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Comparison of Iran and China from the Perspective of Knowledge-Based Economy in Order to Deal with Economic Sanctions

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ABSTRACT: Economic sanctions against countries are among the factors that will disrupt process of economic growth. It seems poor countries will face more sanctions. These countries should fight with sanctions by knowledge-Based management of financial, natural and human resources, from channels of promotion of productive investments, national products, productivity, competitiveness and turn sanctions into opportunities in order to strengthen the foundation of economic prosperity and realize resistive economic. The knowledge-based economy plays an important role in order to realize resistive economic. Therefore, this study compares macroeconomic variables and status of knowledge-based economy in Iran and China, under sanctions during the period 1980-2009. The results indicate during the period 1980-2009, China increased the share of TFP in economic growth and competitive strength through development of new agents markets and made practically ineffective sanctions. So, sanction not only didn't weaken economic and productive variables in China, but also provided an opportunity for strengthen economic foundations. Iran unlike China hasn't suitable situation about innovation components and new agents markets. Therefore, Iran must expanded components of knowledge-based economy and markets of new production factors in order to neutralize effect of sanctions, turn non-renewable wealth into reproducible wealth and increasing share of TFP in economic growth.

KEYWORDS: Economic Sanctions, Knowledge-Based Economy, TFP, Iran, China.

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1. INTRODUCTION

Sanction may be a huge hinder against the economic boom and the entry into international competition. Sanction is a difficult situation but it can create opportunity. In the current world situation and despite pressures and sanctions by Western countries, multiple solutions and economic models is proposed in order to achieve economic growth, until can realize the resistive economic. The resistive economic is an economic that applies to promote the country in order to the economic development objectives in sanctions and threats situation. To achieve this goal, we should use all the resources, capacities and capabilities of public and private sector. Therefore we can express, by correct economic measures, sanctions is considered as an opportunity to strengthen of economic foundations. So, the countries should give strength economic foundations with purposefully planning and prioritizing of development plans, modification of economic structures, improve macroeconomic indicators and make ineffective the sanctions. Due to the intensive fluctuation of the Islamic Republic of Iran's rate of economic growth, low power of competitiveness, high dependence on oil wealth, double-digit inflation rate, high unemployment, lack of proportion between exports and imports of goods and other cases, this country always need to codify coherent and purposeful plans to deal with economic sanctions. In order to achieve this, including the factors that lead to economic prosperity and deal with the sanctions, must emphasis on increasing of the share of total factor productivity growth in economic growth and development of the market of new factor productivity (research and development, human capital, innovation and information and communication technology) to achieve Knowledge-Based Economy. Studying of component of economic growth in developed countries and some developing countries shows that sometimes, in acceleration of economic growth, the share of total factor productivity growth has surpassed from the shares of capital stock growth and labour force growth (Shahabadi, 2005, 2010). Therefore, achieving sustained and stable economic growth need to pay particular attention to effective factors on the growth of total factor productivity. One of these factors is the development of the market of factor Knowledge-Based Economy. Nowadays, importance of Knowledge-Based Economy has increased with the advancement and growth of communities in different fields, scientific, economic, production and technologies. The term of "Knowledge-Based Economy" was introduced by the OECD. According that, Knowledge-Based Economy is an economy that "directly is based on the production, distribution and use of knowledge and information" (Trewin, 2002). Knowledge-Based Economy is built on four interrelated and interdependent bases (innovation, economic and institutional infrastructures and information and education infrastructures). This economy creates profound changes in economic growth with occurrence of scientific and research transformations. Thus, knowledge-Based Economy causes sustainable growth and development and finally achieves resistive economic (Achim & Popescu, 2009).

Therefore, according to the mentioned cases seems that Knowledge-Based Economy is so important in order to deal with economic sanctions. Observations of international scene reveal this fact that a certain range of developing countries faced with such sanctions in some levels of their economic survival. But the way of their Interaction with sanctions phenomenon and its impact has not been equal. For example, China in 1965 and 1974 because of nuclear weapons experiments was passed experience of an economic crisis caused by sanctions at the next round of sanctions in 1989 and 1998, made practically ineffective sanctions with appropriate policies. Therefore, in order to provide appropriate policy strategy to deal with economic sanctions and making ineffective sanctions, we compare and analyze the macroeconomic variables and some parts of the Knowledge-Based Economy of Iran and China for the period 1980 till 2009.

The paper continues as follows: section 2 describes theoretical framework and experimental studies; section 3 discusses the statistical analysis and section 4 discussion and conclusions.

2. THEORETICAL FRAMEWORK AND EXPERIMENTAL STUDIES

2.1. Neoclassical and Endogenous Growth Theory

In the neoclassical growth model, that for the first time was introduced by Solow(1957), the factor of technology has been considered as exogenous, But the endogenous growth model emphasizes that technology is a product of economic system performance and it must be entered as endogenous in growth models. The primary studies on growth models know the difference in growth rates between countries at different of the basic factors of production such as physical capital and labour force, However, recent theoretical and empirical studies showed that in addition to the physical capital and labour force, the factor and internal mechanisms in an economy (such as human capital and research and development) affect economic growth, too.

The new endogenous growth theory offers a theoretical framework for the analysis of economic growth. The main motivation of new growth theory is explain of growth determinant factor and differences in growth rates between countries. Romer (1990) and Grossman & Helpman (1991), with this view that innovation is accumulated research and development function and storage of knowledge, express that economic growth depends on accumulated internal R&D activities and accumulation of foreign R&D capital and storage of the knowledge. Also according of the results of studies of Coe & Moghadam (1993) and Griliches (1998), the most important determinant of continuous and stable economic growth and growth of total factor productivity is accumulation of internal R&D capital.

In other words, the resources of internal growth are divided into two main categories in the theory of economic growth that they are often remembered as the engine of internal economic growth: One of them is growth with the external positive effects which is associated with accumulation of human and physical capital, that its basis and foundation is investment. Another emphasizes on the role of technological progress that its basis is research and development. Because the research and development can help to economic growth from two-way: First, research and development allows to new capital goods are introduced that may have more and better role in the production than available capital goods. This attitude is provided by Romer, Barro and Sala-i-Martin. Second, research and development activities cause to increase accumulation of knowledge and the rate of return of research and development expenses is increased by increase of accumulation of knowledge. Therefore, it can be said technology is a product factor of research and development factory and it can play a role as the most important factor in economic growth and the growth of total factor productivity and competitive strength and create interdependence in developing countries.

2.2. Knowledge-Based Economy

Knowledge and technology has a major role in development and progress of countries, especially in developing countries (As the lack of them is effective in underdevelopment of country).Because at the current world, successful countries are those who are able to transform technological innovation into economic production. After intellectual challenges of the nineteenth century and early twentieth century, that economic competition among the industrial countries of the world became more serious and practical aspects of the economy was considered more, Schumpeter noted the role of knowledge in innovation and economic dynamism and introduced it as basis of entrepreneurship and economic evolution. While primary models of economic growth has been stressed more on physical factors of production (such as physical capital, labour force and land) as production resources, some neoclassical growth models know knowledge as exogenous factor in determination of economic growth; But, also another factor called productivity factor is introduced as one of the factors of growth, and knowledge is one of the most effective factors on productivity and economic growth. Thus, it can be concluded Knowledge-Based Economy has a major effect in increasing production per

capita, reducing inequality in income distribution and at the same time, improving the quality of the environment as attribute of sustainable development. The problem of many underdeveloped countries is their belief to development through the expansion of the macro economy, with increasing production of raw materials, industrial and agricultural products and at the same time, creating a wide export capacity. But in today's world, the successful economies are ones that have an effective system for converting of knowledge and technology to production capacity of the economy. This complex system is an important part of knowledge-based economy; so, the recognition of Knowledge-Based Economy and national innovation system by developing countries can be complementary or replaced of macroeconomic perspective.

Because of the successful economic development has a close relationship with the country's capacity in gaining, absorbing, dispersing, using modern technologies and above all in creating of native innovation capacity, human capital is very important and vital as a creator factor of the capacity of a country in achieving, promoting and creation of innovation. The first time, the term of innovation system was used by Freeman (1987) for Japan. Later, it was more generally and more inclusively developed by Lundvall (1992), Nelson (1993) and Edquist (1997) and organizations such as OECD, EU and UN did some efforts to provide appropriate data that can evaluate the system appropriately, however, the acceptance of innovation system is a new phenomenon in many developing countries (Freeman,1987).

National innovation system is a collection of rules, institutions, human capital and public programs that has a role in connection of science, technology and innovation to the economy. In fact, the major elements of the national innovation system include: 1) Government, 2) Technological infrastructure, and 3) The legal and cultural environment. The imperfect performance of every one of the above elements causes inefficiency of the national innovation system.

1) Government:

The government plays an important role in the coordination of all factors, to the country become more efficient, more dynamic and more competitive in scientific and technological activities and all activities related to economic development. The government implements policies lead to production and distribution knowledge. Innovation policies of the government are divided into three categories:

- **Policies of innovation production (supply):** The policies of Innovation supply is defined by the government activities, so that the government must provide and facilitate resources such as expert human force and resources of innovation information to the firm do activity in a proper context.
- **Policies of demand:** It refers to those policies that directly effects on firm and final consumer of knowledge to use produced knowledge.
- **Policies of promotion based on the creation, dissemination and application of knowledge:** It refers to policies that effect on the supply side and the demand side of innovation.

2) Technological Infrastructure:

Innovative activities depend on its technological infrastructure in any country. The features of technological infrastructure have often being non-palpable, more correlated, more variety, and the structure of professional and clear service. The technological infrastructure in concept of national innovation system is included: educational system, academic research, public research institutions, and the system of the invention and dissemination of information system.

3) The Legal and Cultural Environment:

This environment has several elements such as financial systems, organizational culture, labour relations, and culture of religious, social customs and so on. The national innovation system of a country is defined by the institutionalization of above spaces and environments. These environments affect directly and indirectly on relationships between actors and the flow of technical information and innovative enterprises (Hajihoseini, 1385).

The following elements are considered for the national innovation system in a more detailed classification:

1)The structural elements, 2) The legal and regulatory framework, 3) The innovative culture, 4) The promoters of innovation, 5) The innovation infrastructures, 6) financial credits, 7) The dissemination of information, 8) mechanism of transfer /diffusion of technology, and 9) The support for commercialization (seyfodin & salimi,2001).

Therefore, according to the contents of expressed, factors such as educational system, policies of government, financial system, economic conditions, political-social and legal environment are the components of the national innovation system of a country.

2.3. Experimental Studies

Many studies have been done about the effect of elements of Knowledge-Based Economy on economic growth and increasing of competitive strength and creating of interdependence that in the most of them have been mentioned on positive effect of the above elements. Some studies in this field include:

Coe, Helpman & Hoffmaister (2008, 2009), have analyzed the role of institutions and international R&D spill overs on total factor productivity in OECD countries during the period 1970-2004. The reported results confirmed positive effect of domestic and foreign R&D capital stock on TFP growth. In addition, they show that domestic and foreign R&D capital stocks have measurable impacts on TFP even after controlling for the impact of human capital. The results suggest that institutional differences are important determinants of total factor productivity and that they impact the degree of R&D spill overs.

Dolores (2007) has analyzed the impact of R&D spill overs on UK manufacturing TFP during the period 1970-1997. This research presents new evidence on the long-term impact of R&D investment upon UK industry's productivity performance and on the nature of these “R&D spill overs”. The results suggest that R&D efforts from the industry itself and from other national industries have a positive impact on the industry's productivity but, interestingly, there is no gain from foreign R&D investment

Sebastian (2007), has analyzed public support to innovation and imitation in a non-scale growth model for 22 OECD countries during the period 1960-1980. The results showed that domestic R&D expenditure has more determining role on economic growth than foreign R&D expenditure.

Lederman & Maloney (2007), in a study of 126 countries during the period 1975 to 2000 concluded that R&D expenditure has a positive effect on economic growth.

Chen & Dahlman (2004), assess the effects of knowledge on economic growth. By using an array of indicators, each of which represents an aspect of knowledge, as independent variables in cross-section regressions that span 92 countries for the period 1960 to 2000, they show that knowledge is a significant determinant of long-term economic growth. In particular, the authors

find that the stock of human capital, the level of domestic innovation and technological adaptation, and the level of information and communications technologies (ICT) infrastructure all exert statistically significant positive effects on long-term economic growth.

Savvides & Zachariadis (2003), evaluates various channels through which foreign technology diffuses to the manufacturing sector of developing economies. These economies undertake virtually no own R&D, so they rely on foreign technology to a much larger extent than developed economies. They investigate the direct effect of foreign R&D, as well as technology embodied in imports of intermediate and capital goods and foreign direct investment, on the growth of total factor productivity and value added in the manufacturing sector of 32 economies during 1965-92. They find that foreign R&D typically has the biggest positive impact on domestic productivity and value-added growth. Imports of capital goods and foreign direct investment also play a similar role, but their effect is of smaller magnitude and is not always significant.

Guelec & Potterle (2001), investigated the long-term effects of various types of R&D on multifactor productivity growth, which is the spillover effect of R&D. Econometric estimates were conducted on a panel of 16 OECD countries, over the period 1980-1998. All results were averages over countries and time, and little can be said about country specificities. The results of estimation showed that: an increase of 1% in business R&D generates 0.13% in productivity growth. The effect is larger in countries which are intensive in business R&D, and in countries where the share of defense-related government funding is lower; a 1% increase in foreign R&D generates 0.44% in productivity growth, and the effect is larger in countries intensive in business R&D; 1% more in public R&D generates 0.17% in productivity growth. The effect is larger in countries where the share of universities (as opposed to government labs) is higher, in countries where the share of defense is lower.

Porter & Stern (2000), have reported the use of data in macro level is an important factor in assessing these factors and the effect of innovation on economic growth. They believe that innovation has a positive relationship with human capital especially R&D, and knowledge storage. They also showed there is a week positive relationship between innovation and economic growth.

Shahabadi & Sadeghi (2012), have investigated the Role of Innovation and Competitiveness on D8's Export Performance during the period 1980-2009. The results indicate that the studied countries are as worse status as developed countries in export, innovation and competitiveness. So, for these countries it is essential to pay more attention to fundamental variables which are playing the highlighted role in today's exports.

Shahabadi & Heydari (2011), have investigated the determinants of R&D in selected countries by developing and developed with method of panel data over the period 1995-2006. The results suggest the intellectual property rights have a positive and significant role on severity of R&D and variables of the economic openness and the demand pressure are not significant statistically. Both of control variables are significant statistically and the number of researchers in R&D activity has a positive coefficient for both categories of developing and developed countries. But the variable of industry value added as a percentage of GDP has a positive coefficient for developed countries and a negative coefficient for developing countries.

Baseri et al (2011), have investigated the effect of innovation and Information & Communication Technology on economic growth. Findings of this study -Using annual data for the period 1996-2007 in Iran and countries with par indicators of the knowledge economic with Iran- shows that indicators of innovation and expansion of Information & Communication Technology has had a positive and significant relationship with the economic growth.

Amini (2008), has investigated the role of human capital and R&D in the promotion of TFP at Iran economy by using statistical time series data for the years 1347-1383. The results show that in long-term, public R&D capital, ratio of employment with higher education and the rate of exploitation of capacities have a positive and significant effect on productivity. Despite the increase in public R&D capital and human capital indicators, the total factor productivity index has a very negligible growth and it has only provided 5% of long-term production growth. The main reasons are listed the reduction of economy competitiveness, mismanagement of resource allocation and inefficient use of available resources.

Shahababdi (2001,2007), assesses the role of accumulation of foreign R&D capital (through international trade and foreign direct investment), the accumulation of domestic R&D, human capital and other factors affecting total factor productivity over the period 1338-1382. The result shows the accumulation of domestic R&D, the accumulation of foreign R&D capital, human capital, exports of goods and services, indicators of openness, capital intensity, the real exchange rate and international reserves have a positive effect on total factor productivity. The variable of inflation rate and the dummy variable of Islamic revolution and the imposed war have a negative effect on total factor productivity. Also, the results indicate that if the economy has more open foreign trade and more foreign direct investment and more trained human force, the effect of accumulation of foreign R&D capital on total factor productivity will be more.

Komijany & memarnezhad (2004), have investigated the role of quality of human force and R&D in economic growth by using of Romer technological endogenous change growth model(1990). The results indicate a positive effect on labour force, human capital, physical capital and the income from oil exports and the negative effects of inflation and the virtual variable of Islamic Revolution. Interestingly, because of the low volume and low ratio of investment in R&D to GNP (compared with global average) and the traditional structure and non- manufacturing of non-oil exports, does not appear a significant relationship between R&D and non-oil exports with economic growth.

3. STATISTICAL ANALYSIS

3.1. Statistical Analysis of Knowledge-Based Economy:

The knowledge is considered as one of the very effective forces in the economic and social transformations and it is considered as a public good, because knowledge can be shared with others without decrease and depreciation. However, this is considered as a unique identity for this public good that unlike other physical goods (such as capital, physical assets and natural resources), its use does not lessen the quantity and it can be used repeatedly. In fact, knowledge as a permanent resource, are always available to economic firms and it increases the competitive advantage and creates added value with frequent participation in the various manufacturing and service processes. Consequently, this could lead to the expansion of social welfare and the factor of alleviation of poverty and injustice and promotion of sustainable development. The point that we should always bear in mind is that for achieving Knowledge-Based Economy, just production and distribution of information and addressing to education and research is not sufficient, but also the important point is their application in the use of economic resources continually. In present age, the term of Knowledge-Based Economy implies an emphasis on the role of knowledge and technology in flow of economic development. Hence, it can be said in Knowledge-Based Economy, the knowledge is seen more important than past from view of qualitative and quantitative. Many economists believe nowadays capital volume and market size does not play a critical role in the economic development of nations, but also knowledge and technology plays this role. In other words, make application of knowledge and its effective use in capacity expansion and promotion of utilization degree of resources make possible the realization of Knowledge-Based Economy. In this study in order to examined and compared of

the Knowledge-Based Economy status in Iranian economy and the Chinese economy, is used some components of the innovation system that these components include 1) the number of patent 2) the number of accepted papers in scientific and technical journals 3) research and development expenditure, and 4) the protection of property rights. The following, we will survey status of the innovation components of Iran and China.

3.1.1. The Number of Patent:

In the Solow growth model, invention and innovation are the engines of economic growth of countries so that in this model, increase in innovation and new ideas and thoughts are requisite of achieving to continuous and stable growth. In this regard, it is noted that in addition providing the context of invention of new tools and creative and practical ideas, the legal protection should be done from these innovations and inventions until it not be protested by others. Thus, expanse of invention and creative thoughts depends on material and intellectual protections of new and practical works. The patent is including the right that are granted to inventor of that work against registered inventions and according to that is prevented from manufacture, use, sale, import and export of work by others, such a way that in the absence of this right, the invented work can easily be attacked by others. Regarding the importance of the number of registered inventions as the output of innovative activities, The number of patents are used for analysis and comparison of inventions and innovations of China and Iran with each other. It should be noted in this study the data and information of the World Bank has been used to evaluate this indicator. Because of the lack of sufficient data for China during 1980-1984, this period is limited to 1985-2009. According to table (1), column (3) that shows the number of patents average for the residents of Iran and China, during the period 1985 -2009, average of patents for China is 47,365 and average of patents for Iran is 915 cases, so China has more suitable status than Iran. The interesting point about this table is that China has had considerable progress in the field of number of patents during the period of 2000-2004 and 2005-2009 compared to the beginning of period, so the number of patents of this country has reached on the average from 4070 that cases in 1985 to 43,549 cases during the period 2000-2004 and 158,508 cases during the period 2005-2009. While in Iran, this process of growing is very slow, that these show a huge gap between Iran and China about this indicator. Also the number of patents for per one million people are 35.4 in China and 12.6 in Iran that this shows a huge gap between China and Iran.

3.1.2. The Number of Accepted Articles

Having a creative and trained human force with high performance causes to be done numerous researches and so the science is produce, and it consequently creates new and innovative ideas and it provides the field for the promotion of knowledge and the expansion of innovation. Therefore, another one of variables that is considered as an indicator of innovation, is the number of published scientific papers in valid and approved international journals. According to fourth column in Table (1), that shows the average number of published papers in scientific and technical journals during the period 1985-2009, China has had on the average 21,116 papers and Iran has had 1350 papers in this period. According to the table, the Islamic Republic of Iran, like indicator of patent, in this indicator has a huge gap with China, too. So that the number of papers of published in scientific and technical journals in China during the period 1995-2009, is about 16 times of Iran. This is indicative of a very weak performance of Iran in this area. Also, the average of this indicator for every one million people is 15.78 for China and 18.49 for Iran. Regarding that the training of skilled and committed human force in every country is associated with the production of knowledge and the expansion of innovative activities in various fields, especially production of high quality goods in that country and it can help countries to gain a greater share of markets and stabilize their position in international competition. So it is

expected that Iran with more serious look at the issue of its scholars and researchers, could help them on the path of blurt of their talents in order achieving goals of this country.

3.1.3. Research and Development Expenditure

Including factors that affect the innovation and the requirements of entry into international markets, is investment in research and development activities and considering basic and applied researches. Research and development activities provides field for creation of innovation and quality improvement, variety of products, reducing production costs, increasing performance and competitive strength in domestic and international markets, change of the relative costs and increase the relative advantage of firms and country, increase total factor productivity and consequently also economic growth. Hence it is said, the research and development activities is one of the innovation bases and if every country allocate sufficient resources to research and development activities and use the resources in research and development efficiently, it will prepare the field for increasing of productivity and it can be hoped to increase its economic growth. According to seventh column of Table (1) that shows the average cost of research and development of Iran and China between 2000 and 2009, China on average with allocation 1.09% of GDP to R&D expenditures, has the highest R&D expenditures, while the Islamic Republic of Iran, has just spent 0.65% of its GDP on R&D expenditure on average.

3.1.4. The Protection of Intellectual Property Rights

Considering that achieving technology and Knowledge-Based Economy growth depends on the knowledge components, such as innovation, research and development and elites absorption, Improving the innovation environment in developing countries is created by preparing the field and creating effective rules to protect of innovator, specialists, owners of the idea, design, symptoms and publications and generally elites and innovators of society. Because the protection of intellectual property rights cause to encouragement, strengthen and promote activities and creativities of scientific, research, industrial, intellectual and artistic and finally increasing the productivity. In this study, the Park index (2008) is used to show the status of intellectual property rights in studied countries. According to table (1), during the period 1980-2005, the average index of protection of intellectual property rights is 1.91 for Iran and 2.96 for China. A closer survey of the table we find this point that from 1980 to 2005 in Iran, value of this index has remained constant in 1.91 and has not changed, which indicates weak protection of innovators and inventors. Whereas in China from 1980 to 2005 value of this index has reached of 1.33 in 1980 to 4.08 in 2009, that implies it almost has been 3 times more than Iran.

Table1: The average of some components of Knowledge-Based Economy for Iran & China

Country	Period	average number of residents patent	average number of patents per one million people	average number of accepted scientific and technical journals articles	average number of accepted papers in scientific and technical journals per one million people	average of R&D expenditures (percent of GDP)	protection of intellectual property rights
IRAN	1980-1984	-	-	-	-	-	1.91 (1)
	1985-1989	174 (2)	2.36	91 (2)	1.25	-	1.91 (1)
	1990-1994	243 (2)	3.28	156 (2)	2.13	-	1.91 (2)
	1995-1999	311 (2)	4.2	439 (2)	6.01	-	1.91 (2)
	2000-2004	1145 (2)	15.48	1419 (2)	19.43	0.59 (2)	1.91 (2)
	2005-2009	5011 (2)	67.73	4393 (2)	60.17	0.73 (2)	-
	1980-2009	915 (2)	12.6 (2)	1350 (2)	18.49 (1)	0.65 (2)	1.91 (2)
CHINA	1980-1984	-	-	-	-	-	1.33 (2)
	1985-1989	4071 (1)	3.04	3606 (1)	2.69	-	1.33 (2)
	1990-1994	9300 (1)	6.95	6963 (1)	5.2	-	2.12 (1)
	1995-1999	12738 (1)	9.52	12251 (1)	9.15	0.66 (1)	3.09 (1)
	2000-2004	43549 (1)	32.55	25299 (1)	18.9	1.06 (1)	4.08 (1)
	2005-2009	158508 (1)	118.48	57462 (1)	42.9	1.46 (1)	-
	1980-2009	47365 (1)	35.4 (1)	21116 (1)	15.78 (2)	1.09 (1)	2.96 (1)

* Source: World Bank World Development Indicators (WDI, 1980 - 2009) and Park (2008).
* *The number in parenthesis is the rank of each country in the index.
*** Dashes in the table indicate the lack of complete data for the period and the country of the study.

3.2. Statistical analysis of macroeconomic variables

Based on the calculations in Table (2) are observed during the period 2009-1980, China with average of GDP (constant 2000 US$) 994.96 billion dollars, has better status than the Islamic Republic of Iran with value of 92.66 billion dollars. In other words, China's average of GDP is about 11 times of Iran, that it indicates a high gap in GDP between two countries. That with comparison of this variable with indexes of the Knowledge-Based Economy, we conclude that Iran can increase his share in the global economy with proper economic policies and emphasis on new models of endogenous growth by increasing the competitive strength and the productivity of the national economy, like growing country of China and other successful East Asian countries. Comparison of the average of economic growth during the period 1980-2009 shows that China with an average of economic growth of 10.01 has a better status than Iran with average of 3.14 and it indicates a huge gap in the index of economic growth at these countries. We conclude of comparison of average total factor productivity growth over the period 1980-2009, that China's total factor productivity growth on annual average is about 3.2%. While the Islamic Republic of Iran shows an average annual growth of 0.4 percent, that it is negligible against China's total factor productivity growth during this period. Therefore it can be concluded the total factor productivity growth has an important role in China that it shows very high attention of this countries to Knowledge-Based Economy indicators. During the period 1980 - 2009 the average annual growth rate of the labour force is equal to one for both Iran and China and also during this period, China's average annual growth of physical capital is 4.5 that has a better status than the Iran's annual growth rate (2.6). According to Table (2) is observed during the period 1980 to 2009 the China's average export and import of goods and services

forms, respectively, 20.81 and 18.76 percent of GDP and the Iran's average of exports and imports of goods and services forms, respectively, 19.06 and 19.34 percent of GDP. The point that can be understood from data of exports and imports of goods and services, this is that during the studied period the average of gap between export and import of Iran is negative and in some years, the amount of export has exceeded of import. Here it should be noted that when the increase in imports of goods and services is desirable that exports of goods and services improve subsequently. The other point is that whatever export and import of the country be more or the country's share in global trade increase, it show the broader performance of economy and more interaction with the global economy. The thinkable point is that the country's interdependence creation with the global economy is so important in global trade. According to this point that the Islamic Republic of Iran is one of the biggest oil exporters, therefore, a significant number of share of trade is reserved for the oil export, in the global economy. So that the oil export forms 27.56% of the GDP of the country and regardless of oil export, the trade balance of this country will be negative. With evaluation of the non-oil trade balance of Iran and China, we understand that unlike China, the Islamic Republic of Iran's non-oil trade balance has always been negative that this indicates that Iran's trade balance and economic growth depends on oil that this has caused to Iran become sanction able. So, at the first, Islamic Republic of Iran in order to gain a greater share of global trade must promote national production and non-oil export and until filling the gap of technology in order to increase the competitiveness strength can continue to imports of goods and new technologies in shape of the scheduling program tailored to the realities and the economic potential of country. Also, among the main factors involved in the country's productive capacity are physical capital and human capital. Physical investments, training of skilled labour force and promotion of human capital, are considered as the shock for the economic mutation. Also during the period 1995-2009, China's share of high-technology exports from industrial export with an average of 19.58 is better than Islamic Republic of Iran with an average of 1.63. It shows a huge gap between these two countries. One of the reasons for this is high level of average of foreign direct investment and increasing investment in R&D activities in China which provides the context for technology transfer and with the development of production of goods with higher technology has helped to China to earn this rank. Other point is that the wrong economic policies in Iran have caused the loss of motivation of economic actors in the field of R&D activities expanse and commercialization of innovations and inventions. It has also helped to Iran to be sanction able. In total, it should be said the situation of Iran's high-tech exports is not acceptable and considering this fact that one of the main indicators of Knowledge-Based Economy is high-technology exports which have a higher competitive strength, it emphasizes on necessity of more attention the economic decision-makers of these countries to provide the fields of high-technology production. Thus, these countries should pay more attention to competitiveness of its products by targeting practical R&D activities in order to achieve the resistive economics.

The survey of foreign direct investment inflow can show the degree of development of competitive environment for economic actors. Countries where provide institutions and contexts of absorption of foreign investments, cause advantages growth of their country. According to Table (3) the average of foreign direct investment net inflows during the period 1980-2009 for Iran and China is respectively equal 0.44 and 2.87 percent of GDP, that have a significant difference with each other. In fact, China has been able to attract foreign direct investment on average every year 2.9 percent of GDP over the period 1980-2009 and use the benefits of foreign direct investment flows such as knowledge entry, management and new foreign technology for filling deep gap in technology and increasing competitiveness. Therefore, by comparing of foreign direct investment net inflows of Iran and China it seems that one way for increasing the foreign direct investment is the creation of institutions and providing context for the development of a competitive environment to persuade the foreign investors to bring their

capital and knowledge to this country. It is gradually expected to the technology gap between Iran with other countries be reduced and the contexts of the more optimum use of resources and factors of production and increase of productivity and economy competitiveness be provided by the transfer of technology and managerial skills resulting from entry of these investments to the country. Also Iran's average rate of inflation is 20.2 percent for every year, during the period 1980-2009. However, the average annual inflation rate of China is 5.51 percent. That it implies that the average of inflation rate in Iran is about 3.5 times of the average of inflation rate in China. Exchange rate is one of the most important of economic variables and there is a direct relation between its supply and exports of each country. If the exchange rate in successful countries be mainly determined by market mechanisms, whatever the country's export be more, the effective exchange rate will decrease as currency price in the market. Proportion between Exchange rate and prices of other production factors helps to signalling and the correct guidance of economic activists, and the development of competitive environment. For example, countries where keep relatively fixed exchange rate compared to prices of other factors lower than its market price, instead of relying on country's comparative advantages in the production process will gravitate capital goods imports. Finally, the survey of average index of the real effective exchange rate in the studied countries over the period 1980-2009 shows that the Islamic Republic of Iran with an average of 207 has maximum index of exchange rate and China, with an average of 142.18 has minimum index of exchange rate. Furthermore, both Iran and China have negative average annual growth rate of effective exchange rates index. Remarkable point is proportionality between exchange growth rates and inflation rates among the countries. When the ratio between the exchange rate and the inflation rate reduces or in other words, the inflation increases foreign demand for export goods will reduce and competitiveness strength of productive firms and national economy will reduce in comparison with foreign competitors. Thus, countries that experience lower inflation levels have more competitiveness in the international environment and their export share is more significant.

Many empirical studies about the relationship between economic freedom and economic growth have been done during the last two decades that the most of them have found a significant positive relationship between economic freedom and economic growth. Economic liberalization through creation of market economy relations development, private sector development, foreign trade development, elimination of governmental waste regulations and amendments like these can cause investment encouragement, skills promotion, technology transfer and the efficient use of these investments and provide the context for the development of productive activities from this way. In this study, the index of G-Wartney is used for the economic freedom that belongs to the "Fraser" Canadian Institute. It should be noted variation range of each of the economic freedom indexes is between zero and 10 that a lower value indicates less economic freedom and a higher value indicates greater economic freedom. Also general index are calculated based on mean five variables of Economic Freedom. According to Table (3) the average general index of Economic Freedom of Iran and China are respectively equal to 5.6 and 5.67 during the period 2009-1980. This Indicate that Iran has a poor performance in field of economic freedom, although economic freedom index of Iran has wended the ascending trend. So, it seems that selecting strategies based on improvement of factors involved in the economic freedom index in order to more utilization of economic freedom improvement and its positive impact on other macroeconomic variables improvements is necessary for the evolution of national production, creation of the context of resistive economics and realization of macroeconomic objectives.

Finally, the last index which is examined is the index of political stability. Instability of political systems and existence of internal and external threats, increase the cost of investment and economic activity and reduce motivation for productive activities. In this study, scale which has been used for the measuring the stability of governments, is political stability index of indexes collection of "Kaufman" published by the World Bank (2012). This index surveys vulnerability

of political systems against threats and actions of illegal and violence. The variation range of this index is between -2.5 and +2.5 that higher values indicate greater political stability. According to Table (3), during the period 1995-2009, the average index of political stability is (-0.91) for Iran and (-0.44) for China, which indicates the lack of political stability in the studied countries and China is politically more stable than Islamic Republic of Iran. Therefore, it seems that countries where in addition a stable political and economic environment, try to help to increase of the total factor productivity growth, opening of markets and new products, Multi-product export instead of dependence on single-product export, export and industrial mutation, increasing competitiveness strength of productive firms and national economy by a coherent and practical planning for new factors of production such as R&D expenditures, information technology, scientific management and …, at the national level have continuous and stable rates of economic growth and improved living standards and in the international arena will have further participation and influence power in the global economy. And thereby they will get the ability to deal with sanctions.

Table 2: Summary of economic information for Iran & China

Country	Period	average of GDP (constant 2000 US$)	average of Economic Growth	average of TFP (% annual)	Average of Labour Force (% annual)	average of Physical Capital (% annual)	average of Exports of goods and services (% of GDP)	average of Imports of goods and services (% of GDP)
IRAN	1980-1984	62 (2)	1.11	0.4 (2)	1.1 (2)	2.2 (2)	14.48 (1)	22.3 (1)
	1985-1989	62.93 (2)	-1.72	0.1 (2)	1.2 (2)	0.3 (2)	8.16 (2)	12.52 (2)
	1990-1994	78.82 (2)	5.72	1.9 (2)	0.8 (1)	1 (2)	20.35 (1)	22.45 (1)
	1995-1999	90.97 (2)	3.56	1.8 (2)	1.2 (1)	1.2 (2)	19 (2)	14.78 (2)
	2000-2004	113.44 (2)	5.7	3.1 (2)	1.1 (1)	2.6 (2)	25.21 (2)	22.12 (2)
	2005-2009	147.78 (2)	4.48	1.9 (2)	0.3 (1)	3 (2)	32.56 (2)	23.54 (2)
	1980-2009	92.66 (2)	3.14 (2)	0.4 (2)	1	2.6 (2)	19.06 (2)	19.34 (1)
CHINA	1980-1984	217.29 (1)	9.64	4.9 (1)	1.8 (1)	3.4 (1)	11.1 (2)	10.37 (2)
	1985-1989	369.03 (1)	9.86	0.4 (1)	2.8 (1)	4.4 (1)	12.49 (1)	14.33 (1)
	1990-1994	566.29 (1)	10.86	7.1 (1)	0.6 (2)	3.9 (1)	18.6 (2)	17.43 (2)
	1995-1999	950.33(1)	9.12	3.1 (1)	0.7 (2)	4.5 (1)	20.51 (1)	17.48 (1)
	2000-2004	1437.03(1)	9.18	3.9 (1)	0.4 (2)	5 (1)	26.91 (1)	24.54 (1)
	2005-2009	2429.88(1)	11.4	4.2 (1)	0.2 (2)	6.3 (1)	35.26 (1)	28.43 (1)
	1980-2009	994.96 (1)	10.01 (1)	3.2 (1)	1	4.5 (1)	20.81 (1)	18.76 (2)

* Source: World Bank World Development Indicators (WDI, 1980 - 2009) and Asian Productivity Organization (APO, 2013) and calculations of research.
* *The number in parenthesis is the rank of each country in the index.

Country	Period	average of Oil Exports (% of GDP)	average of High-Technology exports (% of manufactured exports)	Average of FDI, net inflow (% of GDP)	average of Inflation rate (%)	average of real effective exchange rate (2000=100)	average of Economic Freedom (Total index)	average of Political Stability index
IRAN	1980-1984	26.21 (1)	-	-0.004 (2)	17.77 (1)	412.45 (1)	3.91 (2)	-
	1985-1989	16.69 (1)	-	-0.06 (2)	15.23 (1)	428.55 (1)	4.42 (2)	-
	1990-1994	20.26 (1)	-	0.01 (2)	31.55 (1)	123.98 (1)	4.64 (2)	-
	1995-1999	16.9 (1)	0.24 (2)	0.03 (2)	23.41 (1)	69.23 (2)	5.13 (2)	-0.56

	2000-2004	22.87 (1)	1.36 (2)	1.57 (2)	19.75 (1)	91.86 (2)	6.05 (1)	-0.81
	2005-2009	46.83 (1)	4.4 (2)	0.89 (2)	13.52 (1)	115.95 (1)	6.22 (1)	-1.12
	1980-2009	27.56 (1)	1.63 (2)	0.44 (2)	20.2 (1)	207 (1)	5.6 (2)	-0.91
CHINA	1980-1984	1.8 (2)	-	0.33 (1)	2.35 (2)	275.83 (2)	4.69 (1)	-
	1985-1989	0.96 (2)	-	0.81 (1)	8.14 (2)	154.97 (2)	5.05 (1)	-
	1990-1994	0.55 (2)	7.27 (1)	3.41 (1)	11.33 (2)	101.62 (2)	5.13 (1)	-
	1995-1999	0.34 (2)	13.71 (1)	4.43 (1)	3.91 (2)	105.08 (1)	5.51 (1)	-0.3
	2000-2004	0.34 (2)	24.21 (1)	3.23 (1)	2.84 (2)	107.23 (1)	5.76 (2)	-0.4
	2005-2009	0.55 (2)	28.22 (1)	4.02 (1)	4.5 (2)	108.32 (2)	6.18 (2)	-0.53
	1980-2009	0.54 (2)	19.58 (1)	2.87 (1)	5.51 (2)	142.18 (2)	5.67 (1)	-0.44

Table 3: Summary of economic information for Iran & China
* Source: World Bank World Development Indicators (WDI, 1980- 2009), economic freedom index of Fraser Institute, index of Kaufman (2012) and calculations of research.
* *The number in parenthesis is the rank of each country in the index.
*** Dashes in the table indicate the lack of complete data for the period and the country of the study.

3. CONCLUSIONS

In the current world situation and the pressures and sanctions by Western countries against Iran, the sanctions and the war against economic strategy has always been the main concern of economic policymakers. The question is why Iran is sanction able, but countries like China are not sanction able. The answer to this question must be sought in some of the country's economic policies. Therefore, this study evaluates and compares some macroeconomic indicators of Iran and China in order to deal with economic sanctions and creation of great economic jihad. The results show that in China, with particular attention to Knowledge-Based Economy indicators and increase the number of patent, accepted articles in scientific and technical journals, research and development expenditure (R&D) and the of protection of property rights index has been able to achieve a high growth of total factor productivity and economic growth, That this results of the study is exactly the same in Coe et al. (2008, 2009), Dolores (2007), Sebastian (2007), Lederman & Maloney (2007), Chen & Dahlman (2004), Savvides & Zachariadis (2003), Guelec & Potterle (2001), Porter & Stern (2000), Shahabadi & Sadeghi (2012), Shahabadi & Heydari (2011), Baseri et al. (2011), Amini (2008), Shahabadi (2001,2007), and Komijany & Memarnezhad (2004), is quite consistent and it proves the positive effect of Knowledge-Based Economy on total factor productivity and economic growth. Also, the result shows the great part of the export in Islamic republic of Iran is based on oil export and the main part of the Iranian income depends on oil incomes whether China in global level has done multi-product exports. Also in china a significant portion of economic growth belongs to total factor productivity growth and in order to increasing the total factor productivity, the application of knowledge-based economy has a special and particular position in this country. In other words, china's economic policy (monetary, financial, currency and commercial) is through the macro policies of economic and educational and research, while there is not this position in economy of Iran, and the R&D expenditure and the other factors of knowledge-based economy have negligible percentage of GDP. It is worth mentioning Iran's economic problem is not a lack of knowledge, its problem is lack of knowledge application within the industry. In other words, knowledge in Iran economy is based on oil production and with this factor, with wrong economic policies and inconsistence with research, education and innovation policies; there is no demand for knowledge-based economy factors. Iran has high-technology imports through the oil exports, that this prevents of the formation of innovation market in the country. Therefore, it should be said the Islamic Republic of Iran in order to creation of political epic and the resistive economics should create innovation, not to buy it and this is possible. Because this country has talented and creative young forces and with the correct management of oil wealth can easily take the step on the path to self-sufficiency and destroy the West economic domination factor.

So, dependence path should be changed to independence and self-sufficiency and localization in internal production. Nowadays, many people think that self-sufficiency is not important, because the developed countries like USA and other countries aren't self-sufficient in all dimensions. The important issue which these analysts neglect of that is that all of these countries are in the same level of the knowledge and technology and this is the reason of why one country doesn't dominate on another country. The issue is that the faces of the knowledge and creativity and innovation are so vast and complex that every country can't be self-sufficient in all dimensions. Because the countries are faced to young mind limitation. That is why they effort to recruit expert force of the developing countries. Therefore Islamic Republic of Iran in order to deal with economic sanctions and convert threats into opportunities and realization of the great economic jihad must make favourable environment for innovation in country at the priority of entire policy and strategies. And from channel of research and development activities and development of underlying demand of human capital and the innovation from channel of motivation stimulate of economic activists through the modification of macroeconomic policies and perfect harmony of macroeconomic policies with educational and research and innovation policies, should provide strategies in order to increase actual capacity and achieve to potential capacity, And with this plan should increase the country's competitiveness in the international arena and neutralize the pressure of the sanctions, And subsequent of this event, moreover that the government dependence on oil revenues is significantly reduced, it will lead to continuous and stable economic growth. Because economies which encourage and stimulate the innovation and inventions production process with creation and protection of institutions such as respect for intellectual property rights and the development and facilitate access to new components, will faced to the better standards of living and the continuous and stable economic growth and increasing the share of total factor productivity growth in the economic growth and increasing the competitiveness strength. Therefore, according to the study results and in order to deal with economic sanctions can be presented the following solutions:

- ✓ Promoting technology and increasing total factor productivity by making knowledge-base of economy and development of knowledge-based companies with suitable planning and in policies reformation from resources and capital based economy to knowledge-based economy to increase the actual and potential efficiency.
- ✓ paying attention to stagflation and establish a system of predictable and manageable system against inflation index and its adjustment with the level of salary and wages and exchange rate in prevention of optimum policies in this process.
- ✓ Making political stability and avoiding creation of any tension and violence in the country.
- ✓ Prioritizing investment in different economic sectors and on the basis of efficiency.
- ✓ Efforts to increase the economic freedom index for continuous and stable economic growth.

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ETHICAL CONSIDERATION

Authenticity of the texts, honesty and fidelity has been observed.

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Planning and writing of the manuscript was done by the authors.

CONFLICT OF INTEREST

Author/s confirmed no conflict of interest.

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