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Internal Absorption and Foreign Direct Investment Inflows: A new approach towards Market Size

By Mushtaq AHMAD [a] Ferhan K. AHMAD [b]
& Muhammad Ali NASIR [c†] & Gulzar KHAN [d]

Abstract. In continuation of the efforts to understand the dynamics of internal market, this study proposes Internal Absorption as an instrument for measuring market size for economies which confront large trade deficit over a longer period of time. The study empirically examines the impacts of Internal Absorption along with trade openness and gross private investment on FDI inflows in Pakistan. The ARDL approach to co-integration and ECM based on ARDL is used to test the existence of long run relationships among variables for the period 1976-2009. The result establishes strong positive relationship between Internal Absorption and FDI inflows in short as well as in the long run.
Keywords. Foreign direct investment, Internal absorption, Trade openness, Private investment.
JEL. F18, F21, F23, O47.

1. Introduction

The contribution of foreign direct investment (FDI) in accelerating economic growth is well documented in the literature. FDI facilitates the transfer of critical inputs mainly capital and technical skills to host countries and generates mutual benefits to home country investors. This FDI led growth nexus attracted researchers to explore determinants of FDI, prominent among such factors are market size, trade openness, labor productivity, gross private investment, balance of payments, exchange rate, inflation, political stability, infrastructure, geographical proximity, quality and capacity of institutions. A number of empirical studies have brought these factors and their association with FDI under analysis. The main critical issue occupying much of this research work has dealt with assessing the relative significance of variables by referring to country specific economic characteristics. Nevertheless, there is acute shortage of literature which could give deep insight into the effectiveness of a FDI determinant when alternative proxies for measurement are used. The market size or internal demand is generally viewed as a reflection of the level of absorption of goods and services

[a] Department of Management Sciences, CIIT, WahCantt, Pakistan.
03336118699 Mushtaq_45@yahoo.com
[b] BMW UK Ltd, Summit ONE, Summit Ave, Farnborough , UK.
07447532525 fkahmad_1984@hotmail.com
[c] † Leeds Beckett University, Department of Accounting, Finance and Economics, UK.
113 81 23867 M.A.Nasir@leedsbeckett.ac.uk
[d] Department of Economics, Federal Urdu University, Islamabad, Pakistan
03339005001 gulzarakpk@gmail.com

in the country. Dunning (1973) postulates that FDI is a positive function of the market factors and growth in the host country contributes towards long term profitability of the firms. It follows that several other factors such as transportation costs and other barriers to entry, costs of inputs, consumer behavior towards spending, have important influence on the size of actual and potential market, yet they appear to have little role in defining market size. If market is large and growing, it opens up opportunities for exploiting economies of large scale production and other competitive advantages such as introduction of new product (Lankes & Venables: 1996), economies in transaction costs, (Buckley & Casson: 1981), size and accessibility of neighboring markets (Carstensen & Toubal, 2003; Merlevede & Scoors, 2004, Cuyvers et al. 2011).

Generally speaking, the dynamics of internal markets are complex and the degree of complexity may differ cross countries due to their peculiar socio-economic characteristics. Frequently used Grodd Domestic Product-market size proximity is often justified because the value of aggregate domestic output generates corresponding aggregate income which is assumed to reflect the level of internal demand (absorption). However, policy makers in some developing countries argue for consumption-led growth strategy to stimulate internal demand as a means of achieving rapid economic progress by pursuing such expansionary monetary and fiscal measures as budgetary deficit, easy access to consumer financing, trade liberalization. A recent study by Rauscher (1997) points out that 'conspicuous consumption' or 'status-seeking behavior' stimulates economic growth by inducing domestic spending (absorption). As a result, internal demand outstrips internal supplies giving a larger market size than justified on grounds of GDP alone. The excess of internal demand over and above internal output would largely depend on the size of the trade deficit.

The premise of the present study rests on the assumption that the extent of association between FDI and its determinants can also depend on how each of them is defined and measured or the proxies used for them. For this purpose, it specifically examines the GDP market size proximity though widely used in the past, have lacked unanimity in its impact on FDI. Therefore, it appears appropriate to re-visit GDP-market size proximity or GDP based market size hypothesis because of its significance on both conceptual and empirical grounds with a view to develop a relatively more realistic basis of its measurement.

In view of the above cited scenario, the objective of this study is twofold. Firstly, it proposes a new measure of market size known as 'internal absorption'. Secondly, it empirically examines the significance of 'internal absorption' along with other determinants for explaining FDI inflows in the framework of Pakistan economy.

The entire study is divided into Five Sections. Section II presents a brief review of empirical research on the impact of GDP as a determinant of FDI. The data and the proposed methodology for empirical analysis are provided in Section III. The empirical findings and policy conclusions along with recommendations are discussed in the remaining two sections respectively.

2. Review of Emprical Research on Determinants of FDI

In recent years, many studies have attempted to identify and evaluate FDI determinants by examining a combination of key macroeconomic variables. Among others, most commonly used variables are market size, trade openness, labor productivity, gross private investment, balance of payments, exchange rate, inflation, political stability, infrastructure, geographical proximity, quality and

capacity of institutions. A brief review of the literature on the impacts of some important determinants is discussed in following lines.

Quite a large number of studies broadly agree that variables such as political stability quality and capability of institutions in the host country have important positive impacts on FDI. Similarly, the evidence on the positive effects of trade openness is also overwhelming (Seetanah & Rojid (2011), Mottaleb & Kalirajan (2010); Kok & Ersoy (2010)). However, there are other variables such as inflation, exchange rate, balance of payments, the empirical evidence of which is being widely debated among researchers in the recent past. For example, some recent studies notably by Singhania & Gupta (2011) and Onyeiwu & Surestha (2004) recognized the positive effect of inflation while Kok & Ersoy (2009) found that it has significant negative effect. Likewise, several studies argue that the depreciation of host country's currency has positive effects on FDI (See Ang, (2008); Trevino et al (2002); Wei & Liu (2001). However, the findings of sharply contradict these results. According to them, given certain conditions, "a strong host-country currency may make investment more profitable for foreign investors who enjoy an increase in their home-country currency revenue". For balance of payments, favours lower deficit while Trevino et al (2002) consider large deficit as proxy for trade liberalization. It appears that the impacts of such variables are contingent upon certain characteristics of the host country. Several researchers have analyzed the impact of market size (using GDP as a proxy) on FDI inflows. Some studies notably by Kok & Ersoy (2009), Mottalab & Kalirajan (2010), Singhania & Gupta (2011) well acknowledge its positive impact on FDI while others such as Fedderke and Romm, (2006), Ang (2008), Seetanah & Rojid (2011) consider little or weak link between market size and FDI inflows. This is justified on the grounds that FDI is concentrated in export-oriented industries (Tuman & Emmert (1999); Root & Ahmad (1979)). However, evidence of a negative impact has also been reported by Garibaldi, et al (2002) while Kareinin & Plummer (2008) expressed some skepticism about the positive impact of larger market size through economic integration provided the cost of trade diversion exceeds the benefits of trade creation.

In Pakistan, a few researchers have empirically tested the impacts of GDP based market size along with other macroeconomic variables on FDI inflows using the Autoregressive Distributed Lag (ARDL) approach. A brief discussion on the subject follows below;

Some researchers notably Ahmad (2010), Rehman & Ilyas (2011)[1], Mughal & Akram (2011)[2] confirm the positive impact of GDP based market size while Awan et al (2010) could not find any support for the hypothesis. Though some studies have used causality test yet the extent of its impact is not clear due to the presence of other determinants in the model.

Many researchers have approached GDP market size hypothesis using causality analysis. Aqeel & Nishat (2004) consider market size as a dominant determinant of FDI in the short and long-run[3]. More recent studies by Shabbir & Naveed (2010); Hakro & Ghumro (2011); and Arshad (2012) confirm the existence of unidirectional causality in the short-run only, i.e. GDP Granger-causes FDI as there is little evidence of long run relationship. Commenting on the causality tests, Shabbir & Naveed (2010) noted that, "… growth augmenting FDI and its positive

[1] R-Squared and long run adjustment coefficient do not appear to support each other.
[2] Result based on long run relationship only.
[3] Result may be biased due to overlapping of the time series data, (See, Harri, A., Brorsen, B.W. (2009*) The Overlapping Data Problem*. Quantitative and Qualitative Analysis in Social Sciences, 3, 3, 78-115

relation with market size created a bi-directional behavior between two variables FDI and GDP. This bi-directional behavior also becomes the cause for simultaneity bias between these two variables". Thus the inherent or built-in biasness rooted in the data is not expected to give unbiased estimates of their relationship. Recently, Engle and Granger approach has been subjected to certain shortcomings as well. To quote Magazzino (2012), "First of all, when estimating the long-run relationship, one has to place one variable in the left-hand side and use the other regressors. The test does not say anything about which of the variables can be used as regressors and why. Moreover, when there are more than two variables there may be more than one co-integrating relationship, and the Engle and Granger procedure using residuals from a single relationship cannot treat this possibility. A third problem is linked with the two-step estimator involved: any error introduced in the first step is carried into the second one". These observations cast considerable doubt on the validity of the results of causality tests.

It could be questioned that Why market size based on GDP in some countries appears to have little impact in attracting FDI than other countries? The present study argues that since the theoretical justification for the positive impact of market size is strong, the inconclusive empirical evidence may perhaps, be attributed to the lack of GDP in reflecting market size across different countries. As already pointed out above, it appears appropriate to revisit GDP market size proximity or GDP based market size hypothesis. Although developing an index for the purpose of fully reflecting all major influences of the market size remains beyond the scope of the present study, however, it proposes 'internal absorption' which specifically aims at measuring the influence of trade deficit on the size of the internal availability of goods which is not adequately covered by GDP. The following sections empirically examine the significance of the new variable 'internal absorption' along with trade openness and gross private investment on FDI inflows in Pakistan. In particular, it discusses the structure of deriving 'internal absorption' (IA). The detail of the data sources and the proposed methodology for the analysis is provided in the following paragraphs.

3. Data and Methodology

3.1. Data and Variables

Like other studies, the present study emphasizes the comparative importance of internal and external factors as prime determinants of FDI. For this purpose it considers market size based on 'internal absorption' (internal factor) and trade openness (external factor) as the main sources of variation for a developing country like Pakistan. The data for these variables is calculated from the primary macroeconomic variables on annual basis for the period 1976 to 2009 from International Financial Statistics (IFS) and various issues ofEconomic Survey of Pakistan. The data on FDI, private investment and other remaining variables is obtainedfrom Handbook of Statistics on Pakistan, State Bank of Pakistan, World Development Indicators (WDI) and IFS respectively.

3.1.1 Real Internal Absorption

The 'internal absorption' determines the market size based on internal demand (availability) of goods. This approach is particularly useful where internal availability of goods exceeds domestic output because of trade deficit. There is considerable empirical support for the positive impacts of imports on FDI and internal markets. This 'import led FDI' hypothesis is advocated by Mundell (1957); Buckley, et al, (1988); Cetintas & Barisik (2009); and Ahmed (2011). However,

study by Fedderke & Romm (2006)[4] on South Africa did not rule out its negative effect. In context of Pakistan Rehman & Shahbaz (2011), Javed et al (2012) and Arshad (2012) have also found evidence in support of this hypothesis. In particular, a study by Arshad (2012) also confirmed the important role of imports in accelerating economic growth in the country. A continuous and rising trade deficit was an obvious outcome of consumption-led growth strategy which aimed at pushing internal demand over and above domestic output. The tracing of this impact on internal demand is expected to give more realistic measure of market size. The concept of 'internal absorption' as proposed here, is an attempt in that direction.

The accounting framework for 'internal absorption' can be derived by simply replacing net exports by net imports in GDP estimates which can be rewritten as:

$$GDP = (C_t + I_t + G_t + X_t - M_t)$$

and Internal Absorption (IA) as:

$$IA = C_t + I_t + G_t - X_t + M_t$$

Where C_t is Consumption, I_t is Investment, G_t is Government expenditure, M_t is Imports, X_t is Exports. All values are deflated by Consumer Price Index (CPI_t) In a nutshell, GDP is a supply side phenomenon as it is based on domestic output or supplies whereas 'internal absorption' focuses on the internal demand, that is, it measures aggregate output available (absorbed) in the economy. A recent work by Angelo (2010) for Brazil is of particular relevance as it considers aggregate retail sales (inclusive of imports) as a proxy for market size. The study found that it was 'indeed a significant determinant in explaining FDI in Brazil' (p. 214). In view of above, we anticipate a positive association between 'internal absorption' (IA) and FDI.

3.1.2 Trade Openness

Trade openness refers to liberalization of the economy that leads to larger market size. Hence a growing share of external trade increases the overall economic welfare of the country. Declining trade barriers open up possibilities for expanding exports and reaping such benefits as economies of scale. It facilitates the availability of cheaper raw material and other technological inputs which increases productivity and competitiveness of firms. Policy imperfections determine the ease with which foreign investors can operate in the local economy. Most multinational companies (MNCs) seek for skilled or semi-skilled workers or technology that is comparatively cheaper than at home, engage in efficiency/ resource or market seeking investments. Hence, we expect a positive relationship between FDI and trade openness (OP).

The degree of Trade Openness is defined as a ratio of the sum of exports and imports to GDP and rewritten as:

$$Trade\ Openness = (Exports_t + Imports_t)/GDP_t$$

3.1.3 Gross Private Investment

Private investment has strong positive impact on economic prosperity and growth. Several factors such as political and economic stability, potential of future demand and profitability attract investment in the economy. A gradual phasing out of government owned enterprises ensured ever increasing role of the private investors in many parts of the world. For achieving and sustaining a higher GDP growth rate, export promotion and/or import substitution strategies are being vigorously pursued to enhance opportunities for future investment. As potential for profitability of domestic firms increase, it is likely to induce FDI to share the

[4]For further detail see Fedderke & Romm (2006).

benefits of a growing market. Hence, we expect a positive relationship between FDI and gross private investment (PI). Gross private investment (annual per cent growth) is given as in the following;

$PI_t = (PI_t - PI_{t-1})/PI_{t-1}$

4. Model

The conventional approach of determining short and long run and relationships among variables has been to use the standard Johansen Cointegration and Vector Error Correction model structure. Study by Pesaran et al. (2001) has pointed out that this approach suffers from serious flaws as it does not require the pretesting of the variables suggesting that the existence of relationships between variables is applicable regardless of whether the underlying repressor are purely *I(0)*, purely *I(1)*, or a combination of both. Therefore, we adopt the ARDL framework proposed by Pesaran & Shin (1995, 1999), Pesaran, et al. (1996), and Pesaran (1997) to establish the track of causation between variables. This framework yields consistent and robust results for existence of association between variables both for the short and long-run.

In order to attain full-bodied results, we make use of the ARDL approach to create the existence of long-run and short-run relationships. ARDL is enormously of use because it allows us to establish the existence of an equilibrium relationship in the framework long-run and short-run dynamics. The estimating equation for ARDL approach is expressed as in the following;

$$\Delta \ln(FDI_t) = \beta_0 + \sum_{i=1}^{q} \beta_{1i} \Delta \ln(FDI_{t-i}) + \sum_{i=1}^{q} \beta_{2i} \Delta \ln(IA_{t-i}) + \sum_{i=1}^{q} \beta_{3i} \Delta(OP_{t-i}) + \sum_{i=1}^{q} \beta_{4i} \Delta \ln(PI_{t-i}) + \lambda_1 ln(FDI_{t-i}) + \lambda_2 ln(IA_{t-i}) + \lambda_3 \ln(OP_{t-i}) + \lambda_4 \ln(PI_{t-i}) \quad (1)$$

In Equation (1), β_{1i}, β_{2i}, β_{3i} and β_{4i} represents the short-run dynamics of the model whereas the parameters λ_1, λ_2, λ_3 and λ_4 represent the long-run relationship.

The null hypothesis of the model is:

H_0: $\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = 0$ (there is no long-run relationship)

H_1: $\lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq 0$

We begin by formulating a bounds test for the null hypothesis of no co integration in this model. The calculated F-statistic is compared with the critical value tabulated by Pesaran (1997) and, Pesaran et al. (2001) to determine the overall significance of the model.

The ARDL approach estimates (p+1)^k number of regressions in order to obtain the optimal lag length for each variable, where p refers to the maximum number of lags to be used and k is the number of variables in the equation. In the second step, if there is evidence of a long-run relationship (co integration) among the variables, we can apply the following estimating equation;

$$\Delta \ln(FDI_t) = \beta_0 + \sum_{i=1}^{q} \beta_{1i} \Delta \ln(FDI_{t-i}) + \sum_{i=1}^{q} \beta_{2i} \Delta \ln(IA_{t-i}) + \sum_{i=1}^{q} \beta_{3i} \Delta(OP_{t-i}) + \sum_{i=1}^{q} \beta_{4i} \Delta \ln(PI_{t-i}) \quad (2)$$

Provided Equation (2) confirms the existence of long-run relationship, we then apply the ECM which would indicate the adjustment speed back to long-run equilibrium after a short-run disturbance. The standard ECM involves the following estimating equation.

$$\Delta \ln(FDI_t) = \lambda + \delta(ECM_{t-i}) + \sum_{i=1}^{q} \beta_{1i} \Delta \ln(FDI_{t-i}) + \sum_{i=1}^{q} \beta_{2i} \Delta \ln(IA_{t-i}) + \sum_{i=1}^{q} \beta_{3i} \Delta(OP_{t-i}) + \sum_{i=1}^{q} \beta_{4i} \Delta \ln(PI_{t-i}) \quad (3)$$

To validate the goodness of fit of the model, both diagnostic and structural stability tests are conducted. The structural stability test employs cumulative residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ).

5. Emprical Results

In order to establish a long-run association in the, we need to look at the order of integration of each individual variable. This is accomplished by conducting ADF-test and Phillips Pearson test at level and first difference and the results are given in Table 1 (all the results attached as appendix). In our case trade openness is I(0) i.e. level stationary at one percent significance level, while the other two variables *ln(IA)* and *ln(FDI)* are *I(1)* at first difference both in ADF and PP test. The third variable *ln (PI)* is stationary at level according to PP test but is non-stationary according to ADF at level. Consequently, we used the ARDL model.

Based on ADF and PP tests, we employed bounds test which is a three-step procedure, in the first step, we select a lag order on the basis of the Akaike Information Criterion (AIC) because the computation of F-statistics for co integration is very sensitive to lag length. Table 2 shows the F-statistic to look for the best option of lag length. Since the computed value is greater than the upper bound value, we reject the null hypothesis of no long run relationship. Therefore, we conclude that there exists a long run relationship between FDI and trade openness, internal absorption and gross private Investment.

The AIC have been applied to select the most relevant lag length of the variables being considered in the model. The optimal values of the lagged variables are (2, 1, 0, 0) for which the *AIC* value is minimum, i.e. minimum loss of information. Table 3 shows the long run relationship among *FDI* and *IA,OP* and *PI*. Accordingly, coefficients of all the variables are positive, showing positive relationship among them. These results reveal that *IA* is the most important determinant of FDI. The coefficient of IA is *3.69*, i.e. one percent increase in IA gives rise to *FDI* by nearly 3.7 percent. The second significant variable is trade openness with coefficient *3.57* implying that an increased by one percent in trade openness, *FDI* would increase by 3.57 percent. The third variable is gross private investment which is increasingly related to *FDI* too but is insignificant in affecting the *FDI* in the long run.

The short run analysis of the model is presented in table Table 4 . The terms with Δ show short run elasticity. The coefficient of *ECM* is negative and large in magnitude and statistically significant. Its value of *(-0.822)* demonstrates the existence of strong long-run relationship to FDI. In other words, this coefficient of *ECM* suggests a rapid adjustment process, i.e. about 82 percent of the disequilibria of the previous year shock being adjusted back to the long run equilibrium in the current year. In economic terms, the essence of such rapid adjustment is of a meaningful importance. Results of the error correction ARDL version depict that *IA* is the only significant variable in the short run. The coefficient of Δ*ln (IA)* is 3.40 which show that one percent increase in IA pushes *FDI* by 3.40 percent. The variables trade openness and gross private investment show negative relationships with *FDI* in the short run and are insignificant. The value of R-squared is 0.76 reveals that 76 percent variation in *FDI* is captured by *IA*, *OP* and *PI***.** *F- Statistic* value is 10.59 and is significant at 1% level of significance. DW- statistic is 2.10 shows no evidence of autocorrelation. From Figure (1) and Figure (2) attached as Appendix "A", we check for the stability of the ARDL model using Cumulative Sum of recursive residuals (CUSUM) and Cumulative Sum of square of recursive residuals (CUSUMSQ) following (Brown, et al., 1975). The figures show that the

plot remains within the range at 5% level of significance. Therefore, we conclude that the model is structurally stable.

6. Conclusion

On the basis of empirical analysis in previous section we can conclude that the internal absorption is the most dominant variable having significant positive impact on FDI inflows in Pakistan in both short run and in the long run as well. The coefficient of *ECM* is negative and large in magnitude and statistically significant. Its value of *(-0.822)* demonstrates the existence of strong and stable long-run relationship to FDI. The results of this study are of particular importance as they sharply contradict almost all previous empirical studies which demonstrate little or weak relationship among variables with respect to FDI in Pakistan in the long run.

The major difference between the above findings and a number of previous empirical studies about other countries resides in the use of internal absorption for market size. During the course of investigation, we could not find any exclusive study in the entire literature which may have referred to internal absorption as a measure of market size for FDI inflows. As the present study refer to a developing country like Pakistan, however the specification of the model and the results may be varied according to economic characteristics of other countries. Considering the limited scope of this study and for future research we suggest replication of similar analysis on developed economics.

Appendix

Table 1. *Unit Root Test*

	ADF Test		Phillips-Pearson Test	
Regressors	level	1st difference	level	1st difference
FDI	-1.709266	-4.836994*	-1.702175	-4.781533*
Openness	-3.094135*	-5.462667	-2.702129*	-5.450174
Private Investment	-1.892259	-4.603034*	-3.973023*	-8.848102
Internal Absorption	-1.888708	-3.523525*	-1.171015	-5.685413*

Table 2. *F-Statistic for testing the existence of Long-Run Relationship*

Order of lag	F-Statistic
1	6.988466

The lower and upper bound values are 4.29 and 5.61 at 99%.

Table 3: *Estimated Long Run Coefficients using the ARDL* Approach Dependent variable: ln(FDI)*

Regressor	Coefficient	Standard Error	t-Ratio	p-value
Constant	-38.4080	1.7869	-21.4940	0.000
Ln(PI)	0.0041	0.45486	0.0091	0.993
Ln(IA)	3.6882	0.17701	20.8355	0.000
Ln(OP)	3.5703	1.0749	3.3214	0.003

Notes*:* *ARDL Model ARDL (2,1,0,0) selected based on Akaike Information Criterion

Table 4: *Short-run Analysis: Error Correction RepresentationDependent variable Δln(FDI)*

Regressor	Coefficient	Standard Error	T-Ratio	p-value
ΔLn(I)	-0.0038	0.4195	-0.009	0.993
ΔLn(IA)	3.4014	0.5525	6.156	0.000
ΔLn(OP)	-0.8459	1.1497	-0.736	0.468

ΔECM(-1)	-0.8222	0.1346	6.110	0.000
R -Squared	*0.76932*			
Adjusted R-Square	*0.69*			
F(5, 26)	*10.5917(0.000)*			
DW-statistic	*2.10454*			

Notes*:* *ARDL Model ARDL (2,1,0,0) selected based onAkaike Information Criterion

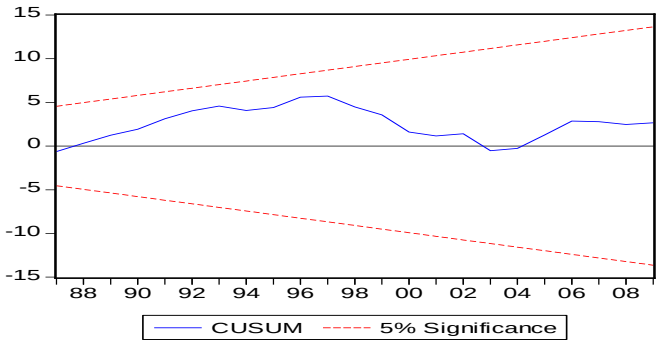

Figure 1. *Plot of Cumulative sum of Recursive Residuals*

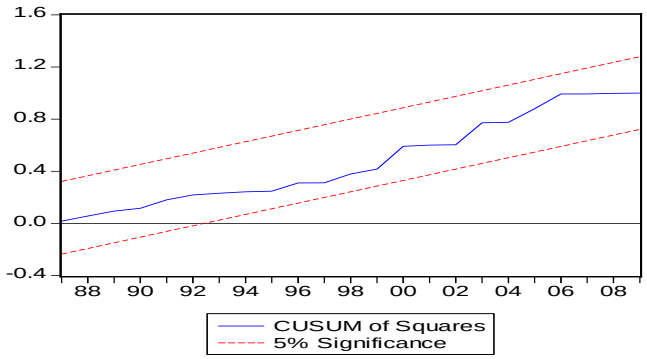

Figure 2. *Plot of Cumulative sum of Squares of Recursive Residuals*

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