The effect of globalization on economic growth in some developing countries through the co-integration Panel Data approach

Dr. Ahmad Ali Asadpour and Zahra Eshghi

Abstract

Globalization is one of the issues that have attracted a large number of contemporary scientists. Presence of robust international organizations like the World Bank, the International money fund, and the World Trade Organization that is called the International Economic Organization has caused the economists to believe that economic globalization is such an undeniable fact that any country or even region that is not able to adapt itself to this process will face with huge losses. According to the recent studies, globalization and free trade are likely to result in economic growth and development; therefore, instead of taking supportive policies, political and economic leaders have decided to compete in overseas markets in order to get out of the poor state of the economy. In this regard the present study was aimed at examining the relation between globalization and economic growth in some selected developing countries during 1995-2010 using GMM method. The results of the study indicated that globalization has had appositive significant effect on economic growth. Moreover, according to other findings of the study, bank credits, human development indices, and foreign direct investment had a direct effect on economic growth whereas economic openness had a negative effect.

INTRODUCTION

As a popular term in the 1990’s, globalization is one of the most controversial subjects in social sciences. Although there is a large body of discussion on it, no comprehensive definition that includes all dimensions of this phenomenon has been provided for it. However, globalization can be considered as a set of multidimensional and complicated procedures that include various fields like economy, ideology, politics, culture, and environment. The rationale behind globalization basically has root in the rational of capitalism which is maintenance and expansion of capital. Therefore, economy is located in the front line of the globalization process. In this field, globalization means the rapid integration of local and national economies into the world economy. This integration associates with the flow of goods and services, capital, technology, and information beyond the national borders. A large number of theoreticians believe that the dominant aspect of globalization is economy. Historically, economic aspect of globalization has been outstanding, which was well exemplified in the Silk Road – a network of related routes that used to connect Eastern, Western, and Southern Asia together and to Southern Africa and Western of Europe. By the 15th Century, this road had been the largest world trade network for 1700 years. This road had economic, political, pilgrimage, and recreational purposes.

Globalization has a lot of supporters and opponents. Attitude about globalization basically depends on whether the individual, group, or society has benefited from the resulted situation or it has brought him loss. Globalization has had positive and negative effects on economy. By reducing trade constraints, improving communication, and allowing foreign direct investment, the integrity of the world markets can provide the opportunity for free flow of capital among different countries, which results in acceleration of economic growth of the involved countries. The supporters of globalization believe that the developing countries can increase their growth pace through globalization.

As one of the counselors of the UN, Bhagwati [18] believes that globalization is a really powerful force that can free the countries from poverty because it accelerates their economic growth. In his view, globalization...
provides the trained workers of the developing countries with more freedom to choose so that they can compete for higher wage in the world markets and have better working conditions. People's easier and better access to the goods of other countries, the chance to use foreign credit sources, global common market that is created under the effect of freedom of good and service exchange, and the chance to compete in the market of global jobs are among positive consequences of globalization.

On the other hand, some believe that globalization has resulted in brain drain in the developing countries. Opportunities that are available in the developed countries attract talents of the poor countries and cause them huge losses. In general, the opponents believe that globalization serves the interests of large companies and operates against the interests of the small ones.

Since most Islamic countries especially those located in the Middle East are among developing or less developed countries and are facing crises like low per capita income and low rate of economic growth, such countries need a continuous and fast economic growth so that they can get out of such problems. However, there are different constraints for economic growth in Islamic countries. In this regard, various solutions have been proposed and implemented.

Due to its large oil and gas reserves, the Middle East is considered as an energy source for the world; therefore, it is highly significant in the world economy. Moreover, attempting to maintain economic growth is the most important challenge for the countries in the region. As a result, understanding globalization and examining its effects on the economy especially the economic growth index as one of the economic status indices can create deeper and systematic insight into this phenomenon in the political and economic leaders of the region. On the one hand, globalization and its effects cause the integration of world markets, improvement of the international trade, and an increase in foreign direct investment. Economic globalization can be the reason for rapid economic growth of such countries. On the other hand, presence of large oil companies with huge capitals and advanced technology can marginalize the traditional and non-oil economy in such countries.

However, since the Middle East countries have several problems like lack of human talents, inefficiency in production, lack of technological development, and lack of the expertise required for producing and exporting internationally competitive goods, they have not been able to play a significant role in foreign trade. Therefore, development of foreign trade is bound to comprehensively training the workforce in order to form and expand the human resources. In fact, enhancing the level of the individual education and skills can provide the required situation for eliminating the economic backwardness, enhancing economic capacities, and creating the required motivation of development. To be more precise, investment in human resources as the growth engine can play an important role in all economic sections especially in foreign trade section of any economic system. In this regard, the purpose of the present study was to investigate the trade developments and changes in human resources in Organization of Islamic Cooperation (OIC) countries and evaluate the resulted effects on their economic growth.

The present study was aimed at examining the effect of globalization on economic growth in some selected developing countries during 1995-2010 using the Panel Data method.

2. Globalization indices:

Economic globalization is not limited to international trade, investment, and finance, but it includes the flow of services, technology, and thoughts beyond the national borders. Therefore, there are different globalization indices each of which covers different dimensions of this phenomenon. In this section, those globalization indices that have frequently been used in the empirical economy literature are presented.

The following indices were respectively designed by Foreign Policy Journal, Heritage Foundation, Fraser Institute, and Swiss Economic Institute (KOF).

Foreign Policy Journal and Kearney International Counseling Office (2001) proposed an index for globalization for the first time. In their proposed index, they have tried to go beyond the economic aspect of this phenomenon and include different measurable components of this multidimensional process. This index is a combination of four key global components as follow.

1. Globalization of trade of goods and services: This index is measured based on the ratio of foreign trade to gross domestic production and also integration of the world and domestic prices.

2. Financial globalization: It is measured via the ratios of foreign direct investment flow and also the ratio of portfolio capital flow to gross domestic production. These two components measure economic dimensions of globalization.

3. Globalization of personal contacts: To measure this sub-index, criteria like the ratio of tourists and international travelers to the population of each country and the per capita duration of inhabitants’ overseas phone calls (person per minutes) are utilized.

4. Internet connection: To measure this index, criteria like the number of the Internet users, the number of the hosts and the Internet provider servers in the country. These two criteria focus on communication and technology dimensions of globalization.
This index was proposed based on the data and statistics retrieved from 50 industrialized countries and some key representatives of the emerging economies. They account for 80% of the world population and 95% of the world production is theirs.

The second index is the index of economic freedom proposed by American Heritage Foundation. It was first discussed in the late 1980's. It was aimed at developing an index for empirically measuring the level of economic freedom in the countries all over the world. In so doing, a set of concrete economic criteria were specified and have been utilized in studying and ranking different countries in annual publication of economic freedom index since 1994. This index is not a mere list of experiential scores, but it is a precise analysis of factors that play the most important role in institutionalizing economic growth. Moreover, a lot of available theories on the origin and factors that are involved in economic growth are also taken into consideration in the conclusion of the related studies. For instance, in a report of 1999, it is stated that countries that have the highest level of economic freedom have the highest rates of long-term economic growth and have outperformed other countries. Moreover, this report attributes the poverty of Sub-Saharan Africa mainly to lack of economic freedom which rests within the policies taken by these countries. The designers of this index have defined economic freedom as, "lack of limitation or restriction on production, distribution, and consumption of goods and services". Following this definition and based on 50 independent economic variables that are classified into 10 main groups, they have calculated and proposed the index of economic freedom for different countries. It is obvious that quantifying these 50 economic variables requires immense data collection from different countries (161 countries in the report of 1999) and the designers of the index claim that they have the required data. By utilizing this data in each main group of the variables for each country, scores between 1 and 5 respectively represent the level of protectionism of very low, low, average, high, and very high. The final score that is the mean of these scores is indicated in a table. The lowest score, i.e. 1, shows the highest level of economic freedom and the highest score, i.e. 5, indicates the lowest level of economic freedom in a country.

Next index is the economic freedom index that has been designed and proposed by Fraser Institute. More than one decade earlier, Michael Walker (Executive Manager of Fraser Institute) and Milton Friedman (Nobel Economics Prize Winner) held some conferences on defining and measuring economic freedom. Outstanding figures like Gary Becker, Douglass North, and Peter Bauer were among the participants of those conferences. Those conferences and meetings ultimately led to publication of world economic freedom report. Since then, annual reports on world economic freedom has frequently been compiled and published. The index of economic freedom is a weighted index that is composed on 21 different variables that are designed in 7 main categories with different weights as follow.

Table 1: Dimensions of economic freedom index

<table>
<thead>
<tr>
<th>Index</th>
<th>Weight (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government size</td>
<td>11</td>
</tr>
<tr>
<td>Economic structure and using the markets</td>
<td>14.2</td>
</tr>
<tr>
<td>Monetary policy and price stability</td>
<td>9.2</td>
</tr>
<tr>
<td>Freedom in using other countries' currency</td>
<td>14.6</td>
</tr>
<tr>
<td>Legal structure and ownership laws</td>
<td>16.6</td>
</tr>
<tr>
<td>Freedom of trade with foreigners</td>
<td>17.1</td>
</tr>
<tr>
<td>Freedom of exchange in financial and capital markets</td>
<td>17.2</td>
</tr>
</tbody>
</table>

Source: Fraser Institute (2010)

Different component of this index have been selected in a way that they cover different dimensions of economic freedom and make data collection from different world countries easier. Following the equation below, a digit between 0 and 10 is gained for each variable:

\[ \frac{V_i - V_{\min}}{V_{\max} - V_{\min}} \times 10 \]

KOF index of globalization was first proposed in 2002 [29]. Further definitions, update, and detail were provided by Dreher et al. The general index covers three globalization dimensions of economic, social, and political. In this index, globalization is depicted as a process in which national borders disappear, national economies, cultures, technologies, and governments integrate, and complicated relationships form out of mutual reliance.

Norris defines globalization as the integration of national economy, culture, government, and technologies. Cohen and Nay believe that globalization results from completion of three processes of economic globalization, political globalization, and social globalization. Clark considers globalization as the process of creating a transcontinental communication network that works as a medium for different flows of the individuals, knowledge, goods, capital, and ideas. Globalization is the process of deleting national borders and integrating national economy, culture, technology, and government. The three dimensions of KOF globalization index are as follow.
• Economic globalization: It is specified through the long distance flow of the good, capital, and services and also the information and the market exchanges.
• Political globalization: It is determined through the influence scope of the governments' policies.
• Social globalization: It includes spreading ideas and information.

In general, economic globalization has two dimensions: first, real economic flow that is utilized to measure the globalization and second, trade and capital restrictions.

The sub-index in the real economic flow includes trade information, foreign direct investment, and portfolio investment. Trade data and the stock of foreign direct investment (normalized through gross domestic production) are respectively provided by the World Bank and UNCTAD STATE website. Data on portfolio investment is retrieved from the statistics published by the International money fund. In general, trade is a set of imports and exports and portfolio investment consists of a country's stock including assets and debts, which is normalized through gross domestic production.

To create the index of globalization, each of the abovementioned variables were converted to a digit in the range of 1-100. Here, 100 and 1 indicated the highest and the lowest rates of globalization, respectively. The higher this index, the higher the degree of globalization will be. Converting the data into percentage was conducted according to the ratio of the main distribution. The amount of the weights utilized for calculation of globalization sub-indices was measured for the studied countries and different years by analyzing main components. Analyzing the main components separated the variance of the variables that were used in each subgroup. Afterwards, the weights were determined in a way that they would maximize the changes of the main components. By doing so, the resulted index measured the amount of these changes as far as possible. A similar trend was utilized for other sub-indices so that the general index of globalization could be gained (Dreher, 2006). The data that were used in the present study were collected on an annual basis. However, there was no access to the data for all countries and years. During calculation of the indices and before the values were weighted, all of the applied variables had linearly been interpolated. Whenever data for the whole period were available, the weights were somehow modified so that the problem could be resolved. When the observations included absolute zero values that were not due to presence of portfolio data, the value of the index was inserted with a zero weight. In cases where the utilized data for the sub-indices and for the general index of globalization were reliable, the general index for globalization was not measured anymore. When more than 40% of the data was not available or at least two sub-indices were not measurable, the observed value was reported in the measured index.

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As indicated in Table 2 above, Iran's status in regard with globalization is not desirable and in general, it was ranked 156 in the world with a score of 40.69.

3. Review of the literature:

One of the most remarkable phenomena in the world economy in recent decades has been the integration of national economies into the world economy, the results of which can be observed in enhancement of international trade, globalization of production, and foreign direct investment. In the second half of the 1980's, the average annual growth of good exchange in the world doubled. This figure tripled in the first half of the 1990's. Foreign direct investment also had a remarkable growth and reached over 400 billion dollars in 1997, which is 7 times more that its amount in the 1970's. Portfolio transactions and other forms of short-term capital also experienced a fundamental growth. Today, the gross amount of this capital has reached over 2 trillion dollars per year, which is almost three times more than its amount in the 1980's (The World Bank, 2006).

Following deregulation in capital markets all over the world and the ever developing information technology, capital markets were quickly set free and with the increasing internationalization trend of services like banking, insurance, advertisement, accounting, communication, and mass media, the patterns of consumption and demand have globally been revolutionized. Moreover, due to the extensive presence of multicultural companies, further integration into the world company is simplified.

Table 2: Iran's ranking in globalization index

<table>
<thead>
<tr>
<th>Indices and variables</th>
<th>Iran's score</th>
<th>Iran's ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic globalization</td>
<td>28.94</td>
<td>146</td>
</tr>
<tr>
<td>Political globalization</td>
<td>30.92</td>
<td>144</td>
</tr>
<tr>
<td>Social globalization</td>
<td>70.93</td>
<td>91</td>
</tr>
<tr>
<td>KOF index</td>
<td>40.69</td>
<td>156</td>
</tr>
</tbody>
</table>

Source: Swiss Globalization National Institute (2011)
Common interpretation of economic globalization is internationalization that focuses on international exchanges and interactions. In the second interpretation, economic globalization is considered as "liberalization". In this view, globalization is interpreted as the process of deleting government's restrictions on a country's foreign relations with other countries in order to achieve an open and boundless world economy. In other words, in this interpretation, globalization is the process of integration into the international economy. Evidence of such interpretation of globalization can be observed in recent decades when barriers to trade, restrictions on foreign currency, and control of capital were extensively or completely pushed aside and even visa was eliminated for the citizens of some countries.

Since more than a century ago, scholars have been debating on the relation between trade liberalization and the countries' economic performance. Liberal economists believe that freer trade results in quicker economic growth. Some of them consider trade liberalization as an essential factor in industrialization and economic development. According to the new theories of endogenous growth, reducing the number of trade barriers leads to acceleration of economic growth due to the following reasons:

- Quicker adoption of advanced technology from developed countries,
- An increase in the benefits received from development and research programs,
- A reduction in price deviation and fluctuation due to more efficient utilization of domestic resources within the sections,
- Help with more specialty, higher production efficiency, and use of intermediate inputs, and
- Quicker supply of new goods and services.

On the contrary; however, some in defending protectionism believe that pursuing supportive policies can benefit the economic performance of a country. Despite of various empirical studies that have reported positive effects of trade openness on economic growth, there are ongoing discussions and disagreements on the issue in an era of experiencing an unbelievable increase in trade liberalization.

Most recent empirical studies that have dealt with investigating the economic liberalization and growth were based on cross-country regression models. Both supporters and opponents of the positive relation between liberalization and growth have resorted to such regression models. However, unfortunately due to various reasons (e.g., poor theoretical basis, decreasing quality of data, inappropriate econometric methods, etc.) the results of the components of these regression models are not that certain and reliable.

Such criticisms have made some supporters of free trade recommend that special care be taken in interpreting the results of cross-country regression models. They also warn that such raw regressions should be used as the confirmation for supporting free trade and not scientific arguments. Some other critics believe that presence of such criticisms questions the existence if a rational relation between trade openness and economic growth. They consider the investigations for finding the relation between trade openness and economic growth as attempts in vain.

A large portion of the economic literature especially international trade has been allotted to the investigation of the relation between the openness degree of economy and economic growth. According to the available theoretical basis in this field, there is a positive relation between the openness degree of economy and economic growth. Romer, Grossman and Helpman, and Barro and Sala-i-Martin and many other economists believe that countries that have a high degree of economic openness have higher capacity to adopt new and outstanding technologies from other part of the world. Chang et al [23] have stated that openness of economy allows for distribution of knowledge and encouragement of competition in domestic and international markets by creating relative advantages like improving the efficient attribution of resources. However, there are opposite views and trends to these views, for instance, Krugman and Rodríguez & Rodrik argue that there are doubts about the relation between openness degree of economy and economic growth especially when investigating the benefits of trade and openness degree of the countries is conducted during a period of time.

Other empirical studies have been carried out in order to determine the relation between economic openness and growth. These studies can be classified into three categories:

The first category has utilized a common regression to investigate the relation between economic openness of the countries by regressing them on gross domestic production per capita growth. There are numerous studies in this category, most of which referred to a significant relation between openness degree of economy and economic growth. Examples include the empirical studies conducted by Dollar [27], Edwards, Barro and Lee [14], Harrison, Easterly and Levine, Dollar and Kray [28], Tervio and Irwin, Islam, and Sala-i-Martin. The results of these studies have indicated that there is a positive significant relation between openness degree of economy and economic growth in the target countries.

In analysis of common regressions, only examining one-way causality is possible; however, it is possible that there is a two-way relation between two variables. The second category has used the Granger Causality test to figure out the relation between openness degree of economy and economic growth. The results of these investigations have unfolded further complexities.

Applying Granger Causality test, Marshal and Jung investigated the relation between openness degree of economy and economic growth in 37 developing countries during 1957-1981. The results of their study
indicated that there was a one-way causal relation between these two variables. Chow [25] also utilized Granger Causality test to examine the relation between openness degree of economy and economic growth in 8 industrialized countries during 1955-1981. The results of this study showed that there was a one-way causal relation between these two variables. Hsiao also applied this test for some selected Asian countries. The results of this study indicated that there was a one-way relation between economic growth and exports.

The third category has dealt with studying the problems and failures of the first two groups based on concepts like co-integration and discovering short-term and long-term dynamics between openness degree of economy and economic growth.

These analyses have been conducted on time series data and based on causality in these target countries. Islam (1998) used an error correction model for 15 Asian countries during 1967-1991 in order to examine the relation between openness degree of economy and economic growth. The results of this study indicated that openness of economy was the cause of economic growth in 10 out of 15 countries.

In their study, Chen and Feng investigated the effective factors in economic growth in the provinces of China with a focus on trade freedom, human resources, and private enterprises during 1978-1989. Utilizing panel data approaches, they indicated that the index of trade liberalization and the ratio of exports and imports to the gross domestic production had a negative insignificant effect on the economic growth of the provinces. Moreover, the index of human resources – registration in elementary school was taken as the representative of this index – had a positive significant effect of the economic growth of the provinces. On the other hand, in this study a series of control and effective variables in economic growth like productivity rate, inflation, investment, industry value added, and private enterprises were included and the results indicated that productivity ratio had a positive insignificant effect, inflation had a negative significant effect, investment had a positive significant effect, industry value added had a positive significant effect, and private enterprises had a negative significant effect on economic growth of China. Liu et al also conducted a study on the relation between openness degree of economy and economic growth in China during 1981-1997. The results of their study indicated that there was a two-way causal relation between openness degree of economy and economic growth of China during the studied period. Utilizing co-integration and error correction, Bouoiyour investigated the relation between economic growth and trade liberalization for Marrakesh during 1996-2000. The results of this study showed that there was no long-term causality. However, imports and exports were the cause of economic growth in the short-term run.

Awokuse (2007) studied the effect of expansion of exports and imports on economic growth in transitional economies of Czech, Poland, and Hungary. The results of this study indicated that there was a two-way causal relation between exports and economic growth in Hungary's economy, a one-way causal relation between exports and imports and economic growth in Czech's economy, and a causal relation between imports and economic growth in Poland's economy.

There are few studies conducted on the relation between globalization and economic growth. In Iran, no studies have been conducted on the relation between globalization and economic growth. However, there are some similar studies on trade openness and economic growth, which are presented below.

Zarghami utilized self-distribution patterns with extensive intervals in order to examine the relation between trade openness and economic growth in Iran during 1962-1986. The results of this study indicated that long-term economic growth rate had been higher with the presence of foreign trade compared to the situation without it.

In their study, Jalali Naeeni and Mohammadi (1996) studied the relation between foreign trade and economic growth during 1959-1992 in oil countries especially Iran. The results of their study that was conducted via a panel data method showed that foreign trade led to economic growth in the studied countries. However, this effect is smaller than the industrialized countries. The results of this study also indicated that restricting imports resulted in economic growth reduction.

Islamluian et al studied the relation between trade openness and macroeconomic variables (including economic growth, inflation, and employment growth) during 1961-2007 using the method of vector autoregressive (VAR). The results of this study indicated that openness of economy in short term would increase economic growth. They also showed that a sudden change as the size of a standard deviation in openness of economy did not have any effect on the studied variables in long term.

4. Methodology:

In equations in which the estimation of unobservable effects and presence of interruption in dependent variables within explanatory variables are difficult, Generalized Method of Moments (GMM) that is based on dynamic panel data models is utilized. To estimate the model based on this method, first of all it is necessary to determine the applied market variables. Adaptability of GMM estimator depends on the validity of the assumption on lack of serial correlation between error statements and instruments. This validity can be examined through the two tests affirmed by Arellano and Bond and Arellano and Bover. The former is Sargan Test which examines the validity of the instruments through predisposed restrictions. The latter is M2 that tests
second-order serial correlation in first-order differential error statements. Failure to reject the null hypothesis in both tests refers to lack of serial correlation and means validity of the instruments. In other words, GMM estimator is adaptable if the second-order serial correlation does not exist in error statements of the first-order differential equation.

Sargan Test (1958) uses the predisposed restrictions and is utilized to determine any type of correlation between instruments and errors. In order for the instruments to be valid, no correlation should exist between the instruments and the error statements. The null hypothesis for this test is that the instruments are valid as far as they are not correlated with the errors in the first-order differential equation. Failure to reject the null hypothesis indicates that the instruments are appropriate. In general, the regression model is written as follow:

\[ Y_i = \alpha + \beta Y_{i-1} + \gamma X_i + \eta_i + \varepsilon_i \]

Where, \( Y \) is dependent variable, \( x \) includes simultaneous explanatory variables, \( \eta \) is the individual specific effect independent of time, \( \varepsilon \) is the error statement, and \( i \) and \( t \) indicate variables of country and time.

5. Evaluation of the model:
The model that is utilized in the present study is as follow:

\[ LY = \beta_0 + \beta_1 L_{KOF} + \beta_2 L_{HDI} + \beta_3 GOV + \beta_4 IPR + \mu + \varepsilon_{it} \]

Where, \( Y \) is the per capita income for the country \( i \) in the time \( t \), \( \beta_0 \) is a fixed statement, \( \beta_1 \)s are estimation coefficients, \( L \) indicates logarithmic conversion, IPR stands for protection of intellectual property rights, Gov is the ration of the government's consumption expenditure to the gross domestic production, KOF is the index of globalization, HDI stands for human development index, \( \mu \) indicates the effects related to the countries which is considered to be fixed in the long run, and \( \varepsilon_{it} \) is the classical error component.

Since KOF index is composed of different variables like foreign investment, trade openness, and bank credits, it can be considered as a proxy for these variables.

In the present study, all of the data have been retrieved from the websites of the World Bank and Swiss Federal Institute. A complete explanation of the utilized variables is presented below.

6. Definition of the model variables:
Globalization (KOF): The International Money Fund (IMF) defines globalization as, "deeper and more extensive integration". In other words, it considers globalization as the development of the mutual economic dependence of countries by increasing the volume and variety of good and service exchange and capital flow beyond the borders and also extensively distributing technology (the International Money Fund, World Economic Outlook, 1997). KOF index was first proposed in 2002 [30]. Further explanations, update, and details were provided by Dreher, Gaston, and Martens in 2008. This index covers economic, social, and political dimensions of globalization.

Economic growth (\( Y \)): An increase in gross domestic production during a period of time is called economic growth.

Intellectual Property Right (IPR): Patent and copyright have experienced different paths in different countries at different times. First, the laws related to property right were assigned endogenously and based on social and economic priorities. Afterwards, international patent laws were seriously affected by America’s initial policies and the original inventors’ rights were focused on. Unlike the US copyright laws that were among the poorest laws, international copyright laws took a European trend that was based on non-economic argumentations of the authors’ rights. Therefore, the property law system of the 21st Century is exceptional because no country supported both patent and copyright simultaneously before (The New Palgrave Dictionary of Economics, 2008). Explanation of the utilized variables and abbreviations in the present study are presented in Table 1 below.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measurement Unit</th>
<th>Variable Definition</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per capita gross domestic production</td>
<td>$</td>
<td>GDP Per person (constant 2000 PPP $)</td>
<td>Y</td>
</tr>
<tr>
<td>Government’s consumption expenditure as a portion of gross domestic production (government size)</td>
<td>%</td>
<td>General Government Final Consumption Expenditure (% of GDP)</td>
<td>G</td>
</tr>
<tr>
<td>Protection of property right</td>
<td>%</td>
<td>ICT Goods Exports (% of total goods exports)</td>
<td>IPR</td>
</tr>
<tr>
<td>Human development index</td>
<td>%</td>
<td>Human Development Index</td>
<td>HDI</td>
</tr>
</tbody>
</table>

7. The study sample:

The sample in the present study consisted of 40 developing countries that had the most data over 1999-2010. These countries are presented in Table 2, below. Selecting these countries was conducted in a way that most data and periods could be included so that more precise results would be attained.

Table 2: The studied countries

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Algeria</td>
<td>11</td>
<td>Colombia</td>
<td>21</td>
<td>Mexico</td>
<td>31</td>
<td>Thailand</td>
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<td>2</td>
<td>Angola</td>
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<td>Congo</td>
<td>22</td>
<td>Nepal</td>
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<td>3</td>
<td>Argentina</td>
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<td>Egypt</td>
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<td>Nicaragua</td>
<td>33</td>
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<td>Bangladesh</td>
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<td>Brazil</td>
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<td>Cameroon</td>
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<td>Venezuela</td>
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<td>8</td>
<td>Chad</td>
<td>18</td>
<td>Jordan</td>
<td>28</td>
<td>Peru</td>
<td>38</td>
<td>Vietnam</td>
</tr>
<tr>
<td>9</td>
<td>Chile</td>
<td>19</td>
<td>Lebanon</td>
<td>29</td>
<td>Romania</td>
<td>39</td>
<td>Ukraine</td>
</tr>
<tr>
<td>10</td>
<td>Malawi</td>
<td>20</td>
<td>Malawi</td>
<td>30</td>
<td>Senegal</td>
<td>40</td>
<td>Kazakhstan</td>
</tr>
</tbody>
</table>

8. The results of the reliability tests:

Applying traditional methods in econometrics is based on the assumption that variables are static. Therefore, in order to avoid the occurrence of spurious regression during the evaluation of the pattern, it is necessary to first examine the static nature of the variables. As was referred to in Review of the Literature section, examining the reliability of the variables in panel data should be carried out through specific tests of this type of data. In the present study, Levin and Lin (LL) test that has the most applicability in examining static variables has been utilized. The tests were examined using EViews 6.0 software. Based on Prob, significant level was assigned at 0.05. Since the null hypothesis (H0) indicates a single root for each variable, the hypothesis that there is a single root for a specific variable is rejected provided that P-Value is less than 0.05. The results of static tests are presented in Table 3.

Table 3: The results of LL test for static nature of the variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Evaluation method</th>
<th>Test statistics</th>
<th>Probability</th>
<th>Static or non-static</th>
</tr>
</thead>
<tbody>
<tr>
<td>LY</td>
<td>Fixed value</td>
<td>2.12</td>
<td>0.95</td>
<td>Non-static</td>
</tr>
<tr>
<td></td>
<td>Fixed value and process</td>
<td>1.68</td>
<td>0.98</td>
<td>Non-static</td>
</tr>
<tr>
<td>GOV</td>
<td>Fixed value</td>
<td>-6.14</td>
<td>0.000</td>
<td>Static</td>
</tr>
<tr>
<td></td>
<td>Fixed value and process</td>
<td>0.67</td>
<td>0.000</td>
<td>Static</td>
</tr>
<tr>
<td>LHDI</td>
<td>Fixed value</td>
<td>-2.57</td>
<td>0.008</td>
<td>Non-static</td>
</tr>
<tr>
<td></td>
<td>Fixed value and process</td>
<td>-2.45</td>
<td>0.007</td>
<td>Non-static</td>
</tr>
<tr>
<td>IPR</td>
<td>Fixed value</td>
<td>0.70</td>
<td>0.75</td>
<td>Non-static</td>
</tr>
<tr>
<td></td>
<td>Fixed value and process</td>
<td>-0.98</td>
<td>0.16</td>
<td>Non-static</td>
</tr>
<tr>
<td>LKOF</td>
<td>Fixed value</td>
<td>-2.10</td>
<td>0.017</td>
<td>Static</td>
</tr>
<tr>
<td></td>
<td>Fixed value and process</td>
<td>-1.05</td>
<td>0.14</td>
<td>Static</td>
</tr>
</tbody>
</table>

According to the results of Lin, Levin, and Chow’s test, variables of IPR, LHDI, and LY are non-static and the rest are static.

Since some variables are static and some are non-static, it is necessary to conduct co-integration test before evaluation of the model in order to avoid spurious regression. Cao and Fisher test was applied to examine the co-integration between the study variables. The results of the first model co-integration test are presented in Table 4. (It should be noted that the results of the co-integration test do not need to be reported in GMM; however, they are presented here to come up with more precise results).

Table 4: The results of Cao co-integration test for the first model

<table>
<thead>
<tr>
<th>Test</th>
<th>T statistic</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cao</td>
<td>-1.77</td>
<td>0.0376</td>
</tr>
</tbody>
</table>

The results presented in Table 4 indicate that there is a long-term relation among dependent and independent variables. After it was ensured that there is a co-integration relation among the variables, they can be utilized to evaluate the model without any concern about occurrence of a spurious regression.

9. The results of the Chow’s tests:

According to the features of the data of the study including time serial and cross-sectional data, like other conducted economic studies, panel data sets have been utilized in the present study. Using this approach has various advantages. This technique makes it possible to include the effect of deleted variables that continue in the regression. Within the framework of panel data method, unobservable heterogeneous effects can be removed from the regression. One of the questions to be answered based on this method is about the selected type of this
model. Different tests can be applied to determine the correctness and strengths of different models. The most common tests are Chow and Hausman tests. These two tests are available in EViews 6.0 software. Chow test is applied to select amongst the minimum aggregated squares and panel data method. In this test, $H_0$ indicates the use of the minimum aggregate squares method and $H_1$ shows the fixed effects approach. The fixed effects approach is acceptable when the difference between the periods can be explained using intercept statements. However, the minimum aggregate squares method uses similar intercept statements.

10. The results of the model estimation:

To estimate the model, the type of the model is selected through Chow diagnostic tests. In this test, first the time fixed effects model is first estimated. Afterwards, Chow test is carried out and based on F-Limmer statistic and the minimum aggregate squares method will be rejected. The results of the study are presented in Table 5.

<table>
<thead>
<tr>
<th>Fixed effects test (Chow)</th>
<th>The calculated value of F</th>
<th>P-Value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>297.71</td>
<td>0.000</td>
<td>$H_0$ rejected</td>
</tr>
</tbody>
</table>

11. Autocorrelation test:

To examine the combined data, Stata 12.0 software has been utilized. The results of the autocorrelation test are presented in Table 6. They indicate the presence of autocorrelation in the level of the rest models.

<table>
<thead>
<tr>
<th>Test</th>
<th>F-statistic</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wooldridge</td>
<td>2.804</td>
<td>0.096</td>
</tr>
</tbody>
</table>

Since the model has the problem of autocorrelation, GMM models can be utilized. The results of evaluating the model are presented in Table 7, below.

Table 7: The results of evaluating the model using the dependent variable of per capita gross domestic production

<table>
<thead>
<tr>
<th>Explanatory variable</th>
<th>Coefficient</th>
<th>T-statistic</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-1.27</td>
<td>-1.65</td>
<td>0.10</td>
</tr>
<tr>
<td>LY (-1)</td>
<td>0.172</td>
<td>4.53</td>
<td>0.000</td>
</tr>
<tr>
<td>LKoF</td>
<td>0.833</td>
<td>6.82</td>
<td>0.000</td>
</tr>
<tr>
<td>GOV</td>
<td>-0.289</td>
<td>-2.14</td>
<td>0.035</td>
</tr>
<tr>
<td>IPR</td>
<td>0.0738</td>
<td>2.138</td>
<td>0.034</td>
</tr>
<tr>
<td>LHDI</td>
<td>0.18</td>
<td>1.87</td>
<td>0.067</td>
</tr>
<tr>
<td>Sargan Test</td>
<td>0.93</td>
<td></td>
<td>(39.49)</td>
</tr>
<tr>
<td>Arellano-Bond Test for AR(1)</td>
<td>0.69</td>
<td>(0.39)</td>
<td></td>
</tr>
<tr>
<td>Arellano-Bond Test for AR(2)</td>
<td>0.56</td>
<td>(0.58)</td>
<td></td>
</tr>
</tbody>
</table>

Source: The results of the present study

The results presented in Table 7 indicate that the evaluated model is appropriate in regard with statistical indices. Wald statistic indicates that the whole regression is significant. In other words, the hypothesis that the coefficients of the independent variables of the model can be zero is rejected and the whole regression is significant. Moreover, as Table 7 shows the null hypothesis of Sargan Test (i.e. the instrumental variables are not correlated with wastes) cannot be rejected; therefore, it can be stated that the instrumental variables utilized in this model are appropriate. In addition, the null hypothesis of the serial correlation in which error statements in the first-order differential correlation do not indicate the second-order serial correlation cannot be rejected.

According to the results presented in Table 7, the human development index is positive and statistically significant. These results indicate that increase in human development index has caused economic growth to increase. Nowadays, one of the most outstanding distinctive factors of countries from one another is their trained and expert workforce. Education and scientific, technological, and technical capacity and insight prepare people to conduct empirical studies, inventions, and discoveries, adapt their work abilities to the ever changing environment of technology and capital properties, and get ready for better using machinery, equipment, and advanced technologies. Investment in human resources along with enhancing the expertise of the workforce and its skills can result in qualitative and quantitative improvement and increase in inefficient use of material resources. Expert workforce that is equipped with knowledge and expertise accounts for a large portion of knowledge-oriented production and economy. Educated workforce (human resource) can help quality of the goods to improve and can play the role of the planner and leader. Workforce that has higher education and training can cause technological and dynamic revolution in production cycle, enhance productivity, trade expansion, and higher economic growth.

Moreover, the effect of the government size on economic growth is negative and significant. The reasons for negative effect of the government size include:
- Increase in taxes and higher amounts of the government's debts in supplying the financial expenditure of the bigger government results in reduction of financial resources and the private section's motivation for investment, acceptance of risk and activities with higher productivity.
- Diminishing return in the bigger government leads to inefficient allocation and wastage of a portion of resources in the economy.
- Slower reaction of the public section compared to the private section to compensating the mistakes, adapting to environmental changes, receiving new information, and using innovations also reduce the level of economic growth.

In regard with the effect of supporting the property right that has been used as a proxy for information technology index in accordance with other studies, the results indicate that there is a positive relation between this variable and economic growth. In interpreting the positive effect of information technology, following reasons have been mentioned in the literature.
- Motivation for innovation and as a result creation of an environment where innovation is praised,
- Motivation for discovering methods for production and distribution of the available products with lower costs,
- Motivating the domestic markets through accepting and improving the available products and technologies,
- Motivation for transmitting the technical knowledge,
- Entrepreneurship in basic industries and supportive ones at all economic levels, and
- Realization of advances that helps to enhance the technologies all over the world (Kraemer & Dedrick, 2001).

The effect of KOF globalization index on economic growth is also positive and statistically significant. Globalization can enhance economic growth through the following factors:
- Quicker absorption of advanced technology from the developed countries,
- Increase in benefits attained from research and development programs,
- Attainment of larger-scope economies, and
- Quicker supply of new goods and services.

Conclusion and suggestions:
- According to the conducted studies on globalization and its positive significant role in economic dimensions like economic growth and development and employment creation, the present study was aimed at examining the relation between globalization and economic growth in some selected developing countries during 1995-2010 using GMM method. Therefore, first the target variables and the data collection resources have been discussed and then regarding the 12-year period of time and presence of different periods, combined data method has been selected to respond to the study questions and analyze the model. In general, the results indicate that KOF globalization index has a positive effect on economic growth. In other words, developing the international trade through increasing foreign investment, improving the workforce's knowledge, developing productivity can play an important role in enhancing the total productivity and reaching higher economic growth.
- Since KOF globalization index is composed of economic, political, and social dimensions, it is recommended future studies focus on the effect of each of these dimensions on economic growth.

REFERENCES

[22] Central Intelligence Agency (various years), World Factbook, https://www.cia.gov/library/