MICROECONOMIC STRATEGIES AND MODELING OF REAL-TIME TRADE WARS WITH GAME THEORY: A THEORITICAL APPROACH ON COMPANIES IN DIYARBAKIR

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1. ABSTRACT

With this research, the aim was to investigate the human and chance factors that are likely to affect the decision making processes in real-life market conditions in times of resource scarcity through the game theory. While economics is a science that analyzes the preferences of individuals and societies to use scarce resources, it is a behavioral (social) science in that economy itself is open to human factors and may sometimes rely heavily on inter-related unpredictable dynamics. In this study, the specific economy branch that is to be studied and analyzed is the microeconomics. By eliciting scale economics, the effects of the market strategies on the profit matrix where companies' earnings or losses are shown will be investigated over the course of five months. The number of the companies included in the research was 32 and they were chosen through the purposive sampling method. 10 of these companies were rooted ones; 15 of them were newer than the ones in the first group; while 7 of them were newly established firms. These companies located in the city of Diyarbakir were included and the decision-making processes to observe how each of them behaved when the financial crisis hit the city was observed. After analyzing the documented expenses and incomes of all these companies under the lights of the game theory and Nash Equilibrium, it was noticed that rooted companies are less affected by the scarcity. More than half the newly established companies earned less than they had expected; whereas, a small number of newly established companies seemed to have chosen the right strategy and had the potential to surpass rooted companies. It was also observed that medium-aged/sized companies seemed to be at risk more than the other two groups as they refrained from innovative approaches and did not have a long-established stance in consumer trust.

Keywords: Microeconomics, company, game theory, innovative, nash equilibrium, Diyarbakir, resource scarcity

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1. Introduction

The theory of game is a discipline that examines the two or more decision makers' sharing process in which there are two or more numbers of resources in a scarce environment. Decision, in Game models, and decision makers are defined as buyers and these players have a preference in order to achieve a certain gain (Bilek, 2004:4). We face the method of determining the strategy for companies (will be referred as players henceforth), in terms of economists and mathematicians when the game theory is defined. Two or more opponents, by combining certain rules, are allowed to play against each other under contradictory possibilities (Özer, 2004:7).

While economics is a science that analyzes the preferences of individuals and societies to use scarce resources provided by nature, the keyword in the definition above is "preferred" since economics is a behavioral (social) science. From a broad perspective, the economy examines how people make choices, and by combining these preferences, they become social preferences(E.)Case, C.Fair, M.Oster, 2012).

In this study, the specific economy branch that is to be studied and analyzed is the microeconomics. By eliciting scale economics, the effects of the market strategies on the profit matrix where companies' earnings or losses are shown will be examined.

Microeconomics is a branch of economics that analyzes how individual industries work and the behavior of individual decision makers (firms and households). These decision-making units are firms and consumers. Decisions, the products that firms are to produce and sell and the decisions of consumers about what to buy, will help explain why goods and services are produced in the economy. Another important issue that microeconomics is interested in is who is the purchasing of goods and services. The rich consume more goods and services than the poor. The distribution of the goods and services produced is also within the scope of the microeconomics. Why does poverty exist? Who is the poor? Why do some professions save more money than others? On a city basis, think about what you're consuming in a day and imagine this idea once more (E.Case, C.Faır, M.Oster, 2012).

As can be seen, in a simple way, microeconomics is an area where companies are looking at consumer indexed movements. But we will show how multi-company activities affect the level of earnings of companies by modeling and using game theory.

2. Methodology

The total 32 companies were chosen on purposive sampling basis since each type of company had its own unique condition before the scarce environment prevailed. Although there were numerous other companies, only some of them were chosen on the grounds that each category symbolizes a typical company located in the city of Diyarbakir. As the players may change, the companies may also vary as long as they maintain to fall in the certain category: rooted, medium sized/aged, or new. The tools that were used to measure the earnings of the companies are the figures provided by the chamber and the name of the name of companies had to be confidential as requested by them.

As stated in the introduction, game theory is still used in many areas such as politics and economics, but it is not well understood due to the complexity of its structure. In this study, we will model the game theory by making small changes on the well-known and played the game spade and we will understand and understand both the principles of microeconomics and strategy based on game theory, and makes them look at a larger perspective from the big picture. First, let's see briefly the basic components of the game. The game spade is a game of luck and strategy usually played with 4 people. At the beginning of each game, 4 players are given 13 cards randomly. The players evaluate the cards they have and tell them how many hands they can get and then the player who says the biggest number is determined. The game is generally based on the fact that each player throws the biggest card in a round of each card, and the players aim to take the highest number of rounds and to assert their claims. The cards have a particular importance. So much detail will be enough for modeling.

According to the game theory, each player's goal is to get the biggest profit that he / she can get personally by establishing a coalition with his rivals. Based on this principle we will examine the similarity the game between spade and real-time trade wars under a few headings.

2.1. Players

Here, players clearly symbolize the companies and the decision-making authorities. Each player makes decisions and these decisions will cause the company to make profit or loss.

2.2. Cards

In this model, the cards represent the movements of the company every 4 weeks (approximately 1 month). Since the companies, ones we are talking about, are companies which can be considered as big in many areas such as market share production, quantity sales amount, we confine and limit the movements of the companies to 4 weeks in case of damage by the effect of policy changes on the image of the company on target group in shorter periods. In the game, each player has 13 cards and they are moving simultaneously within periods, and each game represents 52 weeks or 1 year.

2.3. Types of Cards

There are 13 cards of 4 types in the game Spade: heart, spade, diamond, and club. Of course, these 4 card types are of great importance for the market. According to the rules of the game, you have to play with same type of card that the first card-throwing player plays. The sample of this principle is some basic departments which are very important in every company that makes production and sales. These basic departments are respectively: R & D unit, production unit, sales unit and public relations. And it is essential for a company to try to gain revenue from other companies through the same channel and try to gain revenue by means of company’s movements through one of these 4 basic departments, for the reason that, it will also cause the company to lose its influence on the market if the company ignores itself as a company in one out of 4 areas and tries to develop in another field. Henceforth, it is important to reply to the first card with the same card (except for the trumps mentioned in the model).

2.4. Trump Cards

As we talked about the game, in spade, the players at the beginning of each game evaluate their cards and make a claim about how many hands they can take to determine the trump card. The player who makes the biggest claim determines the trump card (one of 4 types of cards). The trump card that becomes available to all players becomes more valuable than all other types of cards in the game if it is the first card in the hands of the player thrown from the designated trumps type and it allows to have that hand. For example, in the designated card is club; the first player throws the highest card of spades, but in the hands of a player, there is no card of the spades type and that and the player has to throw the trump card. This rule is the advertising organ in commercials. Other companies advertise more effectively than advertising, they will be able to manipulate the target audience and attract attention but if it takes a hand under the budget spent for advertising, so if the company gets a profit, the player gets a loss minus points. In order to decide which type of card to determine for the trump card, the company must evaluate its strengths, good cards, for example, if the company is working on a product that is very different, creative and demanded, it prepares advertisements that impose the importance of innovation and creativity on the R & D team. If the production unit is strong in terms of the price and the availability of the product, the unit of sales should be prepared if the company's relations with the public are very strong, or if the public relations department is concerned.

2.5. Strength of Cards

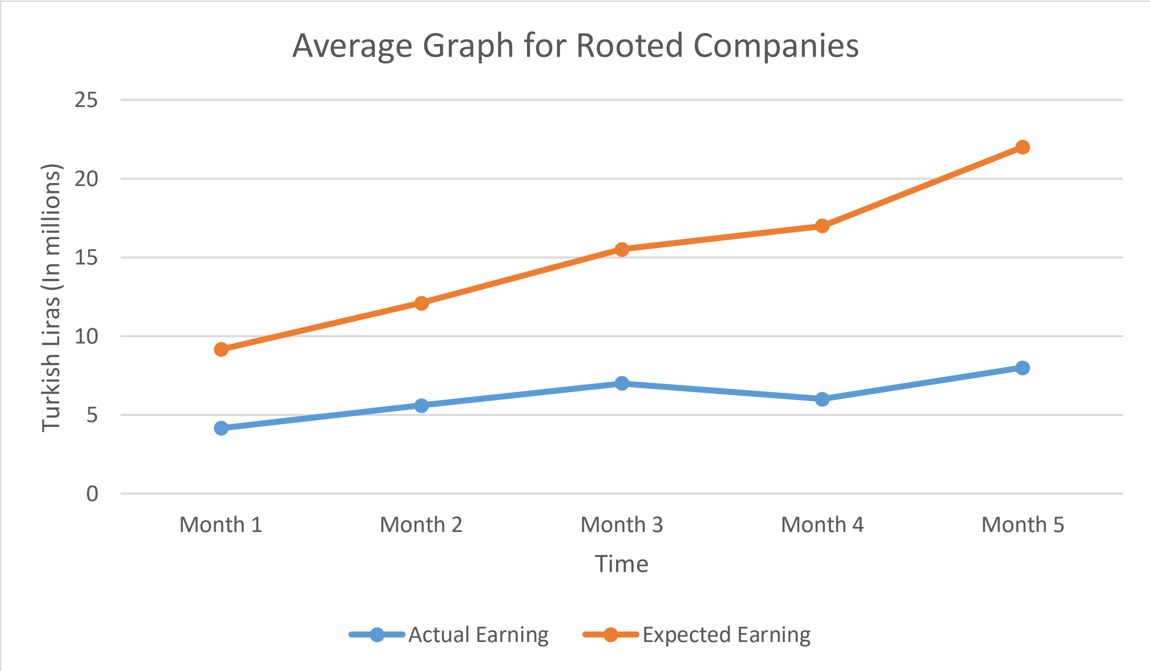
In the game Spades, the cards have a special order of magnitude in which a player has a valuable card in his hand, which means that the company has an economic trump card in the hands of the player, or the potential of being a market leader in some periods. We can see that the company's market share in the short term will grow and in the long run will result in the company's appraisal, and this will lead to better opportunities every year (i.e. representing one year in real trade wars), better cards in every year, and right strategies, as mentioned in the model.

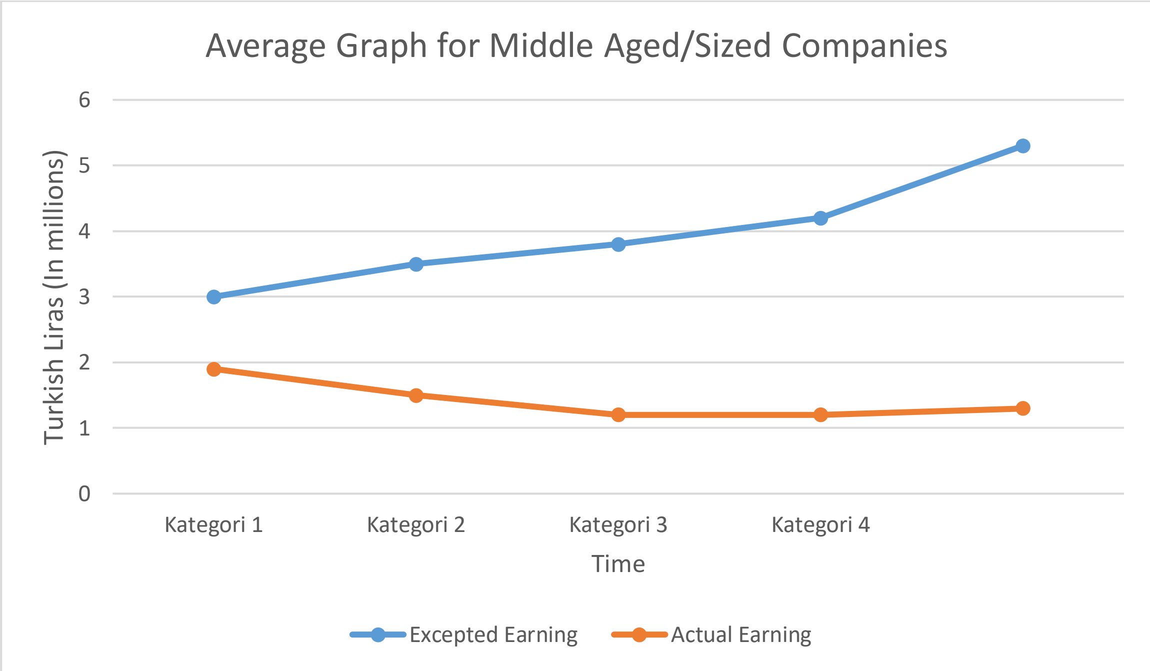
2.6. Distribution of Cards

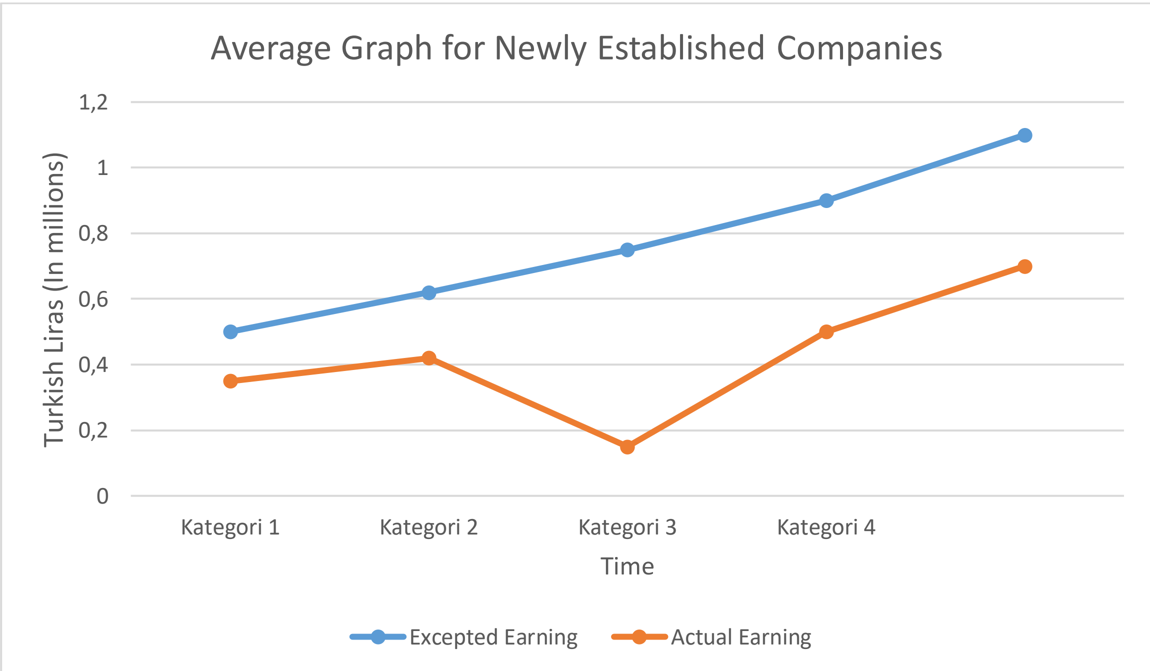
In the original of the Spade game, the cards are randomly distributed to the players, but as you also are aware that it is not possible and reasonable to randomly distribute the advantages and disadvantages of such big market-leading companies. For this reason, the cards are distributed in the first game (representing player replacement and replacement of one in the game) in terms of the size of the company in the market and the amount of sales, that is, proportional to the value of the company in general. In the following games, in addition to the value of the company in the market, the profits of the previous year (of the previous year), are taken into consideration and a card distribution is made accordingly and a new conflict starts for each company.

3. Concluding and Main Findings Under Assumptions

As stated before, scarcity environment is a serious factor that deeply influence the overall balance of the companies. Contrary to normal times, we observed that the chance factor played a relatively major role; however, that did not specifically mean that the companies rolled a dice: companies (players) that set up their growth strategies on basis and changed conditions of the new environment either tended to use their trump cards— meaning that the companies tended to invest in scarce materials and undertook a huge risk that may have ended up a total bankrupt, which indeed was the ending for many newly-created firms. It is also observed that, despite the fact that rooted companies seemed to have lost some of their earning, they managed to follow a fairly plausible tactic for two reasons: they had enough customers to compensate their losses, and they opted for a trajectory that would keep them in a safe position. In other words, while majority of newly-established companies either had trump cards or the cards that had less value, the rooted companies had "aces." Mid-aged/sized companies, on the other hand, were the most severely affected companies.




Average Graph for Middle Aged/Sized Companies
Turkish Liras (In millions)
6
5
4
3
2
1
0
Kategori 1
Kategori 2
Kategori 3
Kategori 4
Time
Excepted Earning
Actual Earning


Average Graph for Newly Established Companies
Turkish Liras (In millions)
1,2
1
0,8
0,6
0,4
0,2
0
Kategori 1
Kategori 2
Kategori 3
Kategori 4
Time
Excepted Earning
Actual Earning

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