NIGERIA'S INDUSTRIAL DEVELOPMENT, CORPORATE GOVERNANCE AND PUBLIC POLICY

Editors
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Essays in Honour of Michael O. Adejugbe
Professor of Industrial Economics

Edited by

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UNCERTAINTY AND FOREIGN DIRECT INVESTMENT: A CASE OF THE MANUFACTURING SUBSECTOR IN NIGERIA

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Oluseye S. Ajuwon and Abimbola Oyinlola

Abstract

Manufacturing sector remains critically important to both the developing and the advanced economies. It is an avenue for increasing productivity in relation to import replacement and export expansion, creating foreign exchange earning capacity, rising employment and per capita income. This study examined the effects of economic and political uncertainties on FDI inflows to the manufacturing sub-sector of the Nigerian economy covering the period 1970 to 2010. Using Error Correction Mechanism (ECM), the model, which incorporates the cost of capital (real lending rate), inflation volatility and exchange rate variability as measures of economic uncertainty, together with political instability as regressors, was estimated. The most preferred estimates were established using the Schwarz and Akaike information criteria. Prior to the estimations, the stationarity conditions of each of the variables were ascertained using the Augmented Dickey Fuller (ADF) tests, while the Johansen method was used to determine cointegrating vectors. The results show that FDI into the manufacturing sub-sector of the economy exhibits no tolerance for inflation volatility (INFVL), that government commitment to the Multinational Investment Guarantee Agency (MIGA) needs to be reinforced, reducing the real cost of capital (RLR), diversifying the economy to boost export (REXPO). Further, positioning the economy for tourism (RINTOUE) will go a long way to attract foreign direct investment into the manufacturing sub-sector of the Nigerian economy. The study concludes by suggesting that maintenance of a stable macroeconomic environment and appropriate policy mix is essential if the Nigerian manufacturing sector is to benefit from globalisation.

1.0 Introduction

Most economists generally believe that manufacturing is a wealth-producing sector of an economy. This is because manufacturing provides important material support for national infrastructure and for national defense. It is therefore unquestionable that manufacturing remains vitally important for the Nigerian economy. The manufacturing sector plays a catalytic role in a modern economy and has many

dynamic benefits crucial for economic transformation. In any advanced economy or even growing economy, the manufacturing sector is a leading sector in many respects. It is an avenue for increasing productivity in relation to import replacement and export expansion, creating foreign exchange earning capacity, raising employment and per capita income, which causes unique consumption patterns.

Surveys and analyses of trends and issues in manufacturing and investment around the world focus on such things as:

- the nature and sources of the considerable variations that occur cross-nationally in levels of manufacturing and wider industrial-economic growth;
- competitiveness; and
- attractiveness to foreign direct investment

The attractiveness and actual disbursement of FDI into a given country depends on many factors, including political and economic conditions both in the host country and in the rest of the world. Uncertainty may emanate from volatility in macroeconomic variables like exchange rates, resource prices, interest rates, and changes in policies and rules of business transactions.

In Africa, economic and political instability plays a significant role in hampering capital inflow along with other macroeconomic and policy uncertainties (Collier, 1994; Senbet, 1996). Empirical results, which support these hypotheses, are so far very weak in the contexts of developing countries, and especially in Nigeria. Previous studies disregarded how the role of uncertainty differs by industrial groups, it only focuses on the analysis of aggregate FDI.

In view of the foregoing, the objective of this paper is to see how economic uncertainties and political instability over the years have hampered the inflow of foreign direct investment into the manufacturing sub-sector of the Nigerian economy. In order to address this and other related issues, the paper is divided into five sections. Following the introduction, Section II reviews the literature, while the model for the analysis is addressed in Section III. Section IV presented the analysis while section V concludes the paper.

2.0 Literature Review

Uncertainty affects manufacturing and non-manufacturing firms differently, due to differences in linkage to the host country market and resource use. Some manufacturing firms enter a host country to exploit untapped resources, and not for the host country market; non-manufacturing firms typically enter to provide services for the host country customers. Source of input (domestic or foreign) and destination

products (local sale or export) also influence the extent to which a foreign firm is exposed to uncertainty. The focus of this study is to address the relationship between economic and political uncertainty and FDI inflow into the manufacturing sub-sector of the Nigerian economy.

Literature identifies some risk and uncertainty factors that tend to constrain investment in developing countries. These include inflation (Dombusch and Reynoso, 1989; Serven and Solimano, 1993 and Oshikoya, 1994), large external debt (Faruqee, 1992), credibility of policy changes during macroeconomic adjustment (Rodrik, 1989), level and variability of the real exchange rate (Faruqee, 1992; Serven and Solimano, 1993; Jenkins and Thomas, 2002), terms-of-trade effect (Oshikoya, 1994) and political instability (Bleaney, 1993; Garner, 1993; Root and Ahmed, 1979, Schneider and Fry, 1985); and infrastructure and institutions (Asiedu, 2002, and Ajayi, 2004). In all these work, none has tried to look at all these identified variables together for the Nigerian economy specifically. Where the issue is addressed, empirical studies consistently find a negative effect of uncertainty (measured in various ways) on investment. Serven (1998) uses seven measures of uncertainty for five variables (such as growth, terms of trade) and finds evidence for all having a negative impact on levels of private investment for a large sample of developing countries. As investment is a robust determinant of growth we hypothesise that uncertainty will have a negative impact on growth.

The ranking of political risk among FDI determinants remains rather unclear. According to ODI (1997), where the host country owns rich natural resources, no further incentive may be required, as it is seen in politically unstable countries, such as Nigeria and Angola, where high returns in the extractive industries seem to compensate for political instability. In general, as long as the foreign company is confident of being able to operate profitably without excessive risk to its capital and personnel, it will continue to invest. For example, large mining companies overcome some of the political risks by investing in their own infrastructure maintenance and their own security forces. Moreover, these companies are limited neither by small local markets nor by exchange-rate risks since they tend to sell almost exclusively on the international market at hard currency prices.

Empirical relationship between political instability and FDI flows is unclear. For example, Jaspersen et al. (2000) and Hausmann and Fernandez-Arias (2000) find no relationship between FDI flows and political risk while Schneider and Frey (1985) find an inverse relationship between the two variables. Using data on U.S. FDI for two time periods, Loree and Guisinger (1995) found that political risk had a negative impact on FDI in 1982 but no effect in 1977.

It is important to note that most of the studies that examine determinant of FDI ignore the issue of uncertainties especially in the case of Nigeria. More importantly studies on Nigeria use a time frame and data series that ended at most 2004 (e.g Ajayi, 2004 and Asiodu, 2002). However between 2004 and 2010 Nigeria has experienced both political and economic uncertainties that might have affected the relationship between macro-economic variables and FDI inflow to the country. Including these period helps in determining the extent to which uncertainties had influenced the quantum of FDI inflow into the manufacturing sub-sector of the economy. In addition, this study attempts to improve on the existing methodology on the relationship between FDI and macro-economic variables by adopting a methodology that allow for an examination of the long-run and short-run relationship between macro-economic variables and FDI inflow into the Nigerian economy.

3.0 Theoretical Framework

3.1 Theoretical Foundation

Following the model developed by Goldberg and Kolstad (1995) [as contained in the work of Lemi and Asefa (2001)], which incorporates both the exchange rate and demand uncertainty, this study adopts the model, but augments it with the Nigerian economic characteristics. Foreign investors divide their production capacity across borders according to the distributions and correlations of exchange rate and demand shocks.

The profit function of a source country firm that produces only for a foreign market, with a combination of domestic capacity and foreign capacity is given by:

$$\Pi(qd, qf, e, \sigma) = e\,(p\,(q) + \delta)\,q - qd - eqf \qquad (1)$$

Where Π stands for expected profit, p (q) is total demand in the host country for the product of affiliate firm, qd and qf are home and foreign capacity costs respectively, δ is demand shock, and e is exchange rate (local currency per foreign currency) of a host country. Typically, the firm decides the level of production both in the domestic market and abroad before uncertainty is resolved. The model becomes more complex when other factors are taken into account. For example, foreign firms invest in a given host country not only to produce and sell products in the host country market, but also to export products either back to the parent firm or to neighbouring countries.

From the above model, expected profit Π is a function of exchange rate and demand shock uncertainty and the correlation between the two. Therefore, level of production

in the domestic market and abroad is a function of demand (price) and exchange rate uncertainties. As foreign firms cross boundaries, other factors pertinent for foreign investors include political instability and host country government policies; these factors are important because, in most cases, they treat foreign firms differently. Other macroeconomic determinants of investment, such as total and skilled labour force, market size and potential cost of capital, productivity (technology), infrastructure, size of export sector, investors' confidence, and image of a host country in the international business community are commonly used control variables for the study of investment behaviour of multinational firms.

The traditional investment model is given by:

$$K_{it} = f(Y_{it}, RLR_{it}) \qquad (2)$$

$i = I, \ldots, N$ and $t = 1, \ldots, T$ (where i stands for sectors and t for time)

Where K_{it} is the desired capital stock, Y_{it} is output and RLR_{it} is real user cost of capital in a host country. The basic model refers to the traditional determinants of investment for domestic investors. However, as seen in equation 1 a multinational firms' investment is affected by other host country characteristics, which alter exchange rate, and demand.

Therefore, this model is augmented based on the premise that in equation 1 both revenue and cost functions are subject to host country uncertainties and instabilities. Revenue is also affected by market size, degree of trade orientation and labour force of the host country. As indicated by Thomas and Worral (1994), other forms of uncertainty emanate from risk of expropriation, and can be guaranteed only through signing bilateral and/or multilateral investment guarantees to protect foreign investors. Baker (1999) reinforced the role played by the Multinational Investment Guarantee Agency (MIGA) to increase flow of FDI. The level of exchange rate becomes a determinant factor, as indicated by Campa (1993), for the case of FDI inflow to the U.S., and also by Bacek and Okawa (2001) for Japanese FDI in Asia. There are not many empirical works that have addressed the roles of some of these uncertainty indicators and policies. Furthermore, robustness of their results to different host and source countries and industrial groups is questionable. This study tries to fill the empirical gap for the case of Nigerian economy and for disaggregated FDI by the major sub sectors of manufacturing and non-manufacturing.

The expected sign for the measure of uncertainty is not clear from economic theory. Positive sign implies that firms invest more in a foreign market to diversify

production, use a market as a shock absorber, or to compete with rival competitor, which is a strategic motive. Cushman (1985) argued that uncertainty affects FDI positively, as multinational firms tend to serve foreign market through FDI than through export when investors start to worry about uncertainty. On the other hand, the theory of investment and option value imply that firms lower investment when there is uncertainty, due to high sunk cost which further delays investment. The predictions of these models seem not to have been tested in the context of the Nigerian economy. The purpose of this paper is to fill this gap.

3.2 Model Variables and Data

Definitions and sources of model variables are presented below. The period of analysis for the flow of FDI from all source countries is between 1970 and 2010. The variables used in the estimation are in annual frequency. The monthly inflation rate and real exchange rate series are used to compute uncertainty indicators. The explanatory variables are grouped into economic uncertainty, political instability and government policy, investor's confidence, domestic market size, potential and cost of capital, and size of export sector. Investors' confidence is proxy by two indicators: ratio of total external debt of a host country to Gross Domestic Product (GDP) (REDEBT). Investors' confidence is expected to be high in cases where the debt burden is low, so that there is no future tax obligation on the business community to pay back the debt. The second indicator is the receipts from international tourist arrivals as a ratio to total exports.

It is difficult, if not impossible, to incorporate the different forms and objectives of policies that host countries have towards the flow of FDI. It is also argued that most policies designed by host countries may not be enforceable and do not address what foreign investors seek in guaranteeing security and benefits. Mostly initiated by source country, host countries sign bilateral and multilateral agreements to show their commitment and to secure their benefits and those of foreign investors. The number of Bilateral Investment Treaties (BIT) signed by a host country and membership in Multilateral Investment Guarantee Agency (MIGA) are used as proxies for government policy and commitment.

3.3 Econometric Methodology

This study addresses the role of economic uncertainty and political instability in affecting FDI flow to the manufacturing sub-sector of the Nigerian economy. The rate of inflation and the real exchange rate uncertainty, as well as political instability are expected to impede FDI flow to the Nigerian economy. Apart from these uncertainty indicators, host country economic policy parameters, investors' confidence, market size and potential size of export sector, labour force availably,

technology and infrastructure facilities are factors in deciding whether to invest in a country. These control variables are expected to contribute to the flow of FDI. Studies show the flow of FDI to African economies is to exploit cheap labour and a large export sector (mainly to extract resources) (Nnadozie, 2000; Allaoua and Atkin, 1993). It is evident from similar studies that the role of advanced communication infrastructure, and suitable policy environment is critical. By using proxy variables for the uncertainty indicators and other control variables, this study estimates FDI model for the manufacturing sub-sector of the Nigerian economy.

The following models are estimated:

$$Y_t = \beta_1 + \beta_2 INF_t + \beta_3 EXR_t + \beta_4 POLI_t + \alpha X_{it} + \varepsilon_t \quad (3)$$

Y_t stand for RMAN which is the dependent variable, which measures ratios of FDI to the manufacturing sub-sector to GDP of a host country, INFVL is the inflation volatility, EXR is the variability in exchange rate, and POLI = political freedom indicator. X_{it} is a vector of explanatory variables that measure market size (GDPPC), investors' confidence indicators which are the ratio of external debt to GDP and tourism receipt in the country (REDEBT, RINTOUE), government policy and commitment (MIGA, BIT), cost of capital, which is the lending rate in the economy (RLR) and the size of export sector (REXPO).

Positive signs are expected for GDPPC, BIT, and MIGA. GDPPC is a measure of effective market size of the country, and foreign firms may sell products to domestic consumers, even though their goal is exporting to neighbouring markets. MIGA captures commitment from the government side, and positive sign may imply investors take advantage of policies and government commitment (after controlling for political freedom indicator (POLI)]. Market potential is often measured by growth rate of GDP. Again, high growth rate may encourage investment, unless there is crowed out effect by domestic firms.

The main source of data except bilateral investment treaty, membership in multilateral investment guarantee, and political instability are taken from the Central Bank of Nigeria statistical bulletin and IMF data bank. Data on bilateral investment treaty and membership in multilateral investment guarantee agency is compiled from United Nations (UNCTAD) and World Bank Publications (UN, Bilateral Investment Treaties 1959 – 2012; World Bank, Convention Establishing the Multinational Investment Guarantee Agency (MIGA, 2010). The freedom House provided the political instability indicator (Freedom House, Annual Survey of Freedom Country Ratings 1970- 2010).

The variables are annual net total foreign direct investment (NFDI) from 1970 – 2010, annual consumer price index from 1970 - 2010, annual exchange rate from 1970 - 2010, and political freedom index for the Nigerian economy. Other control variables include GDP per capita, dummy for periods of membership in Multilateral Investment Guarantee Agency and (MIGA), number of bilateral investment treaties signed by the Nigerian government (BIT), external debt (REDEBT).

The following variables are used in the regression:

Dependent Variable

RMAN = ratio of net foreign direct investment into Manufacturing and Processing to GDP

Economic Uncertainty Indicators

INFVL = inflation volatility.

EXR = variability in exchange rate.

Investor's confidence indicator

REDEBT = ratio of total external debt to GDP

RINTOUE = receipts from international tourist arrivals as a ratio to total exports.

Domestic market size, cost of capital, technology and infrastructure

GDPPC = GDP per capita, which is given by GDP divided by total population of the country.

RLR = real lending rate defined as nominal lending rate minus inflation.

Political freedom and government commitment indicators

POLI = political freedom indicators measured on a one-to-seven scale, with one representing the highest degree of political freedom and seven the lowest.

MIGA = dummy variable for periods of membership in Multilateral Investment Guarantee Agency (MIGA); it takes value of 1 for the years that Nigeria signed agreement and 0 otherwise.

BIT = number of bilateral investment treaty.

Size of export sector indicator

REXPO = ratio of value of total export of goods and services to GDP.

4.0 Data Analysis

4.1 Introduction

The period of analysis for the flow of FDI from all source countries is between 1970 and 2010. The variables used in the estimation are in annual frequency. The explanatory variables are grouped into economic uncertainty (which is measured by inflation rate volatility and exchange rate of naira to a dollar), political instability and government policy (this is captured by a political freedom [POLI], measure on a one-to-seven scale, with one representing the highest degree of political freedom and seven the lowest e.g. during the civil war, Nigeria's political freedom was rated six. Also, a dummy variable for periods of membership in Multilateral Investment Guarantee Agency [MIGA]; it takes value of 1 for the years that Nigeria signed agreement and 0 otherwise. Finally, number of bilateral investment treaty), investor's confidence (investors' confidence is proxy by two indicators: ratio of total external debt of a host country to Gross Domestic Product [REDEBT]. Investors' confidence is expected to be high in cases where the debt burden is low, so that there is no future tax obligation on the business community to pay back the debt. The second indicator is the receipts from international tourist arrivals as a ratio to total exports. This is a good measure of investor's confidence but this is not readily available in Nigeria, the proxy used for this is the international air transport receipts[RINTOUE]), domestic market size, technology and infrastructure (measured by GDP per capita [GDPPC] and real lending rate defined as nominal lending rate minus inflation[RLR]), and size of export sector (this is captured by ratio of value of total export of goods and services to GDP [REXPO]).

This variables are not exhaustible but due to the time frame for the analysis which is informed by the data availability, we cannot incorporate all the variables at hand and also, data for some variables are not readily available such as data for persons able to read and write as a percentage of people ages 15 and above [LITRAR], as well as total value added per economically active population [TVADD].

4.2 Data Analysis

4.2.1 Unit Root Test

There is the need to carry out a unit root test to ascertain the level of serial correlation among all the variables. The results of the unit root test are presented in the table 1 below, using the Augmented Dickey Fuller (ADF). Most of the variables were stationary at first difference, with the exception of real cost of capital (RLR) which was stationary at levels.

Table 1: Unit Root Test

Variable	Order of Integration	Percentage	Test
RMAN	I(1)	1%	ADF
BIT	I(1)	1%	ADF
EXR	I(1)	1%	ADF
GDPPC	I(1)	1%	ADF
INFVL	I(1)	1%	ADF
MIGA	I(1)	1%	ADF
POLI	I(1)	1%	ADF
REDEBT	I(1)	1%	ADF
RLR	I(0)	5%	ADF
REXPO	I(1)	1%	ADF
RINTOUE	I(1)	1%	ADF

Source: Computed by the author

With the result of the unit root test, where some variables were not stationary at first difference, there is the need for a cointegration test. The cointegration test shows that some of the varables were cointegrated. One econometric issue can be raised in estimation of this model and that is collinearity. Collinearity is due to the use of ratio of GDP and growth of GDP as regressors, which maybe correlated. One solution for the collinearity problem is to drop one of the correlated variables, but they were both important to the analysis of these models. In this study, the degree of collinearity obtained was 0.37, which shows that collinearity was not really a problem.

Having ascertained that some of the variables are not stationary after differentiating once, and that they are cointegrated, the stage is set to formulate an error correction model. The intuition behind the error correction model is the need to recover the long-run information lost by differencing the variables. The error correction model rectifies this problem by introducing an error correction term. The error correction term is derived from the long-run equation based on economic theory.

4.2.2 Long Run Equation

The long run equation for the model specified above is presented in the appendix.

4.2.3 The Result of the Parsimonious Error Correction Model

The result of the parsimonious ECM for the equation was presented in the table 2 below. The Over-Parameterised model from which the parsimonious ECM emanated is presented in the appendix.

Table 2: Results from the Error Correction Model for RMAN

Variable	Coefficient	t-Statistic	Prob.
Δ RMAN(-1)	0.4633	3.5241	0.0037
Δ RMAN(-2)	0.6184	4.7960	0.0003
Δ BIT	-0.0294	-4.6270	0.0005
Δ EXRVL(-1)	0.0016	4.5794	0.0005
Δ EXRVL(-2)	-0.0028	-7.1108	0.0000
Δ GDPPC	0.0000	-4.5321	0.0006
Δ GDPPC(-2)	0.0000	3.4956	0.0039
Δ INFVL	-0.0015	-2.7479	0.0166
Δ INFVL(-1)	-0.0012	-2.0503	0.0611
Δ MIGA	0.0783	4.5425	0.0006
Δ MIGA(-1)	-0.0540	-2.6351	0.0206
Δ MIGA(-2)	0.0479	2.7057	0.0180
Δ POLI(-1)	0.0031	1.4598	0.1681
Δ REDEBT(-2)	0.0284	6.5283	0.0000
Δ RLR	-0.0008	-1.5298	0.1500
Δ RLR(-1)	-0.0014	-2.5984	0.0221
Δ RLR(-2)	0.0003	2.2131	0.0454
Δ REXPO	0.0184	5.7303	0.0001
Δ REXPO(-1)	0.0024	0.8322	0.4203
Δ REXPO(-2)	0.0109	2.4640	0.0285
Δ RINTOUE	0.9237	3.7943	0.0022
Δ RINTOUE(-2)	-0.8764	-1.9350	0.0750
ECMMAN(-1)	-0.9091	-8.0738	0.0000

Adjusted $R^2 = 0.8795$ Standard Error = 0.0103

D-W Statistics = 1.9115

Source: Computed by the author

The adjusted R-Square is 88.0% which shows that the model is able to explain 88.0% of factors affecting flow of FDI into the Manufacturing and processing sector. The Durbin-Waston value of 1.91 shows that the analysis is free from problem of serial correlation. The Standard Error value of 0.0103 is also lending credence to the model that the model performed well. The ECM is also negatively non zero and significant at -0.91.

The lagged value of real ratio of investment in Manufacturing and processing sector shows positive impact, which means that its lagged value is reinforcing the attraction of investment in this sector. The Bilateral Investment Treaty (BIT) is showing opposite signal which means that instead of BIT reinforcing investment in the Manufacturing sector, it is impacting it negatively. The lagged value of exchange rate volatility display mixed reaction while the first lag display positive relationship, the second lag display inverse relationship. GDP per capita and its lagged value display the proper sign, likewise inflation and MIGA and their lag value also display the right

sign, it is only the first lag value of MIGA that display opposite reaction. The lag value of POLI also display wrong sign to the *a priori* expectation. The lagged value of real external debt ratio also display positive relationship which shows that external debt is not being perceived as a threat to investment in the manufacturing sub-sector. Cost of capital and ratio of real export display the proper sign with the exception of second lag value of interest rate. Finally, the proxy for tourism shows the right sign, while the lagged value of proxy for tourism display the opposite sign.

5.0 Conclusion and Policy Recomendation

This study has examined the role of uncertainty (both economic and political) in affecting the inflow of FDI into the Manufacturing sub-sector of the Nigerian economy. We found that in the short run, the economic uncertainty variables of inflation volatility (INFVL) and real cost of capital (RLR) has a significant and negative effect on FDI inflow to the Manufacturing sub-sector of the Nigerian economy. Interestingly, political freedom has a significant positive effect on the FDI into the Manufacturing sub-sector in the short run.

This result shows that FDI into manufacturing sub-sector of the economy exhibits no tolerance for inflation volatility (INFNL). There is also the need to put in place a mechanism that will reduce the real cost of capital (RLR), and diversify the economy to boost export (REXPO), and positioning the economy for tourist attraction.

Finally, there is the need for a right enabling environment to encourage inflow of FDI. This can be achieved by designing policy measures that promote adequate provision of good infrastructure, transparent laws, reliable legal systems, security to lives and property among other things as well as sound macroeconomic policies that will reduce inflation and exchange rate variability. Development of our tourist centres to attract foreigners through which the world will know that Africa and Nigeria in particular is a place to be, as well as a place to invest.

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APPENDIX I

The Dependent/Endogenous Variables

YEAR	RMAN	GDPPC	REDEBT	RINTOUE	REXPO	INF	EXR	RLR	POLI	MIGA	BIT
1970	53.28277	0.201657	41.47902	28.57466	209.8602	1.75	0.71	6.25	6	0	0
1971	80.33082	0.238752	37.85389	23.34931	274.2869	1.65	0.7	8.35	6	0	0
1972	72.8826	0.279588	54.28385	25.6589	293.1246	9.41	0.66	0.59	6	0	0
1973	77.02448	0.342518	52.14689	18.08287	429.0772	4.61	0.66	5.39	6	0	0
1974	32.68906	0.51588	20.25164	7.869124	364.0018	13.53	0.63	-3.53	6	0	0
1975	18.62947	0.610415	12.87723	10.02944	181.2712	33.93	0.62	-24.9	6	0	0
1976	18.89421	0.722268	12.85232	9.33126	231.6402	21.1	0.63	-11.1	6	0	0
1977	22.32847	0.783443	11.58301	8.754112	242.0884	21.48	0.65	-15.5	5	0	0
1978	43.24876	0.850199	42.86194	13.78537	207.5968	13.3	0.61	-2.3	5	0	0
1979	46.83117	1.018697	53.80994	8.821792	361.8539	11.65	0.6	-0.65	2	0	0
1980	47.67203	1.233472	59.17557	7.45064	449.7033	10	0.55	-0.5	2	0	0
1981	8.311483	1.079168	11.3594	35.29796	53.714	21.42	0.61	-11.4	2	0	0
1982	9.627649	1.000662	44.1665	48.58403	41.09667	7.16	0.67	4.64	2	0	0
1983	11.46617	0.980143	56.9925	55.00833	40.42337	23.22	0.72	-11.7	7	0	0
1984	11.49088	1.002719	80.67367	54.18134	49.50889	40.71	0.76	-27.7	7	0	0
1985	11.33178	0.958683	86.0571	40.45799	58.30191	4.67	0.89	7.13	7	0	0
1986	13.64364	0.484846	201.2532	54.79452	43.3099	5.39	2.02	6.61	7	0	0
1987	15.2453	0.308381	492.1187	16.15251	148.2404	10.18	4.02	9.02	6	0	0
1988	16.54117	0.351639	609.2368	15.86263	141.8657	56.04	4.54	-38.4	5	1	0
1989	22.83787	0.326064	1015.478	9.011371	244.8836	50.47	7.39	-25.9	6	1	0
1990	23.69277	0.359051	1116.107	5.026113	410.7124	7.5	8.04	20.2	5	1	1
1991	32.75465	0.332122	1236.172	4.881705	457.969	12.7	9.91	8.1	5	1	2
1992	35.91577	0.313433	2005.65	3.678779	757.6929	44.81	17.3	-13.6	5	1	2
1993	46.88333	0.308912	2303.74	5.563375	796.0102	57.17	22.05	-21.1	7	1	2
1994	51.04327	0.276708	2355.46	9.650625	748.0804	57.03	21.89	-36	7	1	4
1995	98.32293	0.275023	2547.43	2.852225	3378.239	72.81	21.89	-52	7	1	4
1996	101.4971	0.287475	2101.548	2.541878	4458.09	29.29	21.89	-8.39	7	1	4
1997	103.6254	0.293856	1973.137	3.451581	4111.16	10.67	21.89	12.6	7	1	4
1998	110.9842	0.298227	2036.144	6.470781	2418.4	7.86	21.89	13.4	6	1	4
1999	116.2204	0.296982	8255.989	4.870351	3808.561	6.62	92.69	20.5	4	1	5
2000	113.4144	0.375023	9509.275	3.317687	5910.842	6.94	102.1	14.7	4	1	5
2001	105.8269	0.348353	8897.316	4.292772	5232.447	18.87	111.9	2.43	4	1	5
2002	92.22825	0.455332	9078.608	5.54416	4026.232	12.89	121	17.3	4	1	5
2003	95.74082	0.508434	9378.052	3.698808	6466.331	14.03	129.4	8.85	4	1	7

2004	195.2246	0.644031	9269.318	7.658369	8724.395	15.01	133.5	5.81	4	1	7
2005	238.2755	0.802787	4796.088	7.231579	12895.76	17.85	132.2	1.64	4	1	9
2006	357.0354	1.014587	757.7129	10.01468	12293.41	8.24	128.7	10.5	4	1	11
2007	346.0964	1.132695	674.9042	8.963745	13101.69	5.38	125.8	13	4	1	13
2008	340.448	1.380969	1763.197	8.396431	15116.71	11.6	118.6	7.1	4	1	13
2009	284.158	1.096576	3874.506	8.467092	11753.81	12.5	148.9	10.4	4	1	13
2010	320.4638	1.239781	1997.975	8.651608	13351.89	13.7	150.3	8.8	5	1	13

Source: Computed by the Author

APPENDIX II

Exchange Rate Volatility

Dependent Variable: EXC				
Method: ML - ARCH (Marquardt) - Normal distribution				
Date: 08/06/13 Time: 12:07				
Sample (adjusted): 1971 2010				
Included observations: 40 after adjustments				
Failure to improve Likelihood after 16 iterations				
Variance backcast: ON				
GARCH = C(3) + C(4)*RESID(-1)^2 + C(5)*GARCH(-1)				
	Coefficient	Std. Error	z-Statistic	Prob.
C	5.651651	12.05305	0.468898	0.6391
EXC(-1)	1.019744	0.108536	9.395472	0.0000
	Variance Equation			
C	85.14777	200.3451	0.425005	0.6708
ARCH(-1)	-0.059671	0.114829	-0.519652	0.6033
GARCH(-1)	0.669861	0.730144	0.917437	0.3589
R-squared	0.940895	Mean dependent var		56.11090
Adjusted R-squared	0.931439	S.D. dependent var		58.24855
S.E. of regression	15.25192	Akaike info criterion		8.226252
Sum squared resid	5815.525	Schwarz criterion		8.459785
Log likelihood	-118.3938	F-statistic		99.49486
Durbin-Watson stat	1.961882	Prob(F-statistic)		0.000000

Variable	□(ARCH Coefficient)	β(GARCH Coefficient)	□+β= Volatility
EXC	-0.059671	0.669861	0.61019

Inflation Volatility

Dependent Variable: INF				
Method: ML - ARCH (Marquardt) - Normal distribution				
Date: 08/06/13 Time: 12:49				
Sample (adjusted): 1971 2010				
Included observations: 40 after adjustments				
Convergence achieved after 24 iterations				
Variance backcast: ON				
GARCH = C(3) + C(4)*RESID(-1)^2 + C(5)*GARCH(-1)				
	Coefficient	Std. Error	z-Statistic	Prob.
C	6.876499	3.988923	1.723899	0.0847
INF(-1)	0.572229	0.211958	2.699732	0.0069
	Variance Equation			
C	11.40078	13.03909	0.874354	0.3819
ARCH(-1)	0.415347	0.389288	1.221069	0.2221
GARCH(-1)	0.569900	0.193643	2.943052	0.0032
R-squared	0.292356	Mean dependent var		20.08475
Adjusted R-squared	0.211483	S.D. dependent var		17.67974
S.E. of regression	15.69935	Akaike info criterion		8.166680
Sum squared resid	8626.434	Schwarz criterion		8.377790
Log likelihood	-158.3336	F-statistic		3.614978
Durbin-Watson stat	1.740798	Prob(F-statistic)		0.014396

ARCH	GARCH	Volatility
0.415347	0.569900	0.985247

APPENDIX III

Table2: The Unit Root Analysis Using Augmented Dickey Fuller Test

	ADF* (1 lag), Trend and Intercept				
Variables	**Level**	**Critical Value**	**First Difference**	**Critical Value**	**Order of Integration**
RMAN	-1.218582	1% -4.205004 5% -3.526609 10% -3.194611	-5.493249*	1% -4.211868 5% -3.529758 10% -3.196411	I(1)
RINTOUE	-2.010963	1% -4.205004 5% -3.526609 10% -3.194611	-6.647834*	1% -4.211868 5% -3.529758 10% -3.196411	I(1)
REXPO	-1.396664	1% -4.205004 5% -3.526609 10% -3.194611	-6.600454*	1% -4.211868 5% -3.529758 10% -3.196411	I(1)
RTRADE	-2.398279	1% -4.205004 5% -3.526609 10% -3.194611	-6.770305*	1% -4.211868 5% -3.529758 10% -3.196411	I(1)
INFVL	-1.340895	1% -4.219126 5% -3.533083 10% -3.198312	-9.124508*	1% -4.219126 5% -3.533083 10% -3.198312	I(1)
EXRVL	-1.486966	1% -4.205004 5% -3.526609 10% -3.194611	-6.069614*	1% -4.211868 5% -3.529758 10% -3.196411	I(1)
RLR	-3.880152**	1% -4.205004 5% -3.526609 10% -3.194611			I(0)
GDPPC	-2.447063	1% -4.205004 5% -3.526609 10% -3.194611	-6.407164*	1% -4.211868 5% -3.529758 10% -3.196411	I(1)
POLI	-2.436638	1% -4.205004 5% -3.526609 10% -3.194611	-5.818043*	1% -4.211868 5% -3.529758 10% -3.196411	I(1)

Source: Computed by the author

APPENDIX IV

Long Run Equation For RMAN

Dependent Variable: RMAN
Method: Least Squares
Date: 12/04/12 Time: 15:25
Sample: 1970 2010
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFVL	0.000510	0.001112	0.459009	0.6498
MIGA	0.050928	0.022170	2.297196	0.0293
POLI	-0.000611	0.002817	-0.216790	0.8299
REDEBT	-0.018468	0.002591	-7.126447	0.0000
REXPO	0.011632	0.003045	3.819549	0.0007
RINTOUE	0.770792	0.460771	1.672830	0.1055
RLR	0.000710	0.001060	0.669315	0.5088
EXRVL	0.001121	0.000330	3.398658	0.0020
BIT	0.006595	0.003870	1.703971	0.0995
GDPPC	-2.66E-05	7.49E-06	-3.557009	0.0014
C	0.040194	0.016784	2.394774	0.0236

R-squared	0.965059	Mean dependent var	0.083051
Adjusted R-squared	0.952580	S.D. dependent var	0.092601
S.E. of regression	0.020165	Akaike info criterion	-4.736990
Sum squared resid	0.011386	Schwarz criterion	-4.267781
Log likelihood	103.3713	F-statistic	77.33462
Durbin-Watson stat	2.269810	Prob(F-statistic)	0.000000

Source: Computed by the author

APPENDIX V

Over Parametised Equation of the Error Correction Model (ECM)

Dependent Variable: D(RMAN)
Method: Least Squares
Date: 07/10/13 Time: 04:57
Sample(adjusted): 1973 2010
Included observations: 38 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RMAN(-1))	0.257663	0.745919	0.345430	0.7526
D(RMAN(-2))	0.343510	0.648062	0.530058	0.6328
D(BIT)	-0.025367	0.020615	-1.230525	0.3062
D(BIT(-1))	0.003776	0.013518	0.279345	0.7981
D(BIT(-2))	0.002444	0.010971	0.222806	0.8380
D(EXR)	0.000232	0.001053	0.219966	0.8400
D(EXR(-1))	0.001757	0.001255	1.399539	0.2561
D(EXR(-2))	-0.002760	0.001275	-2.164466	0.1191
D(GDPPC)	-2.31E-05	1.08E-05	-2.132457	0.1227
D(GDPPC(-1))	-5.87E-06	3.94E-05	-0.148766	0.8912
D(GDPPC(-2))	1.13E-05	3.45E-05	0.328085	0.7644
D(INFVL)	-0.000945	0.002498	-0.378229	0.7304
D(INFVL(-1))	-0.000821	0.002718	-0.302046	0.7823
D(INFVL(-2))	0.000594	0.002504	0.237340	0.8277
D(MIGA)	0.080494	0.058270	1.381386	0.2611
D(MIGA(-1))	-0.037040	0.054456	-0.680177	0.5452
D(MIGA(-2))	0.046496	0.062047	0.749363	0.5080
D(POLI)	-0.000356	0.008411	-0.042270	0.9689
D(POLI(-1))	0.001071	0.006311	0.169694	0.8760
D(POLI(-2))	-0.001398	0.009268	-0.150869	0.8897
D(REDEBT)	-0.002574	0.014325	-0.179713	0.8688
D(REDEBT(-1))	-0.007770	0.024470	-0.317541	0.7717
D(REDEBT(-2))	0.024531	0.016003	1.532962	0.2228
D(RLR)	-0.000420	0.002474	-0.169853	0.8759
D(RLR(-1))	-0.001012	0.002864	-0.353145	0.7473
D(RLR(-2))	0.000782	0.002291	0.341387	0.7553
D(REXPO)	0.017667	0.011370	1.553882	0.2180
D(REXPO(-1))	0.007810	0.015973	0.488942	0.6584
D(REXPO(-2))	0.007120	0.017090	0.416604	0.7050
D(RINTOUE)	0.803947	1.162998	0.691271	0.5391
D(RINTOUE(-1))	0.575678	1.994413	0.288645	0.7916
D(RINTOUE(-2))	-0.497243	1.093711	-0.454638	0.6803
ECMMAN(-1)	-0.963326	0.997606	-0.965638	0.4055

R-squared	0.963419	Mean dependent var	0.007431
Adjusted R-squared	0.573220	S.D. dependent var	0.029802
S.E. of regression	0.019469	Akaike info criterion	-5.691528
Sum squared resid	0.001137	Schwarz criterion	-4.239969
Log likelihood	135.4475	Durbin-Watson stat	1.812844

Source: Computed by the author.