Foreign Capital Inflow and Domestic Private Investment in Nigeria - A Disaggregated Model

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Abstract: Foreign capital inflow (KI) is arguably a vital source of external capital, especially for developing countries with low domestic savings rate. Investigating the trend of KI into Nigeria, we observed that as a ratio of GDP it was 0.67% in 1979, 6.88% in 1989, 9.45% in 1999, and 19.31% in 2009. Thus, this study 'Foreign Capital Inflow and Domestic Private Investment in Nigeria – A Disaggregated Model' is intended to examine the relationship among aggregate KI and domestic private investment (DPI) on one hand, and disaggregated KI and DPI on the other in the period 1986Q1-2012Q4. Variables such as DPI, KI, three inflow components: (foreign direct investment (FDI), portfolio investment (PFI), and remittances (REM)) and dummy are employed. The framework of Khan (2011) which expressed DPI as a function of the explanatory variables was modified and adopted. With coefficient of -0.021 and t-statistic of -0.968 for the first model, the results reveal that aggregate KI has inverse but insignificant relationship with DPI in the short and long run. When disaggregated (second model), FDI coefficient is 0.190 with t-statistic value of 3.013 indicative that the variable has significant growth-inducing impact on DPI. The coefficients of PFI and REM are -0.017 and -0.121 with t-statistic values of -1.105 and -4.887 respectively, suggestive that both have depressing impact on DPI. The joint depressing impact of PFI and REM on DPI is greater than the expansionary impact of FDI on DPI. The coefficient of dummy was found to be significantly positive in determining DPI.

Keywords: Foreign capital inflow; Foreign direct investment; Portfolio investment; Private domestic investment; Remittances.

1. Introduction

A consensus exists in economic literature regarding the definition of investment. Any production of capital such as machinery, dwellings, inventories, or the net increase to existing capital represents investment. The importance of investment can be gauged from various perspectives. First, investment is a key component of aggregate demand and of gross national product, and is positively related with both. Second, investment is important because variations in investment expenditures working through the accelerator are highly correlated with variations in GNP, called the business cycle. Third, because investment expands the productive capacity, it is a major explanation of and contribution to economic development or long run growth (Iyoha, 2004).

Investment is generally financed through domestic and/or foreign savings. While it is financed from domestic saving in typical industrialized and advanced countries of the world, foreign savings are often used to supplement domestic saving in the financing of investment in many developing economies. This is because domestic savings tend to be low in a typical developing country due largely to low income and under-developed financial system. The inadequate savings are indicative that savings will fall short of 'required investment', that is, investment needed to grow at a target rate. Inflow of capital representing foreign savings is required to fill the gap. Increased inflows augment domestic savings, facilitate higher domestic capital accumulation in physical and human capital, increase efficient use of factor inputs are and hence enhance economic growth and development (Calvo *et al.*, 1994).

Capital inflow into Nigeria has shown some impressive outcomes since late 1990s. For instance, while inflow was ₦4,374.72 ($544.12) in 1990, it rose to ₦74,451.17 ($3,401.15) in 1997. The figure rose astronomically in 2005 and 2012 with inflow values of ₦2,670,747.79 ($20,373.39) and ₦6,257,924.40 ($40,114.90) respectively. Average annual inflow in the period 1986–1994 was ₦1,876.07 ($1,508.54) but rose to ₦772,347.70 ($13,729.97) in 1995 – 2012 period. As proportion of GDP, it was equally impressive as it was 7.04% in 1987, 20.64% in 2006, but fell slightly to 19.31% in 2009. When disaggregated, inflow components were equally impressive both in value and as ratio of GDP. Specifically, foreign direct investment (FDI), portfolio investment (PFI), and remittances (REM) was ₦2,452.8 ($610.55), ₦4,353.1 ($1,082.9), and ₦12.4 ($4.5) million in 1987, rose to ₦115,952.2 ($1,140.14), ₦51,079.1 ($502.3), ₦177,251.9 ($1,391.8) million in 2000 and further to ₦1,273,815.8 ($8,554.84), ₦70,938.5

($489.3), and ₦2,710,252.5 ($21,075.1) million in 2009 respectively. In 1987 FDI, PFI, and REM as ratio of GDP was 2.5, 4.5, and 0.02 respectively, while it rose to 5.1 for FDI, 14.0 for REM, while PFI fell to 0.3 in 2009.

Despite these impressive inflow figures, the Nigerian government has, secretly and publicly taken steps to encourage private sector-led investment and growth. The government has made the regulatory as well as policy environment simple for domestic private investment and reduced limitations on foreign investment.   The privatization of public enterprises, which was informed by the dismal performance of enterprises owned by government in Nigeria, the establishment of free trade zones (FTZs), and the investment promotion council (IPC) are all aimed at assigning greater importance to the more efficient and more effective private sector and its growth potential than was the case.

Besides public enterprises and investment reforms, interest rates which hitherto had been kept low in accordance with Keynesian investment theory were deregulated mid 1986. This deregulation, which was in tandem with McKinnon and Shaw interest rates, savings and investment hypothesis, were intended to induce savers and hence stimulate investment. In line with McKinnon-Shaw theory, one of the main purposes of 1986 "interest rate policy in the monetary and credit guidelines" which has been modified periodically is the stimulation of savings and investment. Evidence available is indicative that financial savings increased substantially since 1986. As a ratio of GDP, it was 18.6% in 1986, rose to 32.3% in 1991, further to 39.1% in 2000 and 40.8% in 2012. However, these impressive inflow figures and the increases in the rate of savings have failed to elicit the required improvement in domestic private investment and hence economic growth in Nigeria. On its part, investment-GDP ratio which was 3.7% in 1987 rose marginally to 4.0% in 1994, but down to 3.3% in 2000 before rising to 7.9% in 2010.

Table-1. Trends in Aggregate Capital Inflow (KI), Domestic Private Investment (DPI), and Savings (S), (value, ratio of GDP, and growth rate), in Nigeria (1986 – 2012)

Year	Domestic Private Investment			Aggregate Capital Inflow (KI)			Savings (S)		
	Value ($m)	% GDP	% Growth	Value ($m)	% GDP	% Growth	Value ($m)	% GDP	% Growth
1986	857	3.1	-8.44	857	1,36	-42.73	3858	18.62	-13.19
1987	938	3.9	9.38	938	7.04	497.66	5999	24.90	-23.57
1988	801	3.56	-14.56	801	4.11	-43.65	4712	20.25	4.46
1989	882	5.61	10.09	882	6.88	75.14	9527	39.32	2.00
1990	1836	6.00	108.28	544	1.78	-113.02	9869	32.09	38.65
1991	1380	5.03	-24.80	718	2.56	32.02	8853	32.32	-0.38
1992	1199	4.08	-13.10	3083	10.54	329.16	7850	26.79	-2.99
1993	761	4.84	-36.5	2121	13.05	-31.19	3657	23.16	16.00
1994	720	4.00	-5.30	2500	13.92	17.85	3167	17.51	-10.16
1995	1374	4.84	90.69	1812	6.44	-27.51	5378	18.84	-26.20
1996	1599	4.54	16.38	2393	7.30	32.03	4930	14.09	18.10
1997	1772	4.97	10.82	3401	8.84	42.16	5395	15.06	8.84
1998	1462	4.57	-17.49	2588	7.51	-23.91	5856	1.83	-5.06
1999	1395	3.89	-4.58	2317	9.45	-10.47	6781	18.90	-2.93
2000	1546	3.33	10.82	3034	7.41	30.96	18142	39.11	17.03
2001	1573	3.56	1.72	3139	7.14	3.46	7361	16.68	-21.71
2002	2524	4.26	60.42	3289	5.79	4.79	9203	15.57	20.34
2003	3886	5.74	53.96	3251	4.74	-0.12	9655	14.27	50.14
2004	3832	4.37	-1.39	4324	5.25	33.01	16932	19.27	-24.00
2005	3493	3.14	-8.85	20373	18.08	371.20	20241	18.03	-10.46
2006	6840	4.72	95.82	23556	20.64	15.62	43465	29.89	59.39
2007	9099	5.44	33.03	25493	15.32	8.22	20391	12.25	41.73
2008	10408	4.99	14.38	26449	12.78	3.75	48111	23.12	-0.73
2009	12723	7.51	22.23	30117	19.31	13.87	20048	11.83	34.77
2010	15593	7.94	22.60	31058	13.67	3.12	49856	21.72	18.33
2011	15028	6.10	-3.60	22413	9.46	-27.83	65893	26.82	-10.80
2012	13296	5.32	-11.5	40115	15.55	28.98	107066	40.77	-19.89

Source: Plotted by the Author based on the Data from African Development Report (2009) and World Development Indicators (WDI) 2012

From table 1, the relationship between DPI growth and KI is not clear. For instance, in 1987, KI growth was 497.7% while DPI growth was 4.6%. But by 1990, the growth rate of KI fell to a negative figure of 113% while DPI instead rose to 6.2%. The unclear trend is also observable in 1995 where KI growth was negative at 27.5% but DPI growth rose to 11.1%. In 2005 KI grew by 371.2% and expectedly DPI also grew by 13.4%, but when KI growth fell to 13.9% in 2009, that of DPI instead rose to 22.2%. The same unclear trend characterized KI and DPI growth in 2012. It is therefore necessary to establish a relationship between DPI and KI in Nigeria.

The unimpressive private domestic investment outcome despite these reform efforts is the major reason for this work. Cross-country evidence abound that capital inflows crowd out domestic investment, or that inflows finance

current account deficit, or that they are often used to increase the financing of foreign reserves instead of investment in recipient economies. The overall result is that more foreign inflows into developing economies are converted into their reserves thereby depleting savings meant for developed economies (Bos *et al.*, 1974; Saltz, 1999).

The type of inflow into an economy is also important. Portfolio flows (equity) which appears to be speculatively driven by short term motive in a world of unequal access to information have positive effect on investment only in the economies with more and highly developed domestic financial systems (Hecht *et al.*, 2004). On its part, flows of FDI are more permanent and less volatile and have proved to be remarkably more stable even when the host economy is in crises, suggestive of being driven by more permanent desire for economic prosperity of recipient countries (Elitza, 2008). Workers' remittances or transfers from international migrants are important source of foreign finance and exchange for recipients. They assist stabilize irregular incomes, build human and social capital, and serve as financial support to many poor families in developing countries.

This study will disaggregate capital inflow into components and examine three types: Foreign Direct Investment (FDI), Portfolio Investment (PFI), and Remittances (REM). This is done under two regime periods (1986-1994; 1995-2012) to ascertain their individual and joint impacts on private domestic investment in Nigeria. The sum of these three represents capital inflow (KI) as far as this study is concerned, and the word components or types are used interchangeably.

While several factors may have accounted for the poor response of private domestic investment, it is pertinent and relevant to examine the determinants of private domestic investment in Nigeria using foreign capital inflow and its components as explanatory variables of interest. So far, time series studies for Nigeria on capital inflow and domestic private investment are hard to come by. Again, none of the few studies reviewed on capital inflow-domestic private investment included remittances among inflow components of choice despite its impressive inflow value and growth potentials (Ukeje and Obiechina, 2013). Hence, the objectives of this study are to evaluate the growth-inducing impact of aggregate and disaggregated capital inflow on private domestic investment in Nigeria in the period 1986Q1 to 2012Q4. While evidence from single equation shall be provided, the error correction framework shall be utilized to provide evidence on the subject of interest.

2. Theoretical Literature
2.1. Investment Theory
Many theories are forwarded in the theoretical literature to clarify the changes in capital formation. Five are briefly discussed.

2.1.1. The Flexible Accelerator Theory
Flexible Accelerator Theory originated by Koyck (1954) hypothesizes that investment depends on the rate of interest and on the change of output. The reasoning here is that it is not the level of output that induces new net investment but rather, it is the change in output. The presumption is that firms will need to expand their productive capacity only if output increases, indicative that the relationship between growth of output and the level of investment is the "accelerator principle" since it assumes that a rise in the growth rate of output – an acceleration of output growth – is required to raise the level of investment. Hence, this variable relationship between investment and growth in output is called the *flexible-accelerator* framework (Iyoha, 2004).

2.1.2. Marginal Efficiency of Capital Theory
Perhaps, the most accepted criterion for investment decisions in macroeconomic analysis was suggested by Keynes using the marginal efficiency of capital/marginal efficiency of investment (MEC/MEI) approach.

According to Keynes (1936), a businessman will invest in, say, a machine, if he finds it profitable, that is, if it is more profitable than buying an existing asset, say, a bond. To simplify the approach, assume that the businessman has only two choices: invest in the machine or buy bond. If he chose to buy the machine, the decision to invest in new machines depends on the profitability of such investment against the profitability of holding existing financial assets. Hence, a businessman will invest in a new machine if its rate of return over cost (RROC) is greater than the market interest rate. The RROC, which is the yield on such investment, is what Keynes called the MEC. MEC may be defined as an internal rate or return or a yield.

Keynesian formulation using MEC suggest that investment is inversely linked to the market rate of interest. Thus, ceteris paribus, an increase in the market rate of interest would lead to a decline in investment while a decrease in interest rate would result in an increase in investment.

2.1.3. The Profit Theory of Investment
A major modification of the basic investment demand function suggests that investment depends both on the rate of interest and the level of income. Thus, the hypothesis assumes that higher gross profit results in higher generation of internal funds (higher levels of income) which are associated with increased volume of investment while low income level and economic activity are associated with low levels of investment demand (Chirinko, 1993). Thus, this formulation brings in the role of profits and liquidity as partial determinants of investment demand in modern economies.

2.1.4. The Two-Gap Theory of Investment

Another variant of investment theory is the two-gap model developed by McKinnon R.I. (1964) cited in Iyoha (2004). The theory posits that development in developing countries may be constrained by the existence of two gaps – the savings gap and the foreign exchange gap. The savings gap arises because, for a variety of reasons, domestic savings tend to be low in the typical developing country. Thus, savings will inevitably fall short of "required investment", that is, investment necessary to grow at a target rate. The option to fill this gap rests with the capacity/ability of such country to attract foreign savings. This will come in the form of capital inflow. Foreign capital permits the developing country to invest more than it can save domestically.

Papanek (1960) has suggested that the "need for outside assistance depends on the rate of development considered desirable and the extent to which a country can reach that rate using its own resources". It is obvious that capital inflow recipient country is more likely to achieve the objective of rapid economic growth if the inflow received is effectively utilized.

Hecht *et al.* (2004) state that capital inflows unarguably raise investment rates in developing economies. They argue that because savings are abundant in developed countries with high capital per worker, return on investment is low. On the other hand, capital per worker is low and return on investment high in developing countries, but savings are scarce. Hence, if there is free movement of capital internationally, a part of the savings of the advanced economies would be invested in the developing economies. If this happens, investment rate would fall below the saving rate in developed economies and rise above the saving rate in developing economies. Given freer international capital mobility, poorer nations are expected to achieve faster economic growth and thus fast-track economic convergence among the nations of the world.

Beneficial as they seem, the relationship between foreign capital inflow and domestic investment may equally be negative. Singer (1950) as well as Prebisch (1968) earlier studied FDI and argued that the target economies receive very few benefits of FDI, because these benefits are sent to the country from where FDI emanated. One point regarding the negative impact of FDI on the host economy's economic growth prospects is that even though FDI may increase the level and productivity of investment, it reduces growth rate due to input price variations and misallocation of resources. Bos *et al.* (1974) identified that price distortions as a result of protectionism, reduction in natural resources, and monopoly power are other factors that cause FDI to negatively impact on growth.

2.1.5. Financial Deepening Theory

McKinnon R. I. (1973) and Shaw (1973) equally developed modern theory on capital formation emphasizing the need to deepen the financial system and raise the rate of interest as determinants of output growth. They opined that if an economy was deregulated and freed from repressive conditions, savings and investment will increase and hence output growth. Accordingly, capital formation is a positive function of real interest rate as opposed to modern classical model. They opined that this assertion is possible because higher rate of interest leads to a rise in saving deposits through the banks intermediary role thereby increasing the availability of investible funds, a situation McKinnon refers to as 'conduit effect'. The shortcoming inherent on the modern classical theory is applicable to this framework because it is different from itself.

2.2. Review of Empirical Studies for Nigeria

Nkoro and Furo (2012) empirically investigated the relationship and dynamic interaction between foreign investment flows (aid, remittances, FDI, and foreign debt) and GDP growth in Nigeria for the period 1981-2010. Using some econometric technique like, co-integration, variance decomposition and impulse response function, they found that both co-integration and variance decomposition analyses support causation running both direction between capital inflow components and economic growth. Real GDP response to a standard deviation innovation of capital inflows appears sensitive, that is, the change appears very noticeable within the forecast period. ECM result however, reveals a significantly positive impact of foreign aid on real GDP. Other ECM results indicate the following on real GDP: negatively insignificant, positively significant, and negatively significant effect of remittances, FDI, and external debt on real GDP respectively. All, except the FDI take some time before their impacts are manifested.

Herzer *et al.* (2006) using a two-variable VAR framework for the period 1980-2002, found positively FDI and economic growth relationship for Nigeria, Sri Lanka, Tunisia, and Egypt. Testing for causality relation, it was found that a long-run bi-directional causal relationship exists between FDI and GDP for all the countries examined, that is, causality running from FDI to GDP growth and vice versa. In examining whether FDI-growth relationship can be sustained in Nigeria for the period 1986-2006, Okodua (2009) employed the Johansen co-integration technique and a multivariable VAR framework within a VECM. Okodua found a long-run nexus between GDP growth and foreign direct investment inflow. Further analysis by the author showed causality running only from FDI to GDP growth – a one-way (unidirectional) causality.

Ogbonna *et al.* (2012) evaluated the nexus between foreign direct investment and economic growth in Nigeria in the 1986 – 2010 period. Employing OLS technique and causation tests, the authors observed that although FDI coefficient in the regression result show that 13% of variations in GDP are accounted for by a percent increase in FDI, their relationship is statistically insignificant. The results of the causation test also reveal that causality runs both ways – from FDI to GDP and vice versa – a two-way causality, that is, each granger cause the other. They

recommended that more sectors of the economy be deregulated so as to encourage and promote more investor participation in the productive sector of the economy.

Ekeocha *et al.* (2012) examine the long run factors that determine of foreign portfolio investment (PFI) in Nigeria for the period 1981 – 2010 using quarterly data. Applying time series analysis specifically the finite distributed lag model on market capitalization, real exchange rate, real interest rate, real GDP and economic globalization variables, they find that FPI is positively related with market capitalization and globalization in Nigeria in the long run. They recommend and support the on-going efforts to sanitize the capital market as a way to attract portfolio investors and improve the country's market capitalization.

Ukeje and Obiechina (2013) in their study on remittances – GDP growth relationship in Nigeria using an error correction ECM for the period 1970-2010 found that remittances impact significantly and positively on output growth in the long run. The duo equally reported that in the short run, previous values of remittances significantly and positively impact on economic growth. Equally, its coefficient is appropriately signed. Their study recommends that relevant and required infrastructural facilities be provided to attract more remittance inflows into Nigeria through appropriate and official channels while adopting measures to encourage the remittance receivers to utilize remittance receipts for productive investment or through domestic savings where investors will access them for investment purposes and hence output growth.

Oduh and Urama (2012) investigated whether the end-use of remittances reduces poverty and finance growth in an import-dependent economy like Nigeria. Using macro-econometric framework with six behavioral functions and six identities and estimating and simulating the impact of remittance inflows on total expenditure in Nigeria, the simulation result reveals: first, the much praised poverty-reducing impact of remittance inflow does not finance growth for import-dependent economy as that of Nigeria. The authors blamed the results on the negative effect on the balance of payment even though it is positively linked to private consumption and investment.

Ogbonna *et al.* (2014) sought to examine linkages between remittance inflows and private domestic investment in Nigeria over the period 1970-2012. Applying a time series data from 1970-2012 in an ECM framework, the result indicates that remittance inflow is insignificantly negative in promoting private domestic investment. The coefficient of the error correction term is significant and appropriately signed indicative that previous deviations away from equilibrium state adjust back to equilibrium overtime.

Beneficial as foreign inflows may seem, some empirical results show a crowding-out effect on domestic capital formation. Saltz (1999) evaluated the impact of MNCs on domestic investment for low income economies off the world using VAR framework. The findings showed a crowding-out effect between the level of MNCs and domestic capital formation in 1970-1980 era. He explained that FDI is negatively related with domestic investment because most of the multi-national companies increase output and force local producers to shut down. Also, most multinational companies use imported capital and venture into areas hitherto controlled by government owned enterprises.

2.2.1. Trends in Domestic Private Investment and Capital Inflow Components in Nigeria for the Two Regime Periods (1986-1994; 1995-2012)

The value of aggregate investment spending in Nigeria in the 1986-1994 (deregulation) period was ₦337.2 ($28.1) billion, but rose to ₦23,595 ($181.5) billion in the 1995-2012 (post-deregulation) period. As annual average, it was ₦37.5 ($3.1) billion and ₦1,310.8 ($10.1) in 1986-1994 and 1995-2012 periods respectively. Annual domestic investment spending was ₦13.3 ($3.3), ₦44 ($2.0), ₦335.6 ($3.3), and ₦3,405 ($21.4) billion in 1987, 1994, 2000, and 2012 respectively. As proportion of GDP, it was 15% in 1986, 11% in 1994, 7% in 2000, and 8% in 2012. The above trend is indicative that investment-friendly policies of the government during the deregulation and post-deregulation periods, such as investment and export promotion, privatization, as well as market determined economy, failed to elicit the required private sector-led investment spending necessary to grow the economy. Sectorally, however, the distribution of aggregate investment spending between public and private indicates that the private sector took advantage of the privatization policy to increase its share in total investment spending. For instance, while annual domestic public investment share in total investment was 67% in 1986-1994 era, it fell to 42% in 1995-2012 period. On its part, private investment share in total investment rose from 33% in 1986-1994 to 58% in 1995-2012 period. On annual basis, while public investment share in total investment showed a downward trend of 71%, 63%, 52%, and 42% in the period 1987, 1994, 2000, and 2010 respectively; that of private investment share in total investment trended upward in the same period to 29%, 37%, 48%, and 58% respectively. As proportion of GDP, private investment spending was however, not impressive as it recorded 4%, 4%, 3% and 8% in 1987, 1994, 2005, and 2010 respectively.

FDI inflow into Nigeria was ₦432 ($485.58) million in 1985, but rose to ₦13,866.2 ($1,884.25) million in 1989, and peaked at ₦1,393,491.32 ($8,841.95) million in 2011. This impressive result was as a result of the divestment of Federal Government shares in the Shell Petroleum Development Company Nigeria Limited by three oil companies namely, Shell, Elf, and Agip, which resulted in new capital flows to take up the shares. The enthronement of democratic government in 1999 as well as the continued deregulation and privatization policies, especially in the communication, oil, and energy sectors further impacted positively to maintain the upward FDI inflow. As percent of GDP, FDI inflow was equally impressive as it moved from a low of 0.93% in 1986 to a high of 10.83% in 1994. However, the re-regulation of the economy end of 1994 resulted in sharp reduction in the FDI as

proportion of GDP as it fell to a low of 3.78% in 1995, further to 2.46% in year 2000 before rising marginally to 2.64% and 2.70% in 2010 and 2012 respectively.

Portfolio investment (PFI) inflow between 1986-1998 period was not impressive as negative figures were reported most of the years, except for 1986 and 1992. However, from 1999 PFI inflow recorded remarkable increases arising from the positive outcome of the sustained reform programmes, especially the banking sector consolidation and the high rate of returns on domestic debt instruments, among others. From a low of ₦151.6 ($86.63) million in 1986 and a negative figure of ₦1,618.8 ($219.95) million in 1989, it rose to ₦92,518.9 ($832) million in 2001, ₦360,291.6 ($1,769.19) million in 2006 and peaked at ₦556,585.1 ($2,571.07) million in 2011 arising from the equity participation in the initial public offers (IPOs) of deposit money banks of 2007. As percent of GDP, PFI was equally not impressive in the period 1986-1998. From a low of 0.42% in 1986 it nose-dived to a negative figure of 0.91% in 1989 and remained negative till end of 1998. In 1999, it rose to 0.03%, 0.20% in 2004, and 3.81% in 2012.

Figure-1. graphs DPI, FDI, PFI, and REM as ratio of GDP for the period 1985-2012.
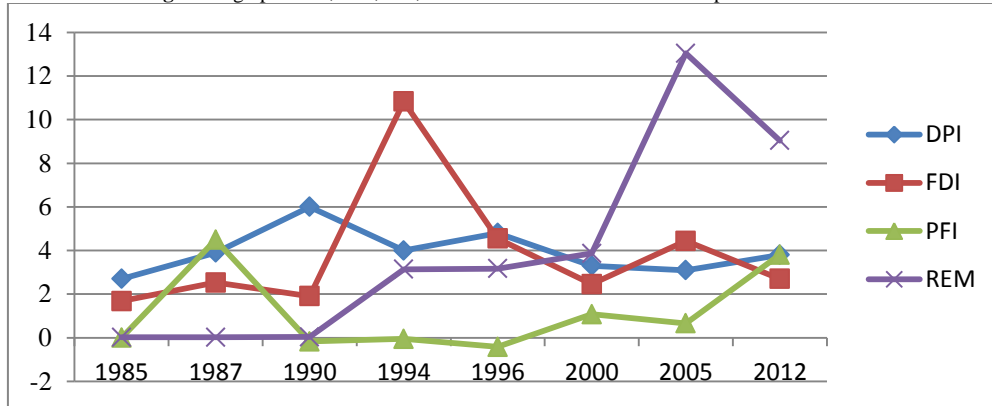
Source: Plotted by the author based on the Data from World Development Indicators (WDI) 2012 and author's computation

Figure 1: DPI, KI Components as percent of GDP 1985 - 2012

Remittance inflow (REM) into Nigeria was ₦75.51 ($10.) million in 1989, but rose to N177,251.90 ($1,391.80) million in 2000; N2,938,239.48 ($22,847.90) million in 2010 and ₦3,645,864.42 ($23,011.01) in 2012. As ratio of GDP, remittance inflow also displayed an impressive upward trend. For instance, with GDP ratio of 0.01% in 1986, it rose to 0.23% in 1991, 16.08% in 2006 but fail to 9.04% in 2012. The unabated growth in remittances is attributable as a direct consequence of the increasing number of Nigerians who travel abroad and the reduction in transaction costs of remitting.

As aggregates, PFI, FDI and REM inflow in the period 1986-1994 was $3,514.87, $8,568 and $1,494 million respectively. Between 1995-2012, PFI, FDI, and REM inflow was $19,867.30, $66,967.61 and $160,292.42 million respectively. As ratio of GDP, PFI, FDI, and REM inflow in the period 1986-1994 stood at 1.65%, 4.01% and 0.70% respectively. However, between 1995-2012, the performance of inflow components as GDP ratio was rather mixed. While FDI and PFI inflow showed downward movements to 3.33% and 0.99% respectively, REM inflow maintained its impressive outlook rising to a high of 7.97%.

3. Theoretical Framework and Model Specification

In modeling for domestic private investment, this research drew substantially from Blejer and Khan (1984) neo classical investment framework. Blejer and Khan in their literature outlined the challenges in using an exact neoclassical investment framework in developing economies. Our model which is in line with the empirical works of Khan (2011) is modified to take care of financial difficulties facing firms in Nigeria and other developing economies. It is modeled around a partial adjustment framework that describes investment as:

$$C_t - C_{t-1} = I_t = \tilde{a}_t(C^d_t - C_{t-1}) \dots\dots\dots\dots \quad (2)$$

Where: I = net investment, C^d = the desired (optimal) stock of capital, C_{t-1} = existing stock of capital for the economy, t = time period, and $\tilde{a}$ = the adjustment coefficient that may change over time. Both C^d and $\tilde{a}$ are internally determined. C^d reflects the efficient use of capital stock, while $\tilde{a}$ results in optimal adjustment drive towards the desired level of capital stock. It is expected that $\tilde{a}$ vary systematically with macroeconomic, financial, technological, and system bottlenecks to meet up with planned level of capital formation. Equation (2) says that any variation in actual capital stock will react only partly to the difference between optimal C and previous values of C.

Khan (2011) notes that rigidities in the financial system due to under developed financial markets exert effect on the series of actions towards a change in C^d, and increases the need for foreign capital inflow to improve investment in developing countries. According to Stordel (1990), the major bottleneck to investment in developing economies is the volume of financial resources, not their costs. We assume that the rate of adjustment is constrained not only by the cost of borrowing (INT), but also by the quantity of foreign capital inflow to the country. However, to capture the two objectives of the study, aggregate capital inflow (KI) and capital inflow components (foreign direct

investment (FDI), portfolio investment (PFI), and remittances (REM)) are entered in the model separately. Hence, the adjustment coefficient is given as:

$$\tilde{a}_t = f(INT_t, KI_t, FDI_t, PFI_t, REM_t) \qquad \text{………………..} \qquad (3)$$

Investment demand function is negatively interest elastic because a higher market rate of interest (INT) increases the cost of capital, crowds out return on investment and hence a fall in investment. Thus, ceteris paribus, a rise in the market rate of interest would lead to a fall in investment while a fall in interest rate would result in an increase in investment.

Foreign Direct Investment (FDI) is expected to impact on domestic private investment through the spread of best practices, transfer of technology and sub-contracting to local firms. But increased FDI can also harm domestic investment as local firms cannot compete with huge multinational corporations and are forced to close down (Khan, 2011). It is therefore difficult to predict *a priori* the sign of the effect of FDI on the coefficient of adjustment, and consequently on domestic private investment. Portfolio flows are expected to impact positively on domestic investment as flows are expected to promote improvements and expansion of financial markets. But portfolio flows and particularly short-term flows that are driven by speculative considerations are often subject to reversals at the first sign of trouble, and consequently might not influence domestic investment (Loungani, 2003). Adams and Page (2005) argue that remittance inflow positively and significantly affect current account balance and economic growth through its direct implications for savings, human capital development, and, indirectly on consumption. Ratha (2003) adds that for rural households, remittances raise their consumption level, and this may induce higher multiplier effect because they are more likely to be spent on home made goods. Hence, remittances are expected to positively impact on domestic investment.

Government investment (GI) is important and can complement domestic private investment, but the manner and source of financing is equally important. Public capital expenditure undertaken to boost infrastructure like transport, communication, education, energy, and irrigation has the potential to complement or crowd in private sector investment as such projects tend to reduce the cost of production and increase the profitability of private capital. However, as argued by Aschauer (1989), public investment that involves large fiscal deficits that result in high interest rate, credit rationing, or a higher current and future tax burden will negatively impact on domestic private investment. The role of public investment in influencing domestic private investment is therefore not in doubt. The coefficient of adjustment becomes:

$$\tilde{a}_t = f(INT_t, KI_t, FDI_t, PFI_t, REM_t, GI_t) \qquad \text{………………..} \qquad (4)$$

Exchange rate is expected to affect the coefficient of adjustment since most developing countries depend on imported capital inputs for production. However, the theoretical postulation is ambiguous about the direction of the effect of exchange rate (EXR) on the rate of investment. While a real depreciation raises the cost of imported capital inputs, and because a large chunk of investment goods in developing countries (Nigeria inclusive) is imported, domestic private investment would be expected to fall on account of significant depreciation. On the other hand, a significant depreciation by raising the profitability in the tradable goods sector would be expected to stimulate private investment in the export sector, but depresses investment in the non tradable goods sector (Ezike and Ogege, 2012). The coefficient of adjustment is now:

$$\tilde{a}_t = f(INT_t, KI_t, FDI_t, PFI_t, REM_t, GI_t \, EXR_t) \qquad \text{………………..} \qquad (5)$$

Following the accelerator principle which assumes the proportionality of expected capital to required output at any given period (GDPg_t):

$$C^d_t = f(GDPg_t) \qquad \text{……………………..} \qquad (6)$$

An expected higher output requires additional inputs which will generate a higher desired capital stock.

Merging equations 2, 5, 6 and adding previous quarter domestic private investment (DPI_{t-1}) gives the domestic private investment (DPI) model that will be estimated, thus:

$$DPI = f(DPI_{t-1}, INT_t, KI_t, FDI_t, PFI_t, REM_t, GI_t, EXR_t, GDPg_t) \qquad \text{…………………} \qquad (7)$$

The study covers two regime periods – deregulation era (1986-1994), and post-deregulation era (1995-2012). We introduce dummy (DUM) variable that has values of zero (0) for deregulation, and one (1) for post-regulation. The magnitude of the coefficient of the DUM variable in the model is used to evaluate the extent of the difference in the capital inflow components in stimulating domestic private investment in these periods. The test applies only to objective two – capital inflow components-domestic private investment nexus. Our model becomes:

$$DPI = f(DPI_{t-1}, KI_t, FDI_t, PFI_t, REM_t, INT_t, GI_t, EXR_t, GDPg_t, DUM) \qquad \text{…………………} \qquad (8)$$

To standardize the data and enable us interpret as percentages, we transform the variables in their log linear forms and present as econometric model thus:

$$lnDPI_t = b_o + b_1 lnDPI_{t-1} + b_2[(lnKI_t)] + b_3[(lnFDI_t) + b_4(lnPFI_t) + b_5(lnREM_t)] + b_6 lnGI_t + b_7 INT_t + b_8 GDPg_t +$$
$$b_9 lnEXR_t + b_{10} DUM + \mu_t \qquad \text{……………….…………} \qquad (9)$$

ln shows that the variables are in their log linear form; while $_t$ denotes time (1986Q1 – 2012Q4)

While aggregate capital inflow (KI) represents the explanatory variable of interest for objective one, capital inflow components (FDI, PFI, and REM) are the variables of interest for objective two. The variables – [(KI) and (FDI, PFI, REM)] – in equation (9) enter the model each at a time and are estimated as such.

Equation (10) is the generalized specification framework of error correction (ECM) model to allow for inclusion of long-run information.

$$\ln\Delta DPI_t = a_o + a_1\ln\Delta DPI_{t-1} + a_2[(\ln KI_t)] + a_3[(\ln\Delta FDI_t + a_4\ln\Delta PFI_t + a_5\ln\Delta REM_t)] + a_6\ln\Delta GI_t + a_7\Delta INT_t$$
$$+a_8\Delta GDPg_t + a_9\Delta\ln\Delta EXR_t + a_{10}DUM_t + \lambda ECM_{t-1}\,\mu_t \qquad \ldots\ldots\ldots\ldots\ldots\ldots \qquad (10)$$

Δ is the first difference operator, a_1- a_{11} are the parameters of the model to be estimated, and λ is the error correction coefficient, while the rest are as earlier defined.

3.1. Estimation Issues

An important assumption of ordinary least squares (OLS) is the existence of zero correlation between the error term and any explanatory variable. Any violation of this makes the explanatory variable endogenous and OLS estimates inconsistent. To test for possible endogeneity problem, we employ Granger (1986) causality test. Granger (1986) causality method of investigating whether X is the cause of Y is to determine how much of current Y is explained by past values of itself and then to see if by including previous values of X, we can better the explain Y. Y is then granger-caused by variable X if X assists predict Y, or if the values obtained from the lagged X's have statistical significant (EViews 3.1 User's Guide, 1999). The idea behind the test of causality should be understood; if X causes Y, then changes in X should come before that in Y (Pindyck and Rubinfeld, 1991). This characteristic makes causality test an important one in the test of endogeneity.

When you regress non-stationary variables on each other, you might have a nonsense or spurious result indicating a statistical significant relationship between the variables, when this may just be evidence of contemporaneous correlation. To ascertain the quality of the variables in our model, we test for the order of integration of each time series using the Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) unit root tests. The two approaches are apt because, while the ADF model accounts for the autocorrelation of the first differences of the series in a parametric way by guessing the value of additional nuisance parameters, the Phillip-Perron makes use of non-parametric statistical methods to correct for the serial correlation of the disturbances while avoiding lagged difference terms (Gujarati and Porter, 2009).

Stationarity achieved, we test for the exact numbers of co-integrating equations among the variables – whether or not there exist long run co-integrating nexus among them. We undertook co-integration tests as given by Johansen and Juselius (1990) maximum likelihood function. In these tests, both the Trace and Maximum Eigen-value statistics are compared with their critical values to ascertain number of co-integration equations.

3.2. Data Sources

Majorly, data source for the estimation of equations and analysis of this study covering the period of 108 quarters are from World Development Indicators (WDI) (2012). They include, gross fixed capital formation (both private and public), aggregate capital inflow (sum of three components: foreign direct investment, foreign portfolio investment, workers' remittances), each of the capital inflow components, and GDP growth rate. Data on interest and exchange rates are from CBN Statistical Bulletin (various years). However, data on domestic sectoral investment as percent of total investment are used to compute data on private and public gross fixed capital formation. Quarterly data generated from annual data 1986 to 2012 using e-views version 6 software are used for the study. The choice was informed by data availability and the dramatic increase in inflow components following the deregulation which started in 1986.

4. Empirical Results

4.1. Presentation of Some Preliminary Tests: Unit Root and Co-integration

We utilized the Augmented Dickey-Fuller (ADF) and Philips Perron (PP) for the unit root tests. Both results show that all the variables are integrated of order one I(I). Afterwards, we undertook co-integration tests based on the Johansen and Juselius (1990) maximum likelihood framework using both the Trace and Maximum Eigen-value statistics. Our results provide evidence that there are two co-integration equations each for Trace and Maximum eigenvalue for the two models. Hence, we conclude that there exists a long run equilibrium relationship among the variables. Results of these tests are not displayed for want of space.

We carried out the Granger causality test to ascertain whether domestic private investment (DPI) has any causal relationship with capital inflow components in Nigeria. The results of the pairwise Granger causality test revealed that DPI does not Granger cause foreign direct investment (FDI) and workers' remittances (REM), while it does Granger cause portfolio investment (PFI). On the other hand, FDI and REM do Granger cause DPI, but PFI variable does not Granger causes DPI. Hence, the causality relationship between DPI and capital inflow components is unidirectional in nature with FDI and REM causing DPI, and DPI causing PFI. The maximum lag length for all the results was 3.

4.2. Empirical Results and Discussion

According to Giles (2013), if time series variables have integration of the same order (example, 1(1)), and they are co-integrated, two types of models are estimated – an OLS regression model using levels of data, and an ECM estimate using OLS. From our unit root tests, all the series have the same order of integration, that is, 1(1), and they are co-integrated. Hence, we estimate two different models. The first is an OLS regression using levels of data (equation 9) to provide the long-run equilibrium relationship. This equation gave us two sets of results referred to as models (1a) and (1b). The second, an error correction model using different data (equation 10) that provided the

short-run dynamics of the relationship between the variables. This equally gave two sets of results called models (2a) and (2b).

4.2.1   Model 1a: Long Run Impact Analysis of Aggregate KI-DPI (Using Levels of Data)
The result showed that the coefficient of one quarter lag of the dependent variable (DPI) itself is significantly positive even at 1% level while aggregate capital inflow (KI) variable is negative and insignificant in explaining variations in domestic private investment in Nigeria in the long run.

4.2.2. Model 1b: Long Run Impact Analysis of KI Components-DPI (Using Levels of Data)
The coefficients of the inflow types displayed mixed signs and sizes, indicative of their varied individual impacts on the growth process of domestic private investment in Nigeria. Specifically, while a 1% increase in FDI during the analysis period significantly increased DPI by about 9% in the long run, an equivalent increase also in PFI and REM significantly depressed DPI by 3% each in the long run. On its part, the coefficient of one quarter lag of the dependent variable (DPI) itself is significantly positive even at 1% level in determining the current outcome of itself.

4.2.3. Model 2a: Short Run Impact Analysis of Aggregate KI-DPI (Using Differenced Data)
In order to support the long-run estimates of model (1a), we present table 2a to see the short-run dynamics of the error correction model. Consistent with the long run results in table 1a, aggregate capital inflow (KI) coefficient is negative and insignificant even at 10% level. Specifically, a 1% increase in aggregate KI in a quarter will insignificantly depress DPI by 2% in the short run. This implies that aggregate capital inflow (KI) contribution to domestic private investment in Nigeria has been negative, but insignificant both in the short and long run. This is in tandem with the findings of Saltz (1999) that capital inflow crowed out domestic investment in developing countries, but inconsistent with the findings of Elitza (2008). Elitza found that aggregate capital inflow raise domestic investment in transition economies of former Soviet Union.

The error correction term (ecm_{t-1}) is less than one, negative and statistically significant, thus corroborating the results of the co-integration tests of the existence of a stable long run equilibrium relationship among the variables. Specifically, the ecm_{t-1} is -0.30, indicative that 30% of previous quarter's disequilibrium (shock) from long run anchor will be restored within a quarter. DW value of 1.84 is close to 2 and is indicative of the absence of autocorrelation problem, hence the model is reliable.

However, that aggregate capital inflow coefficient is negative and insignificant may require further investigation. This is because the type of inflow into an economy is important. Available literature suggests that the magnitude and direction of impact depend on the type of inflow. Dis-aggregating capital inflow into components and estimating their individual impacts on DPI is therefore crucial. This was done (using differenced data) and reported as model 2b presented in table 2b.

4.2.4. Model 2b: Short Run Impact Analysis of KI Components-DPI (Using Differenced Data)
To examine the relative impacts of capital inflow components on the growth of DPI, the short-run results presented in table 2b are also consistent with and support our long-run results. The coefficients of FDI, PFI, and REM are 0.19, -0.02, and -0.12 respectively, while their respective t-statistic is 3.01, -1.11, and -4.89. Specifically, the results show that in the short run, a 1% increase in FDI significantly increases DPI by 19%, while a 1% increase each in PFI and REM inflow will depress DPI by 02% and 12% respectively. This finding reveals that first, as aggregate, the impact of KI on DPI in Nigeria is negative. Second, when disaggregated into components, the relative and direction of impact of each component vary. Third, as aggregate, the joint contractionary impact of PFI and REM on DPI is more than the expansionary impact of FDI. This finding is not as surprising as it is interesting. First, it supports our long-run results reported in table 1b. Second, the unconducive macroeconomic environment prevalent during the period of policy reversals, shifts and antithetical policy measures of the late 80s, mid 90s and during the 2007-2009 global economic crises might have resulted in the risk averse private investors to predict the future, and hence preferred to reverse the reversible investment. Hence, the reversible and volatile nature of PFI as noted by Hecht *et al.* (2004) manifested evidently going by its negative coefficient during the study period. Third, FDI inflow is remarkably stable and more permanent, even during economic crises as evidenced by its positive coefficient. The positive impact of FDI on DPI as revealed in the results is consistent with the two-gap theoretical thesis that foreign capital inflow permits the developing countries to invest more than they can save domestically. It is also in tandem with Ayanwale (2007) who noted that FDI inflow into Nigeria (being mainly in the petroleum sector) turn in substantial profits after adjusting for risk, so that foreign investors could not be discouraged by policy inconsistencies and shifts. Other results consistent with our findings are: Hecht *et al.* (2004) result was for 64 developing countries; Herzer *et al.* (2006) result was on Nigeria, Sri Lanka, Tunisia, and Egypt; Okodua (2009), and Ogbonna *et al.* (2012), studies are for Nigeria. This suggests the need to sustain all pro-FDI policies to further attract massive inflow of foreign capital (especially FDI), while the current efforts to improve the security situation remains imperative.

The negative and significant impact of REM coefficient is in tandem with results of the earlier works done by Oduh and Urama (2012); Akinpelu *et al.* (2013); and Ogbonna *et al.* (2014) for Nigeria; but inconsistent with the findings of Ukeje and Obiechina (2013) also for Nigeria. The depressing effect of PFI coefficient is consistent with most of the previous studies, for instance, the study by Rachdi and Saidi (2011), Durham (2003), and Aitken and Harrison (1999), but inconsistent with findings of Knill (2005), Errunza (2005), and Ekeocha *et al.* (2012).

Results of the control variables are largely consistent with a priori expectations. Specifically, 1% increase in government investment significantly grows DPI by 6%. This is in tandem with theoretical postulation of Khan and Amia (2003) that public investment (in infrastructure – transport, communication, energy, irrigation, etc.) complement or crowd in private sector investment as such tend to reduce the cost of production and raise the rate of return on private capital. However, the result is inconsistent with the findings of Oyejide and Raheem (1993), who found that most public investment in Nigeria were doubtful in utility and viability and constituted a dead-weight loss in terms of net benefits to the economy. Despite this, however, the significance of public investment in Nigeria should not be toyed with or discounted, at least contemporaneously as evidence from this study is indicative that the sustenance of a high level of private investment and real GDP hinges on government investment.

On its part, output growth (GDPg) dynamics, that is, 'acceleration of output', are crucial and significant in the determination of domestic private investment growth in Nigeria. Precisely, a percent positive change in output growth (GDPg) will significantly increase DPI by 003%. Thus, this finding corroborates the theoretical postulations by Koyck (1954) and Iyoha (2004) that firms will expand their output only if there is increase in the growth rate of output – an acceleration of output growth.

The coefficient of interest rate (INT) is in tandem with the theoretical postulations. A 1% increase in prime interest rate will depress DPI by 002%, while the coefficient of EXR is both positive and significant in determining growth process of DPI.

The dummy (DUM) variable which entered into the model to account for policy (regime) changes has a coefficient of -0.04 and t-statistic value of -2.25. These results reveal that the era of deregulation and post-deregulation periods as provided for in our model, significantly and negatively determined DPI behavior in Nigeria even at 1% level. The negative co-efficient of DUM variable is largely consistent with our expectations. The prevailing un-conducive macroeconomic environment during most of the analysis period, derived from policy inconsistencies and shifts, largely informed our expectations. Hence, the robust but negative DUM coefficient has further corroborated and reinforced the findings of Anyanwu (1998), but at variance with that of Ayanwale (2007).

The error correction model (ecm$_{t-1}$) which measures the adjustment speed has a coefficient of –0.28 indicative of feedback effect of approximately 28%. If DPI is in disequilibrium as a result of contemporaneous dynamic shock, it will take a speed of approximately 28% within a quarter to adjust back to long-run equilibrium.

The adjusted R2 is 0.73 indicative that the explanatory variables explained about 73% of the variations in DPI. The DW statistic value is 2.07 indicative of the absence of serial correlation. The F-statistic value of 18.10 is significantly satisfactory and shows that all the variables jointly explained changes in DPI in Nigeria.

5. Conclusion

The question of whether capital inflow components improve domestic private investment in Nigeria has been explored in this study. The application of OLS econometric technique in an ECM framework has proved quite intuitive and acceptable. The empirical investigation sheds new light on the domestic private investment-capital inflow relationship that would prove useful in the design of macroeconomic policies in Nigeria, and also provide the platform on which the policies can be measured.

The study covered the period 1986Q1 to 2012Q4 and examined two vital aspects of the research objective. These are capital inflow-domestic private investment nexus and capital inflow components-domestic private investment nexus. Overall, the goal was to determine the existence of any unique link between capital inflow and the above indicators of domestic private investment. The empirical results clearly emphasize the role of foreign capital inflow in the growth process of the economy of Nigeria through its impact on domestic private investment. On aggregate, capital inflow coefficient was negative and insignificant. However, when disaggregated, PFI and REM components were strikingly found to have depressing effect on domestic private investment as against the expansionary impact of FDI. Hence, by decomposing capital inflow, the study has highlighted that FDI inflow component is more sustainable and more growth-inducing as far as domestic private investment is concerned. Having found FDI component the only contributor to DPI in Nigeria, policies to further attract massive inflow of foreign capital (especially FDI) is imperative.

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Appendix I
Model Estimation Results (Using Levels of Data)

Table-1a. Model 1a – Aggregate KI-DPI Nexus

Dependent Variable: INDPI

Method: Least Squares

Date: 12/29/14   Time: 16:50

Sample (adjusted): 1986Q1 2012Q4

Included observations: 83 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.454988	0.154728	2.940562	0.0038
INDPI(-1)	0.906409	0.020391	44.45067	0.0000
INKI	-0.003416	0.015128	-0.225781	0.8217
INEXR	0.105230	0.022331	4.712329	0.0000
INGI	0.039143	0.019163	2.042658	0.0428
INT	-0.008429	0.002275	-3.704602	0.0003
GDPG	-0.001400	0.001264	-1.107808	0.2697
R-squared	**0.984816**	**Mean dependent var**		**10.01026**
Adjusted R-squared	0.963762	S.D. dependent var		2.708408
S.E. of regression	0.095293	Akaike info criterion		-1.815877
Sum squared resid	1.407530	Schwarz criterion		-1.664037
Log likelihood	155.9940	Hannan-Quinn criter.		-1.754231
F-statistic	18672.59	Durbin-Watson stat		0.607116
Prob(F-statistic)	0.000000			

Table-1b. Model 1b – KI components-DPI Nexus

Dependent Variable: INDPI

Method: Least Squares

Date: 12/29/14   Time: 17:02

Sample (adjusted): 1986Q1 2012Q4

Included observations: 83 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.117046	0.271024	0.431864	0.6673
INDPI(-1)	0.904397	0.027720	32.62602	0.0000
INFDI	0.093506	0.030624	3.053316	0.0033
INPFI	-0.030398	0.007427	-4.093202	0.0001
INREM	-0.034383	0.011987	-2.868269	0.0056
INEXR	0.095369	0.027145	3.513317	0.0008
INT	-0.004001	0.001910	-2.094719	0.0402
GDPG	-0.006455	0.001157	-5.580139	0.0000
INGI	0.065441	0.021581	3.032348	0.0035
DUM	-0.389528	0.103812	-3.752244	0.0004
R-squared	**0.991481**	**Mean dependent var**		**12.23153**
Adjusted R-squared	0.978407	S.D. dependent var		2.221474
S.E. of regression	0.054113	Akaike info criterion		-2.868827
Sum squared resid	0.184479	Schwarz criterion		-2.555066
Log likelihood	114.7122	Hannan-Quinn criter.		-2.743788
F-statistic	13475.34	Durbin-Watson stat		0.978208
Prob(F-statistic)	0.000000			

Models Estimation Results (Using Differenced Data)

Model-2a. Aggregate KI-DPI nexus

Dependent Variable: D(INDPI)

Method: Least Squares

Date: 12/29/14   Time: 17:40

Sample (adjusted): 1986Q1 2012Q4

Included observations: 83 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.003048	0.005190	0.587160	0.5580
				Continue
D(INDPI(-1))	0.668423	0.045899	14.56279	0.0000
D(INKI)	-0.021024	0.021712	-0.968332	0.3344
D(INGI)	0.057011	0.027826	2.048818	0.0422
D(INEXR)	0.301654	0.033556	8.989671	0.0000
D(INT)	-0.001973	0.004259	-0.463294	0.6438
D(GDPG)	0.000219	0.001943	0.112600	0.9105
ECM(-1)	-0. 300945	0.013356	-2.316979	0.0218
R-squared	**0.728878**	**Mean dependent var**		**0.048955**
Adjusted R-squared	0.716473	S.D. dependent var		0.109450
S.E. of regression	0.058279	Akaike info criterion		-2.798729
Sum squared resid	0.519660	Schwarz criterion		-2.645616
Log likelihood	233.2977	Hannan-Quinn criter.		-2.736559
F-statistic	58.76015	Durbin-Watson stat		1.839112
Prob(F-statistic)	0.000000			

Model-2b. KI Components-DPI nexus

Dependent Variable: D(INDPI)

Method: Least Squares

Date: 12/29/14   Time: 18:10

Sample (adjusted): 1986Q1 2012Q4

Included observations: 83 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.056572	0.032778	-1.725920	0.0897
D(INDPI(-1))	0.607320	0.066444	9.140346	0.0000
D(INFDI)	0.189851	0.063006	3.013229	0.0038
D(INPFI)	-0.016922	0.015310	-1.105274	0.2736
D(INREM)	-0.120993	0.024759	-4.886728	0.0000
D(INGI)	0.075221	0.023306	3.227584	0.0021
D(INEXR)	0.179206	0.075413	2.376343	0.0208
D(INT)	-0.001516	0.001866	-0.812794	0.4197
D(GDPG)	0.021249	0.002813	1.844003	0.0447
DUM	-0.037870	0.016853	-2.247059	0.0285
ECM(-1)	-0. 280250	0. 076937	-1.967894	0.0357
R-squared	**0.774398**	**Mean dependent var**		**0.063990**
Adjusted R-squared	0.731611	S.D. dependent var		0.078382
S.E. of regression	0.040607	Akaike info criterion		-3.414953
Sum squared resid	0.095637	Schwarz criterion		-3.029496
Log likelihood	131.5233	Hannan-Quinn criter.		-3.261845
F-statistic	18.09906	Durbin-Watson stat		2.074244
Prob(F-statistic)	0.000000			

Appendix II
Granger Causality Test

Table-3. Pairwise Granger Causality Test Results in the KI Components-DPI Causal Relationship (Models (33)
Sample: 1986Q1 2012Q4
No of Lags: 3

Null Hypothesis:	Obs	F-Statistic	Prob.
INFDI does not Granger Cause INDPI	158	3.56144	0.0158
INDPI does not Granger Cause INFDI		0.48066	0.6962
INPFI does not Granger Cause INDPI	64	0.13955	0.9359
INDPI does not Granger Cause INPFI		10.0278	2.E-05
INREM does not Granger Cause INDPI	166	2.13422	0.0980
INDPI does not Granger Cause INREM		0.78964	0.5013