

# Dynamic Effects of Capital Flow Shocks Upon Stock Market Developments in Nigeria.

## ABSTRACT

**Aims:** To analyze the dependent relationship between capital flow and stock market development in Nigeria.

**Study Design:** case study (Nigeria)

**Methodology:** the study employed the use of Vector Auto-regression Model (Granger – Causality Wald Test, Impulse Response Test and Variance Decomposition Test), to enable us achieve our objectives.

**Scope of the study:** 1986 – 2012.

**Results:** the granger causality result shows that Capital Account Balance (Deju), Foreign direct investment (FDIN), Net portfolio investment (NPI), Real gross domestic product (RGDP), Exchange Rate (EXCR), does not granger cause Market Capitalization (MC). There is bi-causality relationship between Market Capitalization and Trade Openness, that is, both Market Capitalization (MC) and Trade Openness(TROP) granger cause each other. Also, A uni-directional causality exist between Debt (DEBT) and Market Capitalization. Debt granger causes Market Capitalization but Market Capitalization does not granger cause Debt. For Impulse Response result indicates that Market Capitalization responded positively all through the year to the shock in Trade Openness, Real gross domestic product and Exchange Rate. While shocks in Dejure, NPI, and FDIN appears insignificant to Variations in Market Capitalization. Finally, the Variance decomposition analysis reveals that Market Capitalization contributes 40 percent of its own shock all through the year while the other variables accounts for the other 60 percent. Among all the selected variables, Trade Openness and Real gross domestic product seem to account for 45 percent of variation in Market Capitalization for the period under study.

**Conclusion:** based on our findings, market capitalization responded strongly to variations in trade openness and real gross domestic product. While shocks/changes in Deju, Net portfolio investment, Foreign direct investment and Debt appears insignificant to Variations in Market Capitalization. Showing that in all capital flow (liberalization) have not impacted on stock market development in Nigeria during the period under review.

**Keywords:** Market Capitalization, Trade Openness, Foreign direct investment, Real gross domestic product, Exchange Rate, Foreign direct investment, capital Flow, Liberalization)

## 1. INTRODUCTION

During the 1980s, developing countries enacted dramatic reforms to their financial systems through liberalization to make their economies more market-oriented (financial de-repression), making capital easier to move around the world. Since the inception of financial liberalization in mid 1980, there are significant arguments for a positive impact of integration

21 with the international capital market, especially for developing countries. As Developing  
22 countries face a shortage of funds to meet their investment and development needs and the  
23 less than satisfactory economic growth registered by countries of sub-Saharan Africa can be  
24 attributed to low level of investment both human, capital and financial investment. This  
25 resource gap must be filled by capital inflows, composed of foreign direct investment (FDI),  
26 portfolio investment, net borrowing, and debt relief and these can only be achieved by  
27 opening-up the economy.

28 Again taking a stance from the standard Neoclassical growth theory which postulates that  
29 capital should flow from developed (North) to developing (South) countries due to the fact  
30 that the high marginal product of capital (MPK) in the South are caused by low capital-to-  
31 labor ratio or low household saving, thus predicting savings to flow from rich to poor  
32 countries. By tapping the pool of global savings, capital-poor countries could free themselves  
33 from a binding constraint on economic growth – lack of capital. Closer financial integration  
34 could also strengthen domestic financial systems leading to more investment, more efficient  
35 allocation of capital and higher growth [1]

36 Thus, it is useful to take stock of the benefits of further openness to capital flows as well as  
37 the risks. As countries develop, they require more advanced financial systems, which usually  
38 go hand in hand with greater cross-border capital flows. In addition, capital flows can  
39 facilitate the transfer of technology and management practices (particularly through FDI),  
40 and financing of current account deficits for productive investment or smoothing  
41 consumption. They also have indirect benefits for intermediate objectives, such as financial  
42 sector development, macroeconomic policy discipline, and economic efficiency. For  
43 example, in Chile, Korea, and Mexico are some examples where liberalization has produced  
44 a positive result with the integrated approach [2]

45 In Chile, especially since the late 1990s, liberalization has been supported by strong macro-  
46 economic frameworks, including fiscal policy and exchange rate flexibility, carefully  
47 calibrated and sequenced liberalization measures to manage risks, financial market  
48 development, and improvements in the regulatory framework that addressed in particular the  
49 issue of related lending and exposures and has helped to build financial sector resilience. In  
50 Korea, also since the late 1990s liberalization has proceeded through a well-considered  
51 sequence of financial reforms in the context of sound macroeconomic policies and strong  
52 financial sector supervision. The experience also illustrates how long-term liberalization  
53 goals can be integrated with short-term use of Capital Flow Managements (CFMs). In recent  
54 years, Mexico's strong macroeconomic and prudential policy frameworks have allowed the  
55 country both to maintain an open capital account [2]

56 But capital flows can pose risks even for countries that have long been benefited from capital  
57 flows, and have highly developed financial markets as the experience in Latin America in the  
58 early 1980s and in Asia in the late 1990s have shown that capital flows can also bring  
59 serious problems. It is a fact that international capital flows on financial market can be very  
60 volatile. However, different countries experienced different degree of volatility of financial  
61 market and this may be systematically related to the quality of macroeconomic policies and  
62 domestic financial governance. In this context high volatility of capital flows has affected the  
63 macro economic variables such as exchange rate, interest rate, money stock (M3) and  
64 inflation negatively. Even in countries where conducive atmosphere is created for the free  
65 flow of capital and authorities don't operate with any current account deficit complicates the  
66 assessment of integration in financial market [3]

67 In addition, [4] argued on the long-standing puzzle in the pattern of international capital  
68 flows. He pondered why capital does not flow from North (developed countries) to South  
69 (developing countries) despite that it is scarcer and commends a higher rate of return (or  
70 marginal product) in the South as predicted by Neoclassical Theory. On this regard, [5],  
71 examined empirically the "Lucas Paradox" and gave a substantial explanation for lack of  
72 flows of capital from rich to poor countries to include differences in fundamentals across  
73 countries and capital market imperfections. He also affirmed that during 1970 – 2000 low  
74 institutional quality is the leading explanation. Now based on the Lucas Paradox of the  
75 reversal movement of financial capital and fixed capital, one will ponder if actually the  
76 financial liberalization (financial openness) has any impact on the economic/financial  
77 development in the developing world.

78 Empirical studies have attempted to examine whether financial openness contributes to  
79 growth using various methodology but in spite of these literatures; there is great dearth of  
80 study on the effect of different type of capital flow on stock market development. And the  
81 inter-reliant relationship between Capital flow and financial market cannot be ignored.  
82 According to [6], the capital market is a network of specialized financial institutions, series of  
83 mechanisms, processes and infrastructure that, in various ways, facilitate the bringing  
84 together of suppliers and users of medium to long term capital for investment in socio-  
85 economic developmental projects". Beside, [7] argues that the rapid implementation of  
86 financial sector reforms in some countries has not resulted in a priori expectation in the  
87 developing countries. Upon the theoretical assertions that financial liberalization was  
88 embraced to produce positive changes in the financial market and again the degree of  
89 achievement in financial liberalization also depends on financial sector development [8]. And  
90 again considering Lucas paradox of reversal capital flow, it is in the interest of this study to  
91 find out (i) the relationship between different components of capital flow and stock market

development (ii) secondly, to examine the growth impact of such flow on stock market development. (iii) Finally to indicate the variable that most impacted on stock market development.

To achieve these objectives, our hypotheses are developed as

H<sub>01</sub> there is no causal relationship among different component of capital flow and stock market development in Nigeria.

H<sub>02</sub> stock market development has no significant growth responses with capital flow in Nigeria.

H<sub>03</sub> there is no significant impact of capital flow, Trade Openness (TROP), Real gross domestic product (RGDP), Exchange rate (EXCR) on stock market development in Nigeria.

## 2 THEORETICAL AND EMPIRICAL LITERATURE

Capital flow arises through the transfer of ownership of a financial asset from one country to another. The assets involved in these transactions are typically equity and debt instruments. The transactions are recorded in the financial account of a country's balance of payments [9]. According to [10] "Capital flow liberalization" refers to the removal of Capital Flow Managements (CFMs). The concept includes the underlying capital transaction as well as the related payment or transfer, and it implies unrestricted convertibility of local currency in international financial transactions. Liberalization does not rule out the temporary re-imposition of such measures under certain circumstances, the maintenance of prudential measures that, while possibly CFMs, are needed for financial system stability.

### 2.1 Benefits and Risks Associated with Capital Flows

There is general agreement among scholars and practitioners about the benefits and risks associated with cross-border capital flows for economic development in general and for financial sector stability in particular. The benefits include filling the saving–investment gap, allowing portfolio diversification directly and production diversification indirectly (through the more diversified domestic capital formation permitted by access to foreign finance in general and FDI in particular), lowering financing costs, setting and/or raising standards of business and corporate governance, raising the intensity of competition, and enhancing fiscal discipline through the restraining effect of the threat of capital flight. FDI is also supportive of structural reforms, which pay off in terms of a higher productivity growth regardless of the host country's initial conditions, [11].

However, capital inflows can also have less desirable side-effects. In the context of incomplete structural reforms, international capital flows carry considerable risks and may magnify underlying macroeconomic and structural weaknesses. If capital inflows are in

128 excess of the recipient economy's ability to absorb them productively, they can have a  
129 potentially negative impact on the financial sector and, ultimately, on the real economy.  
130 Large capital inflows have been associated with rapid credit expansion and riskier lending  
131 practices in many countries. Large inflows can also lead to real exchange rate appreciation,  
132 resulting in a loss of competitiveness and a deterioration in the debt servicing capacity of  
133 clients in the internationally exposed sectors and thus in the quality of banks' balance  
134 sheets, [10].

135 As the experience of the 1997–98 financial crises in South-East Asia and Russia in 1998  
136 have shown, risks associated with capital inflows also include the sudden (unexpected and  
137 large-scale) reversal of some type of flows, particularly short-term inflows. Short-term  
138 inflows driven by speculative position-taking aimed at exploiting an interest rate differential or  
139 by views on the likely future direction of exchange rate movements can easily be reversed if  
140 fundamental or extraneous events cause expectations to change. While there is general  
141 agreement about the nature of the benefits and costs of capital account liberalization, the  
142 balance of costs and benefits remains an open issue. There is general agreement on the  
143 following two points. First, that the cost–benefit analysis of international financial integration  
144 is highly conditional on the nature and credibility of the exchange rate regime. A less than  
145 fully credible peg is a recipe for financial sector instability and economic dislocation.  
146 Secondly, the sequencing and coordination of capital account liberalization, macroeconomic  
147 stabilization and structural reforms aimed at strengthening the domestic financial sector.  
148 Capital account liberalization should follow domestic financial sector reform and  
149 macroeconomic stabilization. Liberalization of FDI should precede liberalization of portfolio  
150 investment and cross-border bank lending (for a recent analysis, see [11].

## 151 **2.2 Theory of Capital Movements**

152 This was propounded by the earliest theoreticians who assumed in the classical tradition, the  
153 existence of perfectly competitive market considered foreign investments as a form of factor  
154 movement to take advantage of the differential profit. The validity of this theory according to  
155 [12] is clear from the observation by a known economist Charles Kindleberger that under  
156 perfect competition, foreign direct investment would occur and that it would be unlikely to  
157 occur in a world where the conditions were even approximately competitive.

### 158 **▪ Monopolistic Advantage Theory**

159 This theory also known as the Market Imperfection theory was expounded by Stephen  
160 Hymer in 1960. It is an important market imperfections approach to the explanation of  
161 foreign investments. The theory stated that foreign direct investment occurred largely in

oligopolistic industries rather than in industries operating under near perfect competition. Hymer suggested that the decision of a firm to invest in foreign markets was based on certain advantages the firm possessed over the local firms (in the foreign country), such as economies of scale, superior technology, or skills in the fields of management, production, marketing and finance. [13] also argued that market imperfections were the basis for foreign investment.

#### ▪ **Internalization Theory**

It was developed in the 1970s by British economists Peter Buckley and Mark Casson to explain the growth of multinational enterprises and the spread of foreign direct investment. This is an extension of the market imperfections theory. It states that foreign investment results from the decision of a firm to internalize its specific advantages like superior knowledge (ie keeping the knowledge within the firm to maintain the competitive edge). Example, if a firm decides to externalize its knowhow by licensing a foreign firm, the firm (the authorising firm) does not make any foreign investment in this respect but, if it decides to internalize, it may invest abroad in production facilities.

#### ▪ **Location Specific Advantage Theory**

This suggests that foreign investment is pulled by certain location specific advantages. Hood and Young postulate four factors that are pertinent to location specific theory. They are: Labour Costs, Marketing factors (market size, market growth, stage of development and local competition), Trade barriers and Government policy. Other factors include cultural factors. It is important to note that it is the total cost and not only labour cost that is important.

#### ▪ **International Product Life Cycle Theory**

This theory was developed by Raymond Vernon and Lewis T Wells in 1966. It describe how a firm tends to become Multinational at a certain stage in its growth. According to this theory, the production of a product shifts to different categories of countries through the different stages of the product life cycle.

The theory also shows that a new product is first manufactured and marketed in a developed country like the US (because of favourable factors like large domestic market entrepreneurship and ease of organizing production). The product is then exported to other developed markets. As competition increases in these markets manufacturing facilities are established there to cater for these markets and also to export to the developing countries.

194 As the product becomes standardized and competition increases, more manufacturing  
195 facilities are established in developing countries to lower production costs and due to some  
196 other reasons. The developed markets may possibly be serviced by exports from the  
197 production units in the developing countries.

198 The product life cycle theory is useful because it explains the concentration of innovation in  
199 developed economies, and offers integrated theory of international trade and capital flows. It  
200 also provides explanation for the rapid growth in exports of manufactured goods by the  
201 newly industrialized countries.

#### 202       ▪ **The Eclectic Theory**

203 John Dunning has attempted to formulate a general theory of international production by  
204 combining the postulates of some of the theories. According to Dunning foreign investment  
205 by MNCs result from three comparative advantages which they enjoy, these include; the firm  
206 specific advantage; internalisation advantage and location specific advantages.

207 The internalization advantage results from the ability of the firm to internalise its specific  
208 resources. Firm specific advantages result from the tangible and intangible resources held  
209 exclusively, at least temporarily, by the firm and which provide the firm comparative  
210 advantage over other firms. Even when a firm internalizes its exclusive resources, it may not  
211 be able to serve a foreign market without foreign investment. Therefore, for production to  
212 take place on the foreign country there should be some location specific advantages.

213 One important deficiency of the Eclectic theory is its inability to explain the foreign  
214 investment for acquisitions which have become a very important route to internalization.

### 215 **2.3 Empirical Literature**

216 The principal aims of financial liberalization were to stabilize the economy in the short run,  
217 induce the emergence of a market-oriented financial sector for effective mobilization of  
218 financial savings and efficient resources allocation to increase competition, strengthen the  
219 supervisory role of the regulatory authorities and stream-line public sector relationship with  
220 the financial sector [14. [15] posits that financial liberalization entails the abolition of explicit  
221 controls on the pricing and allocation of credit. They said further that financial liberalization is  
222 only one component of a successful development strategy, which should lead to an increase  
223 in both the quality and quantity of financial intermediation by the banking system.

224 McKinnon Shaw hypothesis, according to many authors implies that a monetized economy  
225 reflects a highly developed capital market; hence a high degree of monetization should be  
226 positively related to growth performance. [16] emphasizes that financial markets channel  
227 funds from agents willing to save to those requiring funds and provide liquidity services.

228 [17] states that broad money (M2) is related to the ability of the financial system to provide  
229 liquidity, or a medium of exchange. [18] also focus on the liquid liabilities of financial system.  
230 According to [19] the extent of financial deepening (or financial depth) is an indicator of the  
231 overall size of the formal financial sector which can be measured by the ratio of liquid  
232 liabilities of financial institutions to GDP. [20] concludes that the ratio of broad money M2 to  
233 GDP reflects the extent to which a developing economy is monetized, and provides an  
234 indication of the extent to which the financial sector provides suitable instruments for  
235 payments and savings.

### 236 **2.3.1 Studies on the Relationship between Capital Flow and Stock Market** 237 **Development**

238 [21] use dataset on financial development and structure. This is a unique database as it  
239 combines a wide variety of indicators that measure the size, activity and efficiency of  
240 financial intermediaries and markets across a large number of countries. Unfortunately the  
241 time-span of the data is until 1997 and the database has not been updated afterwards. He  
242 used indicators for stock and bond markets, as well as measures of efficiency of a banking  
243 system and foreign bank penetration. The correlations between these indicators for the  
244 sample of 32 developing countries show, in particular, that countries with more stock  
245 markets are also those that have more efficient banking sector, higher share of the broad  
246 money and of private bank credit in GDP but have fewer foreign banks. No significant  
247 correlation has been detected between the stock market efficiency and the size of both stock  
248 and bond markets. While the inefficiency of a banking sector is negatively correlated with  
249 stock and bond market development characteristics, the correlation coefficients of banking  
250 variables are much more significant with the variables of stock market as opposed to private  
251 bond market. Also, using GDP share of total investment in the economy taken from the Penn  
252 World, they found a significant positive correlation with all other measures of financial  
253 development. The results of this descriptive statistic analysis remain largely unchanged  
254 when the sample of developing countries is augmented with four 'cohesion' economies of  
255 the European Union or when the pre-1989 sample period starting from 1977 is also added,  
256 [22].

257 [23] indicates that emergence of integrated financial markets and high capital mobility made  
258 possible by the increasing globalization of world economies predisposes economies,  
259 especially developing ones to the volatility of capital flows. Also, the nature and source of  
260 capital flows plays critical role in determining the impact of its surge or sudden outflow from  
261 an economy, whereas foreign portfolio investment is adjudged the most volatile.  
262 Notwithstanding, no matter the nature of capital flows (flows over a medium-to-long-term);

263 they are expected to influence the monetary aggregates, especially the economy's net  
264 foreign assets (NFA), inflation, real effective exchange rate, aggregate output (GDP) and  
265 possibly the domestic interest rates. Developing countries are attracting great amount of  
266 capital flows, Nigeria inclusive. With increasing capital flows, especially the Net Portfolio  
267 Investment (NPI) into the Nigerian economy and coupled with its undeveloped nature, the  
268 economy may not be insulated from the ravaging impact of capital flows and/or sudden flight,  
269 if proactive policy measures were not designed and implemented to forestall them. The  
270 study underscores the relation between capital flows and financial crisis as well as policy  
271 issues and challenges for Nigeria. It points out that it is more desirable for the country to  
272 adopt and pursue vigorously, appropriate and coherent policies that would respond to the  
273 increasing capital flows or sudden capital flight rather than procrastinating, probably to be  
274 enmeshed in crisis that often requires very costly measures to solve. Consequently, it  
275 proffers policy measures that would forestall the impact of massive capital inflows and/or  
276 sudden capital flight from the Nigerian economy.

277 [24] empirically investigate how three types of private capital flows could promote economic  
278 growth in recipient developed and developing countries. Their focus is on the role of stock  
279 markets as a channel through which foreign capital flows could promote growth. The findings  
280 reveal that FDI exhibits a positive impact on growth, while both foreign debt and portfolio  
281 investment have a negative impact on growth in all sample countries. However, the results  
282 indicate that stock markets might be a significant channel or leading institutional factor  
283 through which capital flows affect economic growth. The findings provide clear implications  
284 that the negative impact of private capital flows can be transformed into a positive one if the  
285 stock market development has attained a certain threshold level, regardless of whether it is  
286 in developed or developing countries.

287 [25] Use Ordinary Least Squares (OLS) methodology with a Parsimonious Error Correction  
288 Model Specification, after testing for the stationary status (unit root) and long run relationship  
289 (co-integration) of the variables, the result shows that foreign portfolio investment has a  
290 positive impact on capital market growth with the speed of adjustment from short run to long  
291 run as indicated by the ECM-1 having a relatively high value of 66% in absolute terms. The  
292 study thus recommends appropriate and quick measures to reverse the current trend of  
293 nationalization in the demand deposit banks, improvement in the market's legal framework to  
294 ensure safety of investment and the sincere pursuit of the privatization program for a private  
295 sector growth led economy.

### 2.3.1 Studies on the Relationship between Capital Flow and Other Macroeconomic Aggregates

[26] finds a positive effect of capital account liberalization on growth among industrial countries, but they do not find evidence that capital account liberalization promotes growth in non- industrial countries. This study follows a slightly different strategy than does other research in this area by first focusing on the role of capital account liberalization on financial development and then considering the effect of financial development on growth. They find a significant effect of capital account liberalization on the change in financial depth in the cross section of 82 developed and developing nations. This significant result seems to be because of the presence of the OECD countries in the sample. Klein and Olivei show that capital account liberalization significantly affects the change in financial depth in a sample consisting of the 20 OECD countries but not in a sample of the non-OECD countries, nor in a narrower non-OECD sample of 18 Latin American countries, a group that had a relatively high incidence of capital account liberalizations.

[27] argues that the average growth rate among developing countries remained stable at a relatively low level during the 1990s in spite of the boom in capital flows. On the other hand faster rate of growth has been associated with high capital flows in more advanced middle income countries. This shows that the impact of capital inflows varies in countries and regions of the world depending on the prevailing economic conditions.

[28] critically appraised some of the theory and evidence on the relationship between growth and openness and concludes that the relationship between growth and openness is less than clear. He said that though some measures of openness are correlated with growth, that it may be related to geographical factors rather than the openness of policy.

[29] examine the impact of stock market liberalization on economic growth. As previous researchers have done, they begin their analysis by augmenting the standard set of growth model variables with their variable indicating stock market liberalization. To maximize the time-series content in their regression, they use a moving average panel data method. In general, BHL find that financial liberalization leads to a 1 percent increase in annual per capita GDP growth over a five-year period and that this effect is statistically significant. BHL investigate the robustness of this result with respect to alternative sets of liberalization dates, different country groupings, and different time horizons for measuring economic growth.

[30] suggests that the impact of open capital accounts may vary with the level of ethnic and linguistic heterogeneity in the society, a proxy for the number of interest groups. In particular, he finds that capital controls lead to greater inefficiencies and lower growth among countries

330 with a high degree of ethnic and linguistic heterogeneity. While [31] argues that despite  
331 meagre direct evidence that developing countries gain from financial globalization, they  
332 should proceed cautiously, in an incremental manner. He maintains that there is strong  
333 evidence that domestic financial development spurs growth under the right conditions, and  
334 the conditions – plus domestic financial development itself are likely to make capital inflows  
335 from abroad more productive.

336 [32] also find little evidence of a relationship between capital account liberalization and  
337 growth. Using a variety of econometric techniques and a new data set focusing on  
338 quantitative measures rather than rule- based measures, they find that financial integration  
339 does not accelerate economic growth per se, even when controlling for particular economic,  
340 financial, institutional, and policy characteristics. They do, however, find that international  
341 financial integration is positively associated with real per capita GDP, educational  
342 attainment, banking sector development, stock market development, the law-and-order  
343 tradition of the country, and government integrity (low levels of government corruption).

344 [33] using time series data and OLS multiple regression analytical method and focusing on  
345 qualitative measure find a significant and negative relationship between financial sector  
346 liberalization and economic growth in Nigeria. The results of the empirical literature reviewed  
347 above indicate that there is a wide divergence in results across studies. This may reflect a  
348 number of differences in these studies.

349 One reason why empirical research on the .financial openness-growth nexus is still  
350 inconclusive relates to the fact that different econometric techniques make it difficult to  
351 harmonize the results; and although the bulk of research papers take cross-country growth  
352 models as the starting point, visible dissimilarities remain vis-à-vis the sample of countries  
353 ,the sampling period, and the estimation techniques employed. For example,  
354 contemporaneous research has typically employed a neoclassical growth model where  
355 economists regress the growth rate of real GDP per capita on a proxy for financial openness,  
356 in addition to a set of control variables which stand-in for fundamental growth drivers.  
357 However, the econometric models employed differ in three important respects: (1) with  
358 regard to the measures for the degree of financial openness; (2) with regard to the model  
359 specification; and (3) with regard to the use of the investment rate versus the capital stock  
360 per worker. And [34] in a macro-study analyzed the impact of overall financial integration on  
361 TFP growth and using a cross-country data over the period 1975 -1999. He finds that  
362 financial integration has a positive direct effect on productivity growth.

363 .

364 [35] analyzed the relationship between financial openness and productivity growth using an  
365 extensive data set that includes various measures of productivity and financial openness for

366 67 countries -21 industrialised and 46 developing countries. They distinguished between de  
367 jure capital account openness- the absence of restrictions on capital account transactions  
368 and de facto financial integration- measured stocks of foreign assets and liabilities relative to  
369 GDP and they find that economies with more open capital accounts generally have higher  
370 TFP growth even after controlling for the standard determinants of growth. They further  
371 disaggregated the financial integration measure into stocks of liabilities attributable to  
372 different types of capital flows and they find strong evidence that FDI and Portfolio equity  
373 flows boost TFP growth while debt is negatively correlated with GDP growth.

374

375 Another strand of literature focuses on the impact of specific types of capital flows on  
376 economic growth. There is a strong presumption that FDI should yield productivity gains for  
377 domestic firms through several channels including imitation (adoption of new production  
378 methods), skill acquisition (education / training of labour force) and competition (efficient use  
379 of existing resources by domestic firms).

380

381 [36] finds no important effect of FDI on growth. There is also some work looking at the  
382 effects of equity market liberalization on growth. For example, Henry and Sasson (2008) find  
383 that equity market liberalizations are associated with an increase in the growth rate of labour  
384 productivity and economic growth in emerging economies (also see Mitton, 2006). Bosworth  
385 and Collins (1999) on the other hand, find a significant positive impact of portfolio flows on  
386 growth.

387 [37] finds that capital fosters higher economic growth, above and beyond any effect on the  
388 investment rate, but only in economies where the banking sector has reached a certain level  
389 of development. This suggests that the level of financial development plays a pivotal role in  
390 the determination of the impact of capital inflows especially in developing countries.

391 Lastly, the impact of capital inflows on growth is influenced by the components of such flows.  
392 For example, [38] finds that there are large positive benefits from FDI and portfolio equity  
393 flows, while bank (debt) flows have damaging effect on countries with fragile financial  
394 systems.

395

396

### 397 **3 METHODS**

398 There are various empirical models that have been developed to explain the different ways  
399 in which capital flow can affect the macro economy at large. Some strand of study have

400 developed model to test the different impact of capital flow on economic growth. While very  
 401 few have tried to find the impact of capital flow on stock market development.

402

#### 403 i. **Unit-Root Test:**

404 There often exists the problem of non-stationarity in empirical research involving time series  
 405 data and this renders the traditional tools of econometrics (like OLS and 2SLS)  
 406 inappropriate. To overcome this unit-root problem, we test for stationarity of the series in  
 407 use. The Augmented Dickey-Fuller test (ADF) is of choice in this study because of its  
 408 efficiency in detecting unit root. It is specified as follows:

$$409 \quad \Delta Y_t = \theta_0 + \theta_1 Y_{t-1} + \sum_{i=1}^k b_i \Delta Y_{t-i} + \mu_t \dots\dots\dots (1)$$

410 where,  $Y_t$  is a vector of all variables in the model  $\theta_i$  and  $b_i$  are parameters of the model,  $\mu_t$  is  
 411 the white noise at time while  $k$  and  $\Delta$  remain as defined in equation (6) above. This we will  
 412 achieve, conducting the test by first or second level difference if the series are integrated of  
 413 order one or order two (i.e.  $I(1)$  or  $I(2)$ ). The null hypothesis here is that  $Y_t$  has a unit root  
 414 (that is, non-stationary) and the alternative is that there is no unit root (that is, stationary). If  
 415 the variables turn out to contain unit roots, we will therefore, conclude that they are non-  
 416 stationary.

417

#### 418 ii. **Granger Causality Test for Objective (1)**

419 To solve the **first** research objective of checking if there exists a causal relationship between  
 420 Nigeria's privatization proceeds and macro-economic variables within the period under  
 421 review, we employ the Granger causality test. Accordingly, we specified the general form as  
 422 follows:

$$423 \quad Y_t = \beta_0 + \sum_{k=1}^m \beta_k Y_{t-K} + \sum_{P=1}^n \alpha_P X_{t-P} + \mu_t \dots\dots\dots (1)$$

$$424 \quad X_t = \gamma_0 + \sum_{k=1}^m \lambda_k Y_{t-K} + \sum_{P=1}^n \gamma_P X_{t-P} + V_t \dots\dots\dots (2)$$

425 where;  $Y_t$  and  $X_t$  are the variables  $\mu_t$  and  $V_t$  are the mutual uncorrelated error terms,  $t$   
 426 denotes time and  $K$  and  $P$  are the number of lags. The null hypothesis is  $\alpha_P = 0$  for all  $P$ 's  
 427 and  $\lambda_K = 0$  for all  $K$ 's versus the alternative hypothesis that  $\alpha_P \neq 0$  and  $\lambda_K \neq 0$  for at least

some  $P$ 's and  $K$ 's. If the coefficient  $\alpha p$ 's are statistically significant while,  $\lambda k$ 's are not, then  $X$  is said to cause  $Y$ . On the other hand, if  $\lambda k$ 's are statistically significant while  $\alpha p$ 's are not, then  $Y$  is said to cause  $X$  (uni-directional causality). However, if both  $\alpha p$  and  $\lambda k$  are statistically significant, then causality is said to run both sides which is known as bilateral or bi-directional causality. We adopt a Granger causality Wald test for this purpose. In this case, if the probability of the computed  $\text{Chi}^2$ -value is sufficiently low (less than 0.05) we reject the null hypothesis, and accept if otherwise.

### iii Causality Impulse Response Function of VAR for objective 2

To achieve the second objective, we examined the impulse response function (IRF) of the vector Auto regressive model. The impulse response functions are responses all variable on the model to a one unit structural shock to one variable in the model. The impulse responses are plotted on the y-axis with the period from the initial shock on the x-axis.

### iv Variance Decomposition for objective 3

In econometrics and other applications of multivariate time series analysis, a **variance decomposition** or **forecast error variance decomposition** (FEVD) is used to aid in the interpretation of a vector autoregression (VAR) model once it has been fitted.<sup>[1]</sup> The variance decomposition indicates the amount of information each variable contributes to the other variables in the autoregression. It determines how much of the forecast error variance of each of the variables can be explained by exogenous shocks to the other variables.

For the VAR (p) of form

$$y_t = \nu + A_1 y_{t-1} + \dots + A_p y_{t-p} + u_t. \quad \dots \quad (3)$$

### 3.1 Empirical Model

#### • Functional Specification:

$$\text{MC} = f(\text{DEJU}, \text{FDIN}, \text{NPI}, \text{DEBT}, \text{TROP}, \text{RGDP}, \text{EXCR}) \quad \dots \quad (4)$$

Equation (1) describes stock market development proxied by market capitalization (MC), as a function of DEJU, FDIN, NPI, DEBT, TROP, RGDP and EXCR where, DEJU = Capital Account Balance, FDIN = Foreign Direct Investment, NPI = Net Portfolio Investment, DEBT

459 = External Debt, TROP = Trade Openness, RGDP = Real Gross Domestic Product EXCR =  
 460 Exchange Rate, while f = functional notation..

#### 461 • **Econometric form of the Model**

462 In **order** to take care of the presence of white noise, we introduce the error term in the model  
 463 which transforms the mathematical model to an econometric model as specified in equation  
 464 (5) below:

$$465 \text{MC}_t = b_0 + b_1 \text{DEJU}_t + b_2 \text{FDIN}_t + b_3 \text{NPI}_t + b_4 \text{DEBT}_t + b_5 \text{TROP}_t + b_6 \text{RGDP}_t + b_7 \text{EXCR}_t + \mu$$

466 ..... (5)

467 where, Exchange Rate (EXCR) is introduced in the model as a control variable.  $b_{is}$  are the  
 468 model parameters, t is current year while t-1 denotes the previous year. Other variables  
 469 remain as defined in equation (1) above. The model expresses Market Capitalization as  
 470 dependent on the explanatory variables and their previous values where,  $\mu$  = the white noise.

#### 471 ▪ **Source of Data**

472 Annual time series data is sourced from World Bank Indicators 2010 and 2011 edition of the  
 473 CBN statistical bulletin while 2012 series are extrapolated using the popular Moving Average  
 474 Method.

#### 475 ▪ **Software Packages**

476 E-View 5 is used to run the regression while Microsoft Excel 2013 is used to enter the data.

### 477 **3.2 Variable Description**

#### 478 • **De Jure Measures**

479 The IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)  
 480 provides the most readily available, standardized source of information.

481 [39], attempts to capture the intensity of enforcement of controls on both the capital account  
 482 and the current account through a careful reading of the narrative descriptions in the  
 483 AREAER. He scores the intensity of controls for capital account receipts and capital account  
 484 payments separately. For each of these two categories, a score of 0 indicates payments are  
 485 forbidden, 0.5 indicates that there are quantitative or other regulatory restrictions, 1 indicates  
 486 that transactions are subject to heavy taxes, 1.5 indicates that there are less severe taxes,  
 487 and 2 indicates that transactions are free of restrictions or taxes. The sum of the values for  
 488 the two categories is an indicator of over- all capital account openness that ranges between  
 489 0 and 4. A glance at Quinn's data set indicates that the overall trend toward liberalization is  
 490 mostly driven by the OECD countries.

- **De Facto (Quantitative) Measures**

Recently, efforts have been made to gauge the extent of capital mobility through the use of actual capital inflows and outflows, either as a percentage of GDP (as in [39]), by using an annual measure of portfolio and direct investment assets and liabilities as a percentage of GDP as a long-run indicator of financial openness .

- **Market capitalization**

Also known as market value , is the share price times the number of shares outstanding. Listed domestic companies are the domestically incorporated companies listed on the country's stock exchanges at the end of the year. As outstanding stock is bought and sold in public markets, capitalization could be used as aproxy for the public opinion of a company's net worth and is a determining factor in some forms of stock valuation.

- **Trade Openness**

The Openness Index is an economic metric calculated as the ratio of country's total trade, the sum of exports plus imports, to the country's gross domestic product. The interpretation of the Openness Index is the higher the index the larger the influence of trade on domestic activities

### **3.3 RESULTS**

As indicated in the literature, most time series variables are non-stationary and using non-stationary variables in the model might lead to spurious regressions. The first or second differenced terms of the most variables will usually be stationary. Hence some of the variables were found significant at level while all are significant at first differences. See appendix below.

The first step is VAR estimation to select the suitable lag order for the unrestricted VAR. In this respect, lag length criteria test computes various criteria to select the lag order of an unrestricted VAR. In selecting the appropriate lag number, the VAR lag order selection criteria test was employed and lag of 4 is selected for subsequent test based on the minimum Final Prediction Error (FPE) and Akaike information Criteria (AIC) as shown in table 1 below.

**Table 1; VAR Estimation Lag Length**

| LAG | LOGL      | LR        | FPE       | AIC       | SC        | HQ        |
|-----|-----------|-----------|-----------|-----------|-----------|-----------|
| 0   | -677.7763 | NA        | 9.26E+13  | 54.86210  | 55.25214  | 54.97028  |
| 1   | -577.1586 | 128.7906* | 6.48E+12  | 51.93269  | 55.44305  | 52.90631  |
| 2   | -458.0244 | 76.24587  | 6.53E+11* | 47.52195* | 54.15264* | 49.36102* |

\* INDICATES LAG ORDER SELECTED BY THE CRITERION

LR: SEQUENTIAL MODIFIED LR TEST STATISTIC (EACH TEST AT 5% LEVEL)

FPE: FINAL PREDICTION ERROR

AIC: AKAIKE INFORMATION CRITERION

SC: SCHWARZ INFORMATION CRITERION

HQ: HANNAN-QUINN INFORMATION CRITERION

The optimal lag length is 2. The selected lag length is based on different criteria.

Since the individual coefficients in the VAR models are very difficult to be interpreted, we use the Granger causality test, Impulse Response Function analysis and variance decomposition which are contained in VAR to interpret the VAR result. The granger causality test is usually employed in VAR to check for causality among the selected variables. Impulse Response Function analysis is an important one in the VAR model. Analysis of Impulse Response Function traces the response of endogenous variables in the VAR system due to shocks or changes in the error term.

### 3.2 Granger Causality Wald Test for objective i

To achieve objective I, Granger Causality Wald Test was used to examine the causal relationship between stock market developments (proxied by Stock market capitalization) and disaggregated De-jure and De -facto measures of financial openness (Capital account balance, Net foreign direct investment, foreign debt, and Net Portfolio Investment) plus other growth indicators (Trade Openness, Real GDP, and Exchange Rate).

The result is presented in the table 2 below;

542 **Table 2: Summary of Granger Causality Wald Test**  
543

| LAGS: 2                                                          |     |                    |                    |
|------------------------------------------------------------------|-----|--------------------|--------------------|
| NULL HYPOTHESIS:                                                 | OBS | F-STATISTIC        | PROBABILITY        |
| DEJU DOES NOT GRANGER CAUSE MC<br>MC DOES NOT GRANGER CAUSE DEJU | 25  | 0.78270<br>0.34214 | 0.47068<br>0.71432 |
| FDIN DOES NOT GRANGER CAUSE MC<br>MC DOES NOT GRANGER CAUSE FDIN | 25  | 0.19262<br>0.61407 | 0.55104<br>0.82631 |
| NPI DOES NOT GRANGER CAUSE MC<br>MC DOES NOT GRANGER CAUSE NPI   | 25  | 0.14147<br>1.87996 | 0.86894<br>0.17859 |
| DEBT DOES NOT GRANGER CAUSE MC<br>MC DOES NOT GRANGER CAUSE DEBT | 25  | 6.05287<br>0.36065 | 0.00880<br>0.70167 |
| TROP DOES NOT GRANGER CAUSE MC<br>MC DOES NOT GRANGER CAUSE TROP | 25  | 18.5724<br>8.06669 | 2.8E-05<br>0.00270 |
| RGDP DOES NOT GRANGER CAUSE MC<br>MC DOES NOT GRANGER CAUSE RGDP | 25  | 0.67868<br>0.23398 | 0.51859<br>0.79351 |
| EXCR DOES NOT GRANGER CAUSE MC<br>MC DOES NOT GRANGER CAUSE EXCR | 25  | 4.17034<br>1.90554 | 0.03063<br>0.17479 |

544 The granger causality result shows that Deju, FDIN, NPI, RGDP, EXCR does not granger  
545 cause MC. While there is bi-causality between MC and TROP, that is, both MC and TROP  
546 granger cause each other. Also, A uni-directional causality exist between DEBT and MC.  
547 DEBT granger causes MC but Mc does not granger cause DEBT.

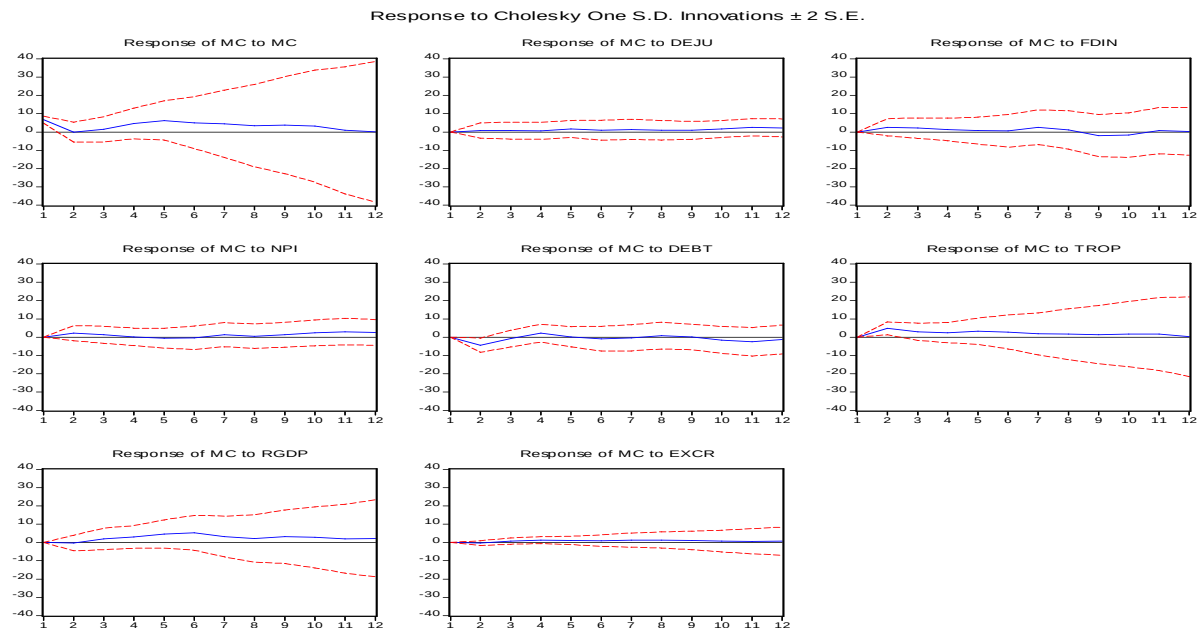
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### 551 **3.3 Impulse response Results (IRF) for objective ii**

552 The graph below shows the impulse response of stock market capitalization, capital flows  
553 and growth variables.



Source ; Graph by IRF, Impulse variable and Response Variable

The impulse response above reveals that the response of MC to shock in DEJU and NPI appears insignificant throughout the period under review. For the response to shock in FDIN, MC responded positive in the first quarter, and between 7<sup>th</sup> and 8<sup>th</sup> month. However, the response was negative towards the end of the year. The response to a shock in DEBT is negative at the beginning and towards the end of the time horizon. MC responded positively all through the period to the shocks in TROP and RGDP. It also responded slightly positive to shocks in EXCR.

### 3.4 Variance Decomposition for objective iii

In applications of multivariate time series analysis, variance decomposition is used to aid in the interpretation of a vector autoregressive (VAR) model once it has been fitted. The variance decomposition indicates the amount of information each variable contributes to the other variables in the autoregression. It determines how much of the forecast error variance of each of the variables can be explained by exogenous shocks to the other variables. This decomposition refers to the contribution of each innovation to the variance of the forecast error associated with the forecast of each variable in the VAR.

### 576 **3.5 Summary of The variance Decomposition**

577 The variance decomposition result presented in the appendix below, shows that MC  
578 accounts for an average of 40 percent of its own shock all through the year while the other  
579 variables accounts for the other 60 percent. Among all the selected variables, TROP and  
580 RGDP seem to account for 45 percent of variation in MC for the period under study.

581

## 582 **4.0 DISCUSSION**

### 583 **4.1 Policy Implication of the Granger Causality Wald Test for objective i**

584 The Causality wald test shows that there is no causal relationship between stock market  
585 development and capital account balance, net foreign direct investment, net portfolio  
586 investment, real gross domestic product, and exchange rate. And this is against our a priori  
587 expectation, it is expected from already existing literature that stock market development is  
588 highly influenced by capital mobility and macroeconomic factors like (Exchange rate,  
589 inflation, interest rate, real GDP among others), the result is line with some studies negating  
590 the existence of any significant relationship between stock market performance and  
591 macroeconomic variables [40]. [41] perceives that stock market has previously generated  
592 'false signals' about the economy and should not be relied on as an economic indicator. The  
593 stock market crash could be an example in which stock prices falsely predicted the direction  
594 of the economy: instead of entering into the recession which many were expecting, the  
595 economy continued to grow for several years [42].

596 Also there is a uni-lateral relationship between debt and stock market development showing  
597 that the level of debt incurred can deter growth in Stock market. While on the other hand, bi-  
598 causality relationship exists between stock exchange development and trade openness, this  
599 is in line with our theoretical literature, trade openness (in theory) has been often referred to  
600 as an engine of growth, since it enables a country to specialize using its comparative  
601 advantage and benefit from the international exchange of goods.

602 This result has to be interpreted with caution since trade flows and FDI can be linked, the  
603 FDI was equally included in the measure of trade openness. FDI is an important source of  
604 stock market Development. Studies have shown that FDI plays roles in raising domestic  
605 savings in the country through creation of jobs and enhancement of technology transfer [43].  
606 Other authors posited that without FDI, it would be difficult to obtain such a large capital  
607 through the country's own domestic savings [44].

608

609

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611

## 612     **4.2     Policy Implication of Impulse response Results (IRF) for objective ii**

613     Looking closely at the result, there exists a strong growth relationship between shocks in  
614     market capitalization and trade openness, real gross domestic product, and exchange rate.  
615     In the wake of financial liberalization worldwide and increasing trade and capital movements,  
616     exchange rates have been identified as one of the major determinants of business  
617     profitability and equity prices. The instability of exchange rate can cause speculation in  
618     foreign exchange market, disrupt international credit operations and international stock  
619     market operations. The instability can also lead to crisis of confidence that could cause  
620     capital flight, or a large-scale withdrawal of short term credit facilities. If there is high  
621     exchange rate, it would encourage round tripping and discourages stock market investment.  
622     It will cause operating cost upward movement and lower corporate profit in the real sector;  
623     the higher the operating cost, the lower the profit. When the value of the currency is  
624     dropping, the incentive to invest by foreign investors in the domestic economy is lost. This  
625     can affect the stock market and price[45].

626     Also in addition, It is important to note that if there is an upward movement in GDP, equity  
627     prices may possibly rise due to the potential for higher profits arising from a healthy business  
628     climate. It has been said that one of the best tools for measuring or estimating the aggregate  
629     economic performance is the Gross Domestic Product (GDP). This is so because if there is  
630     an upward movement in GDP, equity prices may possibly rise due to the potential for higher  
631     profits arising from a stable business and institutional quality. On the other hand, when the  
632     GDP is on the downward trend, there is likelihood of equity price to drop showing that the  
633     business climate is not healthy for further investments, [32].

634

## 635     **4.3     Policy Implication of variance Decomposition for Objective iii**

636     Relaying on the variance decomposition result it is very obvious that the result agrees with  
637     [33], who affirmed that stock market produces its own shocks. And against the a priori  
638     expectation that capital flow have significant impact on stock market development, they are  
639     among the least of variables that have impacted on market capitalization. On the other hand,  
640     Trade openness and real gross domestic product did contributed 45 percent of shocks in  
641     Market capitalization. This could as a result of corruption, lack of transparency, and  
642     instability in the political and economic environment in Nigeria. Though, this results need to  
643     be interpreted with caution

644

645

#### 646 **4.4 POLICY SUGGESTION**

- 647 ➤ Financial liberalization can never an end but a means to an end, therefore it must be
- 648 combined with appropriate fiscal and monetary policy if we will achieve positive
- 649 result.
- 650 ➤ For Nigeria to reap the benefit associated with capital flow, she must build a stable
- 651 and strong macro-economic, political and institutional environment that is devoid of
- 652 constant crisis.
- 653 ➤ Corruption has been remarked as the hallmark of problem confronting developing
- 654 country, thus it is a strong factor against growth of any sector. This can be checked
- 655 by understanding the composition of capital flow.
- 656 ➤ Lack of transparency, accountability and prudential supervision will reduce the
- 657 benefits Nigeria will enjoy considering liberalization. Therefore, measures should be
- 658 put in place.
- 659 ➤ For countries that choose to liberalize capital flows, there should emphasis on a
- 660 systematic process and pace consistent with the country's institutional and financial
- 661 development.

#### 662 **4.5 CONCLUSION**

663 A central debate in international economics is on the supposed impact of trade/ financial  
664 openness; whether it has significant impact on the macro-economy. Also, there has been  
665 arguments by scholars on the risk posed be liberalizing capital flow. But one important issue  
666 is that as country grows, they require more advanced financial systems which usually go  
667 hand in hand with greater cross border capital flows.

668 This paper have successfully, analyzed the impact of capital flow on stock market  
669 development in Nigeria, and it is clear from our regression result that Trade openness and  
670 real gross domestic product have been strong factors that are consistent in affecting stock  
671 market development in Nigeria. As proposed by theoretical evidence, that a country seeks  
672 both economic and financial integration with the rest of the world, in order to achieve speedy  
673 economic growth and develop its financial sector.

674 It is very obvious that opening to trade will affect demand for external finance, and thus  
675 financial depth, in the trading countries. In addition, foreign investment/investors require  
676 strong stock exchange market and stable macro-economic/ institutional environment to  
677 operate.

678 Thus, it is very important to put into consideration the inter- reliant relationship between  
679 stock market development, economic growth and capital flows/ openness. Though foreign

680 Direct Investment (FDI) and portfolio investment are major components of capital flow, but  
681 based on our regression results we found that they are not strong factors for stock market  
682 development.

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## 805 APPENDIX

### Unit Root Test at levels

Null Hypothesis: **MCFD** has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

|                                        | t-Statistic | Prob.* |
|----------------------------------------|-------------|--------|
| Augmented Dickey-Fuller test statistic | -2.094589   | 0.2483 |
| Test critical values:                  |             |        |
| 1% level                               | -3.737853   |        |
| 5% level                               | -2.991878   |        |
| 10% level                              | -2.635542   |        |

Null Hypothesis: **DEJU** has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic based on SIC, MAXLAG=5)

|                                        | t-Statistic | Prob.* |
|----------------------------------------|-------------|--------|
| Augmented Dickey-Fuller test statistic | -0.957744   | 0.7504 |
| Test critical values: 1% level         | -3.752946   |        |
| 5% level                               | -2.998064   |        |
| 10% level                              | -2.638752   |        |

Null Hypothesis: **FDIN** has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

|                                        | t-Statistic | Prob.* |
|----------------------------------------|-------------|--------|
| Augmented Dickey-Fuller test statistic | -3.647906   | 0.0122 |
| Test critical values: 1% level         | -3.737853   |        |
| 5% level                               | -2.991878   |        |
| 10% level                              | -2.635542   |        |

Null Hypothesis: **NPI** has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

|                                        | t-Statistic | Prob.* |
|----------------------------------------|-------------|--------|
| Augmented Dickey-Fuller test statistic | -5.070860   | 0.0004 |
| Test critical values: 1% level         | -3.737853   |        |
| 5% level                               | -2.991878   |        |
| 10% level                              | -2.635542   |        |

Null Hypothesis: **DEBT** has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic based on SIC, MAXLAG=5)

|                                        | t-Statistic | Prob.* |
|----------------------------------------|-------------|--------|
| Augmented Dickey-Fuller test statistic | 0.054829    | 0.9546 |
| Test critical values: 1% level         | -3.752946   |        |
| 5% level                               | -2.998064   |        |
| 10% level                              | -2.638752   |        |

Null Hypothesis: **TROP** has a unit root

Exogenous: Constant

Lag Length: 2 (Automatic based on SIC, MAXLAG=5)

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                                        | t-Statistic | Prob.* |
|----------------------------------------|-------------|--------|
| Augmented Dickey-Fuller test statistic | 0.870524    | 0.9930 |
| Test critical values:                  |             |        |
| 1% level                               | -3.769597   |        |
| 5% level                               | -3.004861   |        |
| 10% level                              | -2.642242   |        |

Null Hypothesis: **RGDP** has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

|                                        | t-Statistic | Prob.* |
|----------------------------------------|-------------|--------|
| Augmented Dickey-Fuller test statistic | -2.756022   | 0.0797 |
| Test critical values:                  |             |        |
| 1% level                               | -3.737853   |        |
| 5% level                               | -2.991878   |        |
| 10% level                              | -2.635542   |        |

Null Hypothesis: EXCR has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

|                                        | t-Statistic | Prob.* |
|----------------------------------------|-------------|--------|
| Augmented Dickey-Fuller test statistic | -0.294737   | 0.9120 |
| Test critical values:                  |             |        |
| 1% level                               | -3.737853   |        |
| 5% level                               | -2.991878   |        |
| 10% level                              | -2.635542   |        |

### Unit Root Test at First Difference

Null Hypothesis: **D(MCFD)** has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic based on SIC, MAXLAG=5)

|                                        | t-Statistic | Prob.* |
|----------------------------------------|-------------|--------|
| Augmented Dickey-Fuller test statistic | -5.305971   | 0.0003 |
| Test critical values:                  |             |        |
| 1% level                               | -3.769597   |        |
| 5% level                               | -3.004861   |        |
| 10% level                              | -2.642242   |        |

Null Hypothesis: **D(DEJU)** has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

|                                        | t-Statistic | Prob.* |
|----------------------------------------|-------------|--------|
| Augmented Dickey-Fuller test statistic | -5.783755   | 0.0001 |
| Test critical values:                  |             |        |
| 1% level                               | -3.752946   |        |
| 5% level                               | -2.998064   |        |
| 10% level                              | -2.638752   |        |

\*MacKinnon (1996) one-sided p-values.

Null Hypothesis: **D(DEBT,2)** has a unit root

Exogenous: Constant

Lag Length: 4 (Automatic based on SIC, MAXLAG=5)

|                                        | t-Statistic | Prob.* |
|----------------------------------------|-------------|--------|
| Augmented Dickey-Fuller test statistic | -4.808037   | 0.0015 |
| Test critical values:                  |             |        |
| 1% level                               | -3.857386   |        |
| 5% level                               | -3.040391   |        |
| 10% level                              | -2.660551   |        |

Null Hypothesis: **D(TROP)** has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic based on SIC, MAXLAG=5)

|                                        | t-Statistic | Prob.* |
|----------------------------------------|-------------|--------|
| Augmented Dickey-Fuller test statistic | -7.204982   | 0.0000 |
| Test critical values:                  |             |        |
| 1% level                               | -3.769597   |        |
| 5% level                               | -3.004861   |        |
| 10% level                              | -2.642242   |        |

Null Hypothesis: **D(RGDP)** has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

|                                        | t-Statistic | Prob.* |
|----------------------------------------|-------------|--------|
| Augmented Dickey-Fuller test statistic | -5.285354   | 0.0003 |
| Test critical values:                  |             |        |
| 1% level                               | -3.752946   |        |
| 5% level                               | -2.998064   |        |
| 10% level                              | -2.638752   |        |

Null Hypothesis: **D(EXCR)** has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

|                                        | t-Statistic | Prob.* |
|----------------------------------------|-------------|--------|
| Augmented Dickey-Fuller test statistic | -4.634811   | 0.0013 |
| Test critical values: 1% level         | -3.752946   |        |
| 5% level                               | -2.998064   |        |
| 10% level                              | -2.638752   |        |

VAR Lag Order Selection Criteria

Endogenous variables: MC DEJU FDIN NPI DEBT TROP RGDP EXCR

Exogenous variables: C

Date: 04/27/14 Time: 00:39

Sample: 1986 2012

Included observations: 25

| Lag | LogL      | LR        | FPE       | AIC       | SC        | HQ        |
|-----|-----------|-----------|-----------|-----------|-----------|-----------|
| 0   | -677.7763 | NA        | 9.26e+13  | 54.86210  | 55.25214  | 54.97028  |
| 1   | -577.1586 | 128.7906* | 6.48e+12  | 51.93269  | 55.44305  | 52.90631  |
| 2   | -458.0244 | 76.24587  | 6.53e+11* | 47.52195* | 54.15264* | 49.36102* |

\* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

|                                              |            |            |            |            |            |            |            |            |
|----------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Vector Autoregression Estimates              |            |            |            |            |            |            |            |            |
| Date: 04/27/14 Time: 07:46                   |            |            |            |            |            |            |            |            |
| Sample (adjusted): 1988 2012                 |            |            |            |            |            |            |            |            |
| Included observations: 25 after adjustments  |            |            |            |            |            |            |            |            |
| Standard errors in ( ) & t-statistics in [ ] |            |            |            |            |            |            |            |            |
|                                              |            |            |            |            |            |            |            |            |
|                                              | MC         | DEJU       | FDIN       | NPI        | DEBT       | TROP       | RGDP       | EXCR       |
|                                              |            |            |            |            |            |            |            |            |
| MC(-1)                                       | 0.668199   | -0.017684  | 1.161768   | 8.820679   | 0.210054   | 0.026724   | -0.325895  | -0.529312  |
|                                              | (0.31259)  | (0.01166)  | (1.05612)  | (5.27875)  | (0.92224)  | (0.00888)  | (0.25240)  | (0.52701)  |
|                                              | [ 2.13761] | [-1.51707] | [ 1.10004] | [ 1.67098] | [ 0.22776] | [ 3.01118] | [-1.29117] | [-1.00437] |

|          |            |            |            |            |            |            |            |            |
|----------|------------|------------|------------|------------|------------|------------|------------|------------|
|          |            |            |            |            |            |            |            |            |
| MC(-2)   | -1.188201  | -0.001854  | 0.857462   | -5.773977  | -0.418029  | 0.021070   | 0.139881   | 1.210550   |
|          | (0.36707)  | (0.01369)  | (1.24018)  | (6.19872)  | (1.08297)  | (0.01042)  | (0.29639)  | (0.61885)  |
|          | [-3.23700] | [-0.13547] | [ 0.69140] | [-0.93148] | [-0.38600] | [ 2.02174] | [ 0.47195] | [ 1.95611] |
|          |            |            |            |            |            |            |            |            |
| DEJU(-1) | -1.698372  | 0.190490   | -12.21969  | 219.8141   | 10.10219   | 0.168322   | -4.821297  | 37.66215   |
|          | (6.10862)  | (0.22779)  | (20.6386)  | (103.157)  | (18.0224)  | (0.17344)  | (4.93242)  | (10.2988)  |
|          | [-0.27803] | [ 0.83624] | [-0.59208] | [ 2.13087] | [ 0.56054] | [ 0.97052] | [-0.97747] | [ 3.65696] |
|          |            |            |            |            |            |            |            |            |
| DEJU(-2) | 4.458683   | 0.338038   | -4.889721  | 76.97501   | 1.867493   | -0.174079  | -1.399914  | -21.15045  |
|          | (8.51138)  | (0.31739)  | (28.7565)  | (143.732)  | (25.1113)  | (0.24165)  | (6.87254)  | (14.3497)  |
|          | [ 0.52385] | [ 1.06504] | [-0.17004] | [ 0.53554] | [ 0.07437] | [-0.72037] | [-0.20370] | [-1.47393] |
|          |            |            |            |            |            |            |            |            |
| FDIN(-1) | -0.029677  | -0.009909  | 0.260276   | -1.512664  | 0.437541   | 0.004896   | -0.042473  | -0.107930  |
|          | (0.08686)  | (0.00324)  | (0.29345)  | (1.46675)  | (0.25625)  | (0.00247)  | (0.07013)  | (0.14643)  |
|          | [-0.34168] | [-3.05943] | [ 0.88695] | [-1.03130] | [ 1.70746] | [ 1.98549] | [-0.60561] | [-0.73706] |
|          |            |            |            |            |            |            |            |            |
| FDIN(-2) | -0.016395  | 0.007595   | -0.678505  | -0.832229  | 0.262678   | 0.003762   | 0.080983   | 0.123664   |
|          | (0.09214)  | (0.00344)  | (0.31129)  | (1.55590)  | (0.27183)  | (0.00262)  | (0.07440)  | (0.15533)  |
|          | [-0.17794] | [ 2.21052] | [-2.17966] | [-0.53489] | [ 0.96634] | [ 1.43832] | [ 1.08855] | [ 0.79611] |
|          |            |            |            |            |            |            |            |            |
| NPI(-1)  | -0.001992  | 0.000317   | -0.045261  | -0.294425  | -0.009517  | 0.000192   | 0.000339   | 0.025146   |
|          | (0.01219)  | (0.00045)  | (0.04119)  | (0.20589)  | (0.03597)  | (0.00035)  | (0.00984)  | (0.02055)  |
|          | [-0.16341] | [ 0.69762] | [-1.09878] | [-1.43003] | [-0.26459] | [ 0.55468] | [ 0.03443] | [ 1.22338] |
|          |            |            |            |            |            |            |            |            |
| NPI(-2)  | -0.005357  | -3.41E-05  | 0.004140   | -0.173619  | -0.040600  | 3.52E-05   | -0.006392  | -0.015353  |
|          | (0.01240)  | (0.00046)  | (0.04189)  | (0.20937)  | (0.03658)  | (0.00035)  | (0.01001)  | (0.02090)  |
|          | [-0.43207] | [-0.07385] | [ 0.09884] | [-0.82922] | [-1.10992] | [ 0.09986] | [-0.63847] | [-0.73450] |
|          |            |            |            |            |            |            |            |            |
| DEBT(-1) | -0.135200  | -0.011048  | 0.268531   | 2.052726   | 0.122443   | 0.003945   | -0.074112  | 0.040807   |
|          | (0.11220)  | (0.00418)  | (0.37908)  | (1.89472)  | (0.33102)  | (0.00319)  | (0.09060)  | (0.18916)  |
|          | [-1.20500] | [-2.64046] | [ 0.70838] | [ 1.08339] | [ 0.36989] | [ 1.23846] | [-0.81805] | [ 0.21572] |
|          |            |            |            |            |            |            |            |            |
| DEBT(-2) | 0.002112   | -0.010306  | 0.354036   | 2.947682   | 0.616712   | 0.007469   | -0.025990  | 0.044096   |
|          | (0.12406)  | (0.00463)  | (0.41913)  | (2.09493)  | (0.36600)  | (0.00352)  | (0.10017)  | (0.20915)  |
|          | [ 0.01703] | [-2.22783] | [ 0.84469] | [ 1.40705] | [ 1.68499] | [ 2.12057] | [-0.25946] | [ 0.21084] |

|                |            |            |            |            |            |            |            |            |
|----------------|------------|------------|------------|------------|------------|------------|------------|------------|
|                |            |            |            |            |            |            |            |            |
| TROP(-1)       | 39.55815   | -0.576738  | 40.47393   | 462.1080   | -11.67006  | -0.290374  | -13.81839  | -12.04745  |
|                | (11.5125)  | (0.42931)  | (38.8961)  | (194.413)  | (33.9655)  | (0.32686)  | (9.29580)  | (19.4094)  |
|                | [ 3.43610] | [-1.34341] | [ 1.04056] | [ 2.37694] | [-0.34359] | [-0.88837] | [-1.48652] | [-0.62070] |
|                |            |            |            |            |            |            |            |            |
| TROP(-2)       | 3.406751   | -0.309609  | 28.73828   | 210.4457   | -23.87168  | 0.076539   | -5.720420  | 2.118107   |
|                | (8.59128)  | (0.32037)  | (29.0265)  | (145.082)  | (25.3470)  | (0.24392)  | (6.93705)  | (14.4844)  |
|                | [ 0.39654] | [-0.96640] | [ 0.99007] | [ 1.45053] | [-0.94180] | [ 0.31378] | [-0.82462] | [ 0.14623] |
|                |            |            |            |            |            |            |            |            |
| RGDP(-1)       | 0.086082   | 0.002200   | 0.730085   | 6.119560   | -0.147690  | 0.013391   | 0.067415   | 0.216340   |
|                | (0.45161)  | (0.01684)  | (1.52581)  | (7.62637)  | (1.33239)  | (0.01282)  | (0.36465)  | (0.76139)  |
|                | [ 0.19061] | [ 0.13063] | [ 0.47849] | [ 0.80242] | [-0.11085] | [ 1.04439] | [ 0.18487] | [ 0.28414] |
|                |            |            |            |            |            |            |            |            |
| RGDP(-2)       | -0.464131  | 0.024860   | 0.318285   | 17.13560   | -0.247009  | 0.001028   | -0.229931  | 0.066457   |
|                | (0.35346)  | (0.01318)  | (1.19421)  | (5.96899)  | (1.04283)  | (0.01004)  | (0.28541)  | (0.59592)  |
|                | [-1.31309] | [ 1.88607] | [ 0.26652] | [ 2.87077] | [-0.23686] | [ 0.10244] | [-0.80563] | [ 0.11152] |
|                |            |            |            |            |            |            |            |            |
| EXCR(-1)       | -0.111089  | -0.004683  | 0.042588   | -3.072843  | 0.093136   | 0.011200   | 0.111640   | 0.908010   |
|                | (0.19890)  | (0.00742)  | (0.67199)  | (3.35880)  | (0.58681)  | (0.00565)  | (0.16060)  | (0.33533)  |
|                | [-0.55852] | [-0.63133] | [ 0.06338] | [-0.91486] | [ 0.15872] | [ 1.98336] | [ 0.69514] | [ 2.70782] |
|                |            |            |            |            |            |            |            |            |
| EXCR(-2)       | -0.052717  | -0.001173  | -0.236433  | -3.433743  | -0.150627  | -0.000370  | 0.089177   | -0.026929  |
|                | (0.13238)  | (0.00494)  | (0.44726)  | (2.23550)  | (0.39056)  | (0.00376)  | (0.10689)  | (0.22318)  |
|                | [-0.39823] | [-0.23768] | [-0.52863] | [-1.53601] | [-0.38567] | [-0.09834] | [ 0.83429] | [-0.12066] |
|                |            |            |            |            |            |            |            |            |
| C              | 13.03768   | 2.513990   | -90.49385  | -43.03801  | 44.82220   | -1.598347  | 11.92540   | 22.93835   |
|                | (30.4320)  | (1.13483)  | (102.818)  | (513.908)  | (89.7840)  | (0.86402)  | (24.5724)  | (51.3065)  |
|                | [ 0.42842] | [ 2.21530] | [-0.88014] | [-0.08375] | [ 0.49922] | [-1.84989] | [ 0.48532] | [ 0.44708] |
|                |            |            |            |            |            |            |            |            |
| R-squared      | 0.912347   | 0.947120   | 0.660769   | 0.821748   | 0.946650   | 0.947023   | 0.699088   | 0.987244   |
| Adj. R-squared | 0.737041   | 0.841360   | -0.017693  | 0.465244   | 0.839950   | 0.841068   | 0.097265   | 0.961733   |
| Sum sq. resids | 368.2919   | 0.512143   | 4204.021   | 105027.1   | 3205.743   | 0.296879   | 240.1186   | 1046.827   |
| S.E. equation  | 6.785019   | 0.253018   | 22.92384   | 114.5792   | 20.01794   | 0.192639   | 5.478579   | 11.43912   |
| F-statistic    | 5.204303   | 8.955359   | 0.973922   | 2.305018   | 8.872097   | 8.938028   | 1.161617   | 38.69801   |
| Log likelihood | -69.09846  | 13.12688   | -99.53497  | -139.7622  | -96.14625  | 19.94287   | -63.75168  | -82.15651  |
| Akaike AIC     | 6.887877   | 0.309850   | 9.322798   | 12.54098   | 9.051700   | -0.235430  | 6.460134   | 7.932520   |

|                                         |          |           |          |          |          |          |          |          |
|-----------------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|
| Schwarz SC                              | 7.716712 | 1.138686  | 10.15163 | 13.36981 | 9.880536 | 0.593406 | 7.288970 | 8.761356 |
| Mean dependent                          | 15.75800 | -1.054888 | 34.22988 | 139.5088 | 68.08480 | 0.927200 | 5.501200 | 78.90360 |
| S.D. dependent                          | 13.23143 | 0.635249  | 22.72370 | 156.6852 | 50.03710 | 0.483214 | 5.766174 | 58.47617 |
|                                         |          |           |          |          |          |          |          |          |
| Determinant resid covariance (dof adj.) |          | 1.03E+10  |          |          |          |          |          |          |
| Determinant resid covariance            |          | 1131365.  |          |          |          |          |          |          |
| Log likelihood                          |          | -458.0244 |          |          |          |          |          |          |
| Akaike information criterion            |          | 47.52195  |          |          |          |          |          |          |
| Schwarz criterion                       |          | 54.15264  |          |          |          |          |          |          |

| Pairwise Granger Causality Tests |     |             |                |
|----------------------------------|-----|-------------|----------------|
| Date: 04/27/14 Time: 00:58       |     |             |                |
| Sample: 1986 2012                |     |             |                |
| Lags: 2                          |     |             |                |
|                                  |     |             |                |
| Null Hypothesis:                 | Obs | F-Statistic | Probability    |
|                                  |     |             |                |
| DEJU does not Granger Cause MC   | 25  | 0.78270     | 0.47068        |
| MC does not Granger Cause DEJU   |     | 0.34214     | 0.71432        |
|                                  |     |             |                |
| FDIN does not Granger Cause MC   | 25  | 0.19262     | 0.82631        |
| MC does not Granger Cause FDIN   |     | 0.61407     | 0.55104        |
|                                  |     |             |                |
| NPI does not Granger Cause MC    | 25  | 0.14147     | 0.86894        |
| MC does not Granger Cause NPI    |     | 1.87996     | 0.17859        |
|                                  |     |             |                |
| DEBT does not Granger Cause MC   | 25  | 6.05287     | <b>0.00880</b> |
| MC does not Granger Cause DEBT   |     | 0.36065     | 0.70167        |
|                                  |     |             |                |
| TROP does not Granger Cause MC   | 25  | 18.5724     | <b>2.8E-05</b> |
| MC does not Granger Cause TROP   |     | 8.06669     | <b>0.00270</b> |
|                                  |     |             |                |
| RGDP does not Granger Cause MC   | 25  | 0.67868     | 0.51859        |
| MC does not Granger Cause RGDP   |     | 0.23398     | 0.79351        |
|                                  |     |             |                |
| EXCR does not Granger Cause MC   | 25  | 4.17034     | <b>0.03063</b> |
| MC does not Granger Cause EXCR   |     | 1.90554     | 0.17479        |

#### IMPULSE RESPONSE OF MC TO THE SELECTED VARIABLES

[illegible]