Trade liberalization, financial development and economic growth in the long term: The case of Iran

Mohammad Nabi Shahiki Tash, Zahra Sheidaei
Faculty of Economic at University of Sistan and Baluchestan, Iran
e-mail: mohammad_tash@yahoo.com

This study seeks to empirically analysis the joint impact of trade liberalization and financial development on economic growth in Iran, using endogenous growth theory during the period 1966-2010. In this article principal component analysis is applied to make better indexes for trade liberalization, financial development and the joint effects of both. The empirical findings obtained from Johansen co-integration procedure signify a positive relationship between trade liberalization, financial development and the joint impact on economic growth in Iran.

JEL Classifications: F0, F3, F4
Keywords: Trade liberalization, Financial Development and Economic Growth

Introduction

Over the last 30 years we have witnessed developments in trade liberalization and financial development. For instance, according to Wacziarg and Horn Welch (2003), the percentage of countries open to trade increased from 16% to 73% during the years 1960-2000. A number of studies have attempted to investigate the impact of trade liberalization and financial development on the economic growth of their countries, and it has become a main issue in developing countries as well. However, most of them emphasized on economic openness rather than supportive closed circumstances and recommend for that, but the main question is that whether trade liberalization and financial development raise economic growth of their countries, and if they do, why?

In Iran's empirical literature the impact of trade liberalization and financial development on economic growth have been separately examined. This study tries to investigate the joint impact of trade liberalization and financial development on the economic growth. In the other hand, there are various proxies for measuring trade liberalization and financial development. Previous studies just used one type of these proxies in their research, while they can affect economic growth through various channels and each proxy just survey one aspect of this issue. To overcome this problem three composition of indicators are made using the principle components analysis (trade liberalization, financial development and economic liberalization). Although there are already many foreign studies that show the joint impact of these two indicators on economic growth; e.g., Roubini and Sala-I Martin (1991) developed the growth model of Barro (1991) by mixing these two factors. The results of both the financial and trade variables in Barro's model indicated that trade and financial variables may play an important role in economic growth.

With this background in mind, the remainder of this paper is organized as follows. In the next section, the literature review and a brief description about related literature are presented. Section three analyzes the relationship between trade liberalization, financial development and endogenous growth. In sections four and five, the theoretical framework is explained and in section 5, the measures for trade liberalization and financial
development are reviewed and three indexes are constructed by applying principal components analysis. In continue, empirical results are reported and discussed. Conclusions are given in section seven.

Literature review

Although there are many foreign empirical evidences that investigate the joint impact of trade liberalization and financial development on economic growth, in Iran the impact of these factors on economic growth just has been examined separately.

Among the empirical studies regarding the joint impact of trade liberalization and financial development on economic growth, Roubini and Sala-I Martin (1991) initially found that business and financial variables play an important role in economic growth.

Renelt (1991) sought for a significant relation between growth and some of the other variables using cross-country study. The findings showed that production function includes supply-side variables, namely: physical capital, labor, human capital, trade liberalization and financial development.

In the empirical literature there are many works that investigate the casual relationship between trade liberalization and economic growth; e.g., Harrison (1996) surveyed the impact of trade liberalization on the economic growth using panel data approach and then compares the predictions from several trade liberalization measures. Results of Granger Causality Testing showed that a two-side relationship exists between liberalization and growth.

Braun and Raddatz (2007), in a study investigated the relationship between trade liberalization and capital account and the real effects of financial development using the cross-country panel data approach for 108 countries during the 1970-2003. The results indicated that financial development had smaller effect on growth in countries which were open in trade and capital flow rather than countries which were closed.

Baltagi (2007) examined the impact of liberalization, financial development and firms using panel data for 108 countries during the 1980-2000. The results of this study indicate that financial and trade liberalization and also economic institutions are considered statistically significant determinants of financial instability in countries after 1980.

Relation between trade liberalization and financial development and economic growth

Relationship between trade liberalization, financial development and economic growth can be explained as follows. Trade policy in terms of tariff reduction or elimination of restrictions on trade might have impacts on the growth through several channels. If openness is to affect economic performance, it must have an intermediate effect on one or all of the following:

1. Allocation of factors of production across sectors (the allocation effect) (Redding, 1997; Grossman and Helpman, 1992);
2. Openness will increase competition in the domestic economy and hence productivity (the import discipline hypothesis) (Greenaway and Milner, 1993; Aghion, Dewatripont, and Rey, 1997; Aghion, Harris, and Vickers, 1997; Aghion and Howitt, 1996);
3. Openness enlarge the market for domestic products (the scale economies) (Taylor, 1994; Grossman and Helpman, 1991);
4. Openness increases the number of inputs that have no domestic substitutes and thus leads to a higher capacity for utilization and productivity (the availability of inputs) (Nishimizu and Robinson, 1986; Quah and Rauch, 1990; Rivera-Batiz and Romer, 1991; Grossman and Helpman, 1992);
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On the other hand, the role of the financial sector in economic development has long been one of the hotly debated issues among economists. With the emergence of the endogenous growth theory, several studies have attempted to show how the operation and policies of the financial sector may affect the rate of economic growth (Roubini and Sala-I-Martin, 1992; Pagano, 1993; Siddiki, 2002). Finance can influence growth in an endogenous growth model through increasing the saving rate (Bencivenga and Smith, 1991), by increasing the returns on investment (Greenwood and Jovanovic, 1990), and by increasing human capital accumulation. From a macroeconomic aggregate production function point of view, all this means that economies that are developed more financially will be able to transform a given amount of inputs, k, into a larger amount of output, Y. This is why the production function is an increasing function of the financial development of the economy (Roubini and Sala-I-Martin, 1992).

The theoretical framework

With the emergence of the endogenous growth theories in 1980s, the relationship between economic policy and growth became a highly debated issue. In the theoretical literature, discussions are focused on different channels through which economic policy affects economic growth. In this section, different models of growth will be discussed to provide a framework of thought that helps to understand the impacts of each link between policy and growth. In other words, each channel through which economic policy affects growth has different implications for growth in different models. There are two competing theoretical frameworks in the growth literature, namely neo-classical and endogenous growth theories. The main differences between them are whether the policy change has a long-term effect on the growth rate. On the one hand, the neoclassical theory argues that a policy change has no effect on long-term economic growth and, on the other hand, endogenous growth theory shows a policy change in the economy does matter.

The endogenous growth theory is a reaction to the traditional Neo-Classical growth models, represented by Solow (1956). This new approach to growth theory has sought to supply the missing explanation of long-term growth. Indeed, this approach provides a theory of technical progress, one of the central missing elements of the neo-classical model. In other words, endogenous growth theories seek to discover what lies behind the exogenous rate of technical progress and hence a country’s growth rate. Endogenous growth theory recognizes that technological change occurs as a result of the efforts of profit-maximizing firms to invent new blueprints and technological progress is an endogenous outcome of economic activity (Kar, Peker and Kaplan, 2008).

The crucial distinction between ‘old’ and ‘new’ growth theories is that the former utilizes the assumption that returns to the capital stock is diminishing, while the latter argues that returns to capital itself or, in a wider sense, to the stock of physical and human capital formation is constant or increasing (Sala-I-Martin, 1990a). This then implies that those variables that lead to non-decreasing returns drive the growth rate. Numerous candidates have been recommended as the source of non-decreasing returns: particularly, the stock of human capital Lucas (1988); accumulated capital, Rebelo (1991); research and development, Romer (1986, 1990); or public infrastructure investment (Barro, 1991). Thus, endogenous growth models highlight sectors of the economy that influence the growth path of an economy. This can be simply shown in a Robelo-type production function, known as the AK model. Most of the endogenous growth models can be viewed as extensions or micro-foundations of the AK model (Sala-I-Martin, 1990b).

Rebelo (1991) formulated the simple form of the endogenous growth model, which has since been widely used in empirical analysis. The AK model takes its name from its production function. In its original form, the model setting involves dynamic maximization. In this section, we will make the further assumption of a constant savings...
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rate. This assumption, however, does not change the main conclusions and intuitions of the model. In the AK model, the production function takes the following form:

$$Y_t = AK_t$$  
\hspace{1cm} (1)

Where $Y_t$ represents output, $K_t$ is capital stock at time $t$ and $A$ is some positive constant. This formulation of the production function means that there are constant returns to capital accumulation. It is also important to note that $A$ is equal to the return to investment in this model. As will be explained in the next section, trade policy primarily affects the rate of return of capital and hence growth. Therefore, $A$ can be written as a function of trade policy ($\tau$) as,

$$A = \theta_0 - \theta_1\tau$$  
\hspace{1cm} (2)

Equation (2) indicates that the rate of return of capital is a negative function of trade policy.

The accumulation of capital is formulated as:

$$K_t = I_{t-1} + (1 - \delta)K_{t-1} \text{ and } I_t = sY_t$$  
\hspace{1cm} (3)

Where $s$ is the investment rate and $\delta$ is the depreciation rate. Both are assumed constants, and investment at time $t$ ($I_t$) is equal to the savings in the economy. The special formulation of the production function in the AK model (equation 1) implies that the marginal product of each unit of capital is always equal to $A$. It does not decline as the capital accumulates. This can be shown easily: after substituting the value of investment into equation (3) and then dividing both sides by $K_{t-1}$ and taking the logarithm of both sides, the resulting equation will be:

$$\log \left( \frac{K_t}{K_{t-1}} \right) = \log [sA + (1 - \delta)]$$  
\hspace{1cm} (4)

For small values of $s$, $A$, $\delta$ and $sA > \delta$, equation (4) can be written as:

$$\Delta \log K_t = sA - \delta$$  
\hspace{1cm} (5)

This equation says that the rate of growth of capital stock is constant if tariff rates are constant. After taking the logarithm and derivative of the production function and substituting the value of the equation of motion of the capital from equation (5) and the value of return to capital from the equation (2), the long term rate of growth of output can be written as follows:

$$\Delta \log Y_t = \Delta \log K_t = s\theta_0 - s\theta_1\tau - \delta$$  
\hspace{1cm} (6)
From equation (6), it is obvious that the rate of growth of the economy is decreasing with tariff rates and increasing with saving rates. Hence, any economic policy that increases the return to investment will permanently increase the rate of growth of the economy. Almost all endogenous growth literature has concentrated on the determinants of the return to investment, \( A \), and how policy change affects it (Sala-I Martin, 1990a).

**Measurement of trade liberalization and financial development**

In the recent empirical literature, researchers have concentrated on finding reliable proxies for trade liberalization. Some of common proxies for measuring trade liberalization are as follows: The share of import or export as a percentage of income, the share of export plus import as a percentage of income and tariffs. In this article the following proxies from trade liberalization are used in the empirical analysis.

**Export to GDP ratio (EX/GDP):** it is considered as a proxy of trade liberalization as the allocation of resources is observed on the level of exports.

**Import to GDP ratio (IM/GDP):** the import share in total production is used as a proxy of liberalization characterizing the dimension of openness related to increased international competition. It also represents the allocation effect of openness since the imports of those sectors that have comparative disadvantages will increase following trade liberalization (Kar, Peker and Kaplan, 2008).

**Foreign trade to GDP ratio (EX+IM/GDP):** this proxy represents the technology spillover dimension of openness. Openness to trade facilitates access to the technological information in the world (Grossman and Helpman, 1992). The following proxies are used for financial development:

**Narrow money ratio (M1/Y):** it is assumed, with financial development, the ratio of narrow money to income will increase.

**Narrow money to broad money ratio (M1/M2):** With financial development, deposits in the banking may be increased, because people put their money in the banking sector, so M1/M2 ratio will decrease.

**Broad money ratio (M2/Y) (De Gregorio and Guidotti, 1995):** in the literature usually the proportion of the widespread money to the income is used as the financial development indicator; this simple indicator which commonly used in the literature measures the degree of monetization in the economy. However, narrow money would increase with increasing in economic transactions, but it is expected that broad money should rise faster than that.

The ratio of \( (M2Y/Y) \): \( M2Y \) is a definition of money including the foreign assets in the national banking systems. After financial liberalization the foreign savers may experience the real return in the countries where real interest is high.

**Construction of Trade Liberalization and Financial Development Indexes**

As discussed in the previous section, each proxy of trade liberalization and financial development just shows one aspects of impact. Therefore, it is useful to develop a tool for description the relationship among variables, so that include all different dimensions of the impact of trade liberalization and financial development and represent a single measure for them. Principal component analysis can be used to combine the information of such proxies. The main objective of principal component analysis is to reduce the dimensions of data set which consists of a number of interrelated variables, using the covariance among them, while retaining as much as possible of the variation present in the data set (Jolliffe, 1986). This is achieved by the linear combination of data which are
orthogonal to each other. The principal component analysis can be applied using the original data or their deviations from their means or standardized variables.

Since this method is sensitive to the unit of measurement, it is better to use of standardized variables, when they are in different units. In addition, according to volatility of variables, the principal components are estimated on the data matrix of the difference of the logs of the standardized variables for the considered period. The variances of principal components are the eigenvalues ($\lambda_i$) of the variance-covariance matrix ($\Sigma$) of the data. Eigenvector of the first principal component are the coefficients for linear combination of proxies. Therefore, one-dimensional measure of trade liberalization or financial development can be found as follows:

$$OP_t = \sum_{i=1}^{5} \lambda_i Z_{it}$$

(7)

Where $OP_t$ represents the one dimensional measure of trade liberalization (or financial development) at time $t$, $Z_{it}$ is the standardized $i^{th}$ trade liberalization (or financial development) proxy at time $t$, and $\lambda_i$ is the eigenvector component that corresponds to a complementary measure of $i^{th}$ proxy. For trade liberalization, three proxies, namely ratio of export to income ($X/Y$), ratio of import to income ($M/Y$) and ratio of export plus imports to income (OPEN) are used to obtain a trade liberalization index (TL):

$$TL = 0.2533L \left( \frac{EX}{Y} \right) + 0.6329L \left( \frac{IM}{Y} \right) + 0.7315L(OPEN)$$

(8)

Where $L$ denotes the logarithm of the following variables, as can be seen from the coefficients of the trade liberalization proxies, they have positive impacts on the trade liberalization index.

The index for financial development (FD) includes the monetary aggregates, namely $M_1/Y$, $M_1/M_2$, $M_2/Y$ and $M_2Y/Y$. The FD index as follows:

$$FD = 0.5434L \left( \frac{M_1}{Y} \right) + 0.5519L \left( \frac{M_2}{Y} \right) - 0.3285L \left( \frac{M_1}{M_2} \right) + 0.5404L \left( \frac{M_2Y}{Y} \right)$$

(9)

The coefficients for financial development indicate that $M_1/M_2$ is negatively related to the index and other variables vise versa.

Due to the existing high correlation ($r = 0.98$) among trade liberalization and financial development indexes, it may not be appropriate to include both at the same time in a regression. Therefore, we have decided to construct another index that includes both proxies for trade liberalization and financial development, namely $X/Y$, $M/Y$, OPEN/Y, $M_1/Y$, $M_1/M_2$, $M_2/Y$ and $M_2Y/Y$. This new index (EL), therefore involves proxies for both external liberalization and financial development. In a narrow sense, this index (EL) can be considered as an economic liberalization index, which carries instruments from both aspects of the issue concerned here. The EL index is as follows (Kar, Peker and Kaplan, 2008).
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\[ EL = 0.3645L\left( \frac{IM}{Y} \right) + 0.1302L\left( \frac{EX}{Y} \right) + 0.3970L\left( \text{OPEN} \right) + 0.4328L\left( \frac{M_1}{Y} \right) + \\
+ 0.4453L\left( \frac{M_2}{Y} \right) - 0.3265L\left( \frac{M_1}{M_2} \right) + 0.4473\left( \frac{M_1 Y}{Y} \right) \]  \hspace{1cm} (10)

**Empirical analysis - Summary statistics:**

The research period is determined by the data availability. The annual data is employed for the Iran economy for the period of 1966-2010. The per capita GDP in constant prices 2005, export, import, narrow money, broad money and foreign assets derived from World Data Bank. The secondary school enrolment rate is available in the website of Iran’s economic time series database and is used as human capital proxy.

We construct the physical capital stock series by the perpetual inventory method following Bernanke and Gurkaynak’s (2001) approach.

\[ K_t = K_0(1 - s) + \sum_{i=1}^{t-1} I_i (1 - s)^{t-1} \]  \hspace{1cm} (11)

Based on Bernanke and Gurkaynak’s (2001) approach, an initial value of the capital stock series for each country i, is generated by: \( K_0 = I_1 / (g_1 + \delta) \) where \( K_0 \) is the capital stock, \( I_1 \) is the capital flow at year 1 or the year after the initial year, \( g_1 \) is the 5-year average annual growth rate around year 1, and \( \delta \) is the depreciation which is assumed to be the same countries (0.06). The data on investment-to-GDP ratio, real GDP growth are from the Penn world table (PWT version 6.3).

**Table 1. DF and ADF tests for unit root**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Intercept without trend</th>
<th>%5 Critical value</th>
<th>Intercept with trend</th>
<th>%5 Critical value</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>LGDP</td>
<td>-1.56</td>
<td>-2.93</td>
<td>-3.01</td>
<td>-3.51</td>
<td>Not I(0)</td>
</tr>
<tr>
<td>LK</td>
<td>-2.23</td>
<td>-2.94</td>
<td>-1.73</td>
<td>-3.51</td>
<td>Not I(0)</td>
</tr>
<tr>
<td>LSEC</td>
<td>-1.3</td>
<td>-2.93</td>
<td>-1.92</td>
<td>-3.51</td>
<td>Not I(0)</td>
</tr>
<tr>
<td>FD</td>
<td>0.28</td>
<td>-2.92</td>
<td>-2.95</td>
<td>-3.51</td>
<td>Not I(0)</td>
</tr>
<tr>
<td>TL</td>
<td>-2.59</td>
<td>-2.93</td>
<td>-3.28</td>
<td>-3.52</td>
<td>Not I(0)</td>
</tr>
<tr>
<td>EL</td>
<td>0.17</td>
<td>-2.92</td>
<td>-2.54</td>
<td>-3.51</td>
<td>Not I(0)</td>
</tr>
<tr>
<td>DLGDP</td>
<td>-3.55</td>
<td>-2.93</td>
<td>-3.7</td>
<td>-3.52</td>
<td>I(0)</td>
</tr>
<tr>
<td>DLK</td>
<td>-6.25</td>
<td>-2.93</td>
<td>-11.9</td>
<td>-3.51</td>
<td>I(0)</td>
</tr>
<tr>
<td>DLSEC</td>
<td>-3.25</td>
<td>-2.93</td>
<td>-4.05</td>
<td>-3.52</td>
<td>I(0)</td>
</tr>
<tr>
<td>DFD</td>
<td>-6.47</td>
<td>-2.93</td>
<td>-6.43</td>
<td>-3.51</td>
<td>I(0)</td>
</tr>
<tr>
<td>DTL</td>
<td>-4.95</td>
<td>-2.93</td>
<td>-4.89</td>
<td>-3.51</td>
<td>I(0)</td>
</tr>
<tr>
<td>DEL</td>
<td>-6.21</td>
<td>-2.93</td>
<td>-6.16</td>
<td>-3.51</td>
<td>I(0)</td>
</tr>
</tbody>
</table>

Recent literature in econometrics suggests that before undertaking an empirical analysis, unit root tests should be investigated for data series, because regression analysis carried out with non-stationary variables may invalidate many of the assumptions of regression analysis. If a time series has a unit root, a widespread and convenient way to remove non-stationarity would be by taking first differences of the relevant variable. A non-stationary
series, which transfers to a non stationary one by difference d times, is called an integration of order d and denoted as I (d) (Charemza and Deadman, 1997). The results of the Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) tests for the variables are presented in table 1. Critical values has been estimated by Eviews 6.

The results of DF and ADF unit root tests show that the levels of the variables are not stationary, but their first differences are stationary, with or without the inclusion of a deterministic trend.

**Estimation of the long-term production Function**

In next step, the test of cointegration among the variables is considered in a new growth theory. The purpose of the cointegration test is to determine whether a group of non-stationary series is cointegrated or not. If such stationary linear combination exists, it may be interpreted as a long-run equilibrium relationship among the variables.

Following Roubini and Sala-I Martin (1992), Coe and Moghadam (1993), Piazola (1995), Odedokun (1996, 1999), Ghatak, Milner and Utkulu (1995, 1997), Siddiki (2002), the augmented production function with trade liberalization and financial development can be written as follows:

\[ Y = f(K, H, X_i) \quad f_1, f_2, f_3 > 0 \quad (12) \]

Where \( Y \) is output, \( K \) is physical capital, \( H \) is human capital, \( X_i (i=1,2,3) \) denotes the trade liberalization, financial development and the joint impact of these two components of economic liberalization. It is expected that these three variables have positive impacts on economic growth.

In the empirical literature, it is expected that physical capital should have a positive effect on economic growth. Also human capital has been considered as a substantial component, not only in the new growth theory (Romer, 1986; Lucas, 1998; Barro, 1991, 1998; Piazolo, 1995; Glomm and Ravikumar, 1997; Hwang, 1998), but also augmented neoclassical models (Barro and Mankiw, 1992; Grammy and Assane, 1996) The educational level of society is applied for the proxy of human capital. The presumption is that an educated labor force is better at creating, implementing and adopting new technologies, thereby generating growth.

The production function is estimated using the Johansen cointegration procedure. In particular, economic theory suggests that the path of certain pairs of variables should not diverge, at least in the long term, though they may diverge in the short term due to seasonal factors. If the variables continue to diverge, market forces or other instruments commence to cause them to converge again. In this vein, cointegration means that one or more linear combinations of these variables are stationary even though individually they are not. If these variables are cointegrated, they cannot move “too far” away from each other. In other words, if there is a long-term relationship between two or more non-stationary variables, the idea is that deviations from this long term path are stationary (Charemza and Deadman, 1997). In contrast, a lack of cointegration suggests that such variables have no link; they can wander arbitrarily far away from each other. The application of the Johansen cointegration procedure (Johansen, 1988; Johansen and Juselius, 1992) in the empirical literature is very common. This methodology emphasizes the identification of long-term relationships, and hence is particularly appropriate for studying the determinants of potential output.

The Johansen cointegration procedure involves estimating a Vector Autoregressive Model (VAR) such as (Holden and Thompson, 1992; Charemza and Deadman, 1997):
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\[ Z_t = A_1 Z_{t-1} + \ldots + A_k Z_{t-k} + \varphi D_t + u_t \]  

(13)

Where \( Z_t \) is a \((n \times 1)\) vector that contains current and lagged values of \( n \) variables which are each assumed to be \( I(1) \), each \( A_i \) is an \((n \times n)\) matrix of parameters, \( D_t \) is a vector of \( I(0) \) variables and is the vector of random errors. Here, the formulation of the VAR model is of major importance because the results of the cointegration test can be very sensitive to that formulation. There are two main interrelated issues that particularly should be taken into consideration. The first one is to include an appropriate lag length to ensure that the residuals are white noise. The second is that using too many lags reduces the power of the statistics. Therefore, the choice of the appropriate lag length is important.

There are several criteria to determine the appropriate lag-length in the empirical literature, namely the Akaike Information Criteria, the Schwarz and Hannan-Quinn criteria (Kar, Peker and Kaplan, 2008).

According to the economic discussions in the previous section, the variables are classified into three models. The first model investigates the effects of trade liberalization on the economic growth. The second model considers the relationship between the financial development and growth and finally the joint impact of trade liberalization and financial development on the economic growth will be proved in third model. The correlation coefficient between trade liberalization and financial development indexes are quite high (\( r=0.95 \)), therefore two variables are not entered in the same regression. The three groups of the mentioned models are represented in the following Table 2.

### Table 2. The definition of the models

<table>
<thead>
<tr>
<th>Model 1</th>
<th>LGDP, Lk, LSEC, FD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 2</td>
<td>LGDP, LK, LSEC, TL</td>
</tr>
<tr>
<td>Model 3</td>
<td>LGDP, LK, LSEC, EL</td>
</tr>
</tbody>
</table>

### Table 3. Johansen cointegration test results

<table>
<thead>
<tr>
<th>Null</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum</td>
<td>Maximum</td>
<td>Maximum</td>
</tr>
<tr>
<td></td>
<td>eigenvalue statistic</td>
<td>5%</td>
<td>Trace statistic</td>
</tr>
<tr>
<td>r=0'</td>
<td>40.58</td>
<td>28.58</td>
<td>95.00</td>
</tr>
<tr>
<td>r=1'</td>
<td>28.26</td>
<td>22.29</td>
<td>54.41</td>
</tr>
<tr>
<td>r=2'</td>
<td>17.13</td>
<td>15.89</td>
<td>26.14</td>
</tr>
<tr>
<td>r=3'</td>
<td>9.01</td>
<td>9.16</td>
<td>9.01</td>
</tr>
<tr>
<td></td>
<td>r=0</td>
<td>r=0</td>
<td>r=0</td>
</tr>
<tr>
<td>r=1</td>
<td>41.42</td>
<td>28.58</td>
<td>76.51</td>
</tr>
<tr>
<td>r=2</td>
<td>23.55</td>
<td>22.29</td>
<td>35.08</td>
</tr>
<tr>
<td>r=3</td>
<td>9.10</td>
<td>15.89</td>
<td>11.53</td>
</tr>
<tr>
<td></td>
<td>2.42</td>
<td>9.16</td>
<td>2.42</td>
</tr>
</tbody>
</table>

Note: * denotes statistical significance at 5% for the number of cointegrating vectors

The empirical investigation has been done by the Eviews software in a VAR model. Before undertaking cointegration test, relevant order of lag of the vector autoregression
VAR) model should be specified. Lag order was determined using the Akaike information criterion (AIC), Schwarz information criterion (sc), Hannan-Quinn information criterion (HQ), Final prediction error (FPE) standards and the sequential modified LR test statistic (each test at 5% level). The statistics show that appropriate lag length for all three models is 2. The results obtained from the Johansen-Juselius cointegration test are presented in Table 3.

The trace and maximum eigenvalue statistics showed that there are three cointegrating vector for mode 1. At least one cointegrating vector for model 2 (whiles Trace statistics represented one cointegrating vectors, and eigenvalue statistics showed two cointegrating vector, Therefore, one cointegrating vector for the Model 2 is assumed in the further analysis), and four cointegrating vectors were for model 3. The corresponding cointegrating vectors for each model presented as follows (standard errors are given in the parenthesis):

\[
LGDP = 0.50 \text{LK} + 0.39 \text{LSEC} + 0.09 \text{FD} +13.75
\]
\[
(0.1698) \quad (0.1844) \quad (0.0110) \quad (5.4930)
\] (14)

\[
LGDP = 0.01 \text{LK} + 1.07 \text{LSEC} + 0.03 \text{TL} + 34.03
\]
\[
(0.3439) \quad (0.2817) \quad (0.1315) \quad (10.2579)
\] (15)

\[
LGDP = 0.56 \text{LK} + 0.49 \text{LSEC} + 0.1 \text{EL} +10.83
\]
\[
(0.1713) \quad (0.0121) \quad (5.1293) \quad (0.1618)
\] (16)

As far as expected, the results indicated positive long-term relationship between human capital, physical capital, trade liberalization and financial development and their joint impact on economic growth. As in the first model, considering financial development, human capital and physical capital, physical capital has had the most effect on growth. The coefficient of physical capital was about 0.5, it means by fixing other factors, one percent increase in physical capital would increase the growth 0.5%. This coefficient for human capital and financial development is about 0.39 and 0.09, respectively. Which indicates financial development have a small effect, but positive on the growth. (Equation, 14)

In the second model, variables follow the same pattern, and have a positive effect on growth. However, the substitution of trade liberalization variable for financial development, make physical capital less effective than human capital. The estimated coefficient for human capital is about 1.07 while it is just 0.01 for physical capital, and for trade liberalization similar to financial development is less but positive about 0.03. (Equation, 15)

In the third model, similar to first model, physical capital has the most influence on growth about 0.56, which it is shown each percent growth in economic liberalization index (reflecting both factor of trade liberalization and financial development) will increase growth about 0.1 percent. (Equation, 16)

**Conclusion**

This study has investigated the relationship between trade liberalization and financial development and their joint impact on the economic growth in Iran. The theoretical framework of this research is based on the endogenous growth model and Mushin Kar's study (2008). In order to survey such relationships, three alternative measures were developed by using the principal component analysis, namely trade liberalization, financial development and economic liberalization proxies. The obtained empirical results by
applying the time series econometric method for the period 1965-2009 indicated that trade liberalization and financial development positively contribute to the economic growth. Although their impacts are negligible. It seems that the main reason for such weak effect has been in the nature and the way of liberalization in the recent years. Financial and trade liberalization are often performed under weak management and disorganized conditions, therefore because of non-optimal resources allocation, they do not able to increase efficiency of investment appropriately, although the investment volume has been increased. But according to the experiences of other countries, the main channel for impact financial development on economic growth is through increasing investment efficiency than investment volume. Therefore the financial and trade liberalization could not influence economic growth through this channel, as it was expected.

Furthermore, the joint impact of trade liberalization and financial development in terms of economic liberalization is also positive on growth, while the human and the physical capital have had significant impacts.

References

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