Organisation for Economic Co-operation and Development

DAF/COMP/WD(2021)6

Unclassified

English - Or. English

25 May 2021

DIRECTORATE FOR FINANCIAL AND ENTERPRISE AFFAIRS
COMPETITION COMMITTEE

Methodologies to Measure Market Competition – Note by Turkey

11 June 2021

This document reproduces a written contribution from Turkey submitted for Item 3 of the 135th OECD Competition Committee meeting on 9-11 June 2021.

More documents related to this discussion can be found at https://www.oecd.org/daf/competition/methodologies-to-measure-market-competition.htm

Please contact Mr Antonio Capobianco if you have questions about this document.
[Email: Antonio.CAPOBIANCO@oecd.org].

JT03476950

Turkey

1. Introduction

1. Private property right and freedom of economic agents in their decision-making processes are two fundamental factors for the success of the free market system. Competition is the major component of this system that provides an allocation-efficient result and thus a welfare optimum. In economics, from perfect competition to monopoly, all market structures are defined and classified by their different levels of competition. Lack of competition in a market that cause waste of resources, productive and allocative inefficiencies, is considered as market failure. To avoid market failure and/or to reveal potential anticompetitive practices that bring similar results, it is important to measure the level or degree of competition in the market.

2. Without any doubt, the more the knowledge and insights about the market structure and the intensity of competition within the market, the greater the probability of choosing right instruments to intervene. Despite the progress in data collection and developments on methods such as new algorithms to process data, and the industrial organization (IO) theory as well, however, it is still far from being an easy task to measure the degree of competition within a market precisely. In this note, we aim to provide a very brief overview of the common methodologies to measure market competition and some techniques used in the Cement Sector Inquiry as an interesting example of the Turkish Competition Authority's (the TCA) experience on the topic.

2. Competition Indicators

3. Depending on the function, scope and the level of compared agents, there are a number of different definitions of competitiveness. The ability of a firm to survive and to operate profitably in a market, for instance, is related with firm level competitiveness. There are also sector based, region based, country based or the entire economy based competitiveness definitions.[1]

4. Competition in a market depends on the structural features of the market and each firms' competitiveness skills. Hence, these two are important and inclusive key concepts that give us a way to evaluate dynamism of the competition in the market. The reason for this view is that, almost all indicators derived to measure competition in a market are emerged and shaped around these two concepts.[2]

5. As competition is not directly observable, economists usually try to measure competition by indicators through empirical studies or by simulations, which are believed to be related with competitiveness. In this context, occasionally a single indicator is used to evaluate market competition, while a group of indicators are used more often to determine the degree of competition in that market accurately. Concentration measures, such as HHI and C4 ratios, are the most common indicators in use. The reason why these

[1] European Commission Report (2018), "*Measuring Competitiveness*"

[2] In the study "*External Report on Competition Indicators and Other Relevant Method"* (2007) by Copenhagen Economics, 57 competition indicators are defined under eight titles: Concentration (7), Barriers to Entry (12), Mobility (4), Innovation (8), Prices (4), Profits (9), Productivity (8) and Product Quality (5).

indicators are the most common mainly lies behind their very simple structure, since they are based only on the market share data of firms in a particular market.

6. Due to the complexity of the real world, however, using concentration indicators alone is not usually sufficient to measure competition within a market accurately. Researchers also refer other economic evidences such as mark-up estimations and their evolution in time, as prominent indicators for the intensity of competition in markets. There are also studies aiming to measure market competition by using a group of indicators with different combinations[3] or with index applications.[4]

3. The TCA's Cement Sector Inquiry

7. As it is the case for many competition agencies around the world, the TCA conducts market studies/sector inquiries to develop and contribute policies with respect to the enforcement of competition law. In one of those studies, the "Cement Sector Inquiry", the TCA conducted price-cost-demand analyses, joint pricing behavior simulations, efficiency and competition analyses to reveal and evaluate structural features of the sector in question, firm behavior, and thus the intensity of the competition in the market.

8. Initially, detailed descriptive statistics such as prices, customers, and sales dynamics related to the sector were evaluated, and then the price-cost and price-demand relations were examined with long and short term distinctions. Then, by analyzing firm behavior with empirical methods, it was tried to measure by simulations if the observed prices of firms at certain observation points (city / year pairs) were rather close to their predicted levels for the types of oligopolistic competition, joint profit maximization or monopolistic behavior.

9. Finally, it was examined whether the prices of firms that are operating more cost effective are relatively low than of those firms with higher cost structures. For this purpose, the technical efficiency levels of the firms were measured by applying the "Data Envelopment Analysis" (DEA), and compared with their price levels.[5]

[3] See, for instance MARÉ, David C. and FABLING, Richard (2019) *"Competition and productivity: Do commonly used metrics suggest a relationship?"*. In their study, the authors use combinations of two profit indicators (profit elasticity and price-cost margin) and two concentration indicators (HHI and top twenty firms' market shares) as competition measures.

[4] The Netherlands Competition Authority introduced a new method to measure whether the structure or behavior of firms in a particular market prone to anti-competitive practices. This method, which is called Competition Index, consists of nine indicators that are related with competition and are considered indicative for the likelihood of anticompetitive behavior.

See https://www.acm.nl/sites/default/files/old_publication/bijlagen/7157_284100_E25_webversie200112.pdf

[5] A more detailed overview of the inquiry can be found in the TCA's contribution submitted to the OECD roundtable on "*Market Study Methodologies for Competition Authorities*" in 2017, which is available at https://one.oecd.org/document/DAF/COMP/WP3/WD(2017)17/en/pdf?_ga=2.55196450.845995513.1621605467-117940529.1594020776.

10. As the inquiry reveals, cement sector can be characterized as an oligopolistic sector because of high investment requirements (almost USD 100 Million per plant), transportation costs[6] and existence of legal entry barriers[7].

11. The analyses mainly used undertakings' sale prices for the period between January 2009 – August 2014, which was amounted to over 5,800,000 observation points. Each observation point contained the data described below:

- Name of the producer (20 total).
- Recipient (buyer).
- Recipient's tax identification number (a total of 6,900 different buyers).
- Type of the recipient (11 in total) according to the factors like:
  - Whether the buyer is a distributor or not.
  - Whether the buyer belongs to the same group of firms with the seller or not.
- Date of sale (day/month/year, consisting 2,100 different dates).
- Type of the cement product sold (32 in total).
- The city that the product was sold from (a total of 58 provinces).
- Quantity sold.
- Price, value added tax and transportation costs.
- The city and the county that the product was sold to (all of 81 provinces).

12. The researchers of the TCA conducted a total of 404 simulations[8] for 5 years and 81 cities in Turkey for the years between 2010 and 2014, in order to evaluate whether the pricing decisions were collusive or not. The simulations were run under different assumptions to predict the prices that would maximize the cement producers' profits in different scenarios ranging from a hypothetical collusion (aiming partial or full joint profit maximization) to Bertrand price competition. After predicting these prices, the observed average annual prices of the cement producers were compared with the findings of the simulations in order to assess which scenario's results were close to the actual prices. In other words, it was tried to reveal which assumptions on the underlying competitive structure of the market used in the simulations were relatively better to explain the prices observed, and thus actual pricing behavior of the cement producers, in the market for the period in question.

13. The statistics for the assessment is calculated by the following formula:

$$\text{Distance statistics for the scenario \#} = \sum_{I=1}^{N} (p_i \text{ observed} - p_i \text{ scenario \#})^2$$

[6] An area of 200-300 km radius of the production facility is generally regarded as the feasible sale zone.

[7] Every cement production facility investment has to be approved by a number of public entities within the context of regulations such as environment protection legislations.

[8] The demand function of cement products is estimated by using econometric methods with logit demand model. In the simulations, market shares and average variable costs are among other parameters that were used besides demand elasticities. These inputs were calculated directly from the available data set.

14. The simulation performances of the scenarios closest to the real world observations were evaluated in three categories[9], taking into account the closeness between predicted prices and real prices.

- 65 observations (16 %) were closer than 5%, 110 observations (27 %) were close between 5% - 10%, 102 observations (25 %) were close between 10% - 15% and 128 (%32) observations were close more than 15 %.
- In 277 of all (404) observation plots, the difference between the price found in the simulation and the observed prices were less than 15%.
- In 234 of the 277 observation plots, prices which are the result of the collusive behavior were 15% or less close to the observed prices; and therefore
- Partial or full collusive behavior scenarios produced more results close to the observed prices than non-collusive behavior.

15. The simulation results indicated that, in most regions collusive behavior aiming joint profit maximization likely had been conducted in relevant period. In addition, collusive behavior was significantly more common compared to the oligopolistic competition. Therefore, according to the study, it was possible to argue that the price levels observed in the cement sector between 2010-2014 had been determined above the price levels that would be expected from oligopolistic competition in general.

16. This study provided an understanding about the structure and the intensity of competition in the Turkish cement sector, and considered the elements that were necessary for the protection and improvement of the competitive structure of the market with a holistic perspective.

[9] Less than 5%, between 5-10% and between 10-15 %.