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Modelling the Long Run Determinants of Foreign Portfolio Investment in Nigeria

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Abstract

This study tries to ascertain the long run determinants of foreign portfolio investment (FPI) in Nigeria such that appropriate policies will be pursued to attract same in the long run. FPI has grown recently in proportion relative to other types of capital inflows to Nigeria before the wake of global financial crisis. Incidentally, there is no empirical regularity regarding the determinants of FPI. This study tries to add to the stock of knowledge by modelling the long-run determinants of FPI in Nigeria over the period of 1981-2010 converted into quarterly series. The variables considered are, market capitalization, real exchange rate, real interest rate, real gross domestic product and trade openness. The study applies time series analysis specifically the finite distributed lag model and discovers that FPI has a positive long-run relationship with market capitalization, and trade openness in Nigeria. Ongoing efforts therefore to sanitize the capital market should be vigorously pursued.

Keywords: Nigeria, Foreign Portfolio Investment, macroeconomic variables.

1. Introduction

Foreign portfolio investment (FPI) is an aspect of international capital flows[i] comprising of transfer of financial assets: such as cash; stock or bonds across international borders in want of profit. It occurs when investors purchase non-controlling interests in foreign companies or buy foreign corporate or government bonds, short-term securities, or notes. Accordingly, just as trade flows result from individuals and countries seeking to maximize their well-being by exploiting their own comparative advantage, so too, are capital flows the result of individuals and countries seeking to make themselves better off, moving accumulated assets to wherever they are likely to be most productive (ERP, 2006). This type of investment has become an increasingly significant part of the world economy over the past three decades and an important source of fund to support investment not only in developed but also developing countries.

Even though Prasand et al., (2007) document a recent phenomenon of "uphill" flows of capital from non-industrial to industrial countries and analyze whether the pattern of capital flows has hurt growth in non-industrial economies that export capital, there has equally been a dramatic increase in the magnitude of international flows of portfolio investment, especially from countries in the North to emerging market economies across the South including Nigeria since the 80s. This has been adjudged to be motivated by relatively low yields in industrial countries together with impressive economic growth and attractive returns in developing economies (Siamwalla et al, 1999). Again, the demand for longer-term finance by the private sectors, and the willingness on the part of developing country governments to provide the legal and regulatory frameworks are fostering instruments, institutions, and especially FPI into the capital markets. However, these massive international flows of portfolio investment to emerging markets have sparked debate about the benefits and demerits as well as its determinants.

While a good number of benefits and demerits associated with international flows of portfolio investment to

emerging market economies are well documented in the literature (Grabel, 1998, ERP, 2002, 2003; FitzGerald, 1999), a wide range of factors have been adduced to have prompted the increase in private capital flows to developing countries. Opinions however differ as to the relative contribution of "push" factors reflecting changes in developed country markets (Fernandez-Arias, 1994) and "pull" factors arising from changes in developing countries (Chuhan et al, 1993, Hernandez and Rudolph 1995)[ii]. That notwithstanding, recent empirical studies have tried to ascertain the determinants of FPI as well as its impacts on the economy. Following literature there are the economic determinants comprising of macroeconomic factors[iii], such as Gross Domestic Product (GDP) growth, exchange rate stability, interest rate, capital liquidity, and the international trade in goods. Again, policy and regulatory determinants of the host national governments are also key criteria necessitating foreign portfolio investment flows to emerging market economies (Collard, et al, 2007; Ditlbacher, et al., 2005). Incidentally, there are no empirical regularities regarding the determinants of FPI. This study tries to add to the stock of knowledge by modelling the long-run determinants of FPI in Nigeria over the period of 1981-2010 (converted into quarterly series) considering the volatile nature of the variable and in the light of the recent global economic and financial crisis. The essence is to ascertain if there is a long-run relationship (co-integration relation) between FPI and its determinants and as such pursue policies that may likely attract same in the long run. The rest of the paper is divided into four sections. Section two examines the nature and trend of capital flow to Nigeria while section three looks at the overview of the literature. Section four presents the methodology, data and data sources as well as the presentation of results and result analysis while section five concludes.

2. Capital Flows to Nigeria: Nature and Trend

Foreign portfolio investment, though a recent phenomenon in Nigeria compared to foreign direct investment, Oversea Development Assistance (ODA) and bank loans, were on the increase since the mid-80s. The relative importance of Portfolio investment to a small emerging market like Nigeria has been attributed to the effective role played by the Nigerian capital market in the recent past. This includes the deregulation of the capital market in 1993 which made the federal government to internationalize the market in 1995, with the abrogation of laws that constrained foreign participation in the Nigeria capital market. Following the abrogation of the Exchange Control Act 1962, foreigners can participate in the Nigerian capital market both as operators and investors. Accordingly, with the internationalization of the Nigerian stock exchange, which was part of the financial liberalization policy in Nigeria in the mid 2000, there were increased inflow of foreign portfolio investment into the Nigeria economy through the capital market (CBN, 2006).

Before 1986, capital flows to Nigeria were mainly, foreign direct investment, ODA and bank loans. However, from 1986, there was a change in the composition of private capital flows to Nigeria. Foreign portfolio investment took the centre stage and its share of private capital flows to Nigeria were on the increase while at the same time official flows, (ODA) and bank loans were declining in real terms. FPI (bond and equity) increased dramatically over the last twenty years that by the end of 2005 it surpassed every other type of capital inflows into Nigeria. It should be noted that institutional investors have also become very important. Not only have they increased their share of companies listed on the stock markets, they have also started to invest more in other emerging and developed markets (AFDB/OECD, 2007). However, with the global financial and economic crisis that started in 2009, the FPI flow into Nigeria decreased significantly.

Even though, FPI is generally considered more passive or speculative in nature than direct investment in equity capital and by contrast highly sensitive to changes in its determinants, and may be withdrawn from the market at short notice, it is still very important in the investment climate of Nigeria considering the saving-investment gap as recorded in the National Economic Empowerment and Development Strategy (NEEDS) and in the vision 20:2020.

3. Overview of the Literature

A wide range of factors have been adduced to be responsible for the increase in international flow of portfolio investment. Siamwalla et al (1999) opine that relatively low yields in industrial countries together with impressive

economic growth and attractive returns in developing economies motivated western investors to relocate their funds to money and capital markets to developing countries. He posits that the increase in international flow of portfolio investment corresponded well with the trend towards trade globalization, international financial linkages, and expansion of production bases overseas.

Grabel, (1998) opines that since the mid-1980s, there has been a dramatic increase in the magnitude of international flows of portfolio investment, especially from countries in the North to emerging market economies across the South. He posits that North-South Portfolio Investment (PI) flows have been heralded as a relatively safe, efficient means of transferring capital to those countries where it is needed most. But this view has been challenged by the series of financial crises across the South, from Mexico in 1994 to Southeast Asia in 1997-98. Thus, many economists have argued that these crises are anomalous, reflecting exceptional circumstances. A closer look however reveals that the unregulated international flow of PI, especially into emerging market economies, is fraught with deep structural problems.

Errunza (2005) posits that the reform of local capital markets and relaxation of capital controls to attract foreign portfolio investments (FPIs) has become an integral part of development strategy. The proximity of market openings and large, sudden shifts in international capital flows gave credence to the notion that the liberalization was the primary culprit that precipitated the Asian crisis. Hence, he reassesses the benefits and costs of FPIs from the perspective of the recipients. Specifically, he discusses the various FPI contributions and presents empirical evidence regarding the relationship between FPIs and market development, degree of capital market integration, cost of capital, cross-market correlation and market volatility. It is clear that the evidence on the benefits of FPIs is strong, whereas the policy concerns regarding resource mobilization, market co-movements, contagion, and volatility are largely unwarranted. He profers some policy suggestions on preconditions for capital market openings, market regulation, and liberalization sequencing.

Agarwal (2006) examines the determinants of foreign portfolio investment (FPI) and its impact on the national economy in six developing Asian countries. Regression results show that inflation rate, real exchange rate, index of economic activity and the share of domestic capital market in the world stock market capitalization are four statistically significant determinants of FPI. The first variable has a negative coefficient while the last three variables possess positive coefficients. Foreign direct investment, total foreign trade and current account deficit variables are found to be statistically insignificant. Regarding the impact of FPI on the national economies, it is found that the index of economic activities and inflation rate show an upward trend. Volatility in portfolio flows has not increased overtime. Ratio of foreign debt and debt-servicing to GDP has declined. But the rule of thumb regarding the issue of sustainability of FPI suggests that India and Indonesia have crossed the upper bounds of permissible debt ratios.

Aggarwal, et al, (2003) examine the investment allocation choices of actively-managed U.S. mutual funds in emerging markets after the Asian financial crisis. They analyze both country- and firm-level governance and disclosure policies that influence these investment allocation decisions. At the country-level, they find that U.S. funds invest more in open emerging markets with stronger shareholder rights, legal frameworks and accounting standards. After controlling for country characteristics, U.S. funds are found to invest more in firms that adopt policies resulting in greater transparency and accounting disclosures in addition to characteristics such as size, visibility, and high analyst following. The impact of stronger disclosure and transparency is most pronounced in countries with weaker investor protection. Their results suggest that steps can be taken both at the country and the firm level to create an environment conducive to foreign institutional investment.

Rai and Bhanumurthy (2007) try to examine the determinants of Foreign Institutional Investments (FII) in India, which have crossed almost US$ 12 billions by the end of 2002. Given the huge volume of these flows and its impact on the other domestic financial markets understanding the behavior of these flows becomes very important at the

time of liberalizing capital account. In this study, by using monthly data, we found that FII inflow depends on stock market returns, inflation rate (both domestic and foreign) and ex-ante risk. In terms of magnitude, the impact of stock market returns and the ex-ante risk turned out to be major determinants of FII inflow. This study did not find any causation running from FII inflow to stock returns as it was found by some studies. Stabilizing the stock market volatility and minimizing the ex-ante risk would help in attracting more FII inflow that has positive impact on the real economy.

Lee (2007) posits that in the last several years there has been a substantial theoretical advancement in our understanding of the factors determining international portfolio capital movements. From the mechanistic flow theory, progress has been made to the portfolio-adjustment theory which rests on a firmer microeconomic foundation. However, because of the multifarious functions of the United States in the world economy the portfolio-adjustment theory is not quite adequate in explaining the foreign portfolio investments in the United States. There are other motives such as maintaining working balances and compensatory balances in addition to the expected utility maximization. In some studies, ad hoc assumptions are introduced to account for these motives for holding U.S. liabilities. Given some statistically successful results, there is much to be desired in this simple portfolio approach modified with ad hoc assumptions. Despite the theoretical weakness Lee asserts that there would have been more empirical research in this area if data on wealth for foreign countries were available. Furthermore, the few existing studies were carried out by doing away with the wealth variable without any convincing justification. Given the constraint of data a more persuasive argument will have to be presented in favor of deleting the wealth variable or using an alternative variable. It seems that a proper use of estimates of permanent income, which can be approximated empirically, may be successful in empirical estimations of capital flows.

4.0 Research Methodology

Multiple regression analysis models of vector error correction model (VECM) are the statistical framework for the research study. This model has been widely used with a good empirical output. Consequently, this study adopts the Vector Error Correction Model (VECM). The model allows the joint estimation of the multiplier effects and adjustment effects of the long-run determinants of foreign portfolio investment in Nigeria.

4.1 *Model Specifications*

We present the formulation of the linear functional relationships of our variables as follow:

$$FPI_t = \alpha_{10} + \varphi_{11} RGDPg_t + \varphi_{12} RIR_t + \varphi_{13} REXC_t + \varphi_{14} MCap_t + \varphi_{15} TDO_t + \varepsilon_{1t} \ldots\ldots\ldots\ldots (1)$$

Where

FPI = Net Foreign Portfolio investment

RGDPg = Growth rate of real GDP

RIR = Real interest rate

REXC = Real exchange rate

MCap = Market capitalization (SIZE)

TDO = Trade degree of openness

Here, RGDPg is allowed as one of the explanatory variables following Passinatti's Profit – growth model[iv] (Jhingan, 1997). The internal rate of return (IRR) is a measure of the rate of return expected by capitals. An import of the Passinatti's model is that IRR can be subsumed in RGDPg, hence in this study; RGDPg is used as a proxy for rate of

return. By lagging the above model in equation (1) yield the following:

$$FPI_t = \alpha_{10} + \varphi_{11} RGDPg_{t-1} + \varphi_{12} RIR_{t-1} + \varphi_{13} REXC_{t-1} + \varphi_{14} MCap_{t-1} + \varphi_{15} TDO_{t-1} + \varepsilon_{1t} \ldots\ldots\ldots(2)$$

We first estimate equation (1) above using OLS. However, according to Engle-Granger the usual presence of the trend in macroeconomic data suggest testing co-integration thus equation (1) is adapted as:

$$FPI_t = \alpha_{10} + \varphi' X_{ij} + \delta t + \varepsilon_{1t} \text{ ---------- (3)}$$

Where φ is a 1xm vector and X is the vector of the explanatory variables included in the model, δ is the parameter of the trend. Estimating equation (3) and saving the residuals, we apply ADF test to the residuals:

$$\Delta\varepsilon_{1t} = \phi_{10}\varepsilon_{1t-1} + \sum_{i-1}^{p} \phi_{1i} \Delta\varepsilon_{1t-1} + \mu_{1t} \text{ ---------- (4)}$$

The hypothesis test of ADF is of following:

H0: ϕ = 1 Unit Root: No Co integration

H1: ϕ < 1 Stationary residuals: Co integration

The above null represents a permanent non-reverting shock to the residuals, in other words deviation from equilibrium is permanent, implying no proof of the theoretical equilibrium in the data. The alternative of stationary residuals means that the deviation from equilibrium is temporary in the short run and eventually the residuals are 'mean-reverting'; meaning that shocks fades out eventually and equilibrium does exist; φ would be interpreted as Long – Run multiplier. Following the Engle – Granger representation theorem, if the I(1) non-stationary variables are co-integrated then a Vector Error Correction Model represents these variables, in first differences the VECM would take the form of:

$$\Delta Z_t = \alpha_{01} + \prod Z_{t-i} + \sum_{i-1}^{p} \Phi_i \Delta Z_{t-i} + \delta t + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(5)$$

Where $\prod = \left(1 - \sum_{i-1}^{p} \Phi_i\right)$ is obtained since $\Delta Z_t = Z_t - Z_{t-1}$ and $\prod$ is a square matrix with dimensions equal to the number of variables in the system and is known as Matrix of Long – Run Multipliers, the "dynamic" or "impact parameters" matrix, it is clear that under the presence of co-integration the "stationary VAR" in differences is mis-specified even if the variables are difference stationary, the difference is obvious in the lack of the matrix of Long – Run multipliers.

To solve this problem we adopt Co-integration Ranks by applying Johansen reduce rank tests to estimate the number of LR relations. Johansen (1995) showed that the number of co-integration relations is determined by the rank of the dynamic matrix $\prod$ with the dimension of k x k and has a reduced rank in the presence of co-integration and has a rank of zero if there is no co-integration, hence the rank r of $\prod$ is $0 \le r \le m$, $m < k$.

4.2 Justification of the Model Specified

Multiple regression analysis model of vector error correction model (VECM) is the statistical framework for the research study. The choice of this model is based on the fact that it allows for joint estimation of relationships between monetary policy and price level, as well as how past information relate to perceived fluctuations. Also, it assumes that the information relevant to the prediction of the respective variables is contained solely in the time series data of these variables and the disturbances uncorrelated. More so, variance decomposition as an aspect of VECM is one of the most popular techniques for capturing the impulse responses and transmission of shocks among the variables.

4.3 Estimation Technique and Procedure

We adopt the maximum likelihood in our estimation. Evaluation of the results was based on the impulse response functions (IRF) and variance decomposition (VD) techniques. For validity and stability of the model, the root of compassion test was conducted. For a long run analysis like this, VECM is the most reliable, consistence and sustainable method and the econometric package (STATA version 10.0) is the software package employed for the estimation. The estimation commences with an extensive unit root test to confirm the stationarity states of the variables that entered the model using both the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. Both tests were used in order to guarantee that our inferences regarding the important issue of stationarity are not likely driven by the choice of the testing procedure used.

The testing procedure for the ADF test is as follows:

$$\Delta X_t = \lambda_0 + \beta t + \gamma X_{t-1} + \delta_1 \Delta X_{t-1} + \ldots + \delta_p \Delta X_{t-p} + \mu_t \quad \text{---------- (6)}$$

where, λ_0 is a constant, βt is the coefficient on a time trend and p is the lag order of the autoregressive process and Δ is the difference operator. The unit root test was carried out under the null hypothesis γ = 0 against the alternative hypothesis of γ < 0.

4.4 Co-integration Tests

Having confirmed the stationarity properties of the variables, we proceed to determine the existence of a long-run relationship among the variables. To ensure a robustness check of the cointegration estimation, we used both the Engle-Granger approach and the Johansen maximum likelihood procedure. Using the Engle-Granger procedure of cointegration test, we first regress the dependent variable on its various determinants to obtain the estimated coefficients, then estimate the residuals from this regression, save it and finally, test if the saved estimated residual series is stationary or not. We also utilized the multivariate Johansen procedure, which uses maximum-likelihood method of estimation and does not suffer normalization problem (Gujarati, 2005) unlike the Engle-Granger approach which suffers the problem of normalization. A multivariate Johansen co-integration test was also adopted to assess the long-run linear combination of the co-integrating vectors of exchange rate fluctuations and trade flows

reformulated into a vector error correction model (VECM) to know whether the disequilibrium in trade could be corrected back to its equilibrium position, following the evidence of co-integration in the VAR model. Finally, the analyses were complemented with impulse response and variance decomposition mechanisms to ascertain the transmission level of macroeconomic variables listed above on portfolio investment variability and the dynamic effect of shocks on the endogenous variable included in the model.

4.5 Definitions and Data Sources

As earlier defined the variables chosen for this study are FPI representing Net Foreign Portfolio investment, RGDPg representing growth rate of real GDP, RIR representing real interest rate, while REXC represents real exchange rate, GFR represents gross capital flow, Mcap represents Market capitalization (SIZE), and TDO represents Trade Degree of Openness over the given period. Note further that RGDPg is allowed as one of the explanatory variables following Passinatti's Profit – growth model (Jhingan, 1997). The internal rate of return (IRR) is a measure of the rate of return expected by capitals. An import of the Passinatti's model is that IRR can be subsumed in RGDPg, hence in this study; RGDPg is used as a proxy for rate of return. Most of these variables were gotten from the Central Bank of Nigeria (CBN) Statistical Bulletin (various issues) and National Bureau of Statistics.

4.6 Presentation and Analysis of Results

For the validity of the results of this analysis, we did select adequate lag order which guided the rest of the estimation of the study. Table 4.1 (see, the appendix) presents the result from lag selection order criteria. The lag order selection statistic presented in table 4.1 shows that all the decisive factors, except FPE, had a lag order 3 as the best lag order for the estimation of this study. This is indicated by asterisk (*) placed on the values. On this basis, the rest of the estimation was conducted at lag order 3.

4.7 Unit Root/Co-integration Analysis

The result of the Augmented Dickey Fuller (ADF) test conducted to ascertain the unit root status of the variables used for this study is presented in table 4.2 (see, appendix). The result shows that all the variables were integrated of order one with constant and trend included. It may be interesting to note that some variables are in their log form while others are not. The reason is that those without log are either measured in rate or have some zero values that cannot be logged. Having noted the evidence of integration from the ADF tested analysis, we move further to conducting co-integration test with Johansen – Juselius Co-integration technique specified in the methodology. Tables (4.3, 4.3a and 4.3b) in the appendix show the obtained results.

The first null hypothesis of zero cointegration was rejected since the Max-lambda and trace statistics of 68.465432 and 135.04557 exceed the critical values of 39.37 and 94.15 respectively in case 2 with the assumption of intercept in VAR. With this we accept that there is at least 1 co-integrating vector in the system. Next we check the Ho: r = 1; with Max-lambda and trace statistics of 44.981409 and 66.580141 exceeding the critical values of 33.46 and 68.52 respectively. This led to the rejection of the null hypothesis of 1 co integration vector. Finally the result shows that at least there exists 2 co-integrating (linear long- run) vectors in the system. Since Ho: r = 2, the null hypothesis is accepted for the rest (3, 4 and 5). To identify the two co-integrating variables we conduct the Vector Error Correction

(VEC) estimate of co-integrating equations, as presented in table 4.4. (Insert here). The result shows that the two co-integrating vectors with net foreign portfolio investment are; market capitalization and the degree of trade openness. The implication of this result is that long run linear relationship exists between these three vectors (net foreign portfolio investment, market capitalization and the degree of trade openness). This was identified because only logMCap and TDO had their p values less than 0.05 at 5% level and significant among the variables included in the model.

5. Conclusion and Policy Recommendation

Just as trade flows, result from individuals and countries seeking to maximize their well-being by exploiting their own comparative advantage, so too, are capital flows the result of individuals and countries seeking to make themselves better off, moving accumulated assets to wherever they are likely to be most productive. One of such capital flows is the foreign portfolio investment. FPI has been noted to flow mostly to developed nations from developing nations. However, there has been dramatic increase in the magnitude of international flows of portfolio investment from developed countries to emerging markets especially before the global economic crisis. Even though, FPI can be unproductive to developing economies, the massive flow of international capital can play a useful role in economic development by adding to the savings of developing countries in order to increase their pace of investment. Nigeria fits well into this category with her wide savings-investment gap as posited in the National Economic Empowerment and Development Strategy (NEEDS) programme and Vision 20:2020. Incidentally, international flow of foreign investment into Nigeria is unregulated, following the internationalization of the capital market in 1995 and the abrogation of laws that constrained foreign participation in the Nigerian capital market. This study tries to ascertain the long run determinants of FPI in Nigeria and as such pursue policies that may likely attract same in the long run. The result of the study shows that FPI flow into Nigeria has a positive long run relationship with market capitalization and degree of openess. Based on the results, it is important that the on-going reform in the Nigerian capital market be sustained, especially in the area of investors' protection and confidence, infrastructural development, and accounting disclosure requirements. In addition, the current stride in liberalization should be sustained. It is also important to make Nigeria's trade policy, investment friendly while we commend the recent VISA policy of the federal government as a policy in the right direction.

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[i] International Capital Flows can be grouped into three broad categories: Foreign Direct Investment,, Foreign Portfolio Investment, Bank and other Investments.

[ii] "Pull" factors reflect the impact of financial deregulation, the growing number of people saving for retirement and the increasing prominence of institutional funds managing savings, pensions and insurance, successful domestic economic policies involving increased domestic saving and investment, reduction in the size of the government deficit and an increase in export growth **(Chuhan et al, 1993, Hernandez and Rudolph (1995)**. "Push" factors reflect the impact of low interest rates and low economic growth in developed countries **(Fernandez-Arias, 1994).**

[iii] Countries with sound macroeconomic policies and well-functioning institutions are in the best position to reap the benefits of capital flows and minimize the risks.

[iv] Passinati's model stipulates that there is only equilibrium rate of profit which is determined by the natural rate of growth divided by the capital owner's propensity to save.

Tables

Table 4.1: Lag Selection Order Criteria

Lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-155.025				.009653	12.3865	12.4702	12.6769
1	-40.132	229.79	36	0.000	.000024	6.31784	6.90308	8.35015
2	-.010865	80.242	36	0.000	.000029	6.00084	7.08769	9.77513
3	103.303	206.63*	36	0.000	1.0e-06	.822848*	2.41133*	6.33912*
4	.	.	36	.	0*	.	.	.

Table 4.2: Augmented Dickey Fuller Test for Unit Root

Variables	Test Statistic	5% Critical Value	Order of integration	Constant/Trend
LogFPI	-0.593	2.997	I~I(1)	Yes
LogMCap	0.127	2.997	I~I(1)	Yes
RIR	-2.088	2.997	I~I(1)	Yes
LogRGDPg	-1.144	2.997	I~I(1)	Yes
REXC	-0.181	2.997	I~I(1)	Yes
TDO	-1.649	2.997	I~I(1)	Yes

Table 4.3: Johansen – Juselius Co-integration Rank Test

H0:		H1:	
Eigenvalues (lambda)	Rank < = (r) r	Max-lambda, statistics (rank < = (r + 1))	Trace statistics (rank < = (p = 6))
.90566254	0	68.465432	135.04557
.78798178	1	44.981409	66.580141
.41182826	2	15.391353	21.598732
.16799464	3	5.3335754	6.2073791
.02797831	4	.8229377	.87380365
.00175246	5	.05086594	.05086594

Table 4.3a: Johansen – Juselius Co-integration Rank Test

Case 1: (Assumption: Intercept in CE)

H0:	Max-lambda, statistics	Trace statistics
0	40.30	102.14
1	34.40	76.07
2	28.14	53.12
3	22.00	34.91
4	15.67	19.96
5	9.24	9.24

Table 4.3b: Johansen – Juselius Co-integration Rank Test

Case 2: (Assumption: Intercept in VAR)

H0:	Max-lambda, statistics	Trace statistics
0	39.37	94.15
1	33.46	68.52
2	27.07	47.21
3	20.97	29.68
4	14.07	15.41
5	3.76	3.76

Table 4.4: VEC Cointegrating Equations

Equation	Parms	Chi2	P>Chi2
-ce1	5	3416.909	0.000

Identification: beta is exactly identified

Johansen normalization restriction imposed

beta	Coef.	Std. Err.	Z	P>/z/
-ce1				
LogFPI	1	.	.	.

LogMCap	-0.6372857	0.1372568	-4.64	0.000
RIR	-0.0077567	0.0042489	-1.83	0.068
LogRGDPg	-0.0703853	0.1789123	-0.39	0.694
REXC	0.000148	0.0007586	0.20	0.846
TDO	-0.8377365	0.2125295	-3.94	0.000
-Cons.	-3.140004	.	.	.