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Application of the Evolutionary Game Model of Genetic Transfer to Analyze Strategic Trade Relations in Target Markets in Line with Regional Sgreements*

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Abstract

Still influenced by Cold War thinking, many countries may interact in the international scenario through competition rather than cooperation. However, in most cases it is not possible to choose permanent trade policies, because by changing the structure of production and the level of development, the interests of countries change. As a result, several forms of strategic interaction emerge during the trade policy process. Accordingly, in this paper, using an asymmetric evolutionary game model and adding a win-win game hypothesis, the effects of applying a cooperation strategy instead of competing in international affairs are analyzed. Examining evolution in the context of game theory helps to better explain phenomena such as cooperative behaviors; therefore, in this study, the dynamic mechanism of change in the period 2005 to 2018 has been considered. Based on the results of the evolutionary game under mixed strategy, Iran will act as a leader due to its higher bargaining power and will choose a competitive strategy instead of cooperating with Turkey, and instead, Turkey will play the role of follower and Instead of competing with Iran, it chooses to cooperate, especially if the projected cost of losing the competition is high. However, in the dynamic evolutionary game under the new win-win hypothesis, it is realized that a strategy of cooperating in trade with Iraq and helping to develop it, is likely to be a logical option for Iran and Turkey. Also, with the presence of Russia, the possibility of gaining more benefits by choosing a cooperation strategy instead of competition will be higher.

Keyword: Evolutionary Game, Cooperation Strategy, Trade Agreement.

JEL Classification: C73, F42, F53.

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1. Introduction

Given the current trend of the economy, which is moving towards integration and globalization, regional cooperation can play an important role in the wider presence of countries in the international scenes. For developing countries such as Iran, which are not ready for a sudden entry into free trade, regionalism can be the most effective way to gradually open up their national economies and integrate them into the global economy. International trade, especially providing more capital inflows into the economic cycle of developing countries, has a positive role in increasing investment and, consequently, increasing the welfare of citizens.

The Iraq market is one of the most important regional markets, which, according to the International Trade Center and World Bank statistics, is highly dependent on imports of consumer goods and capital inputs, and at the same time has a consumer population of about 40 million and in terms of proximity, it is one of the best markets for Iran. Accordingly, the Iraq market is an attractive market for countries and with the reconstruction that will take place in this country in the near future, the share of countries exporting to Iraq will increase; but the main question is how to compete with competitors in this market?

Given the need for concerted action and the need for mutual interest in developing trade programs, this article examines the potential for trade-friendly Iraq, based on game analysis, focusing on Iran and Turkey as Iraq's neighbors, which play a key role in this country's trade. In other words, this study seeks to analyze and recognize the existence or non-existence of a win-win situation theoretically between these countries by examining the literature of evolutionary game theory. In order to examine the impact of other countries on the possibility of reaching an agreement, the model has been developed and Russia has been used as a third country that has a significant impact on trade relations between these countries.

2. Methodology

The analytical model used in this research is the evolutionary game theory of genetic algorithm. In this research, at the first, the game model is designed in accordance with the prisoner dilemma game, and then, in order to examine the win-win strategy, by adding a new hypothesis and obtaining the interests of the actors, the initial model is developed. In the following, in order to obtain a stable evolutionary strategy in the initial model and the asymmetric model of the dynamic evolutionary game, both

models are tested and discussed under two scenarios and in two states of two and three countries.

3. Conclusion

The attitude of the present study is to investigate the evolution and emergence of cooperation in competitive situations and its purpose is to provide a new model of finding optimal strategies in the game of repetitive prisoner dilemma. For this purpose, in two cases of two and three countries, the optimal strategy was studied in two scenarios. In this study, since Iran considers Iraq as one of its largest trading markets and estimates a much higher profit from Iraq than other countries, in most scenarios it is possible that Iran has a competitive strategy for Trade with Iraq instead of cooperating with other countries. Instead, Turkey and Russia may choose to cooperate with Iran, especially when the cost of non-cooperation is high.

By introducing the win-win hypothesis, Iran is likely to cooperate with Turkey and Russia to create a winning position. The results of this hypothesis showed that in both two-country and three-country cases under the win-win hypothesis, the choice of cooperation strategy between countries was the most stable evolutionary strategy among the other options.

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