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STUDY THE FOREIGN TRADE EFFECTS ON ECONOMIC DEVELOPMENT IN SOME DEVELOPING COUNTRIES INCLUDING IRAN AND TURKEY

NAYIER MADADKHAH AZARI

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Submitted by **Nayier MADADKHAH AZARI**

Approval of the Graduate School of Social Sciences, Çankaya University

Prof. Dr. Mehmet YAZICI
Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Science.

Prof. Dr. Mahir NAKİP
Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

Prof. Dr. Mahir NAKİP
Supervisor

Examination Date : 03.02.2016

Examining Committee Members:

Prof. Dr. Mahir NAKİP	(Çankaya Univ.)	
Prof. Dr. Cengiz YILMAZ	(ODTÜ Univ.)	
Doc. Dr. Dilek TEMIZ DINC	(Çankaya Univ.)	

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Name, Last Name : Nayier MADADKHAH AZARI

Signature :

Date : 25.11.2016

ÖZET

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Bu araştırma ekonomisi büyüme sürecinde dış ticaret, fiziksel ve beşeri sermaye ve enerji tüketimi değişkenlere ilişkin endekslerin etkisini araştırmak için çalışır. Yani, 1990-2011 döneminde yedi seçilmiş gelişmekte olan ülkeler sıradan en küçük kareler (EKK) yaklaşımı ile panel eşbütünleşme tekniği çerçevesinde incelenmiştir. yapılan değerlendirme ile elde edilen sonuçlar verilen süre içinde çalışılan endeksleri tüm ekonomi büyüme sürecine olumlu ve anlamlı bir etkiye sahip olduğunu göstermektedir.

Anahtar Kelimeler: Dış ticaret, ekonomik kalkınma, panel eşbütünleşme yöntemi

ABSTRACT

THE AGONY OF THESIS WRITING: FOREING TRADE

MADADKHAH AZARI, Nayier
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This research attempts to study the effect of the indices related to the variables of foreign trade, physical and human capital and energy consumption on the process of economy growth. So, seven selected developing countries during 1990-2011 were studied in the frame of the panel cointegration technique with the approach of the ordinary least square (OLS). The results obtained by the conducted evaluation shows that all of the studied indices during the given time have positive and meaningful effect on the process of the economy growth.

Keywords: Foreign trade, economic development, panel cointegration method

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1. THE RESEARCH OVERVIEW

1.1. Introduction

In order to get development, a lot of scientifically and political trying have been made. Theorists have attempted to provide a theory and pattern to explain the reasons and factors of development, in a way that they explain the current facts well and help those countries, which want development to be in correct direction to it (Naderi, 2005). Foreign trading is a lot of important which has been one of the controversial issue in economy. Most of economists consider foreign trading as the progress and development engine of economy, as the procedure of some countries of the world has become significant due to petroleum, which has caused them to join the world trading organization (Saderski, 2011, 740).

Most of economies have experienced significant progress in economic trading, energy consuming and producing for the last 30 years. However, less information exists about the relationship between economic trading and development. The main question of this research is that if foreign trading has any effect on economic development process. This research attempts to study the variants of foreign trading, humanity resource, physical resource and energy consuming as effective factors on the economic development process in seven[1] selected developing countries during 1990 to 2011.

1.2. Statement of Problem

Economic development is a process whose focus is on the gross domestic product (GDP) growth. The development planning aimed to equip national source and opportunities in order to produce more the required productions and services. However, the attempt to produce more and better. As well as the improvements carried out in organizing the production factors, should utilize all of the resources including natural, human and physical ones (Paytahkti Oskoui, et al, 2011).

Over the years, the factor of economic growth change and analysis of changes factors among the countries and in different times and regions has been one of the essential and interesting topics of economic development. In this regard, significant improvements have been obtained in both theories and the patterns of applied econometric especially since 1980, so that some expects refer the main developments in macroeconomics field to the developments of economic growth theories (Hassan

[1] Iran, Algeria, Egypt, Jordan, Morocco, Tunisia and Turkey.

Zadeh & Heidari, 2001).One of the effective policies on economic growth is trade policy. The trading issue and its relation to economic development is very important discussion, which has been studied and analyzed through various aspects: International trade means the goods and services redeployment through the country's borders, which analyses the commercial exchanges including exporting and importing and the conditions in which these redeployments are done.

Trading causes the economic growth increase by optimizing the resources allocation, availability of suitable intermediate technology and productions, using the advantages resulted by production scale, internal competition increase, using internal and external advantages and providing a suitable environment for inventions (Sadorsky, 2012).

Therefore, the question to which this paper is going to answer is that How the world trade effects on the economic development. To study this relation, the last econometric methods was used and in order to estimate the quantitative effects, some developing countries (including Iran and Turkey) were analyzed. Therefore, by using the Panel co-integration technique this relation was estimated and analyzed.

1.3.Special Necessity of the Research Conducting

The economic growth and development is one of the important macroeconomic indicators of each country, because in order to improve the individual's life level the economic and social indices should be optimized and this significant objective won't be obtained unless the given country economic grows and develops. In order to research the growth and development many factors can be considered. In order to manage a comprehensive and complete planning about the development of each country, it is needed to consider all the given factors to ensure the movement across the long- term and balanced growth and development. There are different solutions in order to achieve the given goals in this field. In order to select one, all of them should be analyzed well regarding their strengths and weaknesses, the required field and each country economic abilities in applying those policies, choose a policy that has the highest coordination with the community conditions. This study attempts to analyze the foreign trade effect as one of the important effective factors on the economic development in the panel co-integration technique model by using selected information from developing countries considering Iran and Turkey. The results obtained by this research can provide obvious perspectives to economic policy makers in order to improve economic policies.

1.4. Research Objectives

This estimate includes four targets, which will be examined in one main goal and three Subsidiary goals:

1.4.1. Scientific Objectives

-To determine the international trade effect on the economic development.

-To determine the physical resource effect on economic development.

-To determine the human resource effect on economic development.

-To determine the energy consumption effect on economic development.

1.4.2. Practical Objectives

The different institutes and organization including ministry of commerce, custom, the country politicians and planners, economic researchers etc., who are involved in the current research objectives, can apply the objectives of this research collection.

1.5. Research Hypothesis

This research has four hypothesizes, can be followed as:

H_1: Foreign trade has an effect on economic development

H_2: Physical resources have an effect on economic development

H_3: Human resources have an effect on economic development

H_4: Energy consumption has an effect on economic development

1.6. Methods

Practicality this study is a kind of practical research and methodologically is causal - analytical one. Therefore, by using the theoretical foundations, a suitable model is introduced and analyzed by the panel co-integration technique. Long- term economic relations which is measured and analyzed in this kind of analysis and the main idea in this co-integration analysis is that, although most of economic time series (including random procedure) are non-stationary but these variables' linear combination may be stationary (without random procedure) in long- term, are the most important advantages of the panel co-integration technique.

1.7. Data Collection Method

In order to conduct this research, library studies is used as a way of data collecting. Data collecting tools includes questionnaire, interview, observation, testing, evaluation, table, sampling laboratory equipment, databases, computer networks, and satellite.

In order to collect data here statistical tables and databases as WDI[2] and internet sites are used.

1.8.Data Analysis Method

In order to analyze the obtained data and estimate the model, panel co-integration method and E-views software are used.

1.9.Statistical Population and Samples:

The analyzed statistical population in this work is made of all developing countries. The studied samples are a selection of developing countries, which the required data for the model variable of those countries are available.

1.10. Conceptual and Pragmatically Definitions of the Words

Economic development: In this research, the economic development is evaluated with the variant of gross domestic production which refers to the total currency value of final products produced by economic units located in a country during certain periods (annual or seasonal). In this definition, the final products mean those products and services, which are at the end of production chain, and they are not bought to produce or other services and are made available to be used inside or to be exported outside the country (central bank, 2014 and the statistic Centre of Iran, 2014).

Trading: International foreign trading refers to transaction of products between the borders of the countries. Exporting, importing and the situation in which these exchanging are taken place are just analyzed (Iman pour Namin, 2008, 24).

Exporting: It refers to the sale, barter transaction or presenting the products or services by the resident units to non- resident units (Iran statistics Centre, 2014)

Importing: It refers to barter transaction, purchase or presenting products and services by non- resident units to resident ones (Iran statistics Centre 2014).

Energy: It is rooted in Greece word of ἐνεργός meaning activity or energy, and it is a basic quantity of physics in science. Energy is a quantity, which is used to explain the status of a particle, object or system. In other words, energy is the ability of doing something or the ability of material to do a work. In informal and public dialog, it is used as a source of heat and power without referring to its type, content or quality. According to Mat Plank, energy is the direct effective ability of a system on outside

[2] World Development Indicators

environment (Malcolm, 1982 and Hornby 1989). In this research, the variant of total energy consumption is resulted by non-renewable fuels (combustion of fossil fuels energy as coal, petroleum and its products and natural gas) and renewable (combination of hydropower and nuclear, geothermal and solar energy) (The world bank 2014).

Human capital: It isn't considered as physical or financial resource, but is defined as knowledge, skill, creativity and healing, In fact, people quality features are considered as their capital (Becker, 2002), and in this research, educated and skilled work force is used as the index of human capital.

Physical capital: It is one of the important factor of production, which includes the existing equipment and tools that are used to produce products and services (Iran statistic Centre, 2014), and in this research gross fixed capital has been used as a symbol of this variant.

1.11. The Research Variables

In this research, the effect of foreign trading, physicals capital, human capital and energy consumption on the procedure of economic development has been analyzed by using the technique of econometric with the approach of panel data and co-integration with ordinary least squares (OLS). The given model inspired by sadorsky's article (2012) is defined as the flowing:

$$LnED_{it} = \alpha_0 + \alpha_1 LnO_{it} + \alpha_2 LnK_{it} + \alpha_3 LnL_{it} + \alpha_4 LnE_{it} + \varepsilon_{it}$$

- **ED**: is an indicator of the economic development index, which is evaluated by GDP (gross domestic product).
- **O**: is an indicator of the foreign trade index, which is included in the model as the total exporting and importing.
- **K** is an indicator of physical resources, which is included in the model as the matrix of gross fixed capital formation.
- **L**: is an indicator of human resources index, which is included in the model as the matrix of educated and skilled workforce.
- **E:** It is an indicator of energy consumption which enters the model in the frame of total energy consumption that is resulted by unrenewable fuels (combination of fossil fuels energy as coal, petroleum and its products and natural gas) and

renewable ones (combination of hydropower and unclear, geothermal and solar energy).

- **Ln:** Is an indicator of the natural logarithm.
- ε: is an indicator of random error.

2. THE THEORETICAL FOUNDATION AND BACKGROUND OF THE RESEARCH

2.1. Economic Growth

2.1.1. Definition of Economic Growth

This research evaluates economic growth against the variant of gross domestic product (GDP). GDP is the total monetary value of final goods produced by the economic units located in a country during a certain time (annually or seasonal). In this definition, the final products mean those goods or services, which have put in the final of production cycle and are not purchased to produce or other services but have been made available to be used inside the country or exported outside (Central Bank, 2014 and statistical center of Iran, 2014).

There can be factors that are more effective on economic development. First, we will take a brief glance on the given factors, but four important and essential variants of foreign trade, human capital, physical capital and energy consumption will be more focused on.

2.1.2. Review the Theories of Economic Development and Growth

The patterns of neoclassic development and growth was a step upward in comparing to Harvard and Domars Keynesian model. The given patterns provided the possibility of developing the previous pattern by contributing the factors price and replacing the production factors.

In 1950, Solow developed a model that has been a standard tool of studying the economic growth. In this model, the rate of economic growth is dependent on the growth speed of production factors (labor and capital). The current growth may be a result of input rate increase of one or both factors.

Exogenous nature of growth factors in the frame of Neoclassic growth don't let economic policy affect the equilibrium rate of long – term economic growth against the short – term transfer between the so – called fix status. However, Romer (1986) and Lucas (1988) introduced the third group of growth models and the model inside parameters endogenously identified the growth rate.

The endogenous growth models have developed in different directions, for example they have accepted the external effect of investment (Spillover effect) so that the

national capital resources will have increasing revenue while it is the same at the level of business.

Although new theories of development believe in endogenous nature of technological sustainable growth. their explanation of income differences is similar to previous theories, for example in Romer's model (1990) a country which allocates more resources to inventions is considered more developed than other country, but why enough and property technology are invested in producing innovation is a question which the models are unable to answer.

The endogenous models of growth and following such questions caused interests in institutional arrangements and economic policy as the political factors affecting the economic growth, which resulted in new economic- political literature of growth that has developed from the combination of new theory of " endogenous growth " and "macro political economy" .

These two research areas are new in a way that in the literature of growth, the new point of effort in studying the economic growth is considered as a endogenous variable which is beyond the population and technological growth based on several factors .

The literature of macro political economy introduces determinant endogenous factors, which affect the selection of policy type and are beyond the standard models domain of macro economy.

The economists believe the policy selection as an exogenous variable or as a selection by a social programmer.

The novelty of macro political economy approach is the emphasis on the political process and conflicts between the individuals as the determinants of policy selection.

The new literature of political economy stared in the late of 1980_s based on the new institutional economics theories and reached its top point in the late of 1990_s after observing the results of structural adjustment programs rooted in neoclassical domain.

The political factors as political instability, the quality of government , income distribution and political organization , which have been considered before , now play as main factors in identifying the difference between the performance of the countries' economy (North , 1990).

Today, the difference in the nature and performance of political and legal institutions is one of the reasons of difference at the level of the countries' development.

The political and legal institutions based on their compatibility with the growth process effect on the procedure of production accumulation factors also on the efficiency rate of all factors and finally on the national production process and so economic growth.

These institutes can appear as a promoting factor in economic growth by shaping the incentive structure and providing a suitable field for productive activities or they can play a preventive role in investment risk increase and exchanging expenses growth (North , 1990).

2.1.3. Effective Factors on Economic Development

The effective factors on economic development are introduced in the frame of quantitative and qualitative factors:

2.1.3.1. The Effective Quantitative Factors on Economic Development:

Workforce: A community with more population potentially has more workforce, and it will experience such a production level that gets more growth and development of population is properly planned.

Capital: Increasing capital rate even without increasing work force finally increasing production rate.

Social overhead capital: social overhead capital includes transportation systems, water and sewage, energy, communication and education. Through these facilities, the government wants to increase the productivity of the society existing capital to provide more suitable condition for economic development.

Energy resources: Energy resources are introduced into production cycle after mines and natural resources discovering through which increase development rate.

Land reclamation: land reclamation is a factor to increase economic development rate, because the more lands cleaning is done, the more arable lands are available which results in more and useful agricultural productions rate (Rahimi Broujerdi, 1995).

2.1.3.2. The Effective Qualitative Factors on Economic Development

- **Technology Changes**

Technology provides necessary knowledge and techniques to produce optimum products and services and facilitates economic development.

- **Savings Resulted by the Scale**

This factor is obtained by those investments, which cause production rate increase.

- **Human Capital**

Human capital is one of the most important production factors, which causes production and services rate by providing required training related to working methods.

- **Government Intervention**

The development and growth of developed countries is more related to the governments' intervention and leadership. Today, economists regardless their school of thought focus on the governments' intervention in achieving the economic development. In general, the governments as an effective and important factor can effect on the economic development process by applying different social and economic policies.

- **Redistribution of Income Policy among the Low- income Classes of Society**

This policy first results in increasing these peoples' income, so it causes effective demand increase in society. Income redistribution causes workforce optimizing quality and increased productivity and causes increased effective demand by income increasing.

- **Encouraging Policies on Saving and Investment**
- The more investment is increased, the more resources are provided for producers to produce.
- **Research and Development Policy**

This policy is of great importance for industrial countries whose economic development is remarkably due to the given policy.

- **Policies to Remove Barriers of Activities in the Private Sector**

This policy invites the government to intromit and attend in the market to optimize its conditions and prevent monopolies.

- **Social Services and Infrastructures Development**

One of the government's important responsibilities is to increase social services and infrastructure's development such as education, public health etc.

- **Monetary, Financial Policies and Budget Reduction**

By this policy, the government can accelerate or recede the economic development, which its main purpose is to stabilize the prices, fair distribution of incomes and employment (Rahimi Broujerdi, 1995).

2.2. Foreign Trade and Economic Development

2.2.1. Review of Foreign Trade Policies

Business is defined in term of exporting and importing, but export plays a great role in the societies, economic development and its effects are wider and deeper than imports. So, there are two general approaches based on determinant factors on exporting:

1-Based on production factors

2- Based on technology

- **Production Factors Based:** It is an approach, which the relative advantages of firms are identified by the initial production factors. In this way, the relative advantages by existing natural monopolies are based on initial production factors, frequency and technology stability.
- **Technology Based:** It is an approach with relative advantages based on the firms' quality products and primary services. In the approach, the exports performance on the firms, investment in applying new technology causes new development (Mobarak, 2010: 40)

Trade has passed a history full of ups and downs. It can be said that the origin of today's scientific and planned economics dates back to the printing of wealth of Nations written by Adam Smith in 1776. However, the articles and works related to the trade in the countries as England, Spain, France, Portugal and Netherland dates back before that time when these countries began movement toward new economy (Salvatore, 2013).

In this regard, Mercantilism theory can be referred to. After the trades' peoples view, it was the classics view that was proposed in which Adam Smith and David Ricardo provided their theories about relative and absolute advantages. In 1936, Haberler introduced the theory of opportunity cost. Heksher and Ohlin's theory was dominant in economic circles during 1930-1950. Between 1960-1970 Linder's theories of comparative advantage, Balasas revealed comparative advantage and Vernon's cycle theory were proposed for the first time. In 1980 s, theory of technology gap and Heksher and Ohlin's' theory and finally in 1990s the theory of comparative advantage emerged out (Badri, 2012: 16).

2.2.2. The Importance of Foreign Trade in the Process of Economic Development

Most of economists believe that trade is the core of development and progress in the present world. They claim that international trade produces the possibility of utilizing the economic potential capabilities regarding the existing relative advantages and introduces clear signs for investing in competitive economic planning across the world. In addition, traditional trade affects the economic development rate by having access to foreign markets, technology and resources.

In experimental studies, it has been reasoned that transmitting technology internationally depends on commercial action. If more sections of economy are exposed to international competition, utilizing superior technology and adopting it in order to keep competitive power will become more.

Foreign trade causes changing resources' allocation from the sectors and industry with low efficiency to the industry with higher efficiency and directs the resources to those activities, which have high efficiency. By increasing foreign trade, commercial and economic organizations are encouraged to discover new trends in economic management and technology improvement and new methods in production. Therefore, those opportunities, which were ignored in the past, are changed to main resources in economic development and growth. Moreover, foreign trade improvement provides various reserve resources with lower expenses for domestic businesspersons, which enable them to produce final products that have more competitive capabilities in internal markets and even in the international markets. These aspects of international trade are considered as efficiency optimizing, production, and progress factors, which lead to economic development process (Lopez, 2003).

2.2.3. Trade Liberalization

Trade liberalization means decrease of trade limitations and business tariffs, which cause the trade limitation to be lowered and the foreign trade volume to be increased. In other words, the foreign trade means the increase of the countries' exports and imports, which bring about them high benefits in the process of economic growth.

Trade liberalization advocates a fact that the countries can speed up their economic growth.

The current belief in the field of trade policy is that developing trade causes economy movement toward high boom and growth, so trade liberalizing is a movement toward economic growth. It includes all of the factors that finally direct the market to an open market. These factors are the decrease of tariff and non – tariff barriers against the trade and improvement of the trade policies in order to facilitate the trading between the countries.

In general, the liberalized trade is the free flow of products and services in the international exchanges, which the government neither encourages nor becomes limited.

It is said that as far as a country lacks more trade limitations, its trade regime possesses more freedom and as far as the government supports domestic industries against the foreign products, the trade regime will possess less freedom or its economy is extremely limited.

The different countries of the world are attempting to increase their national economic ability and try to improve their foreign trade volume in order to exploit its dynamic and stable benefits. One way that the countries follow in respect to increase their foreign trade is focusing on the trade liberalization which is evaluated with the parameter of economic freedom degree.

Trade liberalization is of those effective parameters, which can be influential in foreign trade development. On the other hand, due to the current global economic conditions, these parameters can be considered as evaluation criteria of national economics ability.

The more the countries' exchanges volume increases, the more relationship and dependency between them increases, the economic integration will be easier and of course, this dependency and globalization will increase the rate of vulnerability from the crisis (Lopez, 2003).

2.2.4. Export and Economic Development

The idea that export improvement leads to economic development has been discussed in the literature of economic development for a long time.

The literature of export- led growth is a section of wide literature, which attempts to talk about the kind of trade regime and orientation of extrovert trade. This literature is originated in the 19th century. In the studying about export-led growth the kind of trade

orientation is evaluated by export action. According to neoclassic economists, the export- led growth can lead to economic development and growth. In this case, southeastern countries of Asia especially Hong Kong, Singapore, Korea, Taiwan, Malaysia and Thailand are called as successful examples of the given trade approach. During last three decades, these countries have doubled their life standard twice each ten years (Giles, 1999).

China is the last country that joined this group. China's experience during 1980 and 1990s shows that trade liberalization is a mechanism that can result in quick and efficient and optimize internal resources allocation (Findly, 1996). The research about other countries has shown that trade policy should be considered as an essential factor in the economic policies. On the other hand, the effect of export improvement policies on economic growth is an experimental issue. About the accuracy of export- led growth, many reasons have been provided at the viewpoint of economic theories. Firstly, export growth is an indicator of demand increase for the country productions through which can help production improvement. Secondly, export growth can lead to allocation in producing export products. In the next phases, this can lead to the change of resources, allocation method and direct the resources from non- export deficient sector to the export section with high efficiency. This effect after P. G. Word Doren (1949) who proposed it in 1949 has been known as the word Doren rule. Extrovert trade policies can improve access to the developed technology and optimize learning while doing jobs and management which results in more efficiency (Cavel, 1980), Third, export increase can reduce currency limits and facilitates the firms' import which results in production improvement (Mckinaon, 1964). Fourth, the extrovert trade orientation facilitates using foreign capital in order to develop economy without bearing external debt refund and leads to removing those controls, which result in excessive valuation of foreign currency. Fifth, improvement of some certain products based on the country comparative advantage can result economies of scale through which increase economic development. According to the advocates of this theory, internal markets are to realize the optimal scale of small production and production increase is possible by having access to intern markets, and finally export- led growth can be considered as a part of hypothesis of trade and industrial life cycle (Carnwall, 1977). Accordingly, the hypothesis of economic development is considered as a cycle that begins with products export. Raw materials during the time changes the economic growth, knowledge of domestic economy structure (including consumption demand)

and results in domestic industry improvement leads in domestic industry improvement which finally leads to starting industrial products' export using high technology knowledge.

2.2.5. Import and Economic Growth

In the process of development and growth, import and export together can make clear the process of economic growth well. Actually, import is considered as an independent factor in describing development and its performance. Import can help the domestic economic by making competition in both fields of quality (imports rival products) and prices (encourage reducing the costs). Entering and directing of intermediate and financial firms that are not enough accessible inside the country increases the efficient producers' ability to improve their share in the internal and outside markets. It encourages internal economy to produce more various products, also provides more export opportunities, and as a result causes active presence in the field of international trade (Tayyebi and Tavakoli, 2000).

In general, developing countries have common characteristics due to their economic structures among which the kind of production can be referred to that includes mainly agricultural and traditional products. In order to transmit from traditional production phase to industrial one and go underground the economic growth, importing financial, intermediate and industrial products and suitable technology makes social and industrial evolution possible. If the contexts of localizing imported knowledge and technologies have been provided by importing industrial and capital goods, it causes the technology of the commercial side countries to enter into the country so it will result in transmitting management skills and abilities, which will finally affect the economic growth (Husseini Nasab and et al, 2007).

Developing countries in the transmitting phases of economic growth will need to establish economic infrastructure on which industrial and capital goods importing have more significant effect. As the developing countries lack production resources and factors due to natural or technical reasons, they can remove production barriers by importing them and the production efficiencies will be increased. It is clear that in this type of economic evolution, there is inseparable relation between production pattern, export and import. In summary, the main purpose of importing industrial and capital goods into developing countries is to make a strong posterior and anterior relationship in the process of production (Farjadi and Lali, 1997).

2.3. Physical Capital (Gross Fixed Capital Formation) and Economic Growth

Physical capital is one of the most important factors of production, which includes equipment and tools inventory that are used to produce products and services (Iran Statistics center, 2014), and in this research fixed capital formation has been used as a symbol of this variant.

In the process of economic development and growth, the factor of physical investment is of essential importance. Actually, physical investment should be considered as the necessary condition of production. The economists know the capital as driving force and engine of economic development and growth have planned all of the given patterns based on this hypothesis. According to most of the scholars, there is absolute and unavoidable relation between growth and investment rate, which achieving the first one is impossible without applying another one. Using optimum of production resources, which is an accepted and unanimously agreed approach, can be available by investment, which emphasizes on investment in the economic development and growth. Increasing the society productive forces which results in production improvement, economic growth, complete employment and especially promotion of income rate is not accessible without domestic and foreign investment and applying capital in different economical activities.

Investment improvement causes useless capital absorption and directs them to productive economic sectors and optimized allocation, finally leads to the macro indices improvement of economic growth. Moreover, investment is related to many various factors, which effects on its quantity and quality and forms it free procedure. The main factor should be considered as the purposes of physical investment to get benefit. In fact, the investor never invests without being assure of profitability and being aware of the costs and possible return of that investment. In this process being aware of excess consumption, demand condition, financial security, final prices, required human resources and profit and inflation rate are those factors, which are noticed by the investor (Azizi, 2011).

2.4. Human Capital (Educated and Skilled Work force) and Economic Growth

2.4.1. The Economist' View

Regarding the rate of the industrial developed countries' economic growth, human capital has an important role and it is claimed that its development has caused a great role in the given countries' economic growth.

The human capital is actually a complementary of physical capital and causes the physical capital to be properly exploited.

The experience of the developed countries and studies about their economic growth fields during the times have shown that their economic growth rate cannot be explained only by the given factors as the capital and work force. The human capital should be included as a main variable into the growth models.

The economic growth is not only dependent on the size of work force but also dependent on their efficiency.

As the work force are more educated, their activity and involvement rate will be also more, and the more work force exploits the useful education, the more work force will be able to produce.

Most economists believe that the lack of investment in human capitals is actually the main factor of the economical low growth in the developing countries. if these countries' education system does not upgrade the use of science and the professional skills level, the work force's efficiency and output will be remained at lower level which will result in low economic growth and high expenses.

In fact, it can be said that the physical resources will be more productive if only the countries possess enough human capital.

Actually, the increase of people knowledge and skills is the requisite condition to remove the economic backwardness and untouched capacities to create incentives for progress.

Van Tannin, in his works in 1875, confirmed this point that the communities' enjoyment of highly education level means possessing more capital. He believes that investment in education is reflected in each country's more production.

Marshall in his book "the principles of Economics" refers to education as a national investment and says that the most valuable resource is the one that is used to educate the people. In addition, he believes that everyone needs general training in this world even if he/she does not exploit it directly, because it makes him / her more intellectual and makes him / her ready to do daily works well. Therefore, education is an important way in wealth generation.

According to Marshal, education is of vital importance for managing the industries, because the managers should have access to great talent pool and educate them well.

He refers to other important factors in education as identification of individual genius, creating the power of providence, actualization of a nation's talent and the parents' tendency to their childrens' progress.

According to Milton Friedman, a democratic society can't be emerged without the least education and the values which are respected by the individuals.

He also refers to other important factors in education as family planning, the unity of the nation and creating skills among the people.

George Sakaroplosi focuses on the importance of education in the economic growth in his books and articles. At the point of his view, education has been widely accepted as an important tool in upgrading the level of social and economic growth. He explains that the human capital and the quality of human factors in production is created and developed by investing in education. During a lecture in 1972 in Tehran at the research and educational and scientific planning institute, he said, "Due to high rate of illiteracy, primary education should be developed especially at villages and secondary education shouldn't be supported because of high rate of its graduate unemployment. In addition, the technical and professional education should be improved in Iran due to lack of enough qualified technicians". He also said that the range of different courses graduates isn't matched with the countries' needs.

Theodore Schultz has conducted various studies about the human capital since 1950, which is referred to his ideas about the role of education in the economic growth in the following. He believes that the main reason of economic growth is increase of human investments. He refers to the balance between the human and physical capital, as the prerequisite condition for the economic growth. According to him, education causes the production output increase, high national efficiency, skills and income (Schultz, 1997).

Kindly Berger has provided some discussions about the importance of the human capital in his book "work".

While offering some development ways, he states how to meet the educational requirements and refers to negative results of education. He believes that the

constituent elements of human capital are establishing public health, schools and providing education and information centers in the labor market. He believes that in most of the given items, the discrimination between consumption aspects and investment and between public interests and special interests of investment is very difficult. Obtaining education output as a base for evaluating the investment and discriminating it from the consumption does not solve the problem.

One way to determine the educational needs is considering the countries' demands to different jobs and identifying the educational conditions of these jobs. Of course, identifying the education policy of the country based on such evaluation is not very precise and accurate, but it has been accepted in general that more education is better. The necessary expenses to supply the other elements of development is higher and there are risks in developing education. Appearing high expectations among the groups of the developing countries' people without meeting them is one of these risks. In most cases, the graduates, moving abroad waste the countries' investment on them (Kindle Berger. 1983).

According to Simon Kuznets, human capital has an important role in the economic growth. He says that study the economic growth in long-term in different societies is not possible; unless the conception of capital and capital formation is considered so vast and comprehensive that includes investment in hygiene and education. Kuznets believes that education can improve the efficiency of the complicated system of economical production. At point of his view, the main capital of an industrial developed country is not its industrial tools and devices, but is the knowledge supply, which is created by conducted experiments and scientific discoveries and also is the country's individuals' capacity and skill to apply the obtained knowledge (Kuznets, 1995).

Arthur Lewis studied the relation between education and economic growth and concluded that poor countries can't invest in education as much as the rich ones, so they have to consider priorities in some areas. He refers to the difference between the developing countries and developed ones regarding their emphasis on education. He believes that lack of compatibility between the graduates' skills and qualification with the society needs, difference of the teachers' income in these two groups of countries,

the graduates' unemployment in developing countries and their movement abroad are the distinguishing features of these two groups of the countries.

Tien Berger believes that the first person who used the term of human capital was Jacob Myncer. Myncer emphasizes on the importance of education during the work and its efficiency with special jobs and believes that some newcomers into the labor market are searching high payment jobs, while some others are interested in relatively low-paid jobs that offer education and although they pay less wages but it increases over the years. Jacob Myncer explains the diversity of earning distribution by using the model of Earning Function regarding the personal educational differences. He offers the model as a semi – logarithmic regression where the individual's income is the dependent variable that appears as a natural logarithm and the independent variables are the schooling years, the personal experience years and the square of the personal experience years. In this model, the variable coefficient of the schooling years is an indicator of the average rate of return during the education years.

The given function can be expressed as the following:

$$LnY = B_0 + B_1 s + B_2 x + B_3 x^2 + u_1$$

Where Y is the individuals' received knowledge, s in the schooling years and x is the personal experience.

It's expected that B_1 and B_2 become positive and negative respectively. B_1 indicates the rate of educational output. Later, this function became more applicable and changed to be the base evaluation of income difference between the rural and urban women and men and a base for regional studies of different societies. It has also been used as an evaluation way of educational investment output rate (Mincer, 1958).

Gary Becker, the Nobel laureate in 1992, conducted studies about the effect of investment in the technical and professional education on the distribution level of the individuals' income over their life. He knows skills training as a form of investment, which causes more income for both themselves and the society (Danial, c, 1971).

Paul Romer (1983) believes that the production factors should be divided to physical and human capital, simple work force, ideas and knowledge. He has measured the human capital based on the schooling years, and the knowledge based on the number of registered inventions in a country and concluded that the production functions has

increasing output considering these factors especially knowledge . His analysis means that the level of human capital as education and scientific talent is correlated with per capital income rate and a share of product, which is related to physical capital.

Singer believes that the main problem of economic growth isn't creating wealth anymore, but is making opportunities that create wealth and these opportunities are hidden in human mental power. (Romer, 1986)

2.4.2. The Educated and Skilled Workforce and Economic Growth

Human capital is considered neither physical nor financial capital, but is defined as the individual's knowledge, skill, creativity and healthy. In fact, the peoples' quality characteristics are considered their capital (Becker, 2002), and in this research the occupying work force is used as the index of human capital. In economic theory and in the discussion of work force as one of the production factors what is usually noticed, like to other production factors, is the quantity of work force. Of course, sometimes by dividing the work force into skilled and unskilled ones its quality aspect is taken into account although to a limited extend.

In the discussion about economic growth and workforce as one of the economic growth factors, the main topic is about the workforce quality rather its quantity. The workforce quality is such an important factor that according to some economists as Kuznets the difference between the levels of the countries' economic growth can be justified due to difference between the qualities of workforce.

Kuznets believes that the main capital of a developed country isn't its industrial tools, but it is the workforces' technical and skill capacity. In order to confirm Kuznets idea the case of Germany and Japan a few the Second World War is usually introduced as an example, because both physical capital was destroyed during the war but a remarkable body of workforce was left. Therefore, these two countries could retrieve their economy into its suitable states a few less than two decades.

Surely although the workforces' technical skill is one of the desired workforce characteristics, the purpose of workforce quality is not only technical knowledge, but it includes some conceptions as being interested in the produced products, having cooperation spirits, having a tendency to saving, being organized and active in joying jobs and being encouraged in getting high income. In other words, the proper workforce has a collection of aforementioned characteristics. So according to the

given points the only straits of developing countries in the field of workforce isn't the shortage of specialized people (Vaziri, 1978).

2.5. The Index of Energy Sector (Energy Consumption) and Economic Growth

2.5.1. The Conceptions and Terms Related to Energy

Energy: It comes from the Greek word of ἐνεργός, which means activity, and it is a fundamental quantity of physics and other sciences.

Energy is a quantity is used to describe the status of a particle, object, a job or the ability of materials to do a job.

People use it as a source of heat or power without referring to its quality or nature.

According to Max Planc, energy is the ability of a system to affect its external environment.

Energy Carriers: Energy are the materials, which save the energy.

They may change several times to get their final shape as an energy carrier to be used as oil, gas, wood, wind and etc.

Waste of Energy: It refers to the different useful energy obtained from the final energy.

Energy Processing: It is an operation, which causes the energy carriers to change to other types of energy carriers under the effect of physical or chemical changes.

Energy Intensity: This index is one of the common macro criteria to evaluate the energy consumption efficiently at the national economic level of each country. It is calculated by dividing the final energy consumption (or the primary energy supply) to the Gross domestic product (GDP) and indicates that how much energy is used to produce a certain amount of products and services (in terms of currency).

Energy Efficiency: The index of energy efficiency measures the rate of products and productive services' output in comparing to the input.

By using this index, the general purposes and policies of demand and the energy efficiency also the relation between energy demand and the economic growth can be analyzed.

The improvement of the energy efficiency index can be obtained by decreasing the energy input needed to produce a certain amount of energy services or by increasing the rate or quality of economic output activities.

This index is obtained by dividing the products value to the consumption energy rate (Malcolm, 1982 and Hornby, 1989).

Energy Coefficient: To study the relation between the energy consumption and production, the index of energy coefficient can be used.

The energy coefficient is obtained by dividing the final energy consumption growth value to the GDP.

Due to the use of growth rate in energy coefficient, the problem of changing to the same unit in comparison does not exist in this index as in the comparison between the currency value and energy intensity.

Energy Savings: The methods that the energy producers and consumers use in order to limit the energy losses can be divided to three ones:

1. Inactive method such as the buildings insulation
2. Active method such as the use of smoke and gazes coming out of the kilns.
3. Structural method such as the install of efficient equipment.

Accurate Management of Energy Resources (Natural Resources Preservation): This is a more general and comprehensive conception than energy saving and includes all of the policies that result in logical using, producing and distribution of the energy.

The Equivalent of Petroleum Barrels: This is the general unit of energy measurement and based in the energy carriers is equivalent with o.1367 raw materials for petroleum products, 164.2 square meter for natural gas and 0.194 KW per year for electricity (Malcolm. 1982 and Hornby, 1989).

2.5.2. Energy Consumption and Economic Development

Planning for economic growth is conducted to equip the national resources in order to produce more services and products. But trying to produce more and better should be together with exploiting all of resources including human resources, physical capital

and natural resources as well as applying some improvements in organizing productive factors. In other words, when the economic growth rate is remarkably increased, an increasing pressure is posed on the resources. In this regard, demanding for expert workforce, capital, capital equipment, raw material use and energy is increased. As the possibility of utilizing more than the given resource wasn't provided alongside with production growth, the production will encounter with impasses (Shakibai and Ahmadlou, 2011, 181). Therefore, the relation between economic growth and different energy consumption has attracted the addiction of many economic analysts. The relation between economic and energy has been stated in several ways, each of which indicates the theoretical context and analytical field of that approach (Stern, 2004).

In the growth theories, energy has been introduced as one of the important production factors in the discussions of macro economy. It has been considered to have a special place in the economic growth as the consequent of all economic activate of one society, so the production is obedient to work, capital, energy and raw materials, in other words we have:

Q=f (k, L, E)

Where Q is product, k refers to capital, L indicates workforce and E is energy. E can be supplied by some factors as oil, gas, power, coal and etc, which are known as energy carriers. So there elements of capital, work and energy causes changes in the level of production. It is also assumed that there is direct relation between the given elements and production level, i.e., each of the elements' increase causes production growth. In mathematical expression, we will have:

$$\frac{\partial Q}{\partial K} > 0, \frac{\partial Q}{\partial L} > 0, \frac{\partial Q}{\partial E} > 0$$

On the other hand, energy consumption, which includes different energy suppliers, is an inverse function of price level of energy carriers. In other words, the energy price level increase causes energy consumption decrease, which results in production reduction (Nahidi and kiavar, 2010, 42).

In the field of microeconomics, the real mechanism of changing energy consumption to economic growth or vice versa can be searched in the point of use and it is usually is related to a collection of factors which analyze the consumption behavior. These factors are income, relative prices and economical- social changes.

However, in macro level, when there is a widespread international energy triode or economic rent obtained by energy production, can have major effect on the countries

in come. If energy production can provide significant tax income for the countries, huge income will be available for the governments or high expenses, which should be paid to import energy, are appeared as trade surplus and will have clear effects on the national economics in the macro level whose one obvious example is oil. In the national level, regarding higher prices of imported energy materials, energy-importing countries have to adapt to a new level of payments balance and exporting countries will encounter exported income surplus. It means that only high-income countries are able to consume more energy.

From a macro perspective, analyzing demand and energy consumption needs constant relationships between macro variants and energy economic growth. However, this cannot be true, because the main factors affecting energy demand deeply are economic structures, so the economists use a kind of analyses level, which contains more aspects of microeconomics in their study of economic growth and energy demand (Sina, 2004, 13).

Finally, in order to analyze more the relationship between energy consumption and economic growth some theorist's views are studied in this research.

Historically, the first effective factor on economic growth has been physical capital, in which Schumpeter's ideas can be referred to. According to him, technological inventions and changes (changing tradition to modernity) is the most important process of economy which leads to economic growth (Ebrahimpour, 2008).

Adam Smith (1776) is the first classical economist who introduced human capital as a meaning of capital. But a few after him it was ignored until 1960s when it was used again by some individuals as Bekre (1961-64) and shots (1961-62). In 1980s, it was entered into growth models as an effective factor on economic growth, which among the most outstanding ones Lucass model can be referred to (Mincer, 1981). Finally, in the newest theories of development, energy as one of the important factors in production was entered into the discussions of function, which it can be referred to some ecological economists as Ayras and Nayer. They believe that energy is the main and only factor of production and the factors of work and capital are intermediate one, which need energy to be applied (Daly, 1997).

2.6. The Research Background

2.6.1. The Research Conducted out of the Country

Soderbom and Teal (2003) studied the effect of foreign trade (both import and export) on economic growth in 93 selected countries by using panel data with the least

ordinary squares approach (OLS) during 1970- 2000. The obtained results show that foreign trade has positive and meaningful effect on the given countries economy process.

Herzer and et al (2005) attempted to study the role of foreign trade (export) on the Chinese economic growth by using panel data with OLS during 1960-2001. The results obtained by conducted estimation approve the position and meaningful relationship.

Chen and Gupta (2006) studied the effect of foreign trade (both export and import) on the economic growth process of 20 African countries during 1990-2003. In order to evaluation the effects of variants, panel data technique with OLS, the positive and meaningful relation was proved.

Halicoglu (2012) studied the objective dynamic relation between foreign trade (export) and the economic growth process in Turkey by using time series data during 1968-2008. The results of Granger test showed that in long term there is a causal procedure from export side toward the development index of economy. In addition, in short term there is a causal mutual relationship between export and economic growth.

Sadorsky (2012) studied the role of trade (export and import separately) on the economic growth process on one example of seven Latin American countries by using the panel integration technique with OLS during 1980-2007, that based on the obtained results, it was approved that there is positive and meaningful relation between export and import and economic growth.

Abdullahi (2013) analyzed the effect of foreign trade (both export and import) on the 21 South African country's economic performance during 1981-2009. In this research, Generalized Moments method (GMM) was used and the obtained results showed that there is positive and significant relationship between trade and economic growth index.

2.6.2. The Studies Conducted Inside the Country

Abrishami and et al (2009) attempted to study the effect of foreign trade (both import and export) on the economic growth process in 24 selected developing countries during 1991-2004 based on dynamic panel data and GMM method. The obtained results incited positive relationship between foreign trade and economic growth process.

Emamverd and Sharifi (2010) studied the role of foreign trade (both import and export) on the Iran economic growth process during 1974-2007 based on the Lucass

endogenous growth model (1988) as structural model. In order to avoid false regression, unit root tests were used and the relationship between the variants was analyzed using obtained results by integration method. The results showed a long-term and positive mass relationship between the economic growth index and foreign trade.

Paytakhti and et al (2013) studied the effect of foreign trade (both import and export) on 24 selected developing countries economic growth including Iran during 2002-2011.

In this research, panel data with GMM techniques was used and the obtained results proved a positive and meaningful relationship.

Paytakhti and et al (2012) analyzed the role of foreign trade (export) on the Iran's economic growth process during 1965-2011 by using an econometric technique based on self- explainable method with wide intervals (ARDL). The results showed that exporting in long and short- term has positive affect on the economic growth index.

Sarfaraz Mohammadyar (2013), in his M.A thesis, analyzed the effect of foreign trade (both import and export) on some selected developing and developed countries, economic growth during 1994-2011 by using panel data techniques in the frame of ordinary least squares (OLS) and the obtained results indicated that trade increasing caused the given countries' economic growth index to be remarkably improved.

Golafshan Maleki and et al (2013) studied the role of foreign trade (both import and export) in the process of economic growth. In order to analyze, panel data method with GMM was used and 54 selected developing countries including Iran during 2001-2011 were selected. The obtained results showed that foreign trade has positive and meaningful effect on the given countries' economic growth process.

3. THE METHODOLOGY OF THE RESEARCH

3.1. Econometrics Topics

Any organized activity in standing a problem to get general principles is called research (Beheshti, 2009, 5) the scientific methodology is an instruction whose aim is identify the truth about a topic being searched (Afshin Nia, 1993). In each research, the collected data are used to increase understanding in that field. In practical, in order to conduct research works, there are various ways. The research methods used in a certain topic depends on type of the used information and is different due to the data collecting method. Therefore, the research methods can be separated into experimental and non- experimental methods (De Vaws, 1987:15). In experimental research, datas are collected through experimental conditions. In other words, in this type of research, by experimenter intervention, some changes are made in the individual's characteristics and the effect of the independent variant on the dependent variant is evaluated. In non- experimental methods as library research, observational and survey methods, the researcher doesn't make any changes, but follows those changes which are happened naturally. These steps are as identifying the research topic, sampling, data collecting, data analysis and data interpretation, summarizing data in the theory or scientific topic (Talegani, 2002: 97). The relation between the collected data and the hypothesis, interpretation by the researcher before collecting the data is considered in the phase of analyzing the statistics and data (Zara Nejad and Anvari, 2005:22).

Statistical information used in the econometrics topics are divided to three groups:

- Time series data
- Cross section data
- Panel data

In time series data, the rate of one or more variants for one economic unit is observed during a period of time, but in cross section data, the rate of one or more variants for several economic units during a certain time is collected. Panel data are combination of times series and cross section.

Analysis method of the data combined by times series and cross section is used as a new way in practical analysis in sociological and economic courses. This method has more advocates among behavioral science researchers. In this method, one section or one group of people is analyzed over a certain time. In other words these data have

two dimensions whose one dimension is related to different units in each certain time and the other one is related to time. Because there is no need to more time-series data and statistics and many questions related to the variants' behavior are accurately answered, this method has been noticed by different researchers in most of their studying (Zare Nejad and Anvari, 2005:22-23).

Analysis of panel data is one of the new and practical topics in econometrics. Because it provides a very rich supply of information to increase estimating techniques and theoretical results and makes the researchers able to use Time- series cross- sectional data in analyzing those problems which are impossible to be studied in just sectional area or time- series one (Baltagi, 2005).

Combination of time- series data and cross- sectional data not only provides useful information for estimating econometric models but also can make significant policy implications based on the obtained results.

3.2. The Model of Time Series- Sectional Combined Data (Panel Data)

Panel data is a collection of data based upon which the observations selected randomly by many sectional variants (N) is analyzed over a certain period of time (T). Therefore, there would be two dimensions: time dimension and sections dimension. This T*N of statistical data is called time series cross section data. In other words, if the characteristics of sectional data have been analyzed for two or more years, the formed structure of the observations will be called as the collection of longitudinal data. Because the combined data include both time- series and cross- sectional data aspects, using proper explanatory statistical models, which describe the given variants, are more complicated than the models used in the cross- sectional data or time- series data. In the method of analyzing the combined data, first a certain section (such as a country, region or province) is taken into account. The characteristics of the related variants are analyzed for all N sections during the given period of time T. the equality of the data amount in each section isn't necessary and there can be some variants which are fixed in a section over a period of time being studied (Nerlove, 2000:4).

Using econometric technique with the approach of panel has some advantages, which some important ones are as the following:

Cross- sectional data or time- series ones along do not consider individuals' anisotropy, so they many offer biased estimation. While in Panel, data method by considering individuals' variants this anisotropy is taken into account.

Panel data provide more information, flexibility, less multi co linearity, more degrees of freedom and high efficiency.

By studying repeated cross- sectional views, panel data are useful and better to study the changes dynamically.

Panel data method are more capable in identifying and measuring those effects that aren't easily predicted in sectional or time- series studying and they allow more complicated and developed behavioral models to be explained (Baltagi, 2005: 3-6).

In this method, by considering the variants changes in each section and time together, all available data are used. So that the observations' errors become lower.

Another advantage of using combined data is solving bias problem of estimating sectional equations. The bias of sectional equations are appeared because of ignoring many of the mole explanatory variants and their measurement error. Using this method, due to providing more data, increasing freedom degree. Evaluating the variants during the time, can reduce the equations bias or even remove it (Zara Nejad and Anvari, 2005: 23).

3.3. Unit Root Test in Combined Data

In econometrics, the most currently important topic is studding the methods, which make sure of estimated regression accuracy. As time- series become unsteady, the estimation of coefficients would lead to a false regression.

Therefore, before the model estimation, it is necessary to examine all the variants' steady, because being unsteady of the variants, both about time- series data and panel data, results in false regression problem.

Being steady or unsteady of time- series data can have serious effect on their behavior and characteristics. For example, when a shock is made on a steady time- series, its effects on the given variants will be gradually disappearing. It means that the given shocks effect in time t is less than t-1. On the contrary, unsteady dates received shock effects are limitless so that the effect of a shock in time t for an unsteady time- series isn't less than t-1 (Souri, 2011: 224)

In general, a random process is called stationary (steady) when its variance and mean becomes constant over the time and the rate of covariance between two periods of time desponds only on the distance or interval between them and isn't related to the real computing time of covariance (Gujarati, 2010. 909).

One of the testing, which has been used to study the variants' steady is the Unit root test. This test is based on this logic that when in an autoregressive process of first level, p=1, $y_t=py_{t-1}+u_t$ so that it would have unit root (Gujarati, 2010, 018).

During the last decade, various research have been conducted about the unit root test of panel data ,which can be divided into two generations: The first generation tests include Levin, Lin and chu (LLC), Im, pesaran and Shin (IPS) and the tests of Fisher type including the augmented Dickey- Fuller (ADF) and Philips Peron (pp.) the essentials hypothesis of the given tests is the sectional independence of error components between the units. The tests of second generation reject the hypothesis of sectional independence disturbing sentences. Two major methods are used in these tests:

The covariance Restriction Approach which is remarkably accepted by Chang (2002, 2004), and the Factor structure Approach which has been developed by some economists as Philips and Sul (2003), Moon and Perron (2004), Choi (2002), Pesaran (2003) and some other ones.

The unit root tests of combined data were planned by Quah (1992, 1994) and Breitung (1994). These studying were completed by Levin and Lin (1992, 2003) and Im, pesaran, shin (1997, 2003). Each of the given tests has different stipulation about the Null and Alternative hypotheses. In addition, there are different methods to identify problems as serial correlation and Heterocedasticity (Barbieri, 2009). Each of these tests has its own advantages and disadvantages.

3.3.1. Test of Levin, Lin and Chu (LLC)

Levin and Lin (LL) showed that using unit root test in the combined data has more power than using it for section separately. Wu (1996), Oh (1996), Macdonald (1996) , Francel and Rose (1996) in their research illustrated that applying common unit root tests in the combined data as Dickey- Fuller test, Dickey- Fuller developed test and Phillips-Perron test have less statistical power than the unit root test in combined data. Lin and Levin (1992) illustrated the unit root test as in the following:

(3-1). $\Delta x_{i,t} = p_i x_{i,t} + \delta t + a_1 + \varepsilon_{i,t}$

t=1, 2… t

i=1, 2… N

Where N is the number of the sections and T is the period of time, p_i is auto parameter for each section, δ is the time effect, α_1 is the constant coefficient for each section

and ε_{it} is the model error which has the normal distribution with zero mean and variance δ^2. This test is considered as the following.

Based on the ADF test:

(3-2). $$\Delta x_{i,t} = p_i x_{it-1} + \delta t + a_1 + \sum_{j=1}^{Li} \theta_{ij} \Delta x_{i,t-j} + \varepsilon_{i,t}$$

Where p_i is the auto parameter for each section, L_i is the interval length, δ is the time effect, a_i is the constant coefficient for each section and ε_{it} is the model error, which has the normal distribution with zero mean and variance$\delta^{۲}$. LL test is the combined test of ADF with procedure that has high power in the sections heterogeneity and the terms error variance volatility.

The hypothesis of this test is as the following:

(3-3). $$\begin{cases} H_{\circ} : p_i = \circ \\ H_1 : p_i = p < \circ \end{cases}$$

In these assumptions, when T and N become more, the statistic of the test will approximate toward the normal distribution with zero mean and variance 1.The LL test has several steps. First instead of usual equation, the following one has been used:

$$\Delta X_{i,t} = \rho_i X_{i,t-۱} + \delta_i\, t + \alpha_i + \sum_{j=۱}^{li} \theta_{ij} \Delta X_{i,t-j} + \varepsilon_{i,t}$$

(3-4). In order to carry out the test based upon the LL relation, the following two equations are used to measure the amount:

(3-5). $\Delta X_{i,t} = \sum_{j=1}^{li} \theta_{ij} \Delta X_{i,t-j} + \delta_i\, t + \alpha_i + \varepsilon_{i,t} \Rightarrow \hat{\varepsilon}_{it}$

(3-6). $X_{i,t-۱} = \sum_{j=۱}^{li} \theta_{ij} \Delta X_{i,t-j} + \delta_i\, t + \alpha_i + v_{i,t-۱} \Rightarrow \hat{v}_{i,t-۱}$

The error regression is estimated as the following:

(3-7). $$\hat{\varepsilon}_{it} = p_i \hat{v}_{i,t-1} + \varepsilon_{it}$$

Then the test is carried out based on the given statistics of the test.

In general, by using the statistics and short and long- term coefficients of the variants, the test statistic is evaluated as the following:

(3-8). $$t_{\delta}^{*} = \frac{t_{\delta} - N\tilde{T}\hat{S}_N \hat{\delta}_{\varepsilon}^{-2} SE(\hat{\delta}) \mu_{m\hat{T}}^{*}}{\delta_{m\hat{T}}^{*}} \Rightarrow N(\circ,1)$$

In this relation, SE ($\hat{\delta}$) is the standard deviation, $\hat{\delta}, \hat{\delta}_{\varepsilon}$ is the standard deviation of the long- term normalized equation, $\mu_{M\hat{T}}$ And $\delta_{m\hat{T}}^{*}$ is the mean and the criteria standard

estimated by Lin and Levin by using the interval length and the variants number and $\tilde{T}$is the average number of intervals in each section. The estimated statistic is then compared to the Levin and Lin table of meaningful statistics. If this statistic is smaller than the table statistic, the assumption of being unit root for the given variant shouldn't be rejected (Zara Nejad and Anvari, 2011, 31-39).

3.3.2. The Im, Pesaran and Shins Test (IPS)

The IPS test is one of the steady combined data tests. This test is different from the LL test more due to the considered assumptions. In the H_1 hypothesis of this test, p_i has different value. In other words, the assumptions of this test are as the following:

(3-9). H0: $p_i=0$

i=1, 2… N for all of them

$$H_1 : \begin{cases} P < 0 & i = 1,2,...,N \ for all of them \\ p_i = 0 & i = 1,2,...,N \ \ for all \ of \ \ them \end{cases} (9-3)$$

$0<N_1<N$

Based on these assumptions, some sections can have unit root. So instead of combined data, the unit root test is used separately for each section and then the mean of these statistics are evaluated as$\bar{t}_{NT}$.

If t_{it} (π_i, B_i) indicates the statistic of t for the unit root test of section, i with interval π_i and the coefficient B_i, the standard statistic $\bar{t}_{NT}$ will be defined as the following:

(3-10). $$\bar{t}_{NT} = \frac{1}{N}\sum_{i=1}^{N} t_{it}(\pi_i, B_i)$$

Where If T and N increases toward infinity, the given statistic approximants towards the standard normalized distribution.

In order to make a standard statistic $\bar{t}$, IPS have calculated the values of E (t_{it}+(π_i, B_i)) and Var_{it} (π_i, B_i). When t approximates to infinity, these values will be close to the statistics of Dickey- Fuller test.

Due to the autocorrelation, it has been proposed that in order to remove it, two methods of evaluated variance and asymptotic mean values and using standardized statistic with the mean and variance of t_{it} (π_i, o) under the assumption of $p_i=0$ will be used as following:

3.3.3. Fisher Test

Another method in the unit root test of combined data is using the meaningful level of Dicky- Fuller generalized unit root test. This test is based on Fishers method (1932) which has been later developed by Maddala and Wu (1900), so it is known as MW (Maddala and Wu) test. This test, based upon the usual Dicky- Fuller test, is expressed as the following:

(3-12) $\Delta y_{i,t} = \alpha_i + \rho_i y_{i,t-1} + \sum_{z=1}^{\pi i} B_{i,z} \Delta y_{i,t-z} + \varepsilon_{i,t}$

Where "$y_{i,t}$" is the variable being studied, a_i is the constant coefficient in the Dicky-Fuller developed testing,πi is the interval of the test and ε_{it} is the test error. The assumptions of the MW test as IPS one are as the following:

(3-13&14). $\begin{cases} H_0: the\ unit\ root\ for\ variants\ in\ each\ section \\ H_1: the\ least\ variant\ in\ one\ of\ the\ steady\ sections \end{cases}$

The Fisher test studies the existence or lack of unit root in the combined data in a simple way. After conducting the usual Dicky- Fuller test, the P- Value is used to operate the test. The statistic used in conducting the Fisher test, has been provided by Maddala and Wu (1999) in the following way:

(3-15). $P_{MW} = -2 \sum_{i=1}^{N} Log(\mathrm{P-Value})$

Accordingly, the total value of meaningful level for the general unit root is evaluated for each section. This statistic contains the distribution of x^2 with 2N degree of freedom (Maddala, 1999, 440).

In bigger cases, Chu (2001) showed that this statistics contains the standard normalized distribution as the following:

(3-16). $Z_{MW} = \frac{\sqrt{N}\{N^{-2} P_{MW} - E[-2Log(p_i)]\}}{\sqrt{Var[-2Log(p_i)]}}$

3.3.4. Cross- Sectional Dicky- Fuller test (CADF)

By developing the domain of conducting the combined data unit root test, the Phillips and Sul's research (2003) showed that these tests about the combined data which there would be correlation between the sectional units is with estimated error. In other words, the assumption of lacking correlation between the sections was rejected in most of the research. Therefore, Pesaran (2003) considered a form of the unit root test about

the data that there would be correlation between the sections. In this test, Pesaran used a somewhat Dicky- Fuller generalized regression which contains the average interval of the variants in each section and the average differential of variants in each section. The regression equation of the given test is as following:

(3-17). $\Delta y_{it} = \alpha_i + p_i y_{i,t-1} + c_i \bar{y}_{t-1} + d_i \Delta \bar{y}_t + v_i$

Where $\bar{y}_{t-1} = \frac{1}{N} \sum_{i=1}^{N} y_{i,t-1}$ and

$\Delta \bar{y}_t = \frac{1}{N} \sum_{i=1}^{N} \Delta y_{it}$.

It is also assumed that the value of "t_i"(N, T) equals the statistic of t obtained by estimating the least square coefficient of p_i. This test with sectional characteristics is known as CADF. Because the form and structure of the test is different from the general ADF test, Pesaran (2003) has provided the proper tables of meaningful level in a separate way (Zara Nejad and Anvari, 2005: 44-45).

3.4. Panel Co-integration Test

Studying the existence of the variants co-integration in the panel data is important as the Time- series data. In order to avoid the false regression and identifying the long-term relationship between the variants, the integration method can be useful.

In analyzing the co-integration panel, the existence of long- term economical relation is tested. The main idea in analyzing co-integration is that, although most of the economic time- series are unsteady (including random procedures), the linear combination of these variants may be steady (without random procedure) in long-term.

Analyzing co-integration helps use to estimate the long- term balanced relationship. If an economic hypothesis is accurate, a special collection of variants identified by the given hypothesis will be interrelated in long- term. Moreover, the economic theory just defines the relations in a static way (long- term) and does not provide information about the short- term dynamics between the variants. If the theory is trust worthy, it is expected that, despite the variants unsteady, a static linear combination becomes steady without random procedure. Otherwise, the reliability of the theory will be questioned. So, the counteraction is used to test the economic theories and estimate the long- term parameters (Enders, 2004).

Variants' tests have been provided to test co-integration with very different frameworks. Among which Pedroni Test and Kao test that are based on the integrated tests with two Engle- Granger phases can be referred to. For both tests, the assumptions of integrated panel data are as the following:

(3-18). $H_0 : y = 1 \qquad H_1 : y < 1$

Where the first assumption indicates the lack of integration between the variants in all sections and the second one shows an integration between them (Pedroni, 1999).

The Engle- Grange integrated test analyzes the components left by the false regression on the variants with the unit root. Based upon this method, if the given variants I (1) possesses integration, the left components of the estimated model should be steady and I(0). On the other hand, if the given variants don't possess integration, the estimation left components will also possess the unit root.

Padroni (1999, 2004) and Kao (1990) developed the analytical frame of Engle-Granger to be able to test the panel data, too.

3.4.1. Pedroni Cointegration Analysis

Co -integration test is conducted by the Pedroni's proposed method (1995, 1999) while using panel data. In Pedroni method, the Null hypothesis is assumed based on co-integration lack. The results of the Pedroni co- integration test includes 7 statistics which have been identified in two groups. The first group is within dimensions which include the statistic of panel V and rho like the Philips and prunes test (1988), and the statistic of panel PP (non- parametric panel) and ADF (parametric panel) like the single equation of ADF test.

The second group called as between dimensions can be compared to the average panel tests of Im and et al (1997). This group includes 3 groups of rho, PP and ADF (Pham and Nguyun, 2010).

Pedroni proposes several tests in order to study co-integration, which allow the sections to have different procedures. For example, consider the following regression:

(3-19). $y_{it} = a_i + \delta_t t + \beta_{1i} x_{1i,t} + \beta_{2i} x_{2,t} + ... + \beta_{mi} x_{mi,t} + C_{i,t}$

Where t=1,…,T; i=1,…,N and m=1,..,M which it is assumed that the variants have the unit root. The parameters of a_i and δ_i indicate the latitude from generatrix and the slope of each section.

Under the Null assumption with lack of integration, the remaining component will possess the unit root. The general approach in the Pederoni integrated test is that the

above equation should be used and the remaining components of the model will be obtained and then by using the following assistance regression, the test will be conducted to identify whether the components are disturbing I (1) or not.

(3-20). $E_{it} = P_i e_{it-1} + u_{it}$

If we want to apply the above regression for each of the sections, the following equation will be used:

(3-21) $e_{it} - p_i c_{it} - 1 + \sum_{i-1}^{pi} \psi_{ij} \Delta e_{it} - j + V_{it}$

Pedroni proposes different methods to make statistics of the Null assumption with the lack of integration test pi=1. In this condition, there are two rival assumptions, which are: the assumption of the coefficients p_i equality for all sections and the assumption of the coefficients p_i inequality.

Pedroni shows that the standardized statistic possesses the asymptotic normal distribution as the following:

(3-22). $\frac{N,T - \mu\sqrt{N}}{\sqrt{v}} \Rightarrow N(0,1)$

Where μ and v are the indicators of the adjusting components based on Mont Carlou method (Baltagi, 2005, 254-255).

3.4.2. Kao Co- integration Test

Kao's test follows Pedroni's approach but for the regressions considered in the first phase, the latitude from different generatrixes for sections and equal coefficients have been considered.

In general, if the first phase regression in Pederoni test is considered with different a_is, equal B_is for different sections and y_is=0,so the thirst phase regression of Kao's test will be obtained. Kao has estimated one of the following regressions after the give phase:

(3-23). $\hat{e}_{it} = p\hat{e}_{it-1} + u_t$

(3-24). $\hat{e}_{it} = p\hat{e}_{it-1} + \sum_{j=1}^{p} J_i \Delta \hat{x}_{i,t-i} + V_{i,tp}$

The equation **(3-24)** is for the pool model and **(3-23)** the regression shows general condition.

In the above equation, p is the regression coefficient of long- term error, e_{it} is the estimation error of long- term relation with the panel data and p is the number of

intervals in ADF test whose size depends on removing auto correlate between the error components. Also J_i is the coefficient of the test variant intervals differential and $U_{i,tp}$ is the estimated error of the equation.

Under the assumption of lacking co- integration, kao showed the statistics of the following:

(3-25). $$DF_p = \frac{\sqrt{NT}(\hat{p}-1)+3\sqrt{N}}{\sqrt{10/2}}$$

(3-26). $$DF_t = \sqrt{1/25}tp + \sqrt{1/875N}$$

Moreover, the following statistic for the generalized model P>0:

(3-27). $$ADF = \frac{t_{\bar{p}} + \sqrt{6N}\,\hat{6}_u/\left(2\hat{6}_{ovv}\right)}{\sqrt{\hat{6}_{ov}/28_v^2} + \sqrt{3\hat{\sigma}_v^2/10\hat{\sigma}_{ov}^2}}$$

(3-28). $$\hat{\sigma}_u^2 = \hat{\sigma}_u^2 - \hat{\sigma}_{u\varepsilon}^2\hat{e}_\varepsilon^2$$

Will converge toward the asymptotic distribution of N (0, 1).

The statistics of DF_y and DF_t is an indicator of the sections number and t_p is the standard amount of t for the equation 26-3,s coefficient.

In other words, in this test like to DF_t and DF_p test after estimating the long- term relation.

The estimation error is evaluated and then the ADF test is conducted by using the above equation. The assumptions of this test are like to DF_t and DF_p and the test statistic has the standard distribution t (Baltagi, 2005, 252-253).

3.5. Types of the Models used in Panel Data:

The general form of the panel data Model known as the error component model is as following:

(3-29). $$y_{it} = \beta_1 + \sum_{j=2}^{k}\beta_j x_{jit} + \sum_{p=1}^{s} y_p z_{pi} + \delta t + \varepsilon_{it}$$

Where y indicates the dependent variant, x is the observed explanatory variants and z is the unobservable explanatory variants, which are effective on each sections depended variant and are separated from the values of the error components. I shows the sections with observed units, t is the indicator of time period, and p and j are the difference between observed variants and unobserved ones in the given model. ε_{it} Indicates the estimation error of panel data, which possesses all the conditions related to error terms under the assumptions of Gauss- Markov (Yaffee, 2003, 71).

3.5.1. Fixed Effect Model

In the fixed effect model, the slope of regression for each section is fixed and the fixed term is different from one section to another one. Although the time effect is not meaningful, there is significant difference between sections and their coefficient does not change with time. One of the methods to show the sectional effect is using dummy variants. The general form of this model is as following:

(3-30). $y_{it} = a_1 + a_2 DUM_2 + a_3 DUM_3 + \sum \beta_i x_{it} + e_{it}$

Where x_{it} indicates a vector of independent variants, DUM is dummy variant to show sectional effect, Y_{it} is the vector of dependent variants and e_{it} is the equations error terms. The fixed effect models based upon the existence or lack of time procedure in the fixed term can be separated into bilateral fixed effect model and unilateral one in the latter model, the slopes are fixed, but the fixed term in each time is different. The time effect for t by entering the dummy variant t-1 is shown as following:

(3-31). $y_{it} = a_1 + \lambda_t + \beta_1 X_{it} + \beta_2 X_{it} + e_{it}$

Where X_{it} is the vector of independent variants, y_{it} is the vector of dependent ones; e_{it} is the equation error terms and λ_t is the time effect on the fixed term.

In the above model, the bilateral fixed effect of the equations, slope in each section is fixed, but the fixed term (latitude from generatrix) changes with time and the variant section. In order to show these effects the dummy variant i-1 and t-1 are used for the section and time respectively as the following way:

(3-32). $y_{it} = a_1 + a_2 DUM_2 + \alpha_3 DUM_3 + \lambda_0 + ... + \lambda_t + \beta_2 X + \beta_3 X_{3t} + e_{it}$

Where X_{it} indicate the vector of independent variants, Y_{it} is the vector of dependent ones, DUM is the dummy variant showing the sectional effect, e_{it} is the equation error and λ_t is the time effect on the fixed term. In all of the fixed effect models, which have fixed slope, it is assumed that the errors in each section and also between the sections are identical and there isn't any autocorrelation between its components (Zara Nejad and Anvari, 2005, 29-30). In other words, for each $t \neq s$ and $i \neq j$ we will have:

(3-33).
$$\begin{aligned} &\operatorname{cov}(\varepsilon_{it}, \varepsilon_{it}) = 0 \\ &\operatorname{var}(\varepsilon_{it}) = \delta^2 \end{aligned}$$

3.5.2. Seemingly Unrelated Regressions (SUR)

Another type of fixed effect model is a model in which the fixed terms and the regressions' slope is different. This model is known as the seemingly unrelated regressions model (SUR). In order to describe this model not only dummy variants are necessary for the section, but also a dummy variant is necessary to show the time difference, and the slope difference is shown by using the dummy variants as following:

(3-34). $$y_{it} = \alpha_1 + \alpha_2 DUM_2 + \alpha_3 DUM_3 + \beta_3 X_{2t} + \beta_4 DUMX_{2t} + \beta_5 DUM_3 \rightarrow X_{2t} + \beta_6 DUM_2 X_{3t} + \beta_7 DUM_3 X_{3t} + e_{it}$$

Where the fixed term for the first section is a_i, for the second one is a_1+a_2 and for the third, is a_1+a_3. In addition, the variant slope of X_{2t} for the first section is $\beta_2 + \beta_4$, the coefficient X_{2t} for 2t the second section is $\beta_2 + \beta_5$ and coefficient of X_{3t} for the third section is $\beta_3 + \beta_6$. In SUR models, errors are allowed to have variance anisotropy between each section and autocorrelation exists between the errors' components, but there would be variance consistency and lack of autocorrelation assumption between each sections error. In other words:

(3-35). $cor(\varepsilon_{it}, \varepsilon_{js}) = 0 \qquad t \neq s \quad for\ each$

$cor(\varepsilon_{it}, \varepsilon_{js}) \neq 0 \qquad i \neq j\ for\ each$

In different fixed effect models and SUR as above, dummy variants have been used to explain and by using, the regression method of OLS with N+k the variant has been estimated, where N indicates the total number of observations and k is the number of explanatory variants. These estimations are generally bias- led due to the following reasons:

a. being random parameters in the model, which may cause instability.

b. Reverse calculation of a matrix N+K is impossible (Zara Nejad and Anvari 2005, 30-31).

3.5.3. Random Effect Model

If the variants are chosen randomly and there is not correlation between explanatory variant and errors, the random effect model can be used to get efficient and compatible estimations. By using the ordinary least squares (OLS) method, the model will be appeared as following:

(3-36). $y_{it} - \theta\bar{y}_i = \beta_0(1-\theta) + \beta_1(x_{it} - \theta\bar{x}_t) + [(1-\theta)a_i + (\varepsilon_{it} - \theta\bar{\varepsilon}_i)]$

$and\ \theta = 1 - \sqrt{\frac{\delta_4^2}{T\delta_a^2 + R_\varepsilon^2}}$

In the given equation, if $\theta = 1$, the model estimation with random effect method will change into estimation with fixed effect method, and if $\theta = 0$, the model estimation with random effect will change into the model estimation with pooled Data and estimation with General Least Squares. This model is a regression with random terms as following:

(3-37). $y_{it} = a + \beta_1 x_{it} + \beta\ z_{it} + e_{it} + u_{it}$

Where e_{it} is the error term of each observation and u_{it} is the random effect related to each section and $e_{it}+u_{it}$ is the total error with the condition of cov (e_{it},u_{it})=0 for all is' and ts'. In the random effect models, the estimators of generalized least squares are the best linear unbiased estimators (Seddigi et al, 2000, 112).

3.5.4. Comparing the Random Effect Model to the Fixed Effect Model.

Some points about the methods of fixed effect and random one should be noticed.

In the random effects, method there shouldn't be any relationships between the sectional error terms and the pattern explanatory variants. While this relation can exist in the fixed effects method (Asharf Zadeh and Mehrgan, 2008).

There should be fixed terms of latitude from generatrix in the fixed effects method over the times, while it can change in the random effects method.

The random effects model is more complicated than the fixed one regarding formulation and presentation. The main assumption, which differentiates the random effect model from the fixed one is that the individual specific effects is fixed over the time. It means that μ_i is uncorrelated with $X_{i,t}$.

In other words, the variants deleted from the model whose effects is seen in μ_i isn't correlated with the explanatory variants located in the model and this is the special characteristic of random. The approach of the fixed effects are acceptable when we are sure that the difference between the units and individuals can be shown by using the terms of latitude from generatrix. In other words, the given terms cause the regression of each unit or individual shift to the size of a_i So, this model is just applicable in the sectional units which are being studied and not applicable in the outside cases.

Now let's assume that in the random model, the terms of $\mu_i$isn't correlated with $X_{i,t}$. This plumb condition along with our assumptions about $V_{i,t}$ are enough to cause unbiased ordinary least squares (OLS) asymptotically, but we don't use OLS for two reasons:

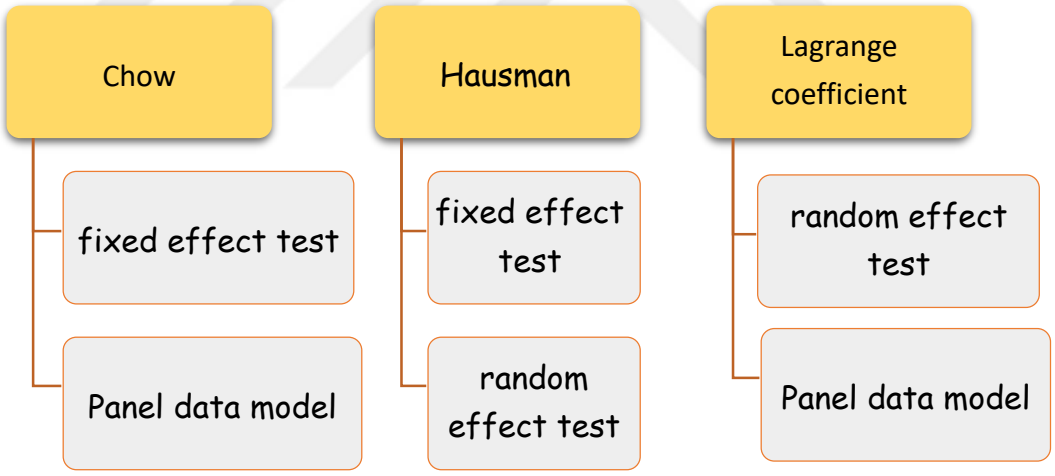
- OLS provides estimations compatible with β but the criteria deviation of the error terms is less estimated.
- OLS isn't efficient in comparing t the generalized least square (GLS)

Actually, the random effects model is a way to deal with this fact that the observed T on the individual NT. So, GLS should be selected (Mir Mohammadi, 2011, 88).

3.6. Diagnostic Tests

In order to identify the type of optimal model applicable in panel data different tests are used. The most common ones are Hausman test for using the fixed effects model against the random effects model, and chow test for using the fixed effects model against the panel data estimated model and Lagrange coefficient test (LM) for using the random effects test against the panel data model.

Table 1: *The Steps of Identifying the Type of Panel Data Model*



3.6.1. The Fixed Effects Test (F)

If the panel linear regression would be as following:

(3-38). $y_t = a_i + \beta_1 x_{it} + \beta_2 x_{2it} + \ldots + \beta_k z_{kit} + e_{it}$

Where y_{it} is the value of dependent variant for the I'th unit in t'th period, x_{jit} is the value of explanatory variant j'th for I'th unit in t'th period. The difference between the sections are shown in a_i and is assumed fixed over the time. If the Null hypothesis is based on the fact, that a_i is fixed for all firms, OLS method will provide efficient and

compatible estimations from $\propto$ and β. However, if the assumption is that there is difference between the various sections, panel Data method is used. To conduct the test the hypothesis of H_0 and H_1 are expressed as following:

(3-39). H_0: the latitude from all the sections, generatrix is the same

H_1: at least one sections latitude from generatrix is different

In order to identify the existence (or lack) of latitude from generatrix for each section, the statistic of F is used as following. This is a simple chow Test:

(3-40). $$F_0 = \frac{(RRSS - URSS)/(N-1)}{URSS/(NT-N-K)} \sim F_{N-1,N(T-1)-K}$$

In the equation, UR indicates the unconstrained model and R is the constrained model with the fixed term for all groups. K is the number of considered explanatory variants in the model, n is the number of sections and t indicates the time period. If the calculated F is bigger than the table F with freedom degree of N-1 and N (T-1) –k, the Null hypothesis will then be rejected, and so the constrained regression will not be reliable and latitude from different generatrixes should be considered. Another essential question, which appears is that if difference between the latitude from generatrixes performs constantly or different performances can explain clearly the given difference between the units. To answer this question, the Hausman Test is used (Ashraf zadeh and Mehrgan, 2011, 103).

3.6.2. Hausman Test

The most popular test to identify the type of panel data model is Hausman test if the hypothesis H, is rejected against the hypothesis H_1 after conducting the test of F, this test can be used to select one of the fixed method or random one (Yaffee, 2003, 76).

The Huasman test is based on existence or lack of relation between the estimated regression error and the model independent variants. If there is such a relation, the fixed effect model is used; otherwise, the random effect model will be used. The hypothesis H_0 is an indicator of the relation lack between independent variants and estimated error and hypothesis H_i indicates the relation existence (Madala, 1999, 435). Because, it can't be decided certainly about the selection of fixed effect model or random one in advance, Hausman proposes a test as following:

(3-41). $$H_0 : E(\varepsilon_{it} / x_{it}) = 0$$

The Null hypothesis indicates that U_i (U_is) is dependent from X_{it} (it means that the random effect model is assumed). If the random effect model isn't used so we have:

(3-42). $H_1 : E(\varepsilon_{it} / X_{it}) = 0$

Moreover, β_{GLS} is the biased and incompatible estimation from$\hat{\beta}$. But in the within model, the within change removes M_is and β_{within} will be an unbiased and compatible estimation from $\hat{\beta}$. $Huasman\ statwes\ that\ \ \beta_{GLS}$ Will be compared to $\hat{\beta}_{within}$ which are compatible under the hypothesis of H_0, but If hypothesis H_0 isn't correct, the probability limit will be different. In fact, $\hat{\beta}_{within}$, whether hypothesis H_0 is correct or not, is compatible, while $\hat{\beta}_{GLS}$ is compatible and performs asymptotically if H_0 is correct, but If it is incorrect it will be incompatible. So a usual test can be conducted based on the difference between $\hat{\beta}_{within}$ and $\hat{\beta}_{GLS}$

(3-43). $\hat{q}_1 - \hat{\beta}_{GLS} - \hat{\beta}_{within}$

After proper conversion and adjustment, the Housman's test statistic will be expressed as following:

(3-44). $m_1 = \hat{q}_1 [\text{var}(\hat{q}_1)]^{-1} \hat{q}_1$

Now under the assumption of H_0 this statistic will have the distribution X_k^2 with freedom degree k, where is the number of explanatory variants or the number of βs. If the value of x^2 (m_i) is more than x_k^2, the hypothesis H_0, i.e., the random effect is rejected and the hypothesis of fixed effect is accepted (Ashraf zadeh and Mehrgan, 2008, 135-138).

3.6.3. Chow Test

Chow test is conduced to apply the pool model

Against the fixed effect model. This test hypothesis are as following:

(3-45). H_0: pooled Model

H_1: fixed Effect Model

The first hypothesis is based on constrained values and the opposite hypothesis is based on unconstrained values. The statistic for the given test based on the total error squares of constrained and unconstrained models are as following:

(3-46). $$CHOW = \frac{RRSS - URSS / N - 1}{URS / NT - N - K}$$

This statistic possesses distribution F with freedom degree of NT- N- K and N-1 (Seddigi and et al, 2000, 111).

3.6.4. Lagrange Coefficient Test (LM)

As the variance of sectional effects are less in the random effect model, panel data method and the general lest squares estimation (pool) are used to estimate the relation between the variants. Accordingly, in order to identify the random effect model against pool model the Breusch- pagan LM test is used. The hypothesis of this test are as following:

(3-47). $H_0 : \delta_a^2 = 0 \rightarrow pool$

$H_1 : \delta_a^2 > 0 \rightarrow RandomEffect$

Where δ_a^2 indicate the variance of the sectional effect model estimated by the random effect. In order to calculate the test statistic, the pool estimated error will be used as following:

(3-48). $$LM = \frac{NT}{2(T-1)}\left[\frac{T^2\sum e_{io}^{-2}}{\sum\sum e_{it}^2} - 1\right]^2 \approx X_1^2$$

Where e_{it} is the pool estimated error and e_{io}^- is the average error during the first time. If the first hypothesis is correct, this statistic will have chi- square distribution with one freedom degree (Nejad and Anvari, 2005, 36-37).

3.7. Describing the Pattern and Variants

In order to estimate the variants effects on the economic growth process, the model being studied inspired by Sadorsky's article (2012) is introduced as following:

$$\text{Ln}\, ED_{it} = \alpha_0 + a_1 Lno_{it} + a_2 Lnk_{it} + a_3 LnL_{it} + a_3 LnE_{it} + \varepsilon_{it}$$

Where:

ED: is an indicator of economic growth, which is evaluated by GDP.

O: is the index of foreign trade, which is included into the model in the form of both import and export.

K: is the index of physical capital, which is included into the model in the frame of establishing gross fixed capital.

L: is the index of human capital, which is included into the model in the frame of educated and skilled workforce.

E: indicates the energy consumption, which is included into the model in the frame of total energy consumption resulted by unrenewable fuels (combination of fossilized

fuels as coal, oil and its products and gas) and renewable ones (combination of hydro power and nuclear energy, geothermal and solar energy)

Ln: indicates natural logarithm

ε:indicates random error

All of the data related to the variants being studied were got from world Development indicators.

4. THE EXPERIMENTAL RESULTS OF THE RESEARCH

4.1. The Experimental Results of the Research

4.1.1. The Stationary Test

In order to analyze the stationary of the variants, Im, pesaran and shins test was used, which is one of the most important tests of unit root in panel data. In this test, the Null hypothesis is based on the existence of one-unit root. The results of this test are briefly shown in tables 2.

Table 2: *The results of the variants unit root test*

Variant	The Im, pesaran and shins test (In the state of latitude from generatrix and trend)			
	In the level		Get the different for once	
	Statistic value	P-value	Static value	p- value
LnED	-2/1829	0/0145	-	-
Lnk	-3/2225	0/0006	-	-
LnL	-3/3471	0/0004	-	-
LnE	0/1743	0/5692	-10/4032	0.0000
LnO	0/4780	0/6837	-5/1908	0.0000

The resource: The research findings based on the Eviews software output

Based on the results of table (2) GDP, skilled workforce and fixed capital variants are in the stationary level (I (0)) but the total energy and openness become stationary by getting difference for once (I (1)). Now that the difference has been obtained, the counteraction relationship of the variants should be analyzed.

4.1.2. The Analysis of Co-integration

Studying the existence of the variants co-integration in the panel data is of great importance. To avoid the occurrence of false regression and also identify the long-term relationship between the variants, the co-integration method can be useful. In order to study the variants' co- integration the Kao's Test has used.

Table 3: *The results of the Kao's co- integration test*

Kao co- integration		
	t-statistic	Prob
ADF	-3/0628	0/0011

The resource: The research findings based on the Eviews software output

As it is seen in the table (3), co-integration or the existence of long- term equilibrium relation between the indices of foreign trade, energy consumption, human and physical resources is accepted with the economic growth index of level %1. Due to the stationary of the variants in the level of I (1) and the stationary of leavings in the level of zero, the variants are co- integrated in the level of zero and the given regression isn't false.

4.1.3. Estimation Based on the Ordinary Least Squares

After conducting the unit root tests and co- integration, the diagnostic test should be done to identify the type of the estimated model. To be ensure of the significance of the given group the statistic of F^7 is used. If the statistics of the evaluated F is bigger than the table F, the hypothesis of H_0 based on the equality of latitude form generatrix is deleted and different latitude from generatrixes should be considered in the estimation. So the panel method can be used in estimation. Now in order to answer this question if the difference of latitude from generatrix in the sectional units operates in a fixed way or random operations can clearly explain the difference between the units, the Huasman test is used. In this test, the hypothesis of H_0 based on the compatibility of the random effects estimation is tested upon the hypothesis of $H_{0,}$ which is based on the incompatibility of the random effects estimation. If the hypothesis of H_0 is rejected, the fixed effects estimation is used in estimation, otherwise the random effects method is used. In the rest of the paper, for each of the given estimations, the related diagnostic tests will be explained in detail.

According to the table (4), in all of the above countries, the hypothesis of H_0 based on the equality of latitude from generatrix is rejected and different latitude from generatrixes should be considered in estimation. So, the panel method is used in estimation.

Table 4*: The results of the fixed effects test*

Effects test	Statistic of test	Freedom level	Prob
Cross- section F	74/9810	(6,132)	0.0000
Cross- section chi- square	212/1366	6	0.0000

The resource: The research findings based on the Eviews software output

Now, in order to identify the type of the estimation method regarding the fixed or random effects, the Huasman test is analyzed. According to the results of the Huasman test shown in the table (5), the hypothesis of H_0 based on the compatibility of random effects estimations in all of the given countries is rejected and the fixed effects is used in estimation.

Table 5: *The results of the Huasman test*

The effects test	The statistic of test	Freedom level	Prob
Cross- section random	43/0129	4	0.0000

The resource: The research findings based on the Eviews software output

Based on the results shown in the table (6):

- The index of foreign trade has positive effect on the economy growth and is meaningful in the level of 1%. The coefficient of the given index is 0.04, which indicates that by increasing foreign trade about one unit, the economy growth also increases about 0.04 unit.

Based on the development theories, trade causes production increase which results in economy growth by improving the resources allocation , having access to technology and better intermediate goods, using gains resulted by production scale, increasing domestic competition, using internal and external gains and establishing suitable environment for new innovations.

- The index of energy consumption has positive effect on the economy growth index and is meaningful in the level of % 1. The coefficient of this index is 0/18, which indicates that by increasing one unit of energy consumption, the economy growth increases about 0.018.

This can be justified by the high share of production section from the energy factor, as the production section is the biggest consumer of energy in the economy of each country. In other words, the process of production and the resulted economy growth can’t be obtained without paying attention to the energy factor.

- The index of human capital has positive effect on the index of economy growth and is meaningful in the level of %1. The coefficient of this index is 0/30, which indicates that increasing one unit of human capital causes 0/30 increase of economy growth.

Today, the individuals play a key role in the organizations growth. By taking a glance on the workforce-growing rate and the organizations development this can be confirmed. Actually the human quality characteristics are kind of capital. Because they can cause more efficiency, production, income, welfare and quick economy growth and as a result they cause higher development.

- The index of physical capital has positive effect on the economy growth index and is meaningful in the level of one percent. The coefficient of this index is 0/11, which indicates that increasing one unit of physical capital, the economy growth also increases about 0/11.

The reason of this meaningful and positive relation is obvious, because the investment as a part of production and the economy growth of each country is important and it is actually considered as one of fundamental requirements of economy development and production and without providing capital, the production and process of economy process go slowly and cost highly expenses.

R^2 and adjusted R^2 indicate the explanatory power of the model that it is better when it approximates to one, because it indicates that high volume of the dependent variant changes are expressed by the independent variants' changes.

Dorbin Watson can also show the problem of co-linear. It means that if the related amount, which is usually between 1.5 – 2.5 or 1.4 - 2.8, gets out of the identified region and there is the problem of autocorrelation in the model. However, based on the conceptions in the Dorbin Watson's book 'Baltaji' it is not very problematic in the method of Data Panel.

Table 6: *The results of the estimated model based on the ordinary least squares*

Variants	Coefficient	Criteria Deviation (SD)	Statistic of t Values	Prob
C	1/4422	0/0859	16/7776	0/0000
LnL	0/3027	0/0373	8/1128	0/0000
Lnk	0/1161	0/0246	4/7212	0/0000
LnE	0/1806	0/0197	9/1539	0/0000
LnO	0/0493	0/0066	7/4807	0/0000
R^2	0/9978			
Adjusted R^2	0/9977			
The statistic of Watson- Durbin	0/5651			
The number of observations	154			

The resource: The research findings based on the Eviews software output

5. Conclusion

5.1. Conclusion and Implications

This research attempted to prove the effect of foreign trade on the seven selected developing countries' economic growth process during 1990-2011.

Therefore, in order to get the intended goal, the following steps have been taken:

1. First, in the chapter one, the general points of the research as the problem statement, its necessity and importance, the research purposes, identifying the variants involved in the model and the use of methodology were referred to.
2. The second chapter which includes theoretical foundations and related literature contains definitions of the terms, theoretical analyses of the effective canals of the variants and the factors influencing them, different ideas and theories.
3. Methodology was analyzed in chapter 3.

   Econometric discussion in the frame of unite-root tests, co-integration and the other diagnostic tests applied in the model of Data Panel were reviewed and then the intended model was defined.

4. In the chapter 4, the experimental results of the research was provided and the indices of the foreign trade, energy consumption , humanity and physical resources in the seven selected developing countries by using the panel co-integration technique with the approach of OLS were evaluated .
5. Finally, in chapter 5, the results obtained by the model were described and some implications were offered for future research.

Actually, this research attempted to answer the question that what effect the foreign trade has on the economic growth process. To answer this question the following hypotheses were provided:

- The foreign trade is effective on the economic growth
- The physical resource is effective on the economic growth
- Humanity resources is effective on the economic growth
- The energy consumption is effective on the economic growth

Based on the research findings, all of the five hypotheses were approved. It means that the economic growth is under the effect of the variants' changes related to the indices of foreign trade, energy consumption, physical and humanity resources.

5.2. The Detail Results are Offered in the Following Lines

First, the studies related to the unit-root was conducted for the models' variants by using the tests of IM, Pesaran and Shin, which stability of the models' variants at the level one was confirmed. Then a long – term powerful relation between the indices of foreign trade, energy consumption, humanity and physical resources was obtained by using the co-integration analyses of Kao method.

Then, by using the F and Hausman Tests, it was understood that the estimation of the above-mentioned models by the method of the Fixed effects is suitable. The results obtained by the evaluation by the Ordinary Least Squares have shown that the indices of the foreign trade, energy consumption, humanity and physical resources have positive effect on the process of economic growth.

5.3. Political Suggestions

Due to the positive relation between the index of humanity resource and the economic growth process, the increase of investment in work force is suggested.

The governments should educate the work force properly through precise and careful planning and they should pay much attention to the management of the humanity. The important point is that the quality and quantity of work force should be emphasized together.

If the given situation is provided well , the work force of different sections of economy will be placed in their suitable professional position due to their special abilities , skills , the production process and as a result on the economic growth.

- Due to the positive relation between the index of physical resource and the economic growth process, what can be strongly remarked is that the improvement of investment in different sections of production can provide the fields of production development and the economic growth.

- Due to the positive relation between the energy consumption and the process of economic growth, the governments should take steps in managing the consumption of energy.

The need of production section to energy is a fact that should not be ignored, but excessive consumption will have significant results on the energy supply.

Because the production process without exploiting energy is impossible and the energy supplies is limit , the governments should take steps in managing energy consumption also provide the opportunities of production increase and the economic growth .

Of these policies, it can be referred to establishing the security of energy delivering due to the economy of the countries, increasing the efficiency of energy, using new and recyclable energies and applying encouraging and punishing policies.

In other words, the optimized combination of recyclable and unrecyclable should be selected and using unrecyclable energies should be minimized, although using recyclable energies costs a lot.

- Due to positive relation between the index of foreign trade and the economic growth process, the opportunities of trade improvement should be provided in the given countries.

In order to get this goal, by taking proper policies regarding openness, the trading and investment opportunities exist in the global economy can be exploited and as a result, the process of production development and economy growth can be improved by having access to the foreign markets.

5.4. Suggestions for Further Research

Research in the following fields can be useful:

- Study the effect of other influential variants on the economic growth process as inflation and humanity development factors.
- Estimating the research model for the selected developing countries.
- Estimating the research model in the frame of dynamic Panel econometric techniques.
- Estimating the research model in the frame of time-series econometric techniques for Iran and Turkey as the ARDL method.

- Estimating the research model in the frame of dynamic Panel econometric technique.

Attachments

The Results of Variable's Unit Root Test (in Level)

Energy Consumption

Null Hypothesis: Unit root (individual unit root process)

Series: LE_1, LE_2, LE_3, LE_4, LE_5, LE_6, LE_7

Date: 06/18/15 Time: 09:11

Sample: 1990 2011

Exogenous variables: Individual effects, individual linear trends

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Total number of observations: 139

Cross-sections included: 7

Method	Statistic	Prob.**
Im, Pesaran and Shin W-stat	0.17439	0.5692

** Probabilities are computed assuming asymptotic normality

Intermediate ADF test results

Series	t-Stat	Prob.	E(t)	E(Var)	Lag	Max Lag	Obs
LE_1	-1.3584	0.8415	-2.168	0.763	0	4	20
LE_2	-2.2425	0.4431	-2.168	0.763	0	4	20

LE_3	-3.7511	0.0421	-2.168	0.763	0	4	20
LE_4	-2.0774	0.5264	-2.168	0.763	0	4	20
LE_5	-2.9082	0.1806	-2.168	0.763	0	4	20
LE_6	-0.1535	0.9890	-2.171	0.871	1	4	19
LE_7	-2.2811	0.4242	-2.168	0.763	0	4	20
Average	-2.1103		-2.168	0.778			

Economic Development

Null Hypothesis: Unit root (individual unit root process)

Series: LED_1, LED_2, LED_3, LED_4, LED_5, LED_6, LED_7

Date: 06/18/15 Time: 09:10

Sample: 1990 2011

Exogenous variables: Individual effects, individual linear trends

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 4

Total number of observations: 135

Cross-sections included: 7

Method	Statistic	Prob.**

Im, Pesaran and Shin W-stat	-2.18298	0.0145

** Probabilities are computed assuming asymptotic normality

Intermediate ADF test results

Series	t-Stat	Prob.	E(t)	E(Var)	Lag	Max Lag	Obs
LED_1	-3.2832	0.0963	-2.168	0.753	0	4	21
LED_2	-4.8113	0.0059	-2.037	0.913	2	4	19
LED_3	-1.5487	0.7747	-2.168	0.784	0	3	19
LED_4	-4.9550	0.0049	-2.010	1.075	3	4	18
LED_5	-3.0811	0.1370	-2.172	0.845	1	4	20
LED_6	-0.8370	0.9451	-2.168	0.753	0	4	21
LED_7	-1.5628	0.7645	-1.858	1.220	4	4	17
Average	-2.8684		-2.083	0.906			

Physical Capital

Null Hypothesis: Unit root (individual unit root process)

Series: LK_1, LK_2, LK_3, LK_4, LK_5, LK_6, LK_7

Date: 06/18/15 Time: 09:10

Sample: 1990 2011

Exogenous variables: Individual effects, individual linear trends

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 4

Total number of observations: 132

Cross-sections included: 7

Method	Statistic	Prob.**
Im, Pesaran and Shin W-stat	-3.22259	0.0006

** Probabilities are computed assuming asymptotic normality

Intermediate ADF test results

Series	t-Stat	Prob.	E(t)	E(Var)	Lag	Max Lag	Obs
LK_1	-0.4254	0.9780	-2.168	0.784	0	3	19
LK_2	-4.4413	0.0137	-1.858	1.220	4	4	17
LK_3	-5.4571	0.0026	-2.170	0.949	1	3	16
LK_4	-1.8281	0.6546	-2.168	0.753	0	4	21
LK_5	-3.3636	0.0849	-2.172	0.845	1	4	20
LK_6	-5.0841	0.0035	-2.037	0.913	2	4	19
LK_7	-2.1828	0.4728	-2.168	0.763	0	4	20
Average	-3.2546		-2.106	0.890			

Humanity Capital

Null Hypothesis: Unit root (individual unit root process)

Series: LL_1, LL_2, LL_3, LL_4, LL_5, LL_6, LL_7

Date: 06/18/15 Time: 09:10

Sample: 1990 2011

Exogenous variables: Individual effects, individual linear trends

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 4

Total number of observations: 136

Cross-sections included: 7

Method	Statistic	Prob.**
Im, Pesaran and Shin W-stat	-3.34710	0.0004

** Probabilities are computed assuming asymptotic normality

Intermediate ADF test results

Series	t-Stat	Prob.	E(t)	E(Var)	Lag	Max Lag	Obs
LL_1	-3.6610	0.0485	-2.168	0.753	0	4	21
LL_2	-3.8671	0.0328	-2.168	0.753	0	4	21
LL_3	-2.6583	0.2627	-1.858	1.220	4	4	17
LL_4	-2.2420	0.4421	-2.037	0.913	2	4	19
LL_5	-1.2020	0.8806	-2.037	0.913	2	4	19
LL_6	-2.9256	0.1768	-2.037	0.913	2	4	19
LL_7	-6.3293	0.0003	-2.172	0.845	1	4	20
Average	-3.2693		-2.068	0.901			

Foreign Trade

Null Hypothesis: Unit root (individual unit root process)

Series: LO_1, LO_2, LO_3, LO_4, LO_5, LO_6, LO_7

Date: 06/18/15 Time: 09:11

Sample: 1990 2011

Exogenous variables: Individual effects, individual linear trends

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Total number of observations: 145

Cross-sections included: 7

Method	Statistic	Prob.**
Im, Pesaran and Shin W-stat	0.47805	0.6837

** Probabilities are computed assuming asymptotic normality

Intermediate ADF test results

Series	t-Stat	Prob.	E(t)	E(Var)	Lag	Max Lag	Obs
LO_1	-2.7698	0.2221	-2.168	0.753	0	4	21
LO_2	-1.9196	0.6072	-2.172	0.845	1	4	20
LO_3	-1.2614	0.8695	-2.168	0.753	0	4	21
LO_4	-1.6720	0.7256	-2.172	0.845	1	4	20
LO_5	-2.1417	0.4949	-2.168	0.753	0	4	21

LO_6	-2.4331	0.3538	-2.168	0.753	0	4	21
LO_7	-1.8688	0.6345	-2.168	0.753	0	4	21
Average	-2.0095		-2.169	0.779			

The Results of Variables' Unit Root Test (with once difference)

Energy Consumption

Null Hypothesis: Unit root (individual unit root process)

Series: LE_1, LE_2, LE_3, LE_4, LE_5, LE_6, LE_7

Date: 06/18/15 Time: 09:12

Sample: 1990 2011

Exogenous variables: Individual effects, individual linear trends

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Total number of observations: 132

Cross-sections included: 7

Method	Statistic	Prob.**
Im, Pesaran and Shin W-stat	-10.4032	0.0000

** Probabilities are computed assuming asymptotic normality

Intermediate ADF test results

Series	t-Stat	Prob.	E(t)	E(Var)	Lag	Max Lag	Obs
D(LE_1)	-5.0043	0.0041	-2.168	0.784	0	3	19
D(LE_2)	-3.9701	0.0290	-2.168	0.784	0	3	19
D(LE_3)	-6.1872	0.0004	-2.168	0.784	0	3	19
D(LE_4)	-4.5847	0.0090	-2.168	0.784	0	3	19
D(LE_5)	-4.5161	0.0111	-2.171	0.897	1	3	18
D(LE_6)	-10.898	0.0000	-2.168	0.784	0	3	19
D(LE_7)	-4.6409	0.0081	-2.168	0.784	0	3	19
Average	-5.6858		-2.168	0.800			

Foreign Trade

Null Hypothesis: Unit root (individual unit root process)

Series: LO_1, LO_2, LO_3, LO_4, LO_5, LO_6, LO_7

Date: 06/18/15 Time: 09:11

Sample: 1990 2011

Exogenous variables: Individual effects, individual linear trends

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 3

Total number of observations: 137

Cross-sections included: 7

Method	Statistic	Prob.**
Im, Pesaran and Shin W-stat	-5.19088	0.0000

** Probabilities are computed assuming asymptotic normality

Intermediate ADF test results

Series	t-Stat	Prob.	E(t)	E(Var)	Lag	Max Lag	Obs
D(LO_1)	-3.7773	0.0401	-2.168	0.763	0	4	20
D(LO_2)	-2.4388	0.3494	-1.999	1.122	3	4	17
D(LO_3)	-3.9315	0.0300	-2.168	0.763	0	4	20
D(LO_4)	-3.7384	0.0431	-2.168	0.763	0	4	20
D(LO_5)	-4.3683	0.0129	-2.168	0.763	0	4	20
D(LO_6)	-5.4432	0.0015	-2.168	0.763	0	4	20
D(LO_7)	-3.7021	0.0461	-2.168	0.763	0	4	20
Average	-3.9142		-2.144	0.814			

Kao Co-integration Test Result

Kao Residual Cointegration Test

Series: LED? LL? LK? LE? LO?

Date: 06/18/15 Time: 09:04

Sample: 1990 2011

Included observations: 22

Null Hypothesis: No cointegration

Trend assumption: No deterministic trend

User-specified lag length: 1

Newey-West automatic bandwidth selection and Bartlett kernel

	t-Statistic	Prob.
ADF	-3.062828	0.0011
Residual variance	1.61E-06	
HAC variance	1.80E-06	

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(RESID?)

Method: Panel Least Squares

Date: 06/18/15 Time: 09:04

Sample (adjusted): 1992 2010

Included observations: 19 after adjustments

Cross-sections included: 7

Total pool (unbalanced) observations: 129

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID?(-1)	-0.263650	0.066398	-3.970767	0.0001
D(RESID?(-1))	0.022295	0.086278	0.258406	0.7965

R-squared	0.113187	Mean dependent var	9.89E-05
Adjusted R-squared	0.106204	S.D. dependent var	0.001435
S.E. of regression	0.001357	Akaike info criterion	-10.35225
Sum squared resid	0.000234	Schwarz criterion	-10.30791
Log likelihood	669.7202	Hannan-Quinn criter.	-10.33424
Durbin-Watson stat	1.933334		

Redundant Fixed Effects Test results

Pool: Z

Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	74.981076	(6,132)	0.0000
Cross-section Chi-square	212.136698	6	0.0000

Cross-section fixed effects test equation:

Dependent Variable: LED?

Method: Panel Least Squares

Date: 06/18/15 Time: 09:03

Sample (adjusted): 1990 2010

Included observations: 21 after adjustments

Cross-sections included: 7

Total pool (unbalanced) observations: 143

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.741041	0.053448	13.86476	0.0000
LL?	0.176094	0.011607	15.17095	0.0000
LK?	0.540396	0.022427	24.09523	0.0000
LE?	0.036948	0.008801	4.198362	0.0000
LO?	0.065173	0.013926	4.679881	0.0000

R-squared	0.987305	Mean dependent var	3.192327
Adjusted R-squared	0.986938	S.D. dependent var	0.039578
S.E. of regression	0.004523	Akaike info criterion	-7.924735
Sum squared resid	0.002824	Schwarz criterion	-7.821139
Log likelihood	571.6185	Hannan-Quinn criter.	-7.882638
F-statistic	2683.208	Durbin-Watson stat	0.326023
Prob(F-statistic)	0.000000		

Hausman Test Results

Correlated Random Effects - Hausman Test

Pool: Z

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	43.012966	4	0.0000

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LL?	0.328757	0.266423	0.000943	0.0424
LK?	0.133063	0.186289	0.000077	0.0000
LE?	0.167793	0.159750	0.000201	0.5706
LO?	0.060833	0.053650	0.000005	0.0020

Cross-section random effects test equation:

Dependent Variable: LED?

Method: Panel Least Squares

Date: 06/18/15 Time: 09:03

Sample (adjusted): 1990 2010

Included observations: 21 after adjustments

Cross-sections included: 7

Total pool (unbalanced) observations: 143

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.313129	0.105308	12.46943	0.0000

LL?	0.328757	0.044189	7.439761	0.0000
LK?	0.133063	0.026335	5.052684	0.0000
LE?	0.167793	0.022752	7.374891	0.0000
LO?	0.060833	0.008575	7.094224	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.997120	Mean dependent var	3.192327
Adjusted R-squared	0.996902	S.D. dependent var	0.039578
S.E. of regression	0.002203	Akaike info criterion	-9.324292
Sum squared resid	0.000641	Schwarz criterion	-9.096381
Log likelihood	677.6869	Hannan-Quinn criter.	-9.231680
F-statistic	4570.561	Durbin-Watson stat	0.482223
Prob(F-statistic)	0.000000		

Model's Estimation Results

Dependent Variable: LED?

Method: Pooled EGLS (Cross-section weights)

Date: 06/18/15 Time: 09:00

Sample (adjusted): 1990 2010

Included observations: 21 after adjustments

Cross-sections included: 7

Total pool (unbalanced) observations: 143

Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.442293	0.085965	16.77764	0.0000
LL?	0.302791	0.037323	8.112820	0.0000
LK?	0.116150	0.024602	4.721204	0.0000
LE?	0.180660	0.019736	9.153911	0.0000
LO?	0.049384	0.006602	7.480744	0.0000
Fixed Effects (Cross)				
_1--C	0.007319			
_2--C	-0.018261			
_3--C	-0.013057			
_4--C	0.006586			
_5--C	0.006972			
_6--C	0.013745			
_7--C	-0.004820			

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.997869	Mean dependent var	3.460993
Adjusted R-squared	0.997708	S.D. dependent var	0.875338

S.E. of regression	0.002162	Sum squared resid	0.000617
F-statistic	6181.413	Durbin-Watson stat	0.565162
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.997044	Mean dependent var	3.192327
Sum squared resid	0.000658	Durbin-Watson stat	0.456533

Reference

Abrishami Hamid, Mehrara Mohsen, Tamadon nezhad Ali R. (2009). *Investigate the relationship between foreign trade and economic growth in developing countries*: GMM, Journal of Knowledge and Development. No. 26, pages: 45-62.

Asharf zadeh s. Hamidreza and Mehrgan Nader (2008). *Econometric panel data*, Research Cooperative Institute of Tehran University.

Afshin Nia Manochehr (1993). *Statistical methods and their application in science.* Published by Ata, Tehran.

Abdullahi, D. (2013). *Effects of financial liberalization on financial market development and economic performance of the SSA region:* An empirical assessment. Economic Modelling, No. 30. PP. 261-273.

Ashrafzadeh S. hamid R. and Mehrgan Nader (2008). Econometric panel data, *the Cooperative Research Institute of Tehran University*, Tehran, second edition 2011, pages 103 and 135-138.

Azizi Nemat A. (2011). *The role of the humanities in the development of social capital, Management and development*, No. 2, pages 58-78.

Baltagi, B. H., (2005). *Econometric Analysis of Panel Data*. John Wiley and Sons. New York. Third Edition.

Becker.G.S. (2002). Human Capital. Colombia University Press. New York.
Badri bookseller, Arash. (2012). *Business and tax impact on employment in the economies of the world*. Master's thesis, Department of Economics. Islamic Azad University of Tabriz, page 16.

Beheshti Mohamad B. (2009). *Introduction to Research Methods in Economics and several economic software*. Published by OfogeTabriz.

Central bank of Iran, 2014. *National accounts concepts, definitions and methods,* http://www.cbi.ir/page/2053.aspx , Accessed 15/08/2014.

Charles P. Kindleberger, Bruce Herrick(1983*). Economic development, New York McGraw-Hill - Economics handbook series* (McGraw-Hill Book Company), 4th edition, [electronic resource], http://openlibrary.org/books/OL3500640M, Accessed 18/05/2014.

Carnwall, RD. (1977). *Economic Growth in East Asia*. NBER Working Paper No. 8330.

Cavel, Y.,(1980), *Recurrent Devaluation and Speculative Attacks on Mexico Peso*. Journal of Political Economy, PP. 148-66.

Carnwall,D.,1977, *Economic Growth in East Asia* . NBER Working Paper No. 8330.

Chen, C. & Gupta, R. (2006). *An Investigation of Openness and Economic Growth Using Panel Estimation*. Department of Economics. Working Paper Series.

Daniel C. Rogers and Hirsch S. Ruchlin(1971), *Economics and Education: Principles and Applications*, the University of Michigan, Free Press, 1971, http://www.jstor.org/stable/2351508?seq=1#page_scan_tab_contents

De Vaws D. A. (1987). *Survey in Social Research*. Translated by H. Nayebi translation. Published by Ney, Tehran, page 15.

Daly, H. (1997). Georgescu–Roegen versus Solow/Stiglitz. *Ecological Economics*, School of Public Affairs, University of Maryford, College Park, MD 20742-1821, USA, Available online 24 July 1998, No 22. PP .261- 266.

Ebrahimpour Raziyeh (2008). *The causal relationship between energy consumption and economic growth in the period 1969-2007*, Master Thesis, Department of Economics, Azad University of Tabriz.

Emamverd G. and Sharifi Omid (2010). *Investigate the relationship between foreign trade and economic openness on economic growth*. Journal of Economic Sciences. No. 5 and No. 13, pages 137-156.

Enders, W. (2004). *Applied Econometric Time Series*, New York: Wiley Press.

Farjadi, G. and M. Lali. (1997). *Imports of capital goods and intermediate impact on economic growth in Iran*. A business research. No. 4, pages 53-31.

Findly, R. (1996). *A Monetary Model of Exchange MarketPressure. American Economic Review*, September. PP. 537-548.

Gujarati D. (2011). *Foundations of econometrics*. Translation Hamid Abrishami, Tehran University Press, page.

Golafshan Maleki and et al (2013). *A dynamic econometric study of the interaction between inflation and economic growth and development on the financial markets of developing countries*. The second national conference on the main challenges and the national production industry.

Gilles, W. H. (1999). *Econometric Analysis*. Prentic-Hall. Inc.

Hassan Zadeh & Heidari, 2001 .*The Role of expenses at the rate of economic growth.* Journal of the Iranian economy. No. 8, pages 59-78.

Halicioglu, Ferda, (2012), *A dynamic econometric study of income, energy and exports in Turkey Energy*, No 36, PP 3348-3354.
Herzer, D. (2005). *Manufacturing export, mining export and Growth: cointegration and causility analysis for Chile*. German Institute for Economic Research.

Hosseini Nasab, Abraham and R. Gucci. (2007*). Iran's foreign trade and productivity growth in manufacturing.* Journal of Economic Research. The first issue, pages 92-75.

Hornby, A. S. (1989). *Oxford Advanced Learner's Dictionary of Current English*,Oxford Univercity Press.

Iman pour Namin Aram (2008). *The effect of trade openness on the volatility of the real exchange rate: A Case Study of Iran*, a Master's thesis, Department of Economics, Azad University of Tabriz.

Iran statistic Centre, 2014. *National Accounts*. Definitions and Concepts, http://amar.org.ir/ , Accessed 10/09/2014.

Kuznets. S. (1955). *Economic Growth And Income Inequality*. American Economic Review. PP. 1-28.

Lopez. E. & Serrano, G. (2003). *Complementarity Between Human Capital and Trade in Regional Technological Progress*. Regional Quantities Analysis Research Group. University of Barcelona.

Mincer, J. (1981). *Investment In Human Capital And Income Distribution*",The Journal Of Political Economy,Vol.66,PP.281-302.

Mobarak, Asgar, (2010). *The effect of investment in research and development on Iranian exports*. Journal of parks and incubators, No. 25. winter 89. pages 47-39.

Madala, G. S., & Wu, S. (1999). A compractive study of Unite Root Tests with Panel Data and a New Simple Test, Oxford Bulletion of Economics and Statistics, https://ideas.repec.org/a/bla/obuest/v61y1999i0p631-52.html, No. 61. PP. 435 & 440.

Malcolm, S. (1982). *Dictionary of Energy*. Mac Millan Reference Book.

Mckinaon K. (1964). *Anticipating Balance-of-Payments Crises: The Role of Early Warning Systems*. IMF: Unpublished.

Mincer. J. (1958). *Investment In Human Capital And Income Distribution*. The Journal of Political Economy. No. 66. PP.281-302.

Mincer, J. (1981). *Investment In Human Capital And Income Distribution*",The Journal Of Political Economy,Vol.66,PP.281-302.

Naderi Aboalgasem (2005). *Knowledge economy as the new model's development and evaluation of the knowledge economy*. Journal of Business Research, No. 35, pages 1-28.

Nahidi Mohamadreza , Kiyavar Farzane (2010). *The relationship between energy prices and energy sectors of Iran's economy industry*. Monthly oil, gas and energy. No. 5, pages: 41-47.

North, Douglass, (1990), *"Institutions, Institutional Change, and Economic Performance"*, Cambridge, The University press.

Nerlove Marc (2000). *An Essay on the History of Panel Data Econometrics*, Agricultural and Resource Economics University of Maryland, DRAFT 08.09.2000, http://www.arec.umd.edu/mnerlove/mnerlove.htmContents1 , page 4, Accessed 12/03/2014.

Paytakhti and et al (2013). *The effect of financial liberalization on financial market development and economic growth based on GMM technique* (A Case Study of Asian developing countries), The second national conference on the main challenges and the national production industry, 2013.

Paytahkti Oskoui, et al, (2012). *The effect of the global financial crisis on economic growth*. The second national conference on the main challenges and the national production industry.

Paytahkti Oskoui, et al, (2011). *During the period 2000-2009 energy consumption and economic development in the world*. National Conference on Jihad Egtesad.

Pedroni, P. (1999). *Panel cointegration*, Asymptotic and Finite Sample Properties of Pooled Time Series Tests With and application to the ppp Hypothesis, Indiana University.

Pham, T., & Nguyen, D. (2010). *Does Exchange Rate Policy Matter for Economic Growth?* Vietnam evidence from a cointegration approach, Economics Bulletin. No 1. PP.169-181.

Romer. M. Paul. (1986). *Increasing return & Long Run Growth*. The Journal Of Political Economy. No 5. PP. 1002-1037.

Rahimi, Boroujerdi, AR. (1995). *Reviews the theoretical and applied on the impact of foreign investment on the economic growth of the Islamic Republic of Iran*. Research project. Monetary and Banking Research Institute.

Sarfaraz Mohammadyar Maryam (2013). *Effect of foreign trade and energy production in the selected countries*. Master's thesis, Department of Economics of Islamic Azad University of Tabriz.

salvatore, dominick(2013*). International Economics*, 11th Edition , Published by Wiley, January 4, 2013, page 44.

Soderbom.M & Teal, F. (2003). *Trade and Human Capital as determinant of Growth*. department of economics. University of Oxford.

Sadorsky, P. (2011), *Trade and energy consumption in the Middle East*, Energy Economics, No 33, PP739-749.

Sadorsky, P. (2012). *Energy consumption*, out put and trade in South America, Energy Economics. No. 34. PP 476-488.

Sadorsky, P. (2011), *Trade and energy consumption in the Middle East*, Energy Economics, No 33, PP739-749.

Shakibai Alireza and Ahmadlou Majid (2011).*The relationship between energy consumption and economic growth in sub-section (1867-2008*): vector error correction approach, Journal of Energy Economics Studies, No. 30, Fall 2011, pages 181-203.

Seddigi, H. R., Lawler, K. A. & katos, A.V. (2000). *Econometrics: A Practical approach*. London and Newyork. Kontledge.

Sina Morteza (2004). *Modeling the relationship between energy consumption and GDP using cross-sectional data for OPEC countries*, a Master's thesis, Department of Economics, Azad University of Tehran.

Stern, D. (2004). *Economic Growth and Energy*. In: Cleveland, Encyclopedia of Energy. No. 2. PP. 35–51.

Souri Ali (2011). *Econometrics with Eviews 7 application*, Published by Farhang shenasi and Nor Elm, Second Edition, spring 2011, pages 224.

Theodore W. Schultz (1997), *"Investing in people: education Low-income countries "*, translated by Syed Saeed Ghasemian J. Sajadieh, Journal of Education, No. 4.

Talegani M. (2002: 97). *Theoretical research methods in the social sciences*. Published by Payam Noor University of Tehran, page 97.

Tayyebi Sayyid Kamil and Tavakoli, Akbar. (2000). *A framework of interaction between intermediate imports - capital and non-oil exports in the industrial sector of the Iranian economy* (76-1340). Journal of Commerce. No. 15, pages 24-1 .

Vaziri jon (1978). *Economics of Education*, Translated by Mohammad proof manner, Tehran University Press, Tehran, 1987.

World Bank. (2014). *World Development Indicators*, http://www.worldbank .org/data/onlinedatabases.html , Accessed 26/10/2014.

Yaffee, R. (2003). *A primer for Panel Data Analysis*, New York University. Information Technology Services.

Zara Nejad Mansor and Anvari Abraham(2005). *Using panel data econometrics in*. Journal of economic studies. No. , Pages 21-51.

CURRICULUM VITAE

PERSONAL INFORMATION

Surname, Name: MADADKHAH AZARI, NAIYER
Nationality: IRANIAN
Date and Place of Birth: 31/01/1982, TABRIZ
Marital Status: MARRIED
Phone: +90 507 076 6764
email: nmadadkhah@gmail.com

EDUCATION

Degree	Institution	Year of Graduation
MS	Çankaya Univ, International Trade	2016
BS	Azad University of Tabriz, AGRICULTURAL ENGINEERING	2004

WORK EXPERIENCE

Year	Place	Enrollment
2004 -2012	Nakhle sabze sobhi	Control Chief

FOREIGN LANGUAGES

Advanced English, Fluent turkey, Advanced Farsi

HOBBIES

Tennis, scuba diving, movies.