No 4.
5. Diacharbe O (1991), "Productivity Data and Economic Growth in Nigeria, in Productivity for Self-Reliance and Excellence", published by National Productivity Center (NPC), pp. 65-69.
6. Englama A (2001), Unemployment Concepts and Issues in CBN Bullion vol.25 No. 4
7. Engle R.F and Granger, C.W (1987), "Co-integration and Error – Correction: Representation, Estimation and Testing", Econometric vol 55 No. 2. Pp.251-276.
8. Kahn G.A (1993), "Sluggish Job Growth: Is Rising Productivity or an Anemic Recovery of Blame?", Economic Review, Federal Reserve Bank of Kansas City, Vol. 78 No.3 pp. 7-25
9. Keynes, J.M (1993) General Theory of Employment, Interest and Money, New York, Harcourt, Brace and World, Inc.
10. Layard R, Nickell S and Jackman R (1994), The Unemployment Crisis, Oxford, Oxford University Press.
11. NDE (2000), Promoting Support for Graduate Employment Creation PRS 2000
12. Okekukola P, (2006), Access Retention and Attrition as Key Issues in attainment of Education for all in Nigeria – Paper presented at a National Conference on "Education for All by the Year 2000".
13. Prokopenko, J (1992) Productivity Management, A Practical Handbook H.O.Geneva
14. Sanusi J.O (2001) The Nigerian Economy: Growth, Productivity and the Role of Monetary Policy in CBN Bullion vol. 25 No. 4
15. Sanusi J.O (1997), "Stimulating Investment Through Interest Rate Management" The Economy, Nov. 10 p.18
16. Yesufu T.M (1984), "The Dynamics of Industrial Relations, The Nigerian Experience". (Ibadan, University Press).

Appendix A

Table A.1. Unit root test results

ADF Test Statistic	-3.954425	1% Critical Value*	-2.6395
		5% Critical Value	-1.9521
		10% Critical Value	-1.6214

*MacKinnon critical values for rejection of hypothesis of a unit root.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(UNR,2)
Method: Least Squares
Date: 01/28/15 Time: 15:50
Sample(adjusted): 1983 2013
Included observations: 31 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(UNR(-1))	-1.150243	0.290875	-3.954425	0.0005
D(UNR(-1),2)	-0.112017	0.181616	-0.616776	0.5422

R-squared	0.657798	Mean dependent var	-0.083871
Adjusted R-squared	0.645998	S.D. dependent var	5.473822
S.E. of regression	3.256821	Akaike info criterion	5.261721
Sum squared resid	307.5995	Schwarz criterion	5.354236
Log likelihood	-79.55667	Durbin-Watson stat	2.009832

ADF Test Statistic	-2.460021	1% Critical Value*	-2.6369
		5% Critical Value	-1.9517
		10% Critical Value	-1.6213

*MacKinnon critical values for rejection of hypothesis of a unit root.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GOVTEXP)
Method: Least Squares
Date: 01/28/15 Time: 15:52
Sample(adjusted): 1982 2013
Included observations: 32 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GOVTEXP(-1)	-0.232074	0.094338	-2.460021	0.0199
D(GOVTEXP(-1))	1.430340	0.630954	2.266950	0.0308

R-squared	0.181586	Mean dependent var	13119.38
Adjusted R-squared	0.154305	S.D. dependent var	727203.5
S.E. of regression	668748.4	Akaike info criterion	29.72466
Sum squared resid	1.34E+13	Schwarz criterion	29.81627
Log likelihood	-473.5946	Durbin-Watson stat	1.980316

ADF Test Statistic	-2.579226	1% Critical Value*	-2.6423
		5% Critical Value	-1.9526
		10% Critical Value	-1.6216

*MacKinnon critical values for rejection of hypothesis of a unit root.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GOVTREV,3)
Method: Least Squares
Date: 01/28/15 Time: 15:54
Sample(adjusted): 1984 2013
Included observations: 30 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GOVTREV(-1),2)	-12.03372	4.665633	-2.579226	0.0154
D(GOVTREV(-1),3)	5.485619	2.549482	2.151660	0.0402

R-squared	0.172587	Mean dependent var	3004682.
Adjusted R-squared	0.143036	S.D. dependent var	16873433
S.E. of regression	15620130	Akaike info criterion	36.03036
Sum squared resid	6.83E+15	Schwarz criterion	36.12377
Log likelihood	-538.4554	Durbin-Watson stat	0.648379

Table A.1. Unit root test results (continued)

ADF Test Statistic	-2.753835	1% Critical Value*	-2.6369
		5% Critical Value	-1.9517
		10% Critical Value	-1.6213

*MacKinnon critical values for rejection of hypothesis of a unit root.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MS)
Method: Least Squares
Date: 01/28/15 Time: 15:56
Sample(adjusted): 1982 2013
Included observations: 32 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MS(-1)	-0.621710	0.225762	-2.753835	0.0099
D(MS(-1))	-0.191698	0.180941	-1.059450	0.2979

R-squared	0.404675	Mean dependent var	206627.0
Adjusted R-squared	0.384831	S.D. dependent var	12773747
S.E. of regression	10018799	Akaike info criterion	35.13829
Sum squared resid	3.01E+15	Schwarz criterion	35.22989
Log likelihood	-560.2126	Durbin-Watson stat	2.021613

ADF Test Statistic	-5.462748	1% Critical Value*	-3.6576
		5% Critical Value	-2.9591
		10% Critical Value	-2.6181

*MacKinnon critical values for rejection of hypothesis of a unit root.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IR,2)
Method: Least Squares
Date: 01/28/15 Time: 15:57
Sample(adjusted): 1983 2013
Included observations: 31 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(IR(-1))	-1.736216	0.317828	-5.462748	0.0000
D(IR(-1),2)	0.188093	0.185979	1.011370	0.3205
C	0.647724	0.739960	0.875350	0.3888

R-squared	0.739312	Mean dependent var	0.016129
Adjusted R-squared	0.720691	S.D. dependent var	7.698120
S.E. of regression	4.068432	Akaike info criterion	5.736158
Sum squared resid	463.4598	Schwarz criterion	5.874931
Log likelihood	-85.91045	F-statistic	39.70400
Durbin-Watson stat	1.902380	Prob(F-statistic)	0.000000

ADF Test Statistic	-3.181917	1% Critical Value*	-2.6395
		5% Critical Value	-1.9521
		10% Critical Value	-1.6214

*MacKinnon critical values for rejection of hypothesis of a unit root.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXR,2)
Method: Least Squares
Date: 01/28/15 Time: 16:12
Sample(adjusted): 1983 2013
Included observations: 31 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXR(-1))	-0.863764	0.271460	-3.181917	0.0035
D(EXR(-1),2)	-0.099807	0.195899	-0.509482	0.6143

R-squared	0.454775	Mean dependent var	0.841184
Adjusted R-squared	0.435974	S.D. dependent var	19.42598
S.E. of regression	14.58923	Akaike info criterion	8.260786
Sum squared resid	6172.527	Schwarz criterion	8.353301
Log likelihood	-126.0422	Durbin-Watson stat	1.947179

Table A.1. Unit root test results (continued)

ADF Test Statistic	-8.538947	1% Critical Value*	-2.6423
		5% Critical Value	-1.9526
		10% Critical Value	-1.6216

*MacKinnon critical values for rejection of hypothesis of a unit root.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP,3)
Method: Least Squares
Date: 01/28/15 Time: 16:13
Sample(adjusted): 1984 2013
Included observations: 30 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1),2)	-2.772168	0.324650	-8.538947	0.0000
D(GDP(-1),3)	0.668281	0.178886	3.735786	0.0008
R-squared	0.854573	Mean dependent var		183649.2
Adjusted R-squared	0.849379	S.D. dependent var		4064068.
S.E. of regression	1577261.	Akaike info criterion		31.44462
Sum squared resid	6.97E+13	Schwarz criterion		31.53803
Log likelihood	-469.6693	Durbin-Watson stat		1.998242

Table A.2. Residual test of co-integration

ADF Test Statistic	-2.761750	1% Critical Value*	-2.6369
		5% Critical Value	-1.9517
		10% Critical Value	-1.6213

*MacKinnon critical values for rejection of hypothesis of a unit root.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID01)
Method: Least Squares
Date: 01/28/15 Time: 17:16
Sample(adjusted): 1982 2013
Included observations: 32 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID01(-1)	-0.578919	0.209620	-2.761750	0.0097
D(RESID01(-1))	-0.116542	0.184021	-0.633311	0.5313
R-squared	0.336241	Mean dependent var		0.114842
Adjusted R-squared	0.314115	S.D. dependent var		3.914481
S.E. of regression	3.241901	Akaike info criterion		5.250658
Sum squared resid	315.2976	Schwarz criterion		5.342267
Log likelihood	-82.01053	Durbin-Watson stat		1.966954

Table A.3. Regression result using ECM

Dependent Variable: D(UNR)
Method: Least Squares
Date: 01/28/15 Time: 17:30
Sample(adjusted): 1981 2013
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.947953	3.270256	-0.901444	0.3760
LOG(GOVTEXP)	0.349326	0.258793	1.349829	0.1892
DLOG(GOVTREV)	1.427962	1.130467	1.263161	0.2182
DLOG(MS)	1.235099	0.826547	1.494288	0.1476
DLOG(IR)	3.936966	2.181042	1.805085	0.0831
DLOG(EXR)	1.718592	1.940550	0.885621	0.3843
DLOG(GDP)	-9.032251	3.449686	-2.618282	0.0148
ECM(-1)	-0.455944	0.168034	-2.713402	0.0119
R-squared	0.455916	Mean dependent var		0.603030
Adjusted R-squared	0.303572	S.D. dependent var		3.259456
S.E. of regression	2.720090	Akaike info criterion		5.046424
Sum squared resid	184.9722	Schwarz criterion		5.409213
Log likelihood	-75.26599	F-statistic		2.992678
Durbin-Watson stat	2.489825	Prob(F-statistic)		0.020021