AN EMPIRICAL ANALYSIS OF IMPORTS OF IRAN: A GREGORY- HANSEN METHOD OF COINTEGRATION

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Abstract

Since the advent of the floating exchange rates during the early 1970s, and the trade liberalization during 1990s, there has been an extensive debate about the impact of exchange rates and other macro variables on imports and exports of a country. Iran has been facing depreciation in its exchange rate coupled with volatility, and declining economic growth due to its structural problems and the exogenous factors such as stringent economic sanctions in recent times. This paper investigates the impact of some of these variables such as exchange rate, world GDP, domestic GDP and the rate of Inflation on imports of Iran using the Gregory-Hansen cointegration method. The structural break is estimated using residual based method to test the null hypothesis of no cointegration against the alternative of cointegration with a structural break. The empirical analysis indicates that there exists a long run relationship between imports and these variables as they are cointegrated and there is a structural break during the year 1995. In view of these findings some policy suggestions have been made.

Key Words: Imports, Exchange rate, GDP, inflation, Cointegration, Gregory-Hansen method and structural break.

I Introduction

The economy of Iran has undergone several changes and shocks. It had to face the oil crises during 1974-75 and a consequent decline in its exports, political upheaval associated with the 1979 Islamic Revolution, a prolonged war with Iraq (1980-1988), a volatile international oil market, stringent economic sanctions in recent times and a consequent decline in the growth rates[1]. Since the advent of the floating exchange rate system in the early 1970s, and the trade liberalization during 1990s, there has been an extensive debate about the impact of exchange rate and other macro variables on imports of a country. Despite the availability of vast literature, only a few papers provide statistically convincing evidence on this relationship.

Iran has been experiencing deterioration in its exchange rate coupled with volatility, and economic slowdown due to structural problems and exogenous factors such as economic sanctions, in spite of being rich in oil reserves. Iran's imports and exports have registered a positive trend growth rate of 4.52 and 4.73 per cent respectively during 1970-2010 but with fluctuations. Consequently the trade deficits have risen phenomenally during the recent decade, 1991-2010[2]. During the period, particularly after 1973, the oil prices have risen resulting in an increase in national income and imports due to the removal of several restrictions on imports. However, during the war period, due to the problem relating petroleum exports foreign exchange has dwindled and also the import capacity. Shortly afterwards, imports have increased as the reconstruction of the economy has started and due to the trade liberalization policies. But during the years, 1993 and 1994, the imports have decreased due to restrictive atmosphere. During 1995-1996, government set the limits on imports with less intensity; furthermore, it increased oil price and foreign exchange incomes, consequently the amount of imports have risen again. In 1997 along with decreasing the global oil price, the value of imports decreased by 6.1% and mounted to 13633 million dollars. This trend continued up to the year 1999, but since 2000 the global oil price along with redemption and decrease of the restriction of import policies, imports have continued to increase. In recent times both imports and exports have risen including the trade deficits due to several internal and external factors. Understanding the impact of these changes in terms of structural breaks has become very important for any macroeconomic time series analysis of this economy (Pahalvani, M, et al, 2005). As Leybourne and Newbold (2003) argue, if structural breaks are not dealt with appropriately, the empirical results obtained from the use of cointegration methods would be spurious and misleading. We make an attempt in this study in understanding the determinants of Iran's imports, in the framework of Gregory-Hansen's cointegration which facilitates the determination of a single structural break.

The present study is pursued with the objective of studying the impact of real effective exchange rate (REER), Domestic GDP, World GDP and the Domestic Inflation on the Imports of Iran. The paper is structured into five sections. A brief review of the earlier studies has been presented in the section two and the third section presents the data and empirical methods used in the study. Empirical findings are presented in section four and the final section deals with conclusions and policy suggestions.

II Brief Review of the Earlier Studies

A review of empirical works on effects of changes in real exchange rate, world GDP and other domestic factors can answer the question that whether the policies relating these variables have helped the growth of foreign trade of a country not. For example, a group of economists believe that devaluation can reduce the imports resulting in an increased domestic production in the country. But a group of empirical studies have confirmed the effects of Shrinkage devaluations of national economy. On the other hand effects of changing the official exchange rate on imports, although it can provide information to analysts but cannot represent all the facts[3].

Alam and Ahmad (2010) have estimated the import demand function for Pakistan using quarterly data for the period 1982-2008 in an ARDL framework. They suggest that there exists a long run relationship between import demand, real economic growth, relative price of imports, real effective exchange rate and volatility of real effective exchange rate. The study also suggests that in the short run, the real economic growth, relative price of imports, real effective exchange rate and real effective exchange rate volatility Granger cause import demand. Dutta and Ahmad (1999) using quarterly data of Bangladesh on import performance for the period 1974–1994 have used cointegration and Error Correction Model (ECM) methodology to investigate the relationship between imports and the major macroeconomic variables, and found a significant and negative relationship between imports and price of imports; and a positive relationship between imports and income. Surprisingly, there are only a few studies available on the effect of exchange rates and other macro variables on the trade volumes of Iran. For instance, Mohammad and Taheri (2008), and Mohammadi and Mohammad Zadeh (2007) have investigated the influence of exchange rate volatility on Iran's trade and found a significant and positive impact. Similarly, Samimi, Adibpour et al (2012) have studied the effect of real exchange rate uncertainty on import demand of Iran for the period 1979-2007 and have concluded that the real exchange rate uncertainty had a negative impact and , the GDP had a positive impact on imports. Studying the bilateral trade between Iran and Turkey, Iraj et al (2012) have concluded that Iran's GDP had a significant positive impact on bilateral exports of Turkey and Iran. Also this is the case for the impact of Turkish GDP on imports. But, relative prices had no significant impact on exports and imports and exchange rate volatility had a significant and positive impact on bilateral exports and imports. Kalyoncu (2006) conducted a study on the aggregate demand function for Turkey using cointegration and error correction approach on annual data for the period 1994–2003 and found a long-run relationship between real imports and real income; and relative import prices with import being income and price elastic. For Indian economy, Dutta and Ahmed (2006) carried out a study on import demand for the period 1971–2005 using the GDP and relative prices, and a dummy variable to capture the impact of economic liberalization on import growth and found a long-run relationship of import volume with GDP and relative prices. However, despite the large number of empirical studies available on the subject, no real consensus has emerged regarding the impact of exchange rate volatility on trade flows more particularly on imports. However, the empirical evidence and results provided in these studies largely depend on the choice of sample period, model specification, proxies for exchange rate volatility, and countries included in the study (Chongcheul et al., 2004). The review of the literature suggests that the studies on imports of Iran and its various determinants are limited and provided mixed evidence and there are not many studies available on cointegration involving these variables applying Gregory – Hansen method. The present study tries to fill this gap.

III Data and the Empirical Methods

The present study exclusively depends on secondary sources of data collected from various domestic and international sources. For instance, the data on exchange rates and the GDP of Iran's major trade partners have been collected from various issues of International Financial Statistics (IFS) published by IMF. The data on value of imports have been collected from the annual reports and balance sheets of the Central Bank of Iran. The study period chosen for the empirical analysis has been 1962 to 2011. All the variables are in real terms and have been transformed in to their natural logarithms. In computing the world economic GDP (the GDP of the major trading partners of Iran has been used as proxy) and to compute the real effective exchange rate (REER), the data on macroeconomic indicators of the major trading partners of Iran (such as India, Japan, United Arabic Emirates (UAE), France, Canada, Italy, Turkey, Denmark, Switzerland, Belgium, Germany, Britain, Austria, Pakistan, China and Korea) have been used as these countries constitute the major share (56%) of Iran's foreign trade. The REER has been computed as follows:

$$\mathrm{REER_j} = \frac{\sum_{t=1}^{11} w_t * E_t * P_t}{P_j} \quad (1)$$

Where:

$\mathrm{REER_j}$ is real effective exchange rate in year(j)

Wi is share of country (i) in Iran's foreign tread in year(j)

Ei is official exchange rate of country (i) in year (j)

P_i is The consumer price index in the country(i) In the year (j)

P_j is The consumer price index of Iran in the year(j)

We have used the GDP of Iran's major trade partners in computing world GDP variable. The data on GDP of each country in terms of its domestic currency has been collected and converted into the dollar terms based on its official exchange rate, and aggregated to get the world GDP. This has been again transferred in to Iran's domestic currency i.e. Rial, using the official exchange rate of Iran. To get the world GDP in real terms we deflate this by CPI index. To verify the determinants of imports, we have used time series methodology which includes two stages:

As most of the time series economic relationships present spurious relations among the variables, testing for the presence of unit root in the variables is a must. In stage one, all the variables are tested for the presence of unit root using Augmented Dickey Fuller (ADF) test as it is one of the widely used methods of testing unit roots in variables. In the second stage, to include the effects of a structural break we have employed the cointegration method suggested by Gregory and Hansen (1996). This method is a popular procedure of allowing a structural break in to the estimation of a cointergration model. They show that

ADF test tends to under-reject the null hypothesis of no cointegration in the presence of a structural break. Considering the importance of the effects of a potential structural break, we applied the Gregory and Hansen (1996) cointegration procedure that allows for an endogenously determined structural break. The problem of estimating cointegration relationships in the presence of potential structural break is addressed by Gregory and Hansen by introducing a residual based technique. The technique is to test the null hypothesis of no cointegration against the alternative of cointegration with a structural break. Here, the break point is unknown and is determined by finding the minimum values for the ADF t-statistic. The Gregory and Hansen procedure takes into account the existence of a potential unknown and an endogenously determined single break, allowing for structural shifts in either the intercept alone, in both trend and level shift and a full break. That is, Gregory and Hansen present three models for testing cointegration where they allow for the existence of structural break in the cointgerating vector. The single structural break is estimated using the procedure called residual based method. The method involves testing the null hypothesis of no integration against the alternative of cointegration with a structural break. The break point is usually unknown and is determined by finding the minimum values for the ADF t-statistic.

Unit root test with structural changes

In cases where structural change not only affects the intercept but also the slope of a function, the null hypothesis may be written as follows:

H_0: $y_t = \mu_1 + dDTB + (\mu_2 - \mu_1)Du + y_{t-1} + u_t$ (1)

Where, (DTB) and (DU) are virtual variables, y_t, is a stationary time series, around a deterministic time trend. But after structural break not only the intercept of the function, but also the slope may change. Thus, the alternative hypothesis would be as mentioned below:

H_1: $y_t = \mu_1 + (\mu_2 - \mu_1)Du + Bt + (B_2 - B_1)DT_t + u_t$ (2)

Where, DT_t is a dummy variable that for the years of t$> TB$ is $DT_t = t$ and is zero for other years. .

To test the null hypothesis against the alternative hypothesis both the null hypothesis and alternative hypothesis may be combined and estimated as following:.

y_t=$\alpha_0 + \alpha_1$Du+$dDTB + Bt + \gamma DT_t$+ρy_{t-1}+$\sum_{i=1}^{p} \theta \Delta y_{t-1}$+$e_i$ (3)

Assuming the validity of the hypothesis "unit roots exist" the following expected:

$$d \neq 0 , B = 0 , \gamma = 0 , \rho = 1$$

If the alternative hypothesis is correct, we would expect the following:

$$\alpha_1 \neq 0 , d = 0 , b \neq 0 , \gamma \neq 0 , \rho < 1$$

With the estimated regression equation, the coefficient of y_{t-1} has a partially distributed time series' can be a test of instability of time series y_t in the presence of a structural break.

Testing for cointegration: Gregory – Hansen Method

In this method of cointegration the existence of only one structural break in the vector cointegration has been considered . The null hypothesis of this is same as the other tests but the alternative hypothesis is different. In this method, a cointegration test based on residual method.

Gregory - Hansen test statistic to extract themselves from the usual convergence regressions have the following:

$Y_{1t} = \alpha + \beta y_{2t} + e_t$, $t = 1, \dots., T$ (4)

Where (y_{2t}) is a vector (m) variable and I(1), and (e_t) is a variable I(0) is assumed. In these tests, different shapes are considered to know the pattern of the structural change as follows:

$y_{1t} = \alpha_0 + \alpha_1 D_{tb} + \beta y_{2t} + e_t,$ $t = 1, \dots, T$ (5)

$y_{1t} = \alpha_0 + \alpha_1 D_{tb} + \gamma t + \alpha_1^T y_{2t} + \beta y_{2t} + e_t,$ $t = 1, \dots., T$ (6)

$y_{1t} = \alpha_0 + \alpha_1 D_{tb} + \beta_1 y_{2t} + \beta_2 y_{2t} D_{tb} + e_t,$ $t = 1, \dots., T$(7)

Equation (5), represents the level shift, the equation (6) represents level shift with trend and the equation (7) represents the regime shift (structural change). (D) Is a dummy variable and if ($t > TB$) its value is one and otherwise it is zero.

Gregory - Hansen method , in order to trace the cointegrating relation in the presence of probable structural changes, also estimates the break point , residual sentences for each of the equations 5 to 7 (depending on the alternative hypotheses) and also estimates its residual sentences ($\hat{e}_{tb}$). Based on these residual sentences, the First order successive correlation coefficient is as follows:

$$\hat{\rho}_b = \sum_{t=1}^{n-1} \hat{e}_{tb}\hat{e}_{(t+1)b} \Big/ \sum_{t=1}^{T-1} \hat{e}_{tb}^2 \quad (8)$$

With the correction for skewness of this coefficient, the Phillips test statistic will be calculated. Now, the residual sentences are calculated as follows:

$$\hat{\nu}_{tb} = \hat{e}_{tb} - \hat{\rho}_b \hat{e}_{(t-1)b} \quad (9)$$

This correction also includes , the estimate of the total harmonic of auto covariance.

$$\hat{\lambda}_t = \sum_{j=1}^{M} w\left(\frac{j}{M}\right)\hat{\gamma}_b(j), \quad (10)$$

In which the (M=M (T)) the optimal value of the parameter, Bandwidth (or the lag shear parameter) and (W (0)) functions weighted corners, and each, in a certain manner, to be determined. To determine the optimal lag shear parameter or Bandwidth parameter, the following is recommend:

$$\widehat{M}_b = 1.3221[\hat{\alpha}(2)T]^{\frac{1}{5}} (11)$$

In this equation, ($\hat{\alpha}(2)$) function, the unknown spectrum density function of (e_t) and based on this, the following can be calculated:

$$\hat{\alpha}(2) = \sum_{\alpha=1}^{p} wa\left[\frac{4\hat{\rho}_a^2\hat{\delta}_a^4}{[1-\hat{\rho}]^8}\right] \Big/ \sum_{\alpha=1}^{p} wa\left[\frac{\hat{\delta}_a^4}{[1-\hat{\rho}_a]^4}\right] (12)$$

In the above equation, ($\hat{\rho}_a$) and ($\hat{\delta}_\alpha$) respectively are autoregressive parameters and innovation variances, and (w_α) is the weight.

Innovation variance parameter ($\hat{\delta}_\alpha^2$), Sum of squares, regression error sentences is as follows:

$$\Delta y_t = \alpha + \delta t + \beta y_{t-1} + \varepsilon_1 (13)$$

In calculating the kernel function, the normal Kernels are used as following:

$$w\left[\frac{j}{M}\right] = (2\prod)^{-\frac{1}{2}} exp\left[\left[-\frac{1}{2}\right]\left[\frac{j}{M}\right]^2\right] \quad J = 1,2, \dots \dots, M (14)$$

the quantity of $\hat{\gamma}_b(j)$ to be calculated as follows:

$$\hat{\gamma}_b(j) = \frac{1}{T}\sum_{t=j+1}^{T} \hat{\nu}_{(t-j)b}\hat{\nu}_{tb}, \quad (15)$$

Based on the above description, the first-order serial correlation coefficient with Sleekness corrections would be:

$$\widehat{\rho}_b^* = \sum_{t=1}^{T-1} (\widehat{e}_{tb}\widehat{e}_{(t+1)b} - \widehat{\lambda}_b) \Big/ \sum_{t=1}^{T-1} \widehat{e}_{tb}^2 \quad (16)$$

Philips test statistic can be summarized as follows:

$$Z_\alpha(b) = T(\widehat{\rho}_b^* - 1), \quad (17)$$

$$Z_t(b) = (\widehat{\rho}_b^* - 1) / \widehat{s}_b, \quad (18)$$

Where:

$$\widehat{s}_b^2 = \widehat{e}_b^2 \Big/ \sum_{1}^{T-1} \widehat{e}_{tb}^2, \quad (19)$$

And $(\hat{\delta}_\alpha^2)$ is the long-term variance of $\widehat{V}_b$ and it is calculated as follows:

$$\delta_b^2 = \widehat{\gamma}_b(0) + 2\widehat{\lambda}_b, \quad (20)$$

other Statistic, the(t) statistic is the coefficient $(\hat{e}_{(t-1)b})$ in the following regression equation (ADF(b)) can be as follows:

$$\Delta\hat{e}_{tb} = \alpha + \beta\hat{e}_{(t-1)b} + \gamma_1\Delta\hat{e}_{(t-1)b} + \cdots + \gamma_1\Delta\hat{e}_{(t-M)b} + \varepsilon_t \quad (21)$$

And thus,

$$ADF(b) = tsat(\widehat{e}_{(t-1)b}), \quad (22)$$

According to Gregory - Hansen, the test statistics, 17, 18 and 22 are conventional tools for analyzing relationships of co-integration, without the presence of structural change (regime change). They proposed test statistics in the structural change in as follows:

$$Z_t^* = \inf_{b \in T} Z_t(b), \quad (24)$$

$$ADF^*(b) = \inf_{b \in T} ADF(b) \quad (25)$$

In order to study the impact of exchange rate and other macro economic variables on imports of Iran, we have estimated the following model based on Gregory- Hansen method:

$$\left(\frac{C}{S}\right): ML_{1t} = \alpha_0 + \alpha_1(D) + \alpha_2 REERL + \alpha_3 WDGPL + \alpha_4 INFL + \alpha_5 IGDPL + \alpha_6 REERL(D) + \alpha_7 WGDPL(D) + \alpha_8 INFL(D) + \alpha_9 IGDPL(D) + e_t, \quad t = 1,2,3,\ldots,T \quad (26)$$

The descriptions of variables have been presented in table -1.

Table 1: Description of the variables used in the model

VARIABALE	DISCRIPTION
ML	Logarithm of real imports
REERL	Logarithm of real effective exchange rate
WGDPL	Logarithm of world GDP in constant prices
INFL	Logarithm of Iran's inflation (CPI)
IGDPL	Logarithm of Iran's real GDP
DML	first difference of Logarithm of real imports
DREERL	first difference of Logarithm of real effective exchange rate
DWGDPL	first difference of Logarithm of world GDP in constant prices
DINFL	first difference of Logarithm of Iran' inflation(CPI)
DIGDPL	first difference of Logarithm of Iran's real GDP

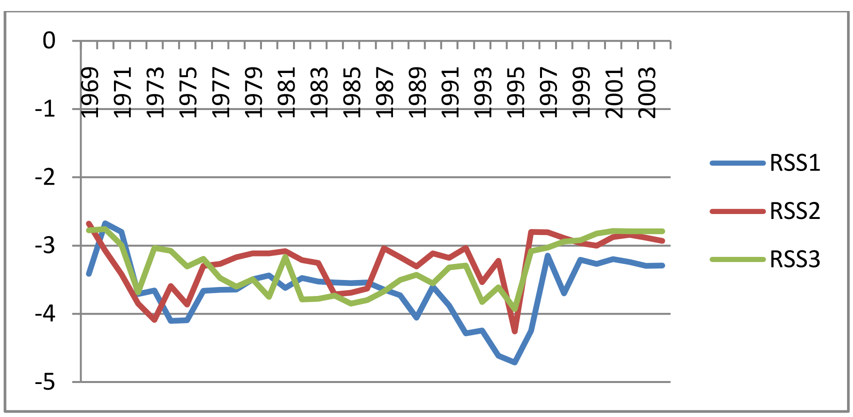
Break point test: the level shift model (C)

The level shift model (C) has been estimated as follows:

$$ML_{1t} = \alpha_0 + \alpha_1(D) + \alpha_2 REERL + \alpha_3 WGDPL + \alpha_4 INFL + \alpha_5 IGDPL + e_t\ , t = 1,2,3,\ldots,T \quad (27)$$

As per the test, the year 1995 appears to be the break point as per the lowest RSS1 value (see, figure 1 and Appendix).

Figure (1): The results of RSS1, RSS2, and RSS3.



Break point test using level shift with trend(C/T) model

The model estimated is as follows:

$ML_{1t} = \alpha_0 + \alpha_1(D) + \alpha_2 REERL + \alpha_3 WGDPL + \alpha_4 INFL + \alpha_5 IGDPL + \gamma.t + e_t , t = 1,2,3, \dots , T$ (28)

As per figure the year 1995 appears as the year of structural break with the lowest value of RSS2.

Break point test using the regime shift model (structural change) (C/S)

The model estimated is as follows:

$\left(\frac{C}{S}\right): ML_{1t} = \alpha_0 + \alpha_1(D) + \alpha_2 REERL + \alpha_3 WDGPL + \alpha_4 INFL + \alpha_5 IGDPL + \alpha_6 REERL(D) + \alpha_7 WGDPL(D) + \alpha_8 INFL(D) + \alpha_9 IGDPL(D) + e_t , \quad t = 1,2,3, \dots , T$ (29)

Its results are presented in picture 1(RSS 3) and table-2.

IV Empirical Findings of the Study

In this section we present the results based on unit root tests and the structural break points.

Unit root tests and structural break

Unit root test has been conducted using ADF test and the results indicate that the variables at their levels are not stationary and have become stationary at the first difference level. Which means the variable are integrated of order one i.e. I (1). Therefore the relevant method of estimation would be cointegration. We have used Gregory-Hansen method for this purpose. The results of unit root tests are presented below:

Table 2: Unit root tests of the variables

Variables	ADF	Ta(b1)	Ta(b2)	Ta(b3)
IVL	-1.8457	-2.47006	-2.46879	-2.33531
REERL	-1.6995	-0.56075	-0.5851	-0.59566
WGDPL	-0.45719	-1.20465	-2.08375	-2.02096
INFL	-1.5941	-4.23526	-4.32841	-4.1798
IGDPL	-1.7944	-2.55216	-2.96016	-2.7041
DIVL	-3.8605	-3.7862	-4.03781	-3.81778
DREERL	-5.1153	-4.06699	-4.23678	-4.08793
DWGDPL	-4.1871	-4.656	-5.20068	-5.22271
DINFL	-10.8048	-6.91741	-7.34539	-7.02676
DIGDPL	-3.3134	-3.19432	-3.46964	-3.40132
Critical values at 5% level	-2.9241	-3.80	-3.85	-4.18

Source: Computed by the authors

Co-integration test of Gregory - Hansen

Cointegration test based on Gregory – Hansen method has been used, for all possible break points (1969-2004) which include the estimation of Z_a ,Z_t and $ADF(b)$. We present these results in Table 3:

Table 3: Test results for all the break points

years	Z_a	Z_t	$ADF(b)$
1969	-19.77686	-4.283992	-4.0298
1970	-19.78545	-4.417521	-4.1207
1971	-20.92836	-4.350809	-3.9927
1972	-21.28308	-4.224622	-3.4821
1973	-19.87039	-3.546833	-3.9552
1974	-21.08171	-4.39211	-3.3851
1975	-24.77215	-5.068498	-3.6613
1976	-23.12886	-5.019328	-4.4804
1977	-25.42349	-4.928527	-4.3041
1978	-26.96561	-4.887809	-3.9092
1979	-23.64632	-4.058688	-3.9585
1980	-23.89866	-4.27921	-3.8129
1981	-23.71401	-4.476167	-4.0061
1982	-23.98947	-4.308894	-3.7365
1983	-23.45217	-4.293124	-3.719
1984	-24.12557	-4.266227	-3.8865
1985	-26.89989	-4.455681	-4.3266
1986	-26.6066	-4.413878	-4.2604
1987	-24.46212	-4.242089	-4.0339
1988	-24.26956	-4.102517	-4.0425
1989	-23.5333	-4.014264	-4.0598
1990	-22.34784	-4.092979	-3.6993
1991	-20.30772	-3.835204	-3.9393
1992	-20.10318	-3.802649	-3.8291
1993	-25.9515	-4.421499	-4.0226
1994	-24.25292	-5.03875	-4.2072
1995	-27.0564	-5.483688	-4.9854
1996	-22.45035	-4.852088	-4.7521
1997	-21.08213	-4.472494	-4.2651
1998	-20.01271	-4.544073	-4.0931
1999	-19.14051	-4.219912	-3.9648
2000	-18.33955	-4.224618	-3.9063
2001	-18.00403	-4.214121	-3.9234
2002	-17.92981	-4.164107	-3.8861
2003	-17.91981	-4.162004	-3.8834
2004	-17.92208	-4.15279	-3.8542

Source: Computed by authors

Based on all three statistics, Z_a, Z_t and ADF (b) the year 1995 has been identified as the year of structural break.

The following equation based on Gregory- Hansen cointegration test has been estimated using DOLS method and the results are presented in table 4.

$$\left(\frac{C}{S}\right): ML_{1t} = \alpha_0 + \alpha_1(D) + \alpha_2 REERL + \alpha_3 WDGPL + \alpha_4 INFL + \alpha_5 IGDPL + \alpha_6 REERL(D)$$
$$+ \alpha_7 WGDPL(D) + \alpha_8 INFL(D) + \alpha_9 IGDPL(D) + e_t\ , \qquad t = 1,2,3,\dots,T$$

Table 4: The results of Gregory-Hansen Cointegration test

		Z^*_a			Z^*_t			Z^*(ADF)		
		-24.25292			-4.9854			-5.483688		
Critical values at the level 5%		-78.52			-6.41			-6.41		
α_0	**α_1**	**α_2**	**α_3**	**α_4**	**α_5**	**α_6**	**α_7**	**α_8**	**α_9**	R^2
-15.999*	-32.36	-1.278*	-1.673	1.153*	2.910*	-1.200	5.068	1.077	-3.480	0.944
-7.238	-1.093	-4.232	-1.010	2.891	8.277	-1.063	1.160	1.108	-1.499	= t

*Note: The coefficient estimates are based on DOLS estimation procedure. * indicates significance at 5% level.*

V Conclusions and Recommendations

As per the empirical findings, there exists a cointegrated relationship between imports and other macro variables considered in the model. As expected, the real exchange rate has a negative relationship and inflation and domestic GDP have a positive relationship with Iran's imports. The global GDP appears to have an inverse long-term relationship with imports though, it is not statistically significant. Based on these empirical findings the following suggestions have been made:

1. Real Effective Exchange Rate (REER) has impacted Iran's imports negatively. Since exchange rate and Imports are statistically and negatively related, Iran should aim at reducing the volatility in exchange rates. It should integrate its exchange rate with the global rates and at the same time follow the policies of minimizing exchange rate fluctuations.
2. Since domestic inflation has a positive and significant impact on imports of Iran, the country should aim at containing rising prices domestically. The monetary and fiscal policies should aim at controlling money supply and rising public expenditure in the economy.

3. The domestic GDP in Iran has a positive and significant impact on its real imports. This is understandable, as Iran being a developing economy depending on the capital goods necessary for its development and growth.
4. Considering the inverse relationship between the global economic growth and the imports of Iran, though it is not statistically significant, the country should confine only to the priority imports such as capital goods and technology so that the productivity in economy increases.
5. In addition, the country should pursue a combination of export promotion/ diversification and import containment policies to increase its exports and economic growth and avoid trade deficits due to dumping from other countries.

.Notes

1. See Pahalvani, M, Wilson, E and Worthington (2005), Structural breaks and cointegrating relationships in Iranian exports and economic growth: An application of autoregressive distributed lag (ARDL) procedure, American Journal of Applied Sciences, 2(7), 1158-1165.

2. See, Ramakrishna, G (2013), The Long run relationship between Exports and Imports; The Experience of India and Iran, International Journal of Contemporary Issues (IJCI) , 1(2), 1-10, Jul-Sept.

3. See, Ahammadi, et al (2011), The Effect of exchange Rate uncertainty on Import: a TARCH Approach, International Journal of Management and Business Research, 1 (4), 211-220, autumn.

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Appendix

Table: Results of estimation break point: Gregory – Hansen method

years	RSS1	RSS2	RSS3
1969	-3.4167	-2.6801	-2.7791
1970	-2.6757	-3.0724	-2.7587
1971	-2.8030	-3.4186	-2.9948
1972	-3.7136	-3.8538	-3.6871
1973	-3.6622	-4.0926	-3.0329
1974	-4.1044	-3.5960	-3.0760
1975	-4.0954	-3.8669	-3.3066
1976	-3.6632	-3.2991	-3.1920
1977	-3.6529	-3.2719	-3.4748
1978	-3.6465	-3.1745	-3.6031
1979	-3.4986	-3.1175	-3.4921
1980	-3.4417	-3.1153	-3.7517
1981	-3.6225	-3.0846	-3.1662
1982	-3.4773	-3.2157	-3.7911
1983	-3.5309	-3.2566	-3.7817
1984	-3.5425	-3.7141	-3.7324
1985	-3.5534	-3.6927	-3.8511
1986	-3.5445	-3.6315	-3.8005
1987	-3.6471	-3.0393	-3.6741
1988	-3.7316	-3.1742	-3.5057
1989	-4.0607	-3.3059	-3.4288
1990	-3.6042	-3.1146	-3.5556
1991	-3.8814	-3.1825	-3.3201
1992	-4.2884	-3.0343	-3.2906
1993	-4.2485	-3.5358	-3.8249
1994	-4.6163	-3.2242	-3.6107
1995	-4.7157	-4.2597	-3.9296
1996	-4.2531	-2.8013	-3.0833
1997	-3.1505	-2.8074	-3.0292
1998	-3.7025	-2.8915	-2.9408
1999	-3.2084	-2.9671	-2.9239
2000	-3.2931	-3.0030	-2.8264
2001	-3.1993	-2.8790	-2.7850
2002	-3.2429	-2.8435	-2.7902
2003	-3.2974	-2.8852	-2.7895
2004	-3.2954	-2.9336	-2.7921

Sources: Computed by authors