Trade Liberalization and Economic Growth in Iranian Economy

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ABSTRACT

The goal of this study is to investigate the effect of trade liberalization on economic growth in Iranian economy using a Cobb–Douglas production function, which is expanded to take into account political instability and trade liberalization. The empirical results show that in the long run the real export and import duty have positive effect on GDP, while the Labor force and education causes to decrease the GDP. Moreover the Iranian activity to become a membership of WTO (as a proxy of trade liberalization) is an effective factor on economic growth in Iran.

Keywords: Trade liberalization, GDP, ARDL approach, Iranian economy
JEL Classifications: E3, F4, F5

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1. Introduction

In the current era of globalization, trade liberalization emerges as one of the most serious policy concerns for governments all over the world, especially for developing countries. Trade liberalization is believed to enhance economic growth and development through specialization and technological advances (Hoque and Yusop, 2010). The role of trade policy in economic development has been a key debate in the development literature for most of the second half of the twentieth century. Whereas the prevailing wisdom in the 1950s and 1960s favored import substitution, that in the 1970s and 1980s favored export promotion/outward orientation (Greenaway et al., 2002).

There are number of empirical studies linking economic growth to the openness of the trade regime (Krueger, 1978; Heitger 1987; World Bank 1987; Romer 1989; Quah and Rauch 1990; Michaely et al., 1991; Dollar, 1992; Edwards, 1992; Harrison, 1995; Savvides, 1995; Bakht, 1998; Onafowora and Owoye, 1998). On the other hand, some other studies find little empirical evidence to support a link between trade liberalization and economic growth (see Sachs, 1987; UNCTAD, 1989; Shafaeddin, 1994; Clarke and Kirkpatrick, 1992; Greenaway and Sapsford, 1994; Karunaratne, 1994; Jenkins, 1996; Greenaway et al., 1997).

A possible link between openness and growth has been an important factor in stimulating an unprecedented wave of unilateral trade reforms, with over 100 countries committing to some kind of trade liberalization over the last 20 years. Many of these programmes have been voluntary; most however have been tied to the policy conditionality which is central to World Bank Structural Adjustment Loans (SALs)[1]. Indeed, trade reforms account for a higher proportion of loan conditions than any other area of policy. The fundamental rationale for this degree of commitment to programmes of trade reform is the obvious belief that liberalization is a pre-requisite to a transition from a relatively closed to a relatively open economy. If openness is indeed positively related to growth, then it follows that liberalization is a requirement for growth (Greenaway et al., 2002). With this background in mind, this paper empirically analyses the relation between trade liberalization and economic growth in Iran during the period 1980-2006 using the framework of an augmented Cobb–Douglas production function.

The remainder of this paper is organized as follows. Section 2 briefly reviews the literature on liberalization and growth. Section 3 prepares the brief review on trade liberalization in Iran. The model and data of this study is presented in Section 4. Section 5 presents the ARDL bounds test approach to cointegration methodology. Section 6 discusses the empirical results and analysis of findings and section 7 concludes the paper.

2. Literature Review on Liberalization and Growth

The relationship between trade and development remains controversial among researchers in spite of political pronouncements that take this nexus as given. Pascal Lamy (2006),

[1] - A detailed account of the SAL process and its ingredients can be found in Greenaway and Milner (1993).

Robert Portman (2006) and Susan Schwab (2006), recent US Trade Representatives, have all argued that failure to conclude the Doha Development Agenda negotiations would be a serious lost opportunity to foster more rapid development in third world countries. In contrast, academic studies take both sides of this question, with many arguing that the evidence at hand does not support the assertions that trade liberalization fosters more rapid growth and development (Abbott et al., 2008).

Keynesian economists believe that reduction of import duties under an import liberalization policy (easy fiscal) contributes to an excess of imports over exports hence a foreign trade deficit (Froyen, 1996, p. 458). In a conventional neoclassical growth model, trade does not affect the equilibrium or steady state rate of output growth because, by assumption, growth is determined by exogenously given technological progress. In two-sector models of this kind, trade policy affects the allocation of resources between sectors and hence the steady-state level of savings and capital accumulation. This can have a one-off effect on the steady-state level of output (which can be positive or negative depending on how savings and capital accumulation are affected by trade policy), but not on the rate of growth (Mattoo et al., 2001).

However, according to the Endogenous Growth model and Standard Partial Equilibrium trade theory, trade liberalization can play an important role in boosting exports hence GDP growth through technology transfers (Goldar & Kumari, 2003; Gordon, 2000, pp. 158–159, 306; Husted & Melvin, 2001, p. 148; Khan, 1997, p. 87; Laird, 1997, pp. 37–44).

Existing studies investigating the effect of trade liberalization on performance fall into three main categories. First, set of studies applying cross-sectional data on a number of countries contains World Bank (1990) and Mosley et al. (1991a, b). Second set of studies uses time series analysis to examine the effect of trade liberalization, normally focusing on a single country (see for example Papageorgiou et al., 1991; Greenaway & Sapsford, 1994; Onafowora et al., 1996; Greenaway et al., 1997 and Narayan and Smyth, 2005). Most of the cross-sectional and time series studies have found, at best, mixed support for the hypothesis that trade liberalization promotes growth.

Third set of studies has applied panel data methods (Greenaway *et al.*, 1998, 2002 and Parikh and Stribu, 2004). These studies suggest, in contrast to much of the cross-sectional and time series literature, that liberalization might have a positive effect on growth in real GDP.

In sum, a review of the literature demonstrates a mixed result regarding the impact of trade liberalization on trade performance in developing countries. Therefore, empirical investigation of individual countries is crucial to examining the impact of trade liberalization on economic growth.

3. Trade Liberalization in Iran

Iran is a large country with population of about 70 million people. More than 65 percent of the population lives in the cities and the proportion of the rural population are

continuously declining. Although the country is rich in mineral resources and has some of the largest hydrocarbon reserves in the world, its per capita income is about USD 2300 and is among the lower middle income countries (World Bank 2006).

The Iranian government is of two minds regarding the country's accession to GATT and the World Trade Organization (WTO). Economic arguments militate in favor of joining the WTO, while arguments against joining see GATT as a tool of powerful industrialized states and cite possible disadvantages of following its rules. Membership in the WTO would reinforce the country's current trend toward economic liberalization and lead neighbors to think of Iran as a lucrative country to do business with (Afrasiabi, 1995).

Throughout 1965-1978, Iran was one of the fastest growing countries in the world, by relying on oil export revenue for financing its diversified industries and services. Islamic Revolution (1979) and the destructive Iran/Iraq war (1979-1987) changed the positive economic trend (Karimi, 2007). During 1976-1989, because of internal and external shocks to the economy the average growth rate of GDP was minus two percent and income per head declined considerably (Karshenas 1998; Hakimian and Karshenas 1999). Since the end of the war the negative trend changed and the country experienced high growth rates. On average, during 1989-2003 GDP growth has been more than 5 percent (Karimi, 2007).

After the Islamic Revolution in 1979, Iran chose an inward-looking strategy and the government got the duty to control imports and exports. Since the late 1980s the country has started to reform the economy to become more active in the globalized world. Iran applied for WTO membership almost a decade ago (first time in 1996), but due to rejection by the US, its membership request has not been accepted (WTO 2005). However, recently in June 2005, Iran was accepted as observer member in WTO.

However, Iran's export growth has increased drastically since 2002, thanks to high oil prices, and the current account surplus is projected to rise with international reserves reaching about $50 billion by the end of 2006 (World Bank 2006) its prospects look challenging. Oil price volatility and capacity constraints in the oil sector, international tensions over the nuclear issue, and the possibility of a prolonged period of "wait and see" on the part of the private sector has adversely affected the economic outlook. Therefore, the probable achievements from economic globalization have been largely out of reach (UNCTAD, 2005).

4. Model and Data

The theoretical framework of the study derives from the Cobb–Douglas production function, which is consistent with the specification used in several previous studies (see for example Hossain and Chung, 1999; Chuang, 2000; and Ramirez, 2000). Following Narayan and Smyth (2005) growth function and an augmented form of growth determinant together with the effect of trade liberalization suggested by Dutta and Ahmed (2006), the study specifies the growth function for Iran in the form of equation as follows:

$$\ln GDP = \alpha_0 + \alpha_1 \ln Lab_t + \alpha_2 \ln Edu_t + \alpha_3 \ln Inv_t + \alpha_4 \ln Exp_t + \alpha_5 \ln Trf_t + \alpha_6 DU79 + \alpha_7 DU96 + \varepsilon_t \quad (1)$$

Where, *ln GDP* is the natural log of real gross domestic income. *ln Lab* is the natural log of the labour force. *ln Edu* is the natural log of the secondary school enrolment rate. *ln Inv* is the natural log of the ratio of total investment to GDP. *ln Exp* is the natural log of real exports. *ln Trf* is the natural log of the ratio of import duty collected to value of imports. *DU79* is a dummy variable to capture the effect of eight year Iran/Iraq on economic growth. It takes the value of one from 1979 to 1986 and zero otherwise. *DU96* is a trend dummy variable representing the date on which Iran rendered the first requisition to become a membership of WTO in 1996, which is equal to one from 1996 to 2006 and zero otherwise, and ε_t is an error term. The sources of the data were the International Financial Statistics (CD ROM, 2008) published by the International Monetary Fund and the Time Series Database of Central Bank of Iran.

Existing studies have used a myriad of proxies for trade liberalization. Following Dutta and Ahmed (2006), based on the availability of time-series data for Iran, we use two measures of trade liberalization in this paper: real exports (*Exp*) as an *outcome-based* measure and the average import tariff collection rate (*Trf*) as the *incidence-based* measure. In the first measure, real export data is used. In the case of second measure, the ratio of import duty Collected to value of imports is used. Moreover, we use an alternative dummy proxy variable (*DU96*) which is activated on the date on which Iran started its activities and adjustment policies to getting membership acceptance from WTO and rendered the first membership requisition to WTO in 1996.

5. Methodology of the Study

5.1. The ARDL Bounds Test Approach to Cointegration

The ARDL ''Bounds test'' approach is based on the ordinary least square (OLS) estimation of a conditional unrestricted error correction model (UECM) for cointegration analysis developed by Pesaran et al. (2001). It is used here to test for the existence of a long run relationship as well as to make an estimation of long and short run coefficients for the study where the trade liberalization variables and dummy can capture both the short run and long run impacts. From the ARDL we can derive a dynamic error correction model (ECM) following a simple linear transformation (Bannerjee et al., 1993), where the ECM integrates short run dynamics with long run equilibrium without losing long run information (Shrestha & Chowdhury, 2005). According to Pesaran and Pesaran (1997) and Pesaran and Shin (2001) (cited in Pahlavani et al., 2005), the augmented ARDL $(p, q_1, q_2, ..., q_k)$ model can be expressed in the following form:

$$Dy_t = c_0 + c_1 t + \lambda_{yx} z_{t-1} + \sum_{i=1}^{p-1} \gamma_i Dy_{t-i} + \sum_{i=0}^{p-1} \gamma_i Dx_{t-i} + \delta_t w_t + u_t \qquad t = 1, ..., n \quad (2)$$

where, y_t is the dependent variable, c_0 is the constant term, x_{it} are the independent variables, L is lag operator, and w_t is the $s\times 1$ vector of deterministic variables including intercept terms, dummy variables, time trends and other exogenous variables with fixed lags. The (conditional) unrestricted ECM version of the selected ARDL model can be obtained by rewriting Eq. (2) in terms of the lagged levels and first difference of $y_t, x_{1t}, x_{2t}, ..., x_{kt}$, and w_t as follows:

$$Dy_t = c_0 + c_1 t + \lambda_{yx} z_{t-1} + \sum_{i=1}^{p-1} \gamma_i Dy_{t-i} + \sum_{i=0}^{p-1} \gamma_i Dx_{t-i} + \delta_t w_t + u_t \tag{3}$$

Where D is the first difference operator, t is the trends, the coefficient γ_i is expressing the short run dynamics of the model's convergence to equilibrium and $z_t = (y_t', x_t')$.

According to Pesaran et al. (2001) and Bahmani-Oskooee and Nasir (2004), for estimation, the economic growth Eq. (1) can be expressed in the UECM version of the ARDL model as follows:

$$\begin{aligned} D(LGDP)_t = {} & \alpha_0 + \sum_{i=1}^{n} \alpha_1 D(LGDP)_{t-i} + \sum_{i=1}^{n} \alpha_2 D(LLAB)_{t-i} + \sum_{i=1}^{n} \alpha_3 D(LEDU)_{t-i} \\ & + \sum_{i=1}^{n} \alpha_4 D(LINV)_{t-i} + \sum_{i=1}^{n} \alpha_5 D(LEXP)_{t-i} + \sum_{i=1}^{n} \alpha_6 D(LTRF)_{t-i} \\ & + \alpha_7 (LGDP)_{t-1} + \alpha_8 (LLAB)_{t-1} + \alpha_9 (LEDU)_{t-1} \\ & + \alpha_{10} (LINV)_{t-1} + \alpha_{11} (LEXP)_{t-1} + \alpha_{12} (LTRF)_{t-1} \\ & + \varepsilon_t \end{aligned} \tag{4}$$

The parameters α_i (i = 1–6) explain the short run dynamic coefficients, while the α_i (i = 7–12) explains the long run multipliers of the equation.

5.2. Advantages of the ARDL Bounds Test Approach

The ARDL Bounds test approach has several advantages over the Johansen's cointegration method. Firstly, the ARDL efficiently determines the cointegrating relation in small sample cases (Ghatak & Siddiki, 2001; Tang, 2003), whereas Johansen's method requires a large sample for validity. Secondly, Johansen's method requires that variables must be integrated with variables of the same order for the cointegration test, while the ARDL approach can be applied irrespective of whether the regressors are I(1) and I(0) or mutually cointegrated, in which the dependent variable must be I(1). If the nature of the stationarity of the data is not clear, then the use of the ARDL Bounds test is appropriate. A unit root test is not necessary if a conclusion can be made from the Bounds test for cointegration (Pesaran et al., 2001). Thirdly, the choices in Johansen's method are

limited; when using the ARDL a large number of choices can be made including decisions regarding the number of endogenous and exogenous variables, if any, for inclusion, the treatment of deterministic elements, as well as the order of VAR, and the optimal number of lags to be used (Pahlavani et al., 2005; Pesaran & Smith, 1998). That means in using the ARDL, a dummy variable can be included in the cointegration test process, which is not permitted in Johansen's method. Moreover, the ARDL permits a diverse number of optimal lags for different variables; while Johansen's method requires a uniform number of optimal lags (Pahlavani et al., 2005).

Pesaran et al. (2001), argued that the asymptotic theory developed in the ARDL approach is not affected by the inclusion of such ''one-zero'' dummy variables. Marashdeh and Saleh (2006), Pahlavani et al. (2005) and Narayan and Smyth, (2005) also used two dummy variables to capture both the long run and short run impacts in their ARDL model of budget deficit for Lebanon, income growth for Iran and trade liberalization and economic growth in Fiji, respectively.

The other major advantage of the ARDL approach is that it can be applied to studies that have a small sample size. It is well known that the Engle & Granger (1987) and Johansen (1988, 1995) methods of cointegration are not reliable for small sample sizes, such as that in the present study. Several previous studies, however, have applied the ARDL approach to relatively small sample sizes. Gounder (1999, 2002) has used the ARDL methodology to test empirically various growth hypotheses for Fiji using similar sample sizes to that in this study. Pattichis (1999), Mah (2000), Tang and Nair (2002) and Tang (2001, 2003) applied the ARDL bounds test approach to estimate the import demand function using small sample cases. Tang (2003) applied the ARDL Bounds test approach to estimate the import demand function for Japan with only 18 annual observations. We have 27 annual observations. Therefore, application of the ARDL Bounds test approach is very appropriate.

6. Empirical Results and Analysis

To execute, the ARDL Bounds test approach requires three steps. The first step is to determine the existence of a long run cointegrating relationship among the variables in the equation. The long run level relationship among the variables is determined using the Wald-coefficient test or *F*-test. If the estimated *F*-statistic appears larger than the upper bound of critical value, then the null hypothesis of no cointegration is rejected, which suggests that the variables included in the model are cointegrated. If the estimated *F*-statistic is smaller than the lower bound of critical value, then the null hypothesis of no cointegration cannot be rejected, which implies that the variables are not cointegrated. However, if the computed *F*-statistic falls in between the upper and lower bounds, then the decision is inconclusive regarding the null hypothesis of no cointegration (Hoque and Yusop, 2010).

The second step is to estimate the elasticities of the long run relationship and determine their values. Finally in the third step, we calculate the short run elasticities from the coefficients of the first differenced variables of the ARDL model. The coefficients of the

first differenced variables in the estimated UECM represent short run elasticities (Tang, 2003). To ascertain the goodness of fit of the ARDL model, relevant diagnostic tests and stability tests are conducted. The diagnostic tests examine the normality, serial correlation, ARCH and heteroscedasticity associated with the model. The structural stability test is conducted by employing the CUSUM and CUSUM of Squares tests.

Since we use 27annual observations, we choose 1 as the maximum lag length in the ARDL model and the calculated *F*-statistic is equal to 4.2543, given that this falls between the lower bound (3.5492) and the upper bound (4.6499) critical value reported in Pesaran et al. (2001) at the 95% significance level. So following Bannerjee et al. (1998) to determine the long-run relationship among the variables of interest, we use the *t*-test. Based on the results in table 1, the calculated value of the *t*-test is -5.92, which is more than the critical value -5.04 (at 99% significance level) tabulated by Bannerjee et al. (1998), so the presence of the long-run relationship is confirmed.

Table (1): Autoregressive Distributed Lag Estimates selected based on SBC

Regressor	Coefficient	Standard Error	T-Ratio [Prob]
LGDP(-1)	0.3130	0.1160	2.6966 [.017]
LLAB	-5.1773	1.2177	-4.2516 [.001]
LLAB(-1)	4.8699	1.1855	4.1078 [.001]
LEDU	-0.2106	0.1117	-1.8855 [.080]
LEDU(-1)	-0.2173	0.1231	-1.7643 [.099]
LINV	-0.0105	0.0445	-.23651 [.816]
LEXP	0.1474	0.0274	5.3837 [.000]
LTRF	0.0423	0.0264	1.6049 [.131]
LTRF(-1)	0.1742	0.0276	6.4161 [.000]
INPT	19.357	2.5916	7.4691 [.000]
DU79	-0.1015	0.0281	-3.6149 [.003]
DU96	0.1089	0.0281	3.8818 [.002]
$R^2 = 0.9984$	$\bar{R}^2 = 0.9970$	***DW=2.6207***	***F(11, 14) 762.36 [.000]***

Next we estimate the long-run coefficients of the ARDL model. One of the more important issues in applying ARDL is choosing the order of the distributed lag functions. Pesaran and Smith (1998) argue that the Schwarz Bayesian Criterion (SBC) should be used in preference to other model specification criteria because it often has more parsimonious specifications: the small data sample in the current study further reinforces this point. The optimal number of lags for each of the variables is shown as ARDL (1,0,0,0,0,1).

Table 2 shows the long-run coefficients of the variables under investigation. The empirical results in table 2 reveal that in the long-run the real export (*ln Exp*) and import duty (*ln Trf*) as tow major proxy of trade liberalization will give raise GDP. Labor force and education causes to decrease the GDP. More specifically, in the long-run one percent increase in real export leads to 0.21 per cent increase in GDP, and one percent increase in import duty Collected to value of imports leads to 0.32 per cent increase in GDP. This

indicates that the real export and import duty have a substantial or statistically significant effect on economic growth in Iranian economy.

Table (2): Estimated Long-run Coefficients using the ARDL Approach

Regressor	Coefficient	Standard Error	T-Ratio [Prob]
LLAB	-0.4475***	0.1205	-3.7136 [.002]
LEDU	-0.6229***	0.1264	-4.9278 [.000]
LINV	-0.0153	0.0658	-0.2330 [.819]
LEXP	0.2146***	0.0652	3.2929 [.005]
LTRF	0.3153***	0.0289	10.921 [.000]
INPT	28.177***	3.1262	9.0133 [.000]
DU79	-0.1478**	0.0575	-2.5706 [.022]
DU96	0.1587***	0.0541	2.9347 [.011]

Note: **(***) indicates significance at the 5% and 1% respectively.

According to reported results in table 2 the dummy variable DU96 (as another proxy of trade liberalization) has a positive and significant effect on GDP, indicating that the Iranian activity to become a membership of WTO is an effective factor on economic growth in Iran. It must be mentioned that the eight year period of the Iran/Iraq war has had a negative effect on economic growth, in which, according to the results in table 2, has the negative value of 0.15, which is statistically significant.

After estimating the long-term coefficients, we obtain the error correction version of the ARDL model. Table 3 reports the short-run coefficient estimates obtained from the ECM version of the ARDL model. The error correction term indicates the speed of adjustment restoring the equilibrium in the dynamic model. The ECM coefficient shows how quickly/slowly the relationship returns to its equilibrium path, and it should have a statistically significant coefficient with a negative sign. Bannerjee et al. (1998), states that a highly significant error correction term is further proof of the existence of a stable long-term relationship.

Table (3): Short-run Error Correction Model (ECM), (Dependent Variable: dLGDP)

Regressor	Coefficient	Standard Error	T-Ratio [Prob]
dLLAB	-5.1773	1.2177	-4.2516 [.001]
dLEDU	-0.2106	0.1117	-1.8855 [.077]
dLINV	-0.0105	0.0445	-0.23651 [.816]
dLEXP	0.1474	0.0273	5.3837 [.000]
dLTRF	0.0423	0.0264	1.6049 [.127]
dINPT	19.357	2.5916	7.4691 [.000]
dDU79	-0.1015	0.0281	-3.6149 [.002]
dDU96	0.1010	0.0281	3.8818 [.001]
ECM(-1)	**-0.6869**	**0.1161**	**-5.9182 [.000]**
$R^2 = 0.9529$	$\bar{R}^2 = 0.9159$	***DW=2.6207***	***F(8, 17)= 35.4020 [.000]***

As can be seen in table 3 the expected negative sign of the ECM is highly significant. The estimated coefficient of the ECM_{t-1} is equal to -0.6869, suggesting that deviation from the

long-term inflation path is corrected by around 0.69 percent over the following year. This means that the adjustment takes place very quickly.

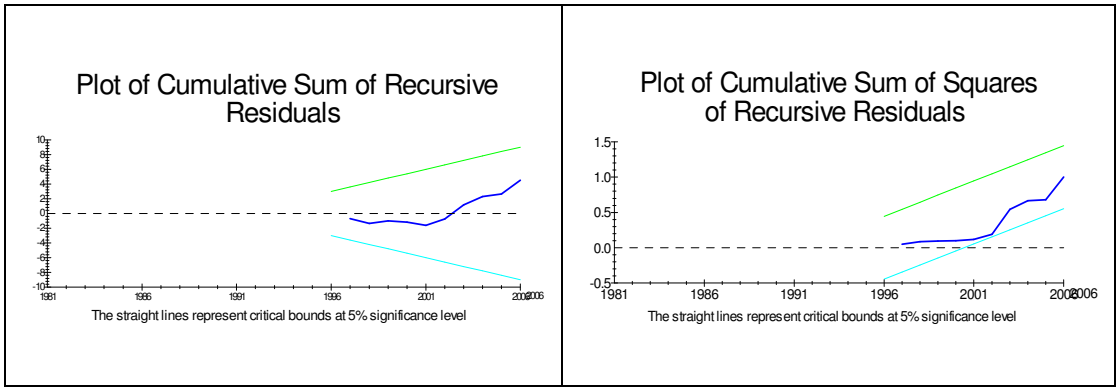
Table (4): The results of Diagnostic tests

	Diagnostic Tests	
	LM version	**F version**
A:Serial Correlation	CHSQ(1)= .29518 [.587]	F(1,15)= .17225 [.684]
B:Functional Form	CHSQ(1)= .45834 [.498]	F(1,15)= .26917 [.611]
C:Normality	CHSQ(2)= .20966 [.900]	Not applicable
D:Heteroscedasticity	CHSQ(1)= .56006 [.454]	F(1,24)= .52836 [.474]

A:Lagrange multiplier test of residual serial correlation
B:Ramsey's RESET test using the square of the fitted values
C:Based on a test of skewness and kurtosis of residuals
D:Based on the regression of squared residuals on squared fitted values

Diagnostic tests for serial correlation, functional form, normality, heteroscedasticity, and structural stability of the model in table 4 shows that there is no evidence of autocorrelation and the model passes all of the reported diagnostic tests.

Figure (1): Plots of CUSUM and CUSUMQ statistics for coefficients Stability Tests



Finally, the cumulative sum of recursive residuals (CUSUM) and the CUSUM of squares (CUSUMSQ) tests were applied to test for parameter constancy. Figure 1 plots the CUSUM and CUSUM of squares statistics for Eq. (4). The results clearly indicate the absence of any instability of the coefficients during the investigated period because the plots of the two statistics are confined within the 5% critical bounds pertaining to the parameter stability.

7. Summary and Conclusion

Using a Cobb–Douglas production function and the ARDL 'Bounds test' approach with annual time series data from 1980 to 2006, the study has estimated and analyzed the impacts of trade liberalization on the economic growth in Iranian economy. It was found that the variables in the economic growth function are cointegrated. The real export, the ratio of import duty collected to value of imports, and the trade liberalization dummy all

significantly influence GDP in Iran with consistent signs, while the Labor force and education factors have negative effect on GDP.

On the whole, the extant literature on trade liberalization and economic growth has found that trade liberalization has not contributed to economic growth. While our results are generally consistent with the existing literature it is important to see the reasons for this. We find that rising in trade liberalization has an important effect on GDP. Therefore, from the above findings and analysis, it is apparent that Iran has been following a gradual trade liberalization policy to promote imports in order to support exports and hence improve the GDP.

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