Tax Incentives and Foreign Direct Investment in Nigeria

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Abstract: *Given the significance of Foreign Direct Investment (FDI) to economic growth and the use of tax incentives as a strategy among government of various countries to attract FDI, this study examines the influence of tax incentives in the decision of an investor to locate FDI in Nigeria. Data were drawn from annual statistical bulletin of the Central Bank of Nigeria and the World Bank World Development Indicators Database. The work employs a model of multiple regressions using static Error Correction Modelling (ECM) to determine the time series properties of tax incentives captured by annual tax revenue as a percentage of Gross Domestic Product (GDP)and FDI. The result showed that FDI response to tax incentives is negatively significant, that is, increase in tax incentives does not bring about a corresponding increase in FDI. Based on the findings, the paper recommends, amongst others, that dependence on tax incentives should be reduced and more attention be put on other incentives strategies such as stable economic reforms and stable political climate.*
Keywords*: Foreign Direct Investment, Tax Incentives, Nigeria, Economic Growth.*

I.   Introduction

Empirical and theoretical evidence over decades suggest that FDI is an important source of capital for investment. It can contribute to Gross Domestic Product (GDP), gross fixed capital formation (total investment in a host economy) and balance of payments (BOPs) especially when there is good economic conditions in the host economy such as the level of domestic investment/savings, the mode of entry (merger and acquisitions of new investments) and the sector involved as well as the host country's ability to regulate foreign investment (Toward Earths Summit, 2002).

FDI can complement domestic development effort of host economies by: (a) increasing financial resources and development; (b) boosting export competitiveness; (c) generating employment opportunities and strengthening the skill base; (d) protecting the environment and social responsibility; and (e) enhancing technological capabilities via four basic channels which are the internalization of research and development, migration of skilled labour, linkages with suppliers or purchasers in the host economies and horizontal linkages with competing or complementary companies in the same industry (Raian 2004 ; OECD 2002).

On the causal relationship between FDI and growth for three countries - Chile, Malaysia and Thailand – Chaudhury&Mavrotas (2003) found a bi-directional causality running from FDI to GDP (a proxy for growth) and vice versa. However, the thesis that FDI determines growth was not established in the case of Chile where a unidirectional relationship was found running from GDP to FDI instead. In support of the above findings, Alfaro (2003) revisited the impact of FDI on economic growth by examining the role FDI inflows play in promoting growth in primary, manufacturing and service sectors of 47 countries between 1980 and 1999 and found that FDI flows into different sectors of the economy and exert different effects on economic growth. FDI into the primary sector was found to have a negative effect on growth while that of the manufacturing sector impacted positively on growth.

With regard to less developed countries, macro and micro empirical analysis suggest that overall FDI have positive impact on economic growth. In many countries FDI constitute the core of the economy's growth. In Bolivia, for instance, Flexner (2000) found that FDI plays a crucial role for a number of reasons: it positively impacts growth by increasing total investment and improving productivity through diffusion of advanced technology and managerial skills. A study across developing countries for the period 1990-2000 by (Makola, 2003) showed that FDI was a significant determinant of economic growth across the 12 - case studied economies and was estimated to be three to six times more efficient than domestic investment. This, according to (Makola, 2003), is the capacity of FDI to produce a crowding-in effect.

Based on the foregoing, the crucial question then is whether tax incentives is a significant driver of FDI. Is it possible to stimulate FDI activity significantly using tax incentives or does it have only a minimal impact on FDI? Or is it possible that the FDI was driven by other political and economic factors besides tax incentives beyond fiscal control? There is a need therefore, to re-appraise the effectiveness of tax incentives generally in the promotion of inflow of FDI. As pointed out by Arogundade (2005), factors such as security, currency convertibility, political stability and market or source of supplies are known to weigh higher on an investor's scale of preferences than fiscal incentives. As he further agued, there is no consensus yet on the role

of tax incentives in the decision of a potential investor to locate FDI among different countries. While some feel that it ranks low, others feel that it significantly influences the location of FDI.

This paper therefore intends to investigate empirically the extent of effectiveness of tax incentives in attracting FDI in Nigeria within the period 1980-2012. Furthermore, we test the neoclassical investment theory's prediction that tax incentives lowers the user cost of capital and raises investment holds in an economy. Empirical studies in this area, in the Nigerian context is scanty. As Arogundade (2005) has observed, there is need for a review of tax incentive policy in Nigeria as many of these incentive packages have decorated the statute books for so long without anybody undertaking a survey to determine their effectiveness or continued relevance. This study intends to fill this gap in the literature. Specifically, the study will provide an overview of the various steps, tools, aspects and issues relating to tax incentives in Nigeria. It will also provide policy makers and analyst with a framework to analysing the usefulness of FDI based on the level of growth involved and suggest reforms to adjust or move towards best practices. Furthermore, it is expected that this study would provide an indication of, as well as, a guide for further studies. Thus, the empirical evidence provided by the study will be of great interest both for application and scientific research.

The rest of this paper will be organized as follows: section two reviews literature associated with FDI and tax incentives in general and in particular for Nigeria. The third section focuses on the research methodology, section four presents the results and implications and section five provides the conclusion and recommendations.

II.   Literature Review

2.1 Foreign Direct Investment in Nigeria

Attracting FDI has been a preoccupation of many economies of the world especially Less Developed Countries(LDCs) who need such investment to boost domestic capital. As a cheap source of external finance, FDI complements domestic savings and encourages growth via investment financing. More so as a source of capital, FDI is reputed to be more stable than other types of financial flows as foreign investors who have access to foreign sources of capital are not constrained by the underdeveloped domestic capital market or by the ability of the domestic economy "to generate foreign cash flow from the export of domestic production" (Heimann, 2001). Again, other economic reasons asserted for the pull towards these kind of investment is access to western markets, new job creation opportunities, access to advanced managerial techniques, access to advanced technology which stimulates technological adaptation and innovation that leads to faster economic growth and facilitation of privatization and restrictions of the economy as a whole.

In line with this incentive, various regimes of the Nigerian government have also developed various legislations over time to improve investment conditions in order to attract FDI. Nigeria as one of the most populous developing countries is striving to attain international competitiveness among other countries in Africa as far as FDI inflows is concerned. Table 3 and Figure 1 show FDI flows in Nigeria.

Table 3: Evaluation of FDI in Nigeria from 2000-2011 (millions naira)

Year	2000	2001	2002	2003	2004	2005
FDI	1,140,137,660	1,190,632,024	1,874,042,130	2,005,390,033	1,874,033,035	4,967,898,866
Year	2006	2007	2008	2009	2010	2011
FDI	4,534,794,015	5,167,441,548	7,145,016,198	7,029,701,142	5,133,465,493	8,025,110,597

Source: CBN Statistical Bulletin, 2012

Fig 1: FDI Flows into Nigeria, 1980-2011 (Millions of naira)
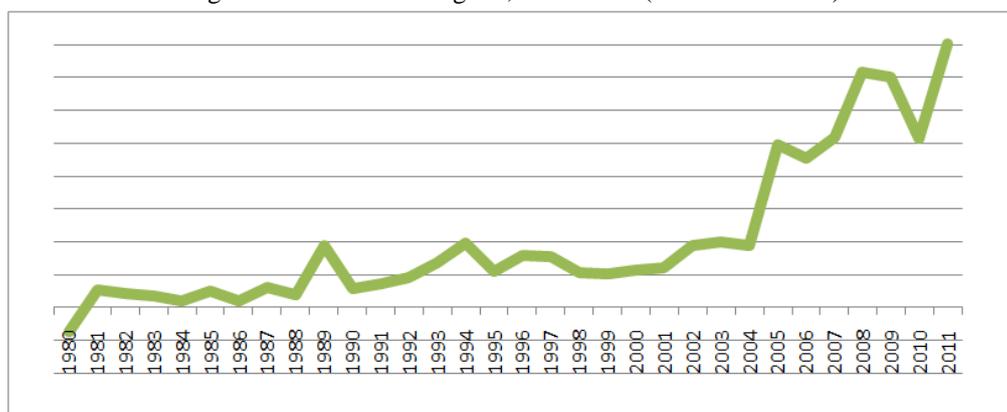
Source: CBN Statistical Bulletin, 2012

Figure 1 shows FDI for Nigeria from 1980-2011. Currently, according to Corporate Nigeria (2013), Nigeria has made it to the top of being among the 20 global destinations for FDI. FDI continued to grow uninterrupted since the beginning of the transformation period such that, according to Central Bank of Nigeria (2011), Nigeria's FDI quadrupled from 2003 to 2011. FDI has grown from a modest US$1.14 billion in 2001 and US$2.03 billion in 2003 to US$7.09 billion in 2009 net inflow making the country the nineteenth largest recipient of FDI in the world.

Composition of FDI in Nigeria

Composition of FDI according to sectoral allocation in Nigeria is available from 1990. The principal recipient of Nigeria's FDI has been the oil and gas sectors, manufacturing sector, infrastructure development, services and consumer goods sector. Empirical assessment of the figure shows that FDI inflows in Nigeria have been heavily concentrated in the hydrocarbon and mining sectors. In recent years FDI inflows to the manufacturing sector has declined, while that of the oil and agricultural sectors have surged. Combinational, the two sectors account for 84.4 percent of total FDI over the period, 1990-2011.

Country of Origin of FDI in Nigeria

As Table 3 shows, the principal sources of FDI for Nigeria have been the United States of America (USA), Latin America and increasingly Europe. The USA presence especially in Nigeria's oil sector is registered through Chevron, Texaco and Exxon Mobil which has an investment stock of US$3.4 billion as at 2008. In 1990 FDI from USA represented roughly 67.8 percent of total FDI. The USA is the leading investor in Nigeria's oil, agriculture and manufacturing sector with the exception being the service sector; between 2010 and 2012 the US accounted for 45.6 percent of all the FDI inflows to Nigeria. Although the USA nominal FDI investment has increased considerably within the decade, its total share, however, in terms of percentage contribution has dropped from 67.8 percent in 2010 to 34.5 percent in 2012. However, the US dominant role was taken over by the Japanese investors in the 1990s whose share of FDI increased from 23.0 percent to 50.5 percent in the same period. The UK one of the host countries of Shell is another relevant foreign investor in Nigeria accounting for about 20% of Nigeria's total foreign investment. Other relevant sources of FDI included Argentina, Brazil, Chile, Italy, Netherland, France, South Africa and increasingly China which is the second largest trading partner to Nigeria in Africa after South Africa. From US$3.billion in 2003, China's FDI in Nigeria is reported to have increased to US$ 6 billion with the Nigerian oil sector receiving about 75% of this amount.

Table 4: Components of Net Capital Flow by Origin

Year	UK	USA	W. Europe	Others
1980	27.9	43.9	26.5	6.2
1981	55	43	51	7
1982	269.8	28.5	76.5	38.5
1983	127	32.1	35.5	34.2
1984	178.2	36.1	48.7	66.9
1985	198.5	36.7	49.8	32.1
1986	116.5	46.9	90.9	62.1
1987	241.4	82.3	59.7	44.1
1988	85.3	151.2	84.7	75.7
1989	629.4	251.7	148.3	165.1
1990	781.4	557.3	98.2	94.9
1991	391.6	55.3	416.1	1238.5
1992	245.7	163.9	385.6	94.3
1993	1416.1	252.9	733.6	331.9
1994	141.1	754.3	419.8	434.5
1995	3023.8	640	488.7	276.3
1996	481.3	329.1	470.4	477.4
1997	748.4	130.9	777.4	285.8
1998	3480	569.3	274.3	5148.2
1999	1159.6	38.3	885.7	636.1
2000	157	0	820.4	315.8
2001	2486	98	464	863.4
2002	3729	163	641.3	1265.4
2003	5594	253	1045.7	1806.6
2004	5960	263	1090	5903.5
2005	7748	343.1	1417	7674.6
2006	12396.8	549	2267.2	12339.2
2007	15996	786.3	3034	15424
2008	16018.171	844.66	3316.92	18730.73
2009	18075.91	979.92	3832.3	22097.78
2010	20133.648	1115.18	4347.68	25464.83
2011	22191.386	1250.44	4863.06	28831.88

Source: CBN Statistical Bulletin, 2012

2.2 Tax Incentives and FDI

Tax incentives have been a major policy instrument used by various governments especially developing countries and those in transition where there is shortage of capital and lags in technological development. According to survey conducted by the OECD (2000) for 50 countries made up of 45 developing countries and transition economies and 5 less developed countries selected from the various regions of the world, almost 85% of the countries surveyed offered one form of tax incentives or the other to attract some form of FDI.

A lot of analysis has been done to determine the effect of tax incentives on FDI from both selective surveys of international investors and time series econometric analysis. Barlow &Wenders (1995) study which is one of the earliest surveys on the effect of tax incentives on FDI examined 247 US companies on their strategies to invest abroad. The result of the survey showed that together tax incentives (10%) and host country's government encouragement to investors (11%) made up 21% of the responses ranked fourth place behind determinants such as currency convertibility, host country political stability and guarantee against expropriation.

Econometric studies carried out on the bivariate relationship between FDI and tax incentives seem to confirm the above survey that though tax considerations are important in the decision of foreign investors to invest in any host economy, it however, do not carry as much weight as market and political factors and in some cases tax incentives were found to have little or no effect on the locations of FDI.Agodo (1978), carried out a study to determine the impact of tax concession of FDI using 33 US firms having 46 manufacturing investment in 20 African countries. The result showed that tax incentives were found to be insignificant determinant of FDI both in simple and multiple regression. Hassett& Hubbard (2002), discovered that investment incentives create significant distortions by encouraging inefficient investment and that low inflation is the best investment incentives than tax Incentives.

However, studies conducted by the World Bank group investment climate advisory services using a series of investor surveys and econometric analysis to determine the effect of taxation on FDI in developing countries in 40 Latin American, Caribbean and African countries between 1985-2004, showed, specifically, that FDI is affected by tax rates with a 10 percent point increase in corporate income tax rate lowering FDI by 0.45 percent point of GDP.

Empirical literature on the connection between FDI and tax incentives in the case of developing countries from the perspective of Walid(2010), who examined the economic and financial risks on FDI on macro level from 1997-2007 using multiple linear regression model revealed that there exist significant and positive relationship between FDI and economic and financial variables utilized for the study. In conclusion, the study recommended promotion of FDI via tax incentives to attract new investments.

Significant to the present study is the empirical analysis conducted by Babatunde&Adepeju (2012) for Nigeria to determine the impact of tax incentives on FDI in the oil and gas sector in Nigeria using data for 21 years. Using Karl Pearson coefficient of correlation statistical method of analysis in analysing the data collected, it was found that there is a significant impact of tax incentives on FDI in the oil and gas sector of Nigeria. Also, the study found that the major determinants of FDI in Nigeria are openness to trade and availability of natural resources on FDI.

Finally, a review of the literature carried out by Mooij&Ederveen (2005), found that most studies' reviews on the relationship between tax incentives and FDI reported a negative relationship between taxation and FDI but with a wide variability in the various tax elasticity of FDI inflow. This variability, according to Mooij&Ederveen (2005), vary depending on host country's political, environmental and economic conditions. The reviewed literature concluded that the influence of taxes on FDI is complex and depends on a number of difficult to measure factors. Thus more empirical analysis is required to shed more light on the role of taxation amongst key factors influencing FDI investment decisions.

Based on the foregoing, the following hypothesis was tested:

H_0:   Tax Incentives in Nigeria as measured by the annual tax revenue as a percentage of Gross Domestic Product (GDP) is not significantly related with FDI

III. Methodology

This section is aimed at describing the econometric methodology adopted to analyse the determinants of FDI and undertakes an empirical assessment of the impacts of tax incentives on FDI in Nigeria. We utilized econometric data covering the period 1980-2011. We also made use of data on net external FDI inflow, effective tax rate in Nigeria, GDP, openness to trade, population, exchange rate and inflation (proxies for macroeconomic stability). The data on FDI, tax revenue and GDP were taken from the Central Bank of Nigeria statistical bulletin, 2012 while data on exchange rate, inflation rate, population and trade openness were extracted from World Bank's World Development Indicators. The choice of this period is to take into consideration the period

of major economic reforms in Nigeria such as National Economic Empowerment Development Strategy (NEEDS) and Structural Adjustment Programme (SAP).

This study adopts the static Error Correction Model (ECM) conducted using annual data from Central Bank of Nigeria statistical bulletin on FDI and proxies of tax incentives for Nigeria. The use of Granger causality tests is to trace the causality between the economic variables as it yields valuable information in terms of time patterns and can be particularly interesting in comparative analysis.

Before estimating the model we use the Augmented Dickey Fuller (ADF) tests (Dickey &Fuller, 1981) and Phillip-Peron (PP) unit root tests, also to test for co-integration using the Johansson's co-integration tests that yields the log-likelihood estimates for the unconstrained co-integration vectors thus establishing the error correction model (ECM). These data were processed by Excel software to take logarithms of all variables, then the E-views software were used to examine the relationship between the variables according to linear regression equation.

The model adopted for this study is simply a modification of the standard gravity model of bilateral FDI flows, augmented by including effective tax rates variable as parameter of interest specified as follows:

$$lnFDINET_{ijt} = \beta_0 + \beta_1 lnETR_{it} + \beta_1 lnGDP_{it} + \beta_2 lnTOP_{it} + \beta_1 lnINF_{it} + \beta_1 lnEXCH_{it} + lnPOP_{it} + ln\varepsilon_{it}$$

Where:

FDINET = Net inflow of FDI in Nigeria in a given year; GDP = Gross Domestic Product in a given year; ETR = Annual Tax Revenue as a percentage of Gross Domestic Product (GDP). Following the works ofBabatunde&Adepeju (2012) and Edmiston, Mudd&Valev (2003); INF = Inflation Rate in percentage; EXCH = Bilateral Exchange Rate between Nigeria naira and $US, POP = Aggregate population of Nigeria; TOP = level of openness to trade; i =FDI to recipient country; j = year; t and ε = error term. All the variables are measured in their log forms.

IV. Results

Table 1 (Appendix) presents the descriptive statistics of the main variables used in the analysis. The table shows that the mean effective tax rate for the period under consideration was 1.76 with standard deviation of 0.39; that of FDINET was 21.04. Exchange rate and inflation showed a mean value of 60.46 and 20.61 with a high standard deviation of 61.41 and 18.16 respectively. The mean values for GDP, population, trade openness and Net flow of FDI in Nigeria were 14.14, 12.25, 3.96 and 21.04 respectively.

Table 2 (Appendix) depicts the correlation matrix showing the degree of correlation between the variables. FDI is shown to be negatively related to effective tax rate and rate of inflation and positively related to GDP, population, openness to trade and exchange rate with high degree of correlation of 89, 59, 70 and 83 percent respectively. The correlation matrix depicts that FDI in Nigeria is negatively correlated with tax incentives to the tune of 44 percent.

Unit root tests

Granger &Newbold (1974) and Granger (1986) have shown that if time series variables are non-stationary, the time series econometric study becomes inadequate. That is, regression coefficients with non-stationary variables would more than likely yield spurious and misleading results. It thus indicates that the times series variables have to be stationary (finite means, variance and auto variance) for them to be valid (Gujarati, 1997). To overcome this problem we test for stationarity of the dependent and independent variables employing the Group Unit Test comprising PP and ADF tests. The results of the tests are presented in Table 3 (Appendix).

Table 3 (Appendix) indicates that the time series of Net FDI Inflow, Gross Domestic Product as an indicator of growth, population of Nigeria, openness to trade, effective tax rate, exchange rate and inflation are non-stationary (we cannot conclude to reject H_0) at 5% level of significance, since the ADF and PP value of each variable at 5% level is greater than the McKinnon 5% critical values (p-value is higher than 5%). That means the series has a unit root problem. The first difference however, we found that they are stationary as calculated t-statistics is lower than the critical values of ADF and PP at 5% level. This implies that we reject the null hypothesis that there is a unit root (a series is a non-stationary process) at 5% significant level. Since all the variables are stationary at first difference, therefore, it is a 1(1) stochastic process. The findings imply that it is reasonable to proceed with test for co-integration relationship among combination of the series.

Co-integration tests

The summary of Johansson' co-integration tests are presented in Table 4 (Appendix). The test rejects the null hypothesis at 5% level of significance which proves the existence of co-integration relationship among the variables of the model. This result thus indicates that in the long run, the dependent variables can efficiently be predicted using the specified independent variables.

Granger causality tests

Table 5 (Appendix) presents the results of the pair wise Granger causality tests among the variables of the model. The result depicts that the null hypothesis that independent variable do not granger causes on FDI could be rejected safely at 1 percent level – a bi-directional relationship runs from independent variables to FDI and vice versa. Specifically, a unidirectional relationship runs from GDP to FDINET, EXCH to FDINET and INF to FDINET. This is consistent with the expectations and realities of the Nigerian economy. However, Granger causality could not be established from POP to FDINET, TOP to FDINET and ETR to FDINET.

Discussion of findings

The model indicates that Net flow of FDI in Nigeria in a particular year is determined by first lag of FDI in Nigeria and Effective Rate of Taxation although both of these variables had a negative impact on Net Flow of FDI. This finding is in line with the conclusions arrived at by Mooij&Ederveen (2005), that most empirical review on the relationship between tax incentives and FDI usually find a negative relationship between the constructs although with the varied tax elasticity of FDI. It is also in line with the empirical work by Agodo (1978) for 33 US manufacturing firms as well as findings of Hassett&Hubbard (2002) who averred that investment incentives create significant distortions thus encouraging inefficient investment. Also, the result of the study showed that there was no significant impact of trade openness, population, exchange rate, inflation, and GDP on FDI in Nigeria. The results are thus in line with similar studies such as Nwankwo (2006) and Babatunde&Adepeju (2012).

The coefficient of determination R^2 is 0.641948 (Appendix 6), indicates that about 64 percent of the total variations in measure of Net flow of FDI are explained by the variations in included independent variables. This shows that our model explains large proportion of variations in Net flow of FDI in Nigeria. The model also represents a good measure of fit. The F-statistic shows overall significance of the model. The F-statistic is significant at 5% level. The results suggest the inflation rate (INF) has the correct sign and is significant at 5%.

More so, the Durbin Watson statistics shows that autocorrelation do not exist between the series of the model. A unit change in trade openness, rate of exchange and inflation will culminate to an increase of 0.468, 0.0055 and 0.0065 unit change in Net flow of FDI in the short-run. The result further shows that in the short run, a unit change in the GDP and Population Rate will induce 0.136 and 0.036 reduction in Net flow of FDI but were not significant.

A crucial parameter in the estimation of the short-run dynamic model is the coefficient of the error-correction term which measures the speed of adjustment of Net flow of FDI to its equilibrium level. Thus the speed of adjustment coefficients is negative and significant. This indicates that any deviation from equilibrium would be adjusted for in the next period at the rate of 52 percent.

V. Conclusion And Recomendations

This paper provides some observations taken from the empirical studies and examines the possible effects of a change in tax policy on FDI in Nigeria. In theory, the fiscal incentives offered by a developing host country which lower its effective tax rate will in most cases be effective in attracting the needed FDI. Using linear regression analysis the result of the study indicates that response of FDI to tax incentives is negatively significant. The above findings have important policy implications: dependence of tax incentive for Nigeria should be significantly reduced. According to literature reviewed, Nigeria might be enjoying FDI because of the vast availability of natural resources (oil and gas) as such loosing huge chunk of Nigerian finances to tax incentives might instead have the negative effect that was shown. Thus it is suggested that other incentives such as political risk, stable economic reforms should be considered as a pivot for FDI in Nigeria instead. Furthermore, it is suggested that effects of tax incentives can be checked on disaggregated sectors such as agriculture (Ironkwe& Peters, 2015) and manufacturing as on the whole decrease in revenue as a result of incentives reduces FDI inflow in Nigeria.

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APPENDIX
Table 1: Summary of Descriptive Statistics

	FDINET	GDP	POP	TOP	ETR	EXCH	INF
Mean	21.04352	14.14275	12.24858	3.964317	1.755627	60.45940	20.60818
Median	20.89775	14.80977	11.62758	4.090468	1.769996	21.88610	13.40762
Maximum	23.25264	17.54061	18.93124	4.404434	2.950764	157.4252	72.83550
Minimum	19.05813	10.77100	11.22286	3.161623	0.494564	0.546400	5.382220
Std. Dev.	1.085557	2.360726	2.147331	0.344786	0.387319	61.40977	18.15888
Skewness	0.207434	-0.115091	2.800474	-1.128111	-0.206746	0.384191	1.538210
Kurtosis	2.324140	1.570779	8.947209	3.264627	7.128935	1.338953	4.093019
Jarque-Bera	0.864740	2.881527	91.76738	7.095777	23.67624	4.605545	14.65620
Probability	0.648969	0.236747	0.000000	0.028785	0.000007	0.099981	0.000657
Sum	694.4362	466.7109	404.2032	130.8224	57.93570	1995.160	680.0698
Sum Sq. Dev.	37.70991	178.3368	147.5530	3.804083	4.800522	120677.1	10551.84
Observations	33	33	33	33	33	33	33

Table 2: Summary of Correlation Matrices

	FDINET	GDP	POP	TOP	ETR	EXCH	INF
FDINET	1	0.896993878297002	0.587227523464786	0.704308598725143	0.446053970125312	0.830010090283885	0.0845640465105918
GDP	0.896993878297002	1	0.529680929177655	0.737701423141111	0.326593123516008	0.916310864111749	0.169607262598259
POP	0.587227523464786	0.529680929177655	1	0.311352069148995	0.542045024896788	0.559715409681673	0.128316646432446
TOP	0.704308598725143	0.737701423141111	0.311352069148995	1	0.030172926383032	0.586358718858325	0.033235328605423 6
ETR	0.446053970125312	0.326593123516008	0.542045024896778	0.030172926383032	1	0.248090780311212	0.0570987267650053
EXCH	0.830010090283885	0.916310864111749	0.559715409681673	0.586358718858325	0.248090780311212	1	0.329088223808093
INF	0.0845640465105918	0.169607262598259	0.128316646432446	0.033235328605423 6	0.0570987267650053	0.329088223808093	1

Table 3: Summary of Group Unit Root Test at 5% Level of Significant

Group unit root test: Summary

Date: 18/11/13 Time: 04:55

Sample: 1980 2012

Series: FDINET, GDP, POP, TOP, ETR, EXCH, INF

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic selection of lags based on SIC: 0 to 1

Newey-West bandwidth selection using Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	0.54264	0.7063	7	221
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	1.63987	0.9495	7	221
ADF - Fisher Chi-square	12.4633	0.5692	7	221
PP - Fisher Chi-square	11.3826	0.6558	7	224
Null: No unit root (assumes common unit root process)				
Hadri Z-stat	7.52883	0.0000	7	231

** Probabilities for Fisher tests are computed using an asymptotic Chi

-square distribution. All other tests assume asymptotic normality.

Table 4: Co-integration Test

Date: 18/11/13   Time: 04:58

Sample (adjusted): 1982 2012

Included observations: 31 after adjustments

Trend assumption: Linear deterministic trend

Series: FDINET GDP POP TOP ETR EXCH INF

Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.849479	153.1187	125.6154	0.0004
At most 1	0.720519	94.41544	95.75366	0.0616
At most 2	0.487279	54.89598	69.81889	0.4234
At most 3	0.390116	34.18725	47.85613	0.4916
At most 4	0.303546	18.85818	29.79707	0.5031
At most 5	0.213818	7.643833	15.49471	0.5042
At most 6	0.005991	0.186266	3.841466	0.6660

Trace test indicates 1 co-integrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.849479	58.70330	46.23142	0.0015
At most 1	0.720519	39.51946	40.07757	0.0577
At most 2	0.487279	20.70874	33.87687	0.7059
At most 3	0.390116	15.32906	27.58434	0.7218
At most 4	0.303546	11.21435	21.13162	0.6259
At most 5	0.213818	7.457567	14.26460	0.4365
At most 6	0.005991	0.186266	3.841466	0.6660

Max-eigenvalue test indicates 1 co-integrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table 5: Granger Causality Test

Pairwise Granger Causality Tests

Date: 18/11/13   Time: 04:57

Sample: 1980 2012

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Probability
GDP does not Granger Cause FDINET	31	3.38074	0.04954
FDINET does not Granger Cause GDP		0.10063	0.90462
POP does not Granger Cause FDINET	31	0.91993	0.41113
FDINET does not Granger Cause POP		2.50404	0.10127
TOP does not Granger Cause FDINET	31	0.17445	0.84089
FDINET does not Granger Cause TOP		0.99809	0.38227
ETR does not Granger Cause FDINET	31	0.92654	0.40860
FDINET does not Granger Cause ETR		1.51312	0.23899
EXCH does not Granger Cause FDINET	31	2.89392	0.07333
FDINET does not Granger Cause EXCH		0.45877	0.63708
INF does not Granger Cause FDINET	31	2.98630	0.06800
FDINET does not Granger Cause INF		0.56521	0.57507
POP does not Granger Cause GDP	31	0.30422	0.74029
GDP does not Granger Cause POP		1.91932	0.16693
TOP does not Granger Cause GDP	31	0.65029	0.53018
GDP does not Granger Cause TOP		3.26770	0.05420
ETR does not Granger Cause GDP	31	0.14585	0.86499
GDP does not Granger Cause ETR		0.71966	0.49636
EXCH does not Granger Cause GDP	31	0.98634	0.38647
GDP does not Granger Cause EXCH		4.47293	0.02140
INF does not Granger Cause GDP	31	3.33116	0.05153
GDP does not Granger Cause INF		0.81989	0.45155
TOP does not Granger Cause POP	31	0.24261	0.78634
POP does not Granger Cause TOP		0.06962	0.93292
ETR does not Granger Cause POP	31	0.15350	0.85847
POP does not Granger Cause ETR		7.95044	0.00202
EXCH does not Granger Cause POP	31	2.71285	0.08510
POP does not Granger Cause EXCH		0.00478	0.99523

INF does not Granger Cause POP	31	0.15286	0.85902
POP does not Granger Cause INF		0.07938	0.92391
ETR does not Granger Cause TOP	31	0.33766	0.71652
TOP does not Granger Cause ETR		0.37655	0.68991
EXCH does not Granger Cause TOP	31	0.65840	0.52609
TOP does not Granger Cause EXCH		2.21860	0.12894
INF does not Granger Cause TOP	31	0.36428	0.69818
TOP does not Granger Cause INF		0.11851	0.88872
EXCH does not Granger Cause ETR	31	0.98354	0.38747
ETR does not Granger Cause EXCH		0.19072	0.82751
INF does not Granger Cause ETR	31	0.11596	0.89097
ETR does not Granger Cause INF		0.93185	0.40658
INF does not Granger Cause EXCH	31	0.96646	0.39368
EXCH does not Granger Cause INF		0.79035	0.46429

Table 6: Parsimonious Static ECM Regression

Dependent Variable: D(FDINET)

Method: Least Squares

Date: 18/11/13   Time: 05:09

Sample (adjusted): 1982 2012

Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.990486	1.472193	0.672796	0.5081
D(FDINET(-1))	-0.440628	0.156022	-2.824144	0.0099
ETR	-0.460523	0.269054	-1.711639	0.1010
TOP	0.467941	0.418432	1.118321	0.2755
POP	-0.036098	0.050939	-0.708663	0.4860
EXCH	0.005467	0.004160	1.314212	0.2023
INF	0.006596	0.004770	1.382832	0.1806
GDP	-0.136885	0.136271	-1.004508	0.3261
ECM(-1)	-0.528488	0.229560	-2.302173	0.0312
R-squared	0.641948	Mean dependent var		0.101331
Adjusted R-squared	0.511747	S.D. dependent var		0.585316
S.E. of regression	0.408990	Akaike info criterion		1.287448
Sum squared resid	3.680002	Schwarz criterion		1.703767
Log likelihood	-10.95545	F-statistic		4.930452
Durbin-Watson stat	2.014248	Prob(F-statistic)		0.001375