

# 1 Growth Effect of Balance of Payments and Monetary Policy in 2 Nigeria (1980-2013): A Time Series Analysis

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## 7 **Abstract**

8 The study critically investigates the effect of balance of payments deficit and monetary policy  
9 on the economic growth of Nigeria between 1980 and 2013 using dynamic econometric model.  
10 The variables used in formulating the econometric model were selected from the study of  
11 Kallon (1994) within the general framework of Thirlwall and Hussain (1982). The model  
12 balance of payments as a percentage share of gross domestic product ( BOP Y ), first lag of  
13 balance of payments as a percentage share of gross domestic product ( ( ) t?1 ), exchange rate  
14 of naira via-a-vis U.S dollar (ER), log of broad money supply (lnMS), and monetary policy  
15 rate (INT), in Nigeria during the review period. While, economic growth is proxied by real  
16 gross domestic product growth as the regress and. The result indicated that there is long-run  
17 relationship between balance of payments, monetary policy and economic growth in Nigeria.  
18 Also, balance of payments and monetary policy variables were found to be growth enhancing  
19 during the reviewed period. However, emanating from the empirical findings, proper policy  
20 recommendations were proffered.

22 *Index terms*— balance of payments, monetary policy, economic growth, long-run, Nigeria.

## 23 **1 Introduction**

24 In recent years, the developing countries, Nigeria inclusive faced several problems hindering economic development,  
25 the most visible ones are the increased deficit of the state's general budget, the increased balance of payment  
26 deficit, the rise of inflation rates, either demand inflation or production costs inflation, the rise of unemployment  
27 rates and the existence of structural defects between fiscal and monetary policies. Besides, the economic  
28 deformations resulted from the difference between social and political targets, on the one hand, and the economic  
29 targets in managing and mobilizing the available economic resources.

30 Over the past decades, the Nigeria economy has been exemplified by high-ceilinged balance of payment deficits  
31 and declining trade balances. Several doubt, the uniqueness of national income accounting warrants that national  
32 budget deficits must create either a surplus of private saving over investment or an excess of imports over exports.  
33 Typical economic reasoning suggests that government borrowing reduces the domestic supply of funds available  
34 to finance new investment that piloted an inflow of funds from abroad. A counterbalance adjustment to balance  
35 of payment account is essential to reinstate domestic account balance.

36 Under this consideration, an issue that has engaged the minds of governments for past decades is the  
37 effectiveness of monetary policy in influencing economic variables. Udegbunam (2003) argued that despite the lack  
38 of consensus among economists on how it actually works and on the magnitude of its effect on the economy, there  
39 is a remarkable strong agreement that monetary policy has some measure of effects on the economy. Monetary  
40 policy refers to the combination of measures designed to regulate the value, supply and cost of money in an  
41 economy, in consonance with the level of economic activities. It can be described as the art of controlling the  
42

## 3 II. THEORETICAL AND EMPIRICAL REVIEW

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43 direction and movement of monetary and credit facilities in pursuance of stable price and economy growth in an  
44 economy ??CBN, 1992).

45 The monetary authorities "i.e. the Central Bank" must take a deliberate effort to control the money supply  
46 and credit conditions for the purpose of achieving broad economic objectives. Monetary policy rests on the  
47 relationship between the rates of interest in an economy, that is, the price at which money can be borrowed,  
48 and the total supply of money. Monetary policy uses a variety of tools to control one or both of these, to  
49 influence outcomes of macroeconomic stability which involves the achievement of internal and external balance.  
50 The internal balance refers to achievements of price stability (inflation), low unemployment, high and stable  
51 economic growth, while the external balance refers to achievements of balance of payments Year 2015

### 52 2 ( )

53 A equilibrium and exchange rates stability (Chibundu, 2009). Kemp (1975) identified two major shortcomings  
54 that were apparent towards the exploration of the body Y BOP Y BOP researchers believe that these  
55 characteristics are intimately, and even feasibly causally, related. Without a of research dealing with the balance  
56 of payments. First, there are no widely accepted theories of balance payments which simultaneously incorporate  
57 the current and capital account. The great majority of models used in payments theory consider either the  
58 capital account or the current account separately. Second, there have been very few attempts to include even the  
59 fundamentals of portfolio choice theory in balance of payments (BOP) models. In spite of this, this is surprising  
60 in view of the essential monetary nature of payment theory. The conversation of balance of payments problem  
61 and what should be done about its empirical research will invariably involve the mentioning of monetary policy.  
62 In addition, anyone who discusses an economy's monetary policy will almost certainly mention the balance of  
63 payments situation (Grove, 1965). Hence, observation and logic therefore convinces that monetary policy and  
64 balance of payment are intermeshed to such a degree that one cannot be fruitfully discussed without the other.

65 However, the main relevance of the study lies in its attempt in establishing the growth effect of monetary policy  
66 and balance of payments problems. In particular, by using Nigeria as an empirical evidence, the research provide  
67 quantitative information which enable us know and when to use monetary policy to restore economic growth  
68 to its long-run path being distorted by balance of payments problems. If a significant negative relationship is  
69 established between balance of payment and domestic credit expansion, the implication for monetary management  
70 will be that the manipulation of domestic credit by the monetary institutions or authorities will enhance balance  
71 of payments viability overtime especially at this critical moment of the nation's economic circumstances. On the  
72 other hand, if no significant negative relationship is established, it follows that the Nigerian monetary and fiscal  
73 authorities should give greater priority to other policy instruments or measures to achieve balance of payments  
74 stability.

75 Similarly, different views and analyses were given by various scholars on the definitional approaches to  
76 balance of payment; the fact still remains that balance of payments problem persistent and its inherent growth  
77 consequences. Invariably, these problems dictate macroeconomic performances, amidst the ineffectiveness of  
78 monetary policy instruments in the growth adjustment process. This argument forms the main thrust of this  
79 paper to investigate the in Nigeria between 1980 and 2013. This covers the pre structural adjustment programme  
80 ??pre-SAP, 1980 ??pre-SAP, -1985); SAP era ??1985) ??1986) ??1987) ??1988) ??1989) ??1990) ??1991)  
81 ??1992) ??1993), post-SAP ??1994) ??1995) ??1996) ??1997) ??1998) ??1999) ??2000) ??2001) ??2002) and  
82 the current National Economic Empowerment Development Strategy (NEEDS) era ??2003) ??2004) ??2005)  
83 ??2006) ??2007) ??2008) ??2009) ??2010) ??2011) ??2012) ??2013).

84 The remaining part of this paper is structured into five sections. Section two covers the theoretical and  
85 empirical review, followed by stylized facts on economic growth, balance of payments, and monetary policy nexus  
86 in Nigeria as presented in section three. Section four presents the econometric model and employed methods of  
87 estimation. The results and discussion are shown in section V. Section six concludes and recommends.

## 88 3 II. Theoretical and Empirical Review

89 Historically there have been different approaches to the question of how or even whether to eliminate current  
90 account or trade imbalances. With record trade imbalances held up as one of the contributing factors to the  
91 financial crisis of 2007-2010, plans to address global imbalances have been high on the agenda of policy makers  
92 since 2009. Within the international economics literature, there have been three principal approaches to analyzing  
93 devaluation. These are the elasticity approach, the absorption approach and the monetary approach. Differences  
94 among these approaches have occasionally been the focus of sharp controversy, most notably in the case of  
95 elasticity and absorption, and recently in the case of the monetary approach as contrasted with the others. It  
96 should be noted that each approach has its own sets of arguments; hence, the three approaches are elasticity  
97 approach, absorption approach and monetary approach.

98 There are plethora of studies on the effect of monetary policy on balance of payments and growth, but very few  
99 studies have documented for the simultaneous nexus among economic growth, balance of payments, and monetary  
100 policy in Nigeria. This empirical gap justifies the focus of this study. However, some of the documented studies in  
101 those aspects with different views are reviewed herein. For instance, Egwaikhide (1999) shows that between 1953  
102 and 1989, imports as proportion of GDP did not fall below 10 per cent except for 1974 and 1986. Nwani (2005)

103 investigates the long-run determinants of balance of payments dynamics in Nigeria over a period of 22 years i.e.  
104 1981 to 2002 using three methods of analysis, namely OLS, Co-integration and ECM. The results gotten from  
105 the research study indicate that balance of payment co-integrated with all the identified explanatory variables,  
106 suggesting that balance of payment fluctuations in Nigeria could be caused by the level of trade openness, external  
107 debt burden, exchange rate movement and domestic inflation.

108 On the degree of openness, Aliyu (2007) discovers that the measure of openness was 40% in 1989, 64.8% in  
109 1992, 86.9% in 1995 and then fell to 73.6% in 1997. The study further shows that for ten

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111 Volume XV Issue VIII Version I Year ( ) A years, that is, from 1989-1998, except for 1993, 1995 and 1998 the  
112 BOP balance was consistently in deficit. Thus, the size of the openness of the economy and the pattern of  
113 disequilibrium in BOP explain how this disequilibrium is transmitted promptly and widely to the rest of the  
114 economy.

115 Radulescu, (2007) examined the monetary factors influencing the elements of the balance of payments in Rome  
116 using OLS and ADF. From his study, he observed that the monetary policy of the central authority did not support  
117 the efforts for the recovery of the economy. Almost during the entire decade, the monetary policy was harsh,  
118 restrictive, basically oriented towards controlling inflation, thus neglecting the other macroeconomic variables,  
119 such as the local savings discouraged by the high inflation and the investments that would have supported the  
120 economic growth.

121 Gulzar and Feng (2007) studied how balance of payments can act as a constraint to the rate of growth of  
122 economic output in long-term in Spain within 1850 to 2000. They discovered that the Spanish rate of GDP  
123 growth was slightly above both the EU's growth rate, and the balance of payments-constrained growth rate, so  
124 that the foreign sector would have worked to some extent, although very mildly, as a constraint to the growth of  
125 the Spanish economy in the long run.

126 Vasquer, Javier and Chaquero, (2007) proposes a methodology for analyzing the effect of balance of payments  
127 liberalization on measures of poverty and distribution problems in Jamaica with a glossary look at both micro  
128 and macro simulation of the cost of rent seeking. In the application to Jamaica, we find that the reallocation  
129 of resources away from rent-seeking activities in the presence of exchange controls is significant and has large  
130 macroeconomic effects. Opening up of the current account has little effect on poverty, but liberalization of the  
131 capital account reduces poverty, especially amongst the very poor.

132 Umer, Abro and Ghazali (2010) examined how Pakistan's balance of payments deficit is being influenced  
133 by different factors using OLS, Cointegration, ECM. The results show that the roles of monetary variables for  
134 Pakistan's balance of payment do not determine economic growth empirically.

## 135 **5 III. Stylized Facts: Economic growth and Balance of Payments 136 in Nigeria**

137 This phase of the paper accesses the trend of balance of payment in relation with economic growth in Nigeria  
138 between a decade after independence ??1970) and 2010. This enables to determine causal relationship between  
139 balance of payments components (current and capital account) and economic growth proxy as growth rate of  
140 gross domestic product (GDP). The time series plot of current and capital accounts are presented in Figure ??1  
141 and 3.2 respectively, the total balance of payments is presented in Figure ??3, while the plot of gross domestic  
142 growth rate is shown in Figure ???

## 143 **6 Econometric Methods: Specification and Description**

144 This section of the paper presents the methodological description for the effect of balance of payments and  
145 monetary policy on economic growth in Nigeria between 1980 and 2013. The time frame is chosen to cover  
146 the eras of economic programmes in Nigeria, like the Pre Structural Adjustment Programme (SAP), Structural  
147 Adjustment Programme (SAP), Post-Structural Adjustment Programme (Post-SAP), and the current National  
148 Economic Empowerment Development Strategy (NEEDS) era. In order, to achieve the research objective  
149 precisely, this section of the study focused on the model description of the methodology employed for detailed  
150 econometric analysis.

## 151 **7 a) Model Specification**

152 The econometric model employed by Kallon (1994) within the general framework of Thirlwall and Hussain (1982)  
153 as described by the simple openeconomy LM model is employed to derive the long-run BOP Growth constraint  
154 equation. Balance of payments (BOP) constrained growth model equation is also known as Thirlwall's law and  
155 it states that an increase in the income elasticity of demand for imports reduces equilibrium income growth rate  
156 with respect to the balance of payments. The econometric specification of the equation is proposed by Thirlwall  
157 and Hussain (1982) as follows????(?? ?? ) = ?? + ??????(?? ?? ) + ?? ??(1)

158 Where ?? ?? is domestic income level, while ?? ?? is the value of domestic exports. This equation states that  
159 domestic income is determined by domestic exports. The implicit income elasticity of imports can be obtained by

## 12 RESULTS AND DISCUSSION

160 the inverse of coefficient  $\delta$ . Using this framework, Kallon (1994) further restructured the theoretical equations  
 161 in a LM model of the form:  $\delta_1 + \delta_2 + \delta_3 + \delta_4 = 1$   
 162  $\delta_1 > 0$  (2)

163 Where equation ( ??) is the commodity market equilibrium, which is assumed to depend on the domestic  
 164 interest rate ( $r$ ), level of government spending ( $g$ ), the relative price ( $P_f$ ) and the real income ( $Y$ ) of the  
 165 previous year. On the other hand, the money market equilibrium (LM) equation is of the form:  $M ?? = ?? 1 ??$   
 166  $?? + ?? 2 ?? ?? + ?? 3 ???. ?? (?? 1 > 0, ?? 2, ?? 3 < 0) (3)$

167 That is money market equilibrium is assumed to depend on real income (Y), domestic interest (r) and the  
 168 domestic inflation rate (OP). BOP constraint growth model is assumed to be independent of real income (Y)  
 169 with some lags, relative price (P f ) and the differential between the domestic interest rate and the sum of the  
 170 foreign interest rate and the expected change in the exchange rate (er). Hence, the balance of payment constraint  
 171 growth model is of the form:?? ?? = ? 1 ?????? ?? + ? 2 ?? ??  $\delta$  ???" $\delta$  ???" + ? 3 ?? ??(4)

172 The theoretical derived balance of payments constraint growth model (4) within the Thirlwall's law and IS-LM  
 173 framework is further modified for the study of Nigeria balance of payment position. However, following the law  
 174 of one price (i.e. purchasing power parity), the relative prices reflects the cross-country exchange rate between  
 175 trading partners (i.e. between Nigeria and U.S). This justifies the use of exchange rate as a proxy of relative  
 176 prices. The theoretical adopted model is modified with the incorporation of first lag of balance of payment  
 177 balance (BOP t-1 ) and exchange rate (er) in order to ensure dynamism in the model as follows:  
 178 INT MS ER Y BOP Y BOP RY + + + + ? ? ? ? ? + ? ? ? ? ? + = ? 5 4 3 1

179 Therefore equation ( ??

## 180 8 b) **Apriori Expectations**

181 The *apriori* expectation provides expected signs and significance of the values of the coefficient of the parameters  
182 under review on the part of the empirical evidence and theoretical assertions. All, the incorporated variables  
183 in theoretical modified model balance of payments constraint and monetary policy growth model ( ??) within  
184 the Thirlwall's law and IS-LM framework are expected to enhance economic growth positively excluding lending  
185 rate.

186 All the independent variables are expected to have positive relationship with the dependent variable.

187 And this implies that if there are increases in the independent variables there will also be a proportionate  
188 increase on the dependent variable and vice versa.

<sup>189</sup> 9 c) Diagnostic Test i. Pre Estimation Diagnostic Test

190 The time series properties of the variables incorporated in the dynamic model ( ??) is examined using the  
 191 Augmented Dickey-Fuller unit root test in order to determine the long-run convergence of each series to its true  
 192 mean. The test involves the estimation of the following:  $\hat{Y}_t = \beta_0 + \beta_1 Y_{t-1} + \dots + \beta_p Y_{t-p} + \epsilon_t$  (7)  
 193  $\hat{Y}_t = \beta_0 + \beta_1 Y_{t-1} + \dots + \beta_p Y_{t-p} + \beta_{p+1} \hat{Y}_{t-1} + \dots + \beta_{p+q} \hat{Y}_{t-q} + \epsilon_t$  (7)

194 The time series variable is represented by  $Z$ ,  $t$  and  $t^2$  as time and residual respectively. The equ. (6) and  
 195 (??) are the test model with intercept only, and linear trend respectively. Also, the paper examined the long-  
 196 run relationship or cointegration among economic growth, balance of payments and monetary policy in Nigeria  
 197 using single equation residual based techniques such as Engle-Granger two procedure test. The test has the null  
 198 hypothesis of "series are not cointegrated".

199

## 10 . Post Estimation Diagnostic Test

201 The specified autoregressive model (??) is estimated through the use of Classical Normal Least Square Estimator  
202 and other time series diagnostic tests are employed like Ramsey RESET test for the entire structural stability of  
203 the model in line with underlining classical assumptions; residual diagnostic tests like Histogram normality test,  
204 and Breusch-Pagan-Godfrey (BPG) Heteroskedasticity test.

205 11 d) Required Data and Sources

The required data for the empirical estimation of the specified econometric model is gross domestic product (GDP), real GDP, broad money supply, interest rate or monetary policy rate, and exchange rate of naira vis-a-vis U.S dollar. Based on the nature of incorporated variables in the formulated model, secondary data is employed for detail analysis. The time series data are sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin, Volume 21, 2013 and World Development Indicator (December, 2013).

211 V.

## 212 12 Results and Discussion

213 This section of the paper presents the results of estimated Augmented Dickey-Fuller (ADF) unit-root test models  
 214 in 5.1 and the estimated regression result for the dynamic model is shown under section 5.2.

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## 215 13 a) Time Series Stationary Test and Cointegration Results

216 The stationary test results of the incorporated times series variables in the dynamic model expressed in equation ( 217 ??) is presented in table 5.1 using the ADF unit-root test. The test result indicated that the time series variables, 218 log of real gross domestic product ( )

## 219 14 RY ln

220 ); exchange rate of naira via-a-vis U.S dollar (ER); log of broad money supply (lnMS), and monetary policy rate or 221 interest rate (INT) were found to reject the null hypothesis "no stationary" at first difference. This indicates that 222 those incorporated series in the dynamic regression model have no unit-root or are stationary at first difference 223 and this implies that these series in their first difference are mean reverting and convergences towards their 224 long-run equilibrium. Also, unlike other enumerated series, balance of payments as a percentage share of gross 225 domestic product ( Y BOP ) is the only time series variables found to reject the null hypothesis "no stationary" 226 at level. However, the linear combination of log of real gross domestic product ( RY ln 227 ), balance of payments as a percentage share of gross domestic product ( Y BOP ), exchange rate of naira 228 via-a-vis U.S dollar (ER), log of broad money supply (lnMS), and monetary policy rate or interest rate (INT) 229 yields the estimated error term (  $t_{t u e c t}$  ). The estimated error term (  $t_{e c t}$  ) as shown in Table ???.1 230 was found to reject the null hypothesis "no stationary", which implies the null hypothesis "no cointegration" is 231 rejected following the Engle-Granger cointegration procedure.

## 232 15 b) Dynamic Model Results

233 The estimated dynamic regression model that captures the effect of balance of payments and monetary policy 234 variables on economic growth is shown in Table ???.2. The coefficient, residual and stability diagnostic tests 235 results are reported in Table ???.3 and 5.4 for the estimated dynamic model. The estimated dynamic regression 236 model in Table ???.2 indicated that balance of payments as a percentage share of gross domestic product ( Y 237 BOP ), first lag of balance of payments as a percentage share of gross domestic product( ( ) 1 ?  $t Y BOP$  238 ), exchange rate of naira via-a-vis U.S dollar (ER), log of broad money supply (lnMS), and monetary policy 239 rate (INT) have positive effect on log of real gross domestic product ( RY ln 240 ) in Nigeria between 1970 and 2010. These conform with the apriori expectations excluding the effect of 241 interest rate as a monetary policy variable.

242 In magnitude term, a percentage change in balance of payments to gross domestic product ( Y BOP ), first 243 lag of balance of payments to gross domestic product ( ( ) 1 ?  $t Y BOP$  244 ), exchange rate (ER), and monetary policy rate (INT) results to 1.65%, 1.16%, 0.1%, and 4.3% change in real 245 gross domestic product (lnRY) respectively during the considered time-frame. However, in partial significance 246 test using t-statistic indicated that among all incorporated factors, it is only first lag of balance of payments to 247 gross domestic product ( ( ) 1

## 248 16 ? $t Y BOP$

249 ) and exchange rate (ER) that does not have significant effect on real gross domestic product (lnRY) as a 250 measure of economic growth in Nigeria. This further revealed that balance of payments and monetary policy 251 have significant effects on economic growth in Nigeria during the reviewed periods.

252 Similarly, the F-Statistic results indicated that balance of payments, monetary policy variables and other 253 control variables have simultaneous significant effect on economic growth in Nigeria. This complements the 254 results of the adjusted R-squared that revealed that 98.5% of the total variation in economic growth proxied by 255 real gross domestic product is accounted by changes in that balance of payments as a percentage share of gross 256 domestic product ( Y BOP ), first lag of balance of payments as a percentage share of gross domestic product ( 257 ( ) 1

## 258 17 ? $t Y BOP$

259 ), exchange rate of naira via-a-vis U.S dollar (ER), log of broad money supply (lnMS), and monetary policy 260 rate (INT). The diagnostic test presented in Table ???.3 indicated that the residual generated from the dynamic 261 model shown in Table ???.2, is found not to reject the null hypothesis of "normally distributed" at 5% significance 262 level. Similarly, the White heteroskedasticity test result also indicated that the test statistics are insignificant 263 at 5% and thus call for the acceptance of the null hypothesis "homoskedasticity". However, the overall stability 264 of the model is examined using the Ramsey RESET test and the non-significance of the test statistics suggests 265 that no specification error and justify the structural fit of the model for policy simulation. These diagnostic 266 tests indicate that there is no violation of the classical linear regression considered assumptions for analyzing the 267 effect of balance of payments and monetary policy on economic growth in Nigeria between 1980 and 2013. The 268 reported co-efficient diagnostic test in Table ???.4, Variance Inflation Factor is employed to examine the presence 269 of multicollinearity. The result indicated that centered VIF value for each of incorporated explanatory variables 270 is less than 10 benchmark value. This indicates that none of the explanatory variables [balance of payments as 271 a percentage share of gross domestic product ( Y BOP ), first lag of balance of payments as a percentage share 272 of gross domestic product ( ( ) 1

273 **18 ? t Y BOP**

274 ), exchange rate of naira via-a-vis U.S dollar (ER), log of broad money supply (lnMS), and monetary policy  
275 rate (INT)] is found co-linear. This implies that there is no multicollinearity problem in the estimated dynamic  
276 regression.

277 **19 VI.**

278 **20 Conclusion and Recommendation**

279 This study critically examined the precise effect of balance of payment deficit and monetary policy on economic  
280 growth in Nigeria between 1980 and 2013. This ranges from the period of Pre and Post Structural Adjustment  
281 Programme (SAP) eras. During these eras, the Nigerian economy has undergone series of economic reforms over  
282 the years. The study also incorporates the significance effect of balance of payment, money supply and interest  
283 rate on economic growth. On this basis, a dynamic econometric model

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285 Volume XV Issue VIII Version I Year 2015 ( ) A was formulated and the results indicated that balance of payments  
286 and considered monetary policy variables (money supply and monetary policy rate) were found to exert positive  
287 and significant effect on economic growth in Nigeria. The joint significance of the incorporated time series using  
288 F-Statistics yield the conclusion that "balance of payments deficit and monetary policy have significant effect on  
289 economic growth in Nigeria" during the reviewed periods.

290 However, the observed nature of the effect of balance of payment deficit and monetary policy on economic  
291 growth in Nigeria yields the following strategic policy options are proffered as follows: a) The central authority  
292 should adopt a policy of export promotion combined with an import substitution strategy could be rational  
293 in terms of policy prescriptions, since both strategies lead to moderate balance-of-payments constraints in the  
294 long run. b) It is observed that monetary policy stimulates growth better under a flexible rate regime but it is  
295 accompanied by severe depreciation, which could destabilize the economy. In other words, monetary policy would  
296 better stabilize the economy if it is used to target inflation directly than be used to directly stimulate growth.  
297 c) The government should acknowledge that Excessive money supply is the loss of reserves which is another fact  
298 for policy makers in case of Pakistan. So, monetary authorities should control money supply while considering  
299 the balance of payments. Economic growth can be achieved through money demand to remove the balance of  
payment deficit. <sup>1 2</sup>

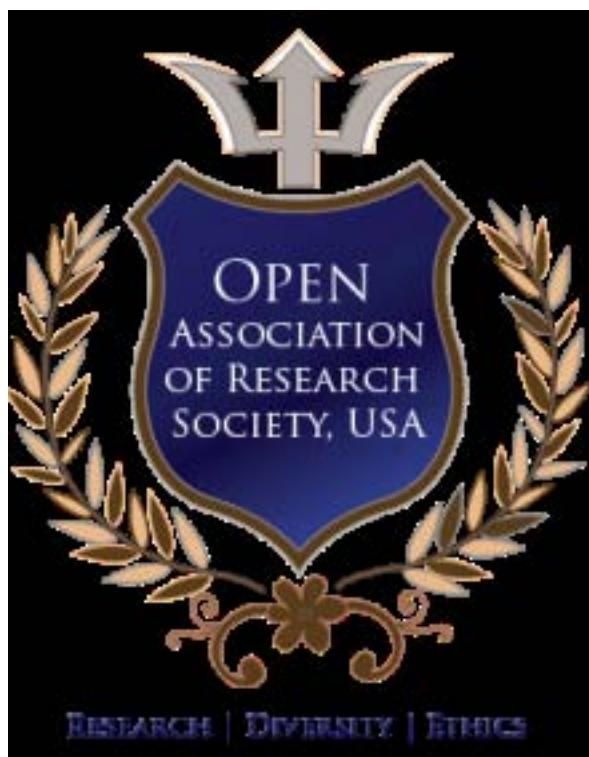


Figure 1:

current account

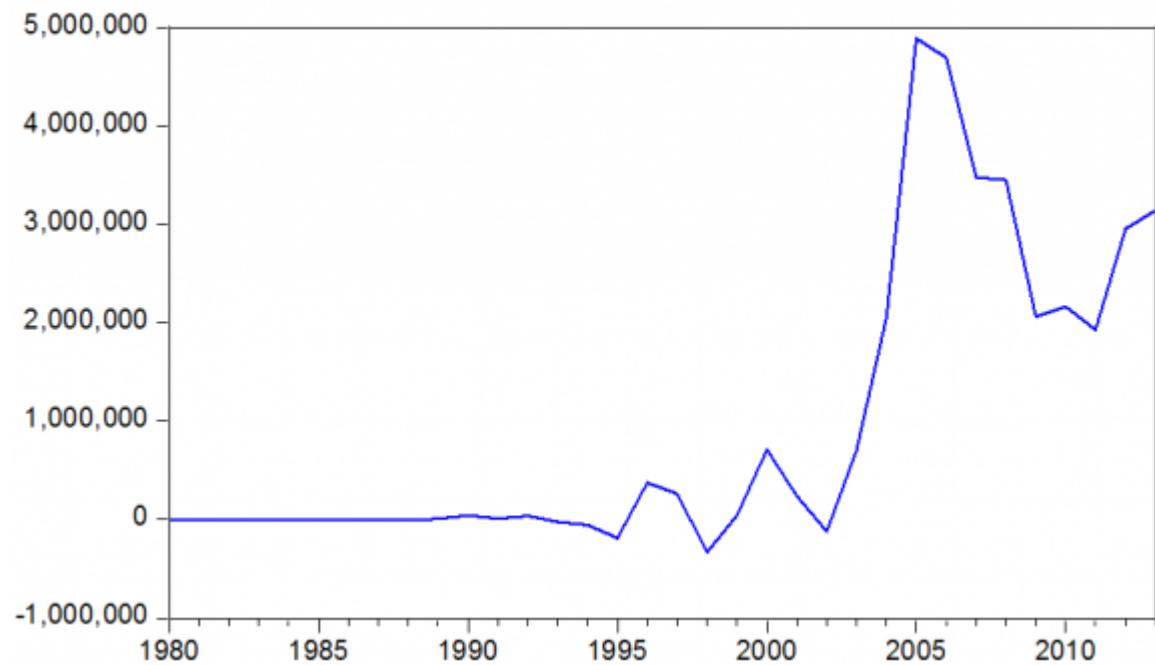
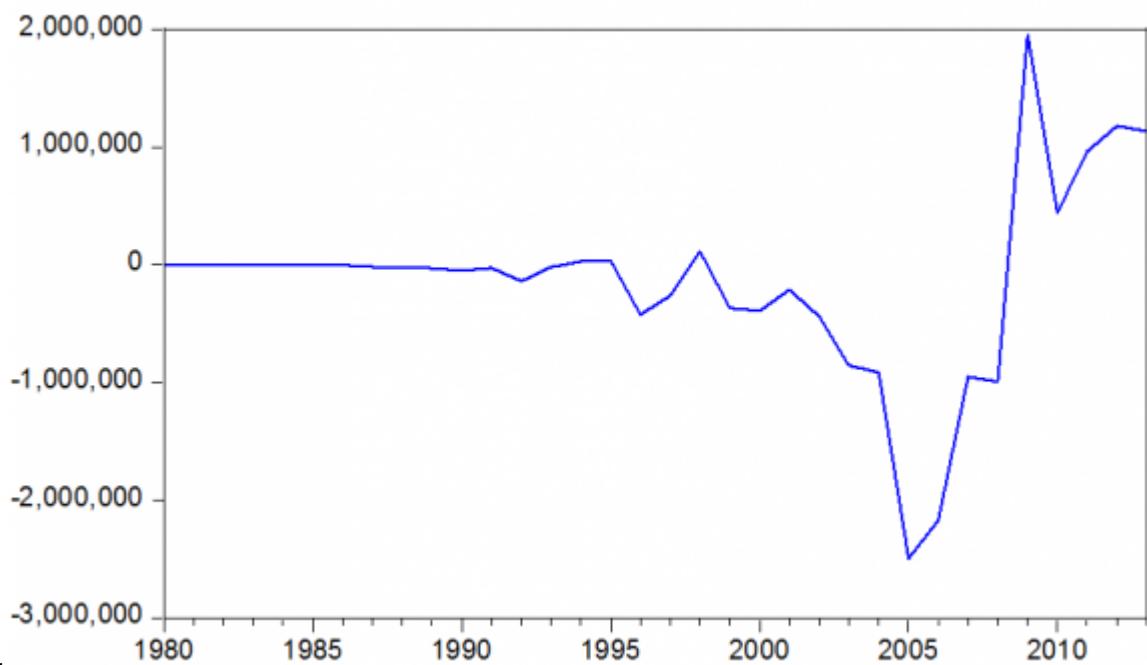


Figure 2:

capital account



31

Figure 3: Figure 3 . 1 :

32

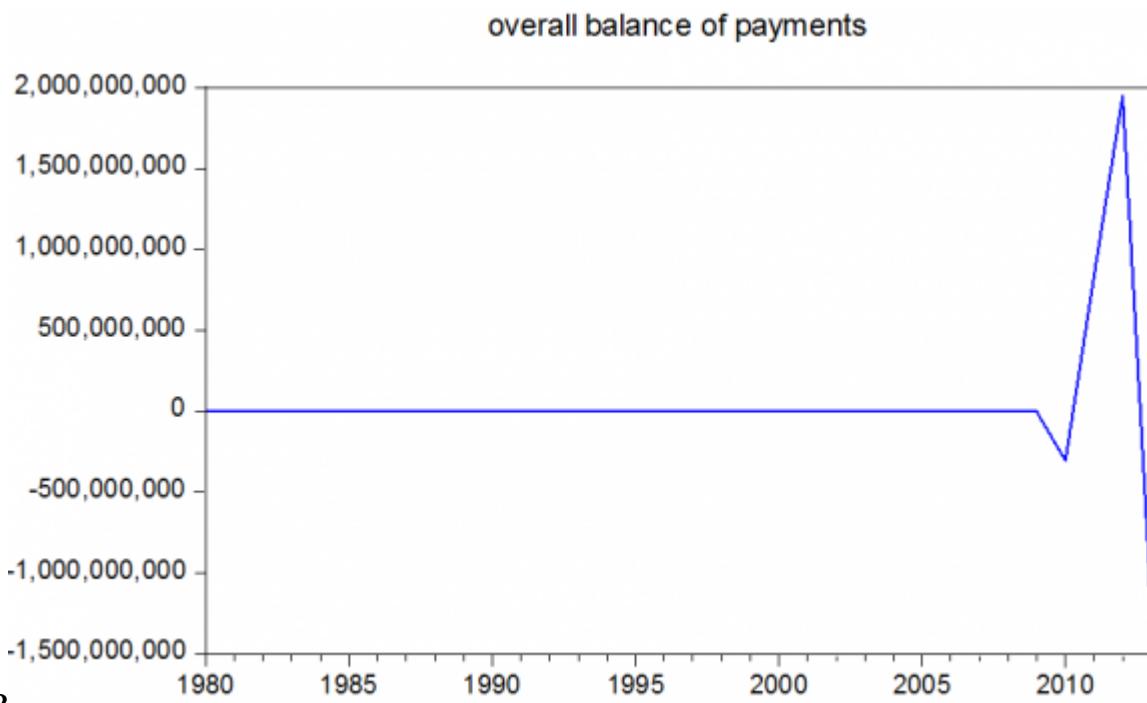
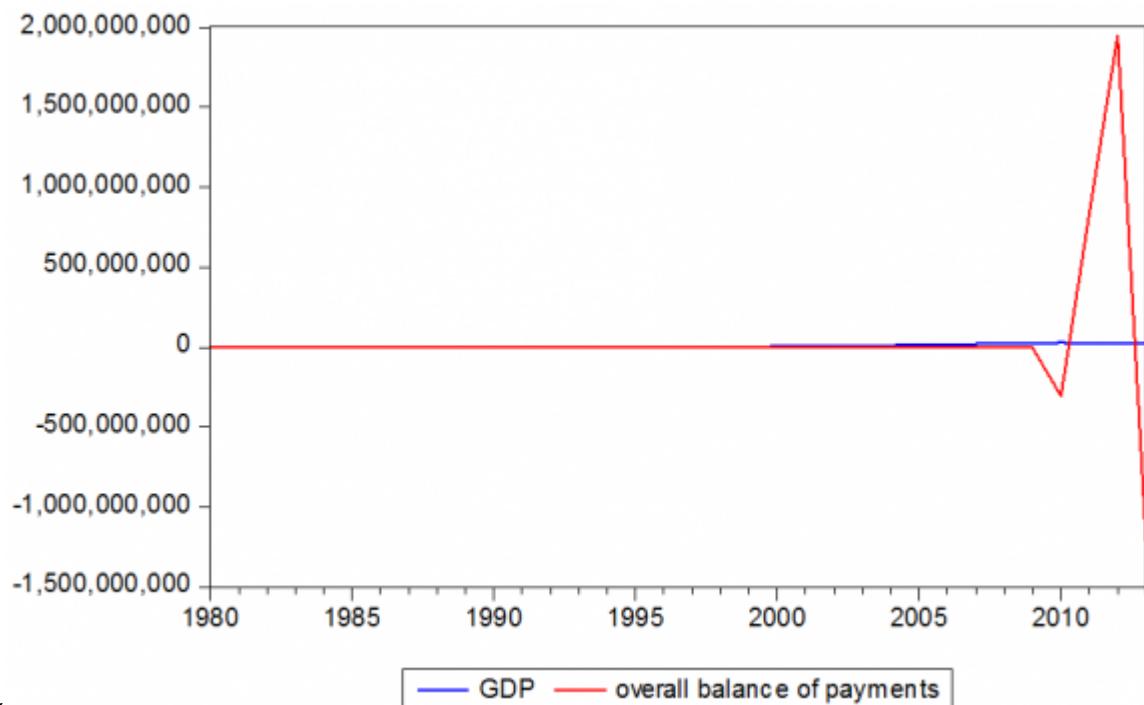


Figure 4: Figure 3 . 2 :

34



Figure 5: Figure 3 . 4 :



35

Figure 6: Figure 3 . 5 :

51

Variable	ADF Tau Statistics		Linear Trend	Order of Integration
	Intercept	RY		
ln				

Figure 7: Table 5 . 1 :

52

Dependent Variable: ln t					
RY					
Method: Least Squares					
c	Variable	Coefficient	Std. Error		t-Statistic
(	BOP	2.03338*	0.452249		4.496149
(	Y	0.0165**	0.008807		1.875912
t	t	0.011583	0.009192		1.260020
ER		0.001032	0.002385		0.432577
ln	MS	0.90312*	0.050947		17.72665
t	INT	0.04279*	0.014499		2.951764
R-squared		0.986968	F-statistic		514.9795
Adjusted R-squared		0.985051	Prob(F-statistic)		0.000000
S.E. of regression		0.324486	Durbin-Watson stat		0.615324

Note: \* significant at 1%; \*\* significant at 5. The values shown in brackets are standard error

Source: Authors Computation, 2015

Figure 8: Table 5 . 2 :

53

Model 1			
Residual Normality Test			
Jarque-Bera	0.10384	Prob(J.B)	0.9494
Heteroskedasticity Test: White			
F-statistic	1.6987	Prob. F(20, 19)	0.1268
Obs*R-squared	25.653	Prob. Chi-Square(20)	0.1776
RESET Test			
F-statistic	0.8301	Prob. F(1, 33)	0.3688
Likelihood ratio	0.9937	Prob. LR(1)	0.3188

Source: Authors Computation (2015) using E-Views 7.

Figure 9: Table 5 . 3 :

54

Variance Inflation Factors			
Included observations: 40			
Variable		Coefficient	Uncentered
c		Variance	VIF
( BOP	Y	0.204529	77.70049
	)	7.76E-05	1.680750
	t		1.578203
(	BOP	Y	8.45E-05
	t ER		1.830828
	ln	MS	5.69E-06
	t INT		10.45418
		t	0.002596
			140.3733
			7.176197
			0.000210
			11.86074
			2.231032

Source: Authors Computation (2015) using E-Views 7.

Figure 10: Table 5 . 4 :





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