THE HANDBOOK OF ECONOMIC ANALYSES USED IN TURKISH COMPETITION BOARD DECISIONS

ECONOMIC ANALYSES AND RESEARCH DEPARTMENT 2019

FOREWORD

As known, competition law brings together law and economy disciplines. The role of economy discipline has significantly increased in recent years. In line with this process, economic/numerical analyses used in competition law are becoming more and more complicated. It is observed that economic/numerical analyses are used in Board decisions more frequently parallel to global developments, looking at Competition Authority's 22-year experience.

One of the tasks that the Competition Authority emphasizes is "Competition Advocacy", which is promoting competition law and increasing competition awareness in the society. The Authority has published many works such as "Competition Law for SME's", "Competition Law for Consumers" and "Competition Terms Dictionary". Within this framework, we believe that a study concerning economic/quantitative analyses used by the Authority will be beneficial for raising awareness among our shareholders.

To this end, we would like to submit our work "Economic Analyses used in Competition Board Decisions", which aims to explain quantitative analysis methods used in Competition Board decisions in a clear and simple manner, to our shareholders' information.

I would like to express my sincere thanks to those who made valuable contributions, especially, the Head of Economic Analyses and Research Department Zeynep MADAN, Chief Competition Expert Tarkan ERDOĞAN, Competition Expert Seda N. BAYRAMOĞLU, Research Expert B. Sinem DEMİR, Administrative Services Official Dr. M. Fazıl ÖZKUL from the same Department and in addition Chief Competition Expert Şerife Demet KORKUT and Şamil PİŞMAF, who also supported this work.

We hope that this work, which is a reflection of Competition Authority's experience and capacity in competition economics, will be useful for all interested shareholders within the framework of our competition advocacy activities.

Prof. Dr. Ömer TORLAK

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INTRODUCTION

It is possible to categorize economic analyses used in Competition Board decisions up to now under three titles. First title covers the analyses for the definition of the relevant market. Those constitute the majority of the analyses the Board uses. The second title is devoted to analyses used mainly in the evaluation of mergers and acquisitions to detect competition restrictions. Economic analyses used in decisions concerning agreements restrictive of competition and concerted practices are explained under the third title.

1. ANALYSES FOR THE DEFINITION OF THE RELEVANT MARKET

One of the primary aims of competition economics practices is to measure the market shares of undertakings concerned. Thus, first, it is necessary to draw the borders of the product cluster or geographical area -in competition law terms the relevant market - to be evaluated with respect to the existence of market power.

In order to define the relevant product market, the market consisted of all goods and services which are regarded, by consumers, as substitutes by reason of price, intended use and characteristics is taken into account. Relevant geographic market is defined on the basis of the geographic areas in which undertakings operate in the supply and demand of their goods and services, in which the conditions of competition are sufficiently homogeneous, and which can easily be distinguished from neighboring areas, as the conditions of competition are appreciably different from these areas[1].

1.1. Correlation Analysis

Correlation is a general term used to show the interdependency between two variables[2]. In the literature, it is accepted that there is a "*correlation"* between two variables in case a change in a variable is dependent on a change in the other variable. Correlation analysis is a statistical technique to measure the strength of the interdependency between those variables. This technique is preferred in competition law processes due to relatively less data requirements and facility to use. One of the

[1] For detailed information, please see Guidelines on the Definition of the Relevant Market (2008), Competition Authority https://www.rekabet.gov.tr/Dosya/guidelines/3-pdf, Access date: 8.1.2019

[2] EVERITT, B. S. and A. SKRONDAL (2010), The Cambridge Dictionary of Statistics, Fourth Edition, Cambridge University Press, 2010

correlation analyses mostly applied is price correlation analysis/test. This test is applied especially within the scope of merger and acquisition investigations.

The correlation coefficient, which shows the strength and direction of two variables X and Y, can be calculated as follows:

$$\rho = \sigma_{XY} / \sigma_X \sigma_Y$$

σ_{XY} : Covariance between X and Y.

σ_X and σ_Y: X and Y's standard deviations

Correlation coefficient takes values between "-1" and "+1". "-1" (negative) correlation coefficient shows inverse perfect linear relationship between variables whereas "+1" (positive) correlation coefficient shows perfect linear relationship in the same direction[3]. Correlation coefficient "0" shows that there is not a linear relation between two variables. However, it does not mean that the variables are independent.

The bigger is the absolute value of the correlation, the stronger is the relationship between the variables. On the other hand, simultaneous movement observed between two variables may be the result of other variables that are outside the analysis but affecting both variables such as shock effects. Thus, the fact that two variables move together does not always show that there is a causality relationship between those variables. High correlation between independent variables might be a coincidence (by chance). This fact is called illusionary correlation.

The logic behind using price correlation analysis to define the relevant market is as follows: In case the products analyzed are in the same market, it is expected that those products exert pressure on each other; in other words, compete with each other and in the long run product prices move similarly. For instance, if there is an increase in one product's price, at least some of the demand for that product transfers to

[3] Positive correlation shows that both variables increase or decrease together whereas negative correlation shows that one variable is decreasing while the other one is increasing.

competing product and competing product's price is expected to rise due to supply-demand balance[4].

If the correlation coefficient between the two price series is closer to "+1", relevant products' price movements are more similar. There will be less similarity, moving away from that value. Similarly, it is expected that the correlation between the prices of products in the same geographic region is higher than products subject to change in different geographical regions. In this respect, price correlation analysis can be used for defining not only the relevant product market but also the relevant geographic market.

On the other hand, price correlation test have some weaknesses[5] regarding the definition of the relevant market. First of all, this test is less reliable compared to econometric models used for estimating demand elasticity. It may result in defining the relevant market narrower or wider than reality. Another drawback of price correlation analysis is spurious correlation problem[6] mentioned above. For instance, prices of two products in different markets may move similarly due to shocks affecting both products, therefore, high correlation is observed between two prices. Accordingly, it is possible that high correlation between two products may be the result of inflation, common expenses, seasonality, integrated variables, etc. instead of competitive interaction.

Price correlation test was first used as a correlation analysis in defining the relevant market in Ülker decision[7] dated 2003. The case was related to exclusionary practice claims under the scope of article 6 of the Act no 4054 on the Protection of Competition (the Act no 4054). First, the Board asked whether biscuits, cakes, chocolates and chocolate covered products are in the same market to find whether Ülker held a dominant position. Depending on available price information, correlation coefficients were calculated between 13 products under four main groups, being biscuit, cake, cracker and cream chocolate. Price data were deflated to eliminate inflation effects. As a result of the analysis, relevant product market was defined as biscuit, cake and chocolate as a whole because the correlation was high between the main groups.

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[4] ÖZKUL, M. F. (2017), İlgili Pazarın Belirlenmesinde Kullanılan Kantitatif Yöntemler ve Güncel Uygulamalar, Finans Politik&Ekonomik Yorumlar Cilt 54, s: 624, p. 18

[5] BISHOP, S. and M. WALKER (2010), The Economics of EC Competition Law: Concepts, Application and Measurement, Third Edition, Sweet and Maxwell, London, p. 493

[6] DAVIS, P. and E. GARCES (2010), Quantitative Tecniques for Competition and Antitrust Analysis, Princeton University Press, New Jersey, Princeton p. 176–177

[7] Board Decision dated 09.06.2003 and numbered 03-40/436-187.

In Frito Lay Decision[8] dated 2006, the addressee of the investigation Frito Lay argued that the relevant market should be defined widely as “macro snack” (snacks consumed between meals) and suggested price correlation analysis as a basis for this argument. Pointing out weak aspects of correlation analysis (common costs, inflation, etc.), the Competition Board emphasized that the results of this test would be less reliable in case those factors were ignored. As a result of its evaluation, the Board did not accept a wider market definition based on price correlation analysis argued by the undertaking concerned; instead, defined the relevant product market as “packaged crisps” taking into account other criteria[9].

Competition Authority used price correlation analysis to define the relevant market in a merger case in Cadbury/Intergum/Dandy/Falım decision[10] dated 2007. The Board made a correlation analysis to find whether gum market’s sub categories, sugar free gum, sugar gum and sweetened gum are separate relevant markets. To this end, average real price movements in three subcategories in the previous three years were analyzed. The analysis showed that price correlations between those categories were low. As a result, each of the segments were defined as a separate product market.

1.2. Granger Causality Test

Recently, econometric tests based on price series have been used in order to complement correlation analysis[11]. Granger causality analysis/test is leading among those econometric tests.

As stated in the previous section, correlation coefficient between two series might be coincidentally high without any reasons. In order to prevent this fallacy, causality of the relationship between one series with another is observed. Simple price data are necessary to apply this test so-called Granger causality to define the relevant market.

According to Granger causality, if the prediction of variable Y is more successful when past X values are used compared to the situation when past X values are not used, X is Y’s Granger-cause[12]. If product X is in the same market as product Y, it is expected that there is a causal relationship between two products’ price series. For example, if

[8] Board Decision dated 06.04.2006 and numbered 06-24/304-71.
[9] Considerably different price levels, competitors’ observations, information and documents obtained during on-sight inspection showing that Frito Lay did not define the market so wide in reality.
[10] Board Decision dated 23.8.2007 and numbered 07-67/836-314.
[11] BISHOP, S. and M. WALKER (2010), p.527
[12] BISHOP, S. and M. WALKER (2010), p.528

the relevant geographic market is consisted of two geographical areas, a situation affecting the price in one region will spread to the other, thereby will Granger-cause the prices in the other region[13].

Competition Board first used Granger causality test in 2004 for the investigation regarding the claims concerning predatory pricing by Coca Cola Satış ve Dağıtım A.Ş. (Coca Cola A.Ş.) in soda pop submarket[14]. In the said decision, whether coke, fruit soda pop and soda pop constituted a single market or those categories constituted separate relevant markets was discussed. To this end, multiple regression analysis and Granger causality analysis were applied. According to Granger causality analysis results, causality relationship was found between soda pop prices and coke demand[15] as well as between coke prices and soda pop demand[16]. Similar analysis was made to fruity soda pop and coke as well as soda pop and fruity soda pop. Both regression analysis and Granger causality analysis showed that the relevant product market was carbonated drink market covering coke, fruity soda pop and soda pop.

The second decision where Granger causality analysis was used is Gıdasa-Marmara Gıda acquisition in 2008.[17] Granger causality analysis was used to find whether oil and margarine were in the same market. Granger causality test was applied to average price series during ten years between 1994 and 2004 and showed that olive oil, sunflower oil, corn oil and butter prices moved independently from packaged margarine and bowl margarine. Thus, it was concluded that margarine and oil constituted a separate market.

1.3. Shock Analysis / Natural Experiment

One of the methods used to define the relevant market is shock analysis. This analysis is preferred because it is simpler and easier to apply compared to many analyses used in competition economics and strong if applied properly[18].

Shock analysis is a natural experiment that takes a significant change in the market as a basis. This analysis enlightens the competition conditions in the market depending on how customers or competitors react vis à vis an unexpected and sudden change in

[13] BISHOP, S. and M. WALKER (2010), p.528
[14] Board Decision dated 23.1.2004 and numbered 04-07/75-18
[15] Unilaterally from soda pop prices to coke demand.
[16] Unilaterally from coke prices to soda pop demand.
[17] Board Decision dated 7.2.2008 and numbered 08-12/130-46
[18] DAVIS, P. and E. GARCES (2010), p.185, BISHOP, S. and M. WALKER (2010), p.592–593

supply and demand conditions. In another words, an external shock regarding the sector may include valuable information about the functioning of the sector. Launch of a new product, sudden fluctuations in exchange rates, sudden increase in input costs, effects of advertisement campaigns, regulatory interventions and commercial disputes are examples of shock types[19].

An example of shock analysis applied within the scope of relevant market is as follows: A and B are in the same market. There is an increase in customs tax for B, that means an increase in the price of B. Analyzing product A's demand change will contribute to defining the relevant product market. Because it is expected that product A's sales and prices will increase all other things being equal if A and B are in the same market. Other external shocks can be analyzed similarly.

It is possible to make similar observations related to geographical market definition. For instance, in case of a new entry to a certain geographical area, if the prices both in that area and in the neighboring/adjacent area decrease, it can be concluded that both areas are in the same geographical market definition.

As stated above, shock analysis is preferable as it is simple and requires few data[20]. However, it should be noted that there should be a causal relationship between the "shock" analyzed and undertakings' behavior as a prerequisite. Moreover, there should not be any other significant change in the market simultaneously.

According to paragraph 38 of the European Commission Notice on the Definition of the Relevant Market[21], shock analysis (recent past events or shocks) might be potentially useful for the definition of the relevant market. Similarly, paragraph 25 of the Guidelines on the Relevant Market issued by the Competition Board states that:

> *"Findings indicating the products substituted each other in the recent past:*
>
> *In some examinations, it may be possible to analyze information concerning cases in the recent past or changes in the market which may constitute*

[19] ICN (2013), The Role of Economists and Economic Evidence in Merger Analysis, The Merger Working Group, ICN Warsaw, https://www.internationalcompetitionnetwork.org/wp-content/uploads/2018/05/MWG_RoleofEconomics.pdf, Access date: 10.1.2019, p. 4.
[20] ICN (2013), p. 14
[21] European Commission Notice on the Definition of the Relevant Market for the Purposes of Community Competition Law [1997] OJ C372/5; [1998] 4 C.M.L. R 177

examples that two products were substitutes for each other. Naturally, such information is taken as a basis for market definition. Where there was a change in relative prices in the recent past (other factors being equal), responses in demand shall be decisive in determining the substitution level. If it is possible to conduct an analysis concerning which products lost sales where new products were introduced into the market in the past, valuable information for relevant product market definition may be gathered."

The only decision where the Competition Board used shock analysis is the decision in 2007 to withdraw the exemption granted to vertical agreements between Coca Cola and final points of sales, which included an exclusivity provision[22]. What was sought for the relevant decision was whether the relevant market was consisted of coke drinks and other carbonated drinks or carbonated drinks as a whole. Ülker Group entered the market in 2003 with Cola Turca brand. This launch was taken as a shock parameter. Accordingly, first, the effects of Cola Turca's advertisement and marketing costs on those of Coca Cola A.Ş., which was the biggest player in the market, were examined. The analysis showed that Coca Cola A.Ş. spent most of marketing costs on coke drinks.

The second phase of the shock analysis looked into the shares Cola Turca took from coke drinks and orange/soda pop after it was launched. The losses in coke drinks in 2003 data, which reflected the consumers' reaction to market entry, was three times more than the losses of other carbonated drinks. In 2004, this ratio was calculated as nearly two times. The data showed that Cola Turca's entry affected other coke drinks mainly. For determining the relevant market, the decision took into account other factors (chain retailers' opinion, product positioning in chain retailers, price level comparisons, product/brand image differences) in addition to shock analysis.

1.4. Elzinga-Hogarty Trade Flow Test

Elzinga-Hogarty trade flow test is one of the analyses used in competition law enforcement to define geographical market. This test's advantage is that it is applicable only with quantity data when price data are not available. The main logic of the test is based on the suggestion that if there is no or weak trade flow (export, import) between regions, each region determines its own price regardless of other regions. Those

[22] Board Decision dated 10.9.2007 and numbered 07-70/864-327.

regions are regarded separate geographical markets. On the contrary, regions with busy trade flow are regarded as being in the same geographical market.

Elzinga-Hogarty test depends on two criteria based on transport information[23]: LIFO (Little in from Outside) and LOFI (Little out from Inside). LIFO is related to the demand side of the market and measures how much the demand (consumption) is met by the production in that area. High LIFO value means that entry to the area (import) is low; thus, the market analyzed can be regarded as a separate geographical market.

LIFO= (Production-Export)/Consumption

LIFO=1-(Import/Consumption)

LOFI, on the other hand, is related to supply side of the market and measures the flow of goods from the area in question to different areas. In line with this, the relative value of outflow from the area (export) to total production in the area is taken into account. High LOFI value means that firms' sales to outside of their production area are limited; thus, the area in question can be regarded as a separate geographical market.

LOFI= (Production-Export)/Production

When we rearrange the equation

LOFI= 1- (Export/Production)

Therefore, high LIFO and LOFI values mean that the area analyzed can be regarded as a separate geographical market. If one of the criteria is under a certain threshold (generally 0.9), producers in that region (suppliers) will bear competitive pressure from suppliers in other regions, thus, the test should be repeated to include the closest neighborhood. In this way, geographical borders should be expanded until the two critical value thresholds are exceeded. The threshold is generally accepted as 0.9.

[23] ÖZKUL M. F. (2017), p. 20-21

Kenneth Elzinga and Thomas Hogarty, who developed the test, suggested this threshold as 0.75 (weak market) or 0.9 (strong market)[24].

Competition Board first used Elzinga-Hogarty test in 2000 in *Farplas* decision[25] related to the preliminary inquiry made in response to the claim that Arçelik A.Ş. abused its dominant position in white goods market. The test was used also for *Arçelik/Blomberg* decision[26] dated 2002 to define the relevant market for washing machines. The decision was related to acquisition by Arçelik of a white goods producer, Blomberg in Germany. In order to answer the question whether the geographical market for washing machines is Turkey or EU countries including Turkey, LIFO and LOFI values were calculated. The geographical market was defined as the borders of EU including Turkey because LIFO was very high (0.93) but LOFI was low (0.71) (in other words export from Turkey to EU was high).

Beside the abovementioned decisions, Competition Board has used Elzinga-Hogarty test in many decisions, especially in files related to cement sector. *Nuh Çimento* decision[27] dated 2016 and *Iron-steel* decision[28] dated 2017 are recent examples.

On the other hand, regarding cement files, the Board uses another test similar to Elzinga-Hogarty called “10% criterion”, which measures competitive pressure on the basis of each facility active in the market. The Competition Board used 10% criterion method for the first time in *Bolu Çimento/Deniz Çimento* decision[29] in 2007. The method takes into account the rate of the sales by a specific cement facility to a certain region in total consumption in that city. This method differentiates the sales by a cement facility on city basis, in case the sales by the relevant facility to a specific city constitute at least 10% of total cement consumption, the city where the sale takes place is included in the relevant geographic market[30]. The main criterion here is how important is the facility for the specific region (city), in other words to what extend that facility is able to create competitive pressure in that region (city).

The biggest disadvantage of trade flow tests such as Elzinga-Hogarty and 10% criterion is that those tests are static and overlook relative price changes included in

[24] ICN (2013), p. 58
[25] Board Decision dated 17.10.2000 and numbered 00-39/436-242.
[26] Board Decision dated 28.05.2002 and numbered 02-32/367-153.
[27] Board Decision dated 18.02.2016 and numbered 16-05/118-53.
[28] Board Decision dated 7.09.2017 and numbered 17-28/481-207.
[29] Board Decision dated 24.07.2007 and numbered 07-34/352-132.
[30] Board Decision dated 9.11.2014 and numbered 14-01/6-5 (para. 15)

relevant market definition[31]. In fact, while looking for the borders of the relevant market, it is necessary to evaluate customers' possible reactions[32] to small but non-transitory change in relative price.

Other criticisms to these types of tests is as follows: potential competition is not taken into account, relevant market is defined narrower or broader than reality, threshold values such as 80-90% taken as a basis in the test do not rely on economic reason[33].

Indeed, the Board's Ro-Ro decision[34], in which those points were discussed widely, lists the disadvantages of the test under four main titles, including examples from EU and US (para. 178).

- The market is defined narrower than reality/potential competition is not taken into account,
- The method is static,
- Threshold values do not have economic basis,
- The market is defined broader than reality.

In the same decision, the Board explained the use of analyses based on transport data such as Elzinga-Hogarty test on the following grounds: prices are determined through bargaining; unless there is long price series, annually determined prices do not show real supply and demand in the market; it is difficult to find real prices, etc.

1.5. Hypothetical Monopolist Test

One of the techniques used to define the relevant (product and geographic) market is hypothetical monopolist test. The main benchmark to determine the relevant market is the existence or degree of supply and demand substitution with respect to products (regions) in question. The relevant market consists of products and regions making competitive pressure on each other to meet consumer demand. Thus, it is related to measuring competitive level between alternative products while determining the relevant market. There are three methods with respect to applying hypothetical monopolist test, being SSNIP, Critical Loss test and FERM test[35].

[31] BISHOP, S. and M. WALKER (2010), p 683–686
[32] For instance, whether customers will prefer easily available substitutes or providers in other regions.
[33] Board Decision dated 18.02.2016 and numbered 16-05/118-53 p.29.
[34] Board Decision dated 9.11.2017 and numbered 17-36/595-259.
[35] KALKAN, E. (2012b), İlgili Pazarın Tanımlanmasına İlişkin Sayısal Yöntemler, Information Note, p.3

1.5.1. SSNIP Test (Small but Significant and Non-Transitory Increase in Price Test)

Demand substitution means whether consumers or other users prefer other alternative products to a certain extend in case of a certain increase in a product's price. Hypothetical monopolist test is used to determine the relevant market with respect to demand substitution. This test was first used by US Department of Justice and later many competition authorities started to apply it.

In order to measure the demand substitution, SSNIP assumes that there is a small but significant and non-transitory increase in relative prices of the product and evaluates users' possible reactions to this change. This small but significant and non-transitory price increase is 5% or 10%. While US Department of Justice accepts this increase as 5%, in EU practice this ratio is generally taken as 10%[36].

It is possible to explain SSNIP's functioning in the following example[37]: Let's focus on the definition of the relevant market within the scope of two banana producers' application for merger. Let's suppose that there is only one banana producer. Does this banana producer find making a small but non-transitory increase in its prices at 5% or 10% level profitable? If this increase is profitable, if the answer is yes, in this case, banana product will not face significant competitive pressure from other products; in other words, it is accepted that there is no other product to substitute banana with respect to demand. Therefore, banana will be defined as a separate product market.

Let's assume that when the monopolist firm increases banana prices at 5% or 10% level, demand will switch to significantly kiwi and less significantly to pineapple. In this case, the monopolist firm will not find this price increase profitable. Therefore, banana will not be deemed as a relevant product market alone because there are products such as kiwi and others to make competitive pressure on banana sellers. The test will continue so that the relevant market widens. In the second phase, let's assume that there is a single firm who sells banana and kiwi. In that case, does this seller find increasing banana and kiwi prices at 5% or 10% level profitable? If the increase is profitable, the relevant market consists of banana and kiwi. Otherwise, closest

[36] MOTTA, M. (2004), Competition Policy, Cambridge University Press, US, p.102
[37] MOTTA, M. (2004), p. 102-103

products which make competitive pressure on banana and kiwi will be added and the test will be repeated. Finally, when the price increase becomes profitable for the hypothetical monopolist, the products added to the analysis will constitute the relevant market.

SSNIP test is used also to determine the geographical market in addition to the product market. In this case, SSNIP functions in the following way: Let's think of a merger between two mineral water producers in Ankara. Let's seek the answer to the question *"can this hypothetical monopolist increase mineral water prices at 5-10% level in a profitable way?"* If the answer yes, Ankara province is a geographical market alone. If the answer is no, in other words, if this price increase is not regarded profitable because of competitive pressure from firms, for instance, in Konya, in this case, the test will be repeated to include Konya and consequently the region where the hypothetical monopolist can increase its prices profitably can be defined as geographical market.

SSNIP test is mainly used in concentration analyses to define the relevant market. For analyses other than concentration such as examinations regarding the abuse of dominant position, the use of this test has some drawbacks since in a market structure with a dominant firm, the question whether a hypothetical monopolist makes a small, significant but non-transitory increase in the current prices will not be meaningful and leads to mistakes within the scope of SSNIP test. Applying SSNIP test by taking current prices as a basis will result in defining the market broader than it is.

For instance, let's assume that a firm is dominant in a properly defined market. As the firm is dominant, its prices are over competitive levels maximizing its profits. Therefore, it will not be profitable for this dominant firm to increase current prices. Thus, SSNIP test will define the market where the firm is located broader than it really is and consequently reaches a misleading conclusion that the firm is not dominant or does not have market power[38].

This fact, known as the cellophane fallacy, was first seen as a result of Du Pont case in 1956 in US[39]. Du Pont held 75% market share in the cellophane market, which should have been the relevant market. On the other hand, Du Pont held 20% market

[38] MOTTA, M. (2004), p. 105
[39] DAVIS, P. and E. GARCES (2010), p. 207-208

share in the market consisted of cellophane and other packaging materials (alternative market share definition). US Supreme Court defined the market broadly in a wrong way due to high cross price elasticity observed between cellophane and other packaging materials and concluded that Du Pont did not have market power. The Court's approach was criticized later because of the reasons stated above and it was accepted that SSNIP would result in broader definition of market in competition cases other than concentrations.

The Competition Board also points out this situation as follows in the Guidelines on the Definition of the Relevant Market (para. 12):

> *"In markets where concentration is low, the price to be taken into account will generally be the current market price. However, this does not apply to cases where market price is determined in an environment with insufficient competition. Especially, in abuse of dominant position investigations, the current market price is significantly higher than competitive price due to market power."*

At SSNIP's first phase, for the product (or geographical region) taken as the starting point of the analysis, price elasticities[40] of relevant products are needed or should be estimated. Moreover, it is necessary to know or estimate hypothetical monopolist's price-marginal cost margin and relevant candidate product's price elasticity[41]. As stated before, if it is profitable for the monopoly to increase its prices at 5% or 10% level at the first stage[42], the said product alone is the relevant market. If it is not profitable, the process is repeated by adding the closest product to hypothetical monopolist's product cluster.

At SSNIP's second phase, if the hypothetical monopolist has more than one product, in case both products' prices are increased by 10%, cross price elasticity[43] should be known (or should be estimated) beside the products' own price elasticities.

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[40] Price elasticity (of demand) as an economic term can be defined as the ratio of the percentage change in the price of a product to the percentage change it will cause in quantity. As the demand curve of the products is negative, price elasticity is negative as a rule.

[41] KALKAN E. (2012b), s. 7

[42] If price elasticity is sufficiently "low", hypothetical monopolist will increase its prices profitably since its loss in sales will be lower than the increase in sales resulting from high prices.

[43] Cross price elasticity can be defined as the ratio of the percentage change in a product price to percentage change in other products' demand.

The Competition Board first used SSNIP test to define geographical market in 2009 in Oyak/Lafarge acquisition decision[44]. The logic of SSNIP test regarding the product market is the same for determining the geographic market. The Competition Board explains the test in the reasoned decision with its stages as follows (para. 400):

> *"...within the framework of the explanations made above, SSNIP test is applied in relation to the file in question according to the phases below:*
>
> 1) *A starting region will be selected to define the geographic market concerning each relevant facility,*
> 2) *Assuming that all facilities in that region are controlled by a monopoly, the monopoly's profit in the first six months of 2008 and 2009 after the prices of the products produced in those facilities are increased by 10% will be calculated,*
> 3) *If the total profits calculated after the price increase is more than the total profit before, the relevant geographic market is defined within the borders of the starting region,*
> 4) *If total profits are less compared to the situation before the price increase, the test will continue, adding new regions. New regions to be added will be determined according to the region with highest product flow to the starting point. It will be assumed that the producers in the newly added region is controlled by the hypothetical monopolist and the effect of the price increase on the total profits will be reevaluated.*
> 5) *No more new regions will be added at the point where price increase leads to an increase in total profits, the area including the region that is added lastly is defined as "the relevant geographical market".*

The Board took Kocaeli and Zonguldak provinces, where the relevant parties' facilities were located, as the starting point. However, neighboring provinces without a facility were regarded as being in the same region as the province making the highest sales to them. In this case, the regions to be tested first at SSNIP's beginning phase:

- with respect to Oyak Bolu facility "Bolu and Düzce"
- with respect to Lafarge Aslan (Darıca) facility "Kocaeli and Sakarya"
- with respect to Ereğli facility "Zonguldak"

[44] Board Decision dated 18.11.2009 and numbered 09-56/1338-341.

In the relevant decision, each facility's own price elasticity and cross price elasticity in each province and price-benefit margins are needed to apply SSNIP test. Demand elasticities are estimated econometrically within the framework of nested logit model (para. 430). Price-costs rates are calculated by using average variable cost data provided by acquisition parties (para. 440). Assuming that the facilities established in the starting region are under the body of the same hypothetical monopolist, how hypothetical monopolist's total profit at the starting point as a result of 10% price increase in all products of this facility was effected was calculated. While this calculation is made, residual demand elasticity is calculated by adding cross price elasticities that show the increase in demand of that product resulting from the price increase in other products of the monopoly to each product's own price elasticity (para. 450). As a result of the SSNIP tests, Kocaeli-Sakarya, Bolu-Düzce and Zonguldak provinces are each identified as a separate geographical market.

1.5.2. Critical Loss Test

The second method out of three different methods applied within the framework of hypothetical monopolist test is the critical loss test. Critical loss analysis estimates the minimum decrease in sales so that unilateral price increase by the hypothetical monopolist is not profitable. Unilateral price increase will create two types of effects on profit[45]: First, when the prices increase, as some consumers will switch to substitutes, sales and profits will decrease. Second, profit per unit will increase as the price increases. If the second effect is more than the first, it can be said that the price increase is profitable. Critical loss test tries to find the answers to the following questions[46]:

1. If the hypothetical monopolist increases its prices at a certain ratio (t), under the assumption of losing some of its customers, without changing its profitability, what is the loss ratio that makes the firm indecisive about whether to increase the prices - critical loss- in percent ? In another words, how much loss there should be in sales so that an increase of t rate becomes unprofitable.
2. What is the real loss in sales stemming from the price increase?

[45] KALKAN, E. (2012b), p.4
[46] KALKAN, E. (2012b), p.4

Critical loss and real loss can be estimated as follows, assuming that fixed and variable costs remain the same after the price increase[47]:

Critical loss: $\frac{t}{t+m}$

Real loss: εt

t : $\frac{\Delta p}{p}$ price increase rate (%5-%10)

m: $\frac{p-c}{p}$ profit margin (Lerner index)

Ɛ: price elasticity of demand

Those two ratios are compared after real loss and critical loss values are found. Accordingly[48]:

- *"Real loss< Critical loss $\rightarrow$ the relevant market is the candidate market identified at the beginning. If the real loss is less than the critical loss, it means that the hypothetical monopolist can increase its prices profitably. The price increase increases profitability. In this case, it means that the candidate market is the relevant product market.*
- *"Real loss > Critical loss$\rightarrow$ the relevant market is broader than the candidate market identified at the beginning because if the real loss is bigger than the critical loss, this means that the loss in sales as a result of the price increase does not make the price increase profitable. The analysis is repeated by broadening the market via taking into account the closest substitutes.*

As seen from the formula, profit margin is needed for critical loss calculation. If the profit margin is high, the percentage of critical loss will be smaller. That is to say, while if we assume t as 5%, the profit margin will be 40%, the critical loss is 11.1%, when the margin is 90% critical loss is 5.3%. In this case, when the profit margin is high, significantly smaller critical loss ratio might lead to defining the market broader than it

[47] KALKAN, E. (2012b), p.5
[48] ICN (2013), p. 15, 54, 55

is[49]. On the other hand, it is necessary to know demand flexibility for having the real loss information. The said demand flexibility may be obtained directly via demand estimation or business experience, market document and customer queries may be helpful[50] [51].

1.5.3. Full Equilibrium Relevant Market Test (FERM Test)

This is the last of the three methods used when applying the hypothetical monopolist test. The SSNIP test assumes that the prices of the potential competing products do not rise (stay fixed) while the hypothetical monopolist increases the prices of its own products. However, companies producing the competing products should be expected to respond to the price increases in question by adjusting their own prices. The FERM test takes this point into consideration when defining the relevant market[52].

The FERM test relaxes SSNIP test's assumption that the prices of the companies excluded from the test do not change. In the FERM test, following the increase of the hypothetical monopolist's prices, there would be changes in both the demand and the elasticity values for other companies' products. These changes would lead to further changes in output and price level, which would be determined by the companies within the framework of profit maximization. The application of this more realistic test is technically more complicated than the SSNIP test[53]. FERM can be applied under certain assumptions with the help of a technique called "*merger simulation*". Merger simulations are used when estimating the effects of mergers and acquisitions between competing undertakings on product prices as well as on the average prices in the industry.

Briefly, the simulation is conducted as follows[54]: Market shares of the undertakings in the relevant market are first established, followed by the estimation of own and cross price elasticities of the parties to the merger via econometric methods. These calculations use the price and quantity data before the merger transaction. Afterwards, first degree conditions of profit maximization are calculated for each undertaking in the

[49] DAVIS, P. and E. GARCES (2010)
[50] KALKAN, E. (2012b), p.5
[51] The Competition Board used critical loss analysis in investigation processes related to Besler/Turyağ (see the decision dated 12.10.2010 and numbered 10–64/1355–498) and Anadolu Grubu/Migros (see the decision dated 9.7.2017 and numbered 15–29/420–117), the decisions did not include details about those analysis made.
[52] DAVIS, P. and E. GARCES (2010), p.218, 219
[53] KALKAN, E. (2012b), p.17
[54] KALKAN, E. (2012b), p.18

market. Using the profit margins obtained from the pre- and post-merger solutions, a calculation is made for the probable rate of price increase (t) that may arise as a result of combining the products under the same hypothetical monopolist. If this rate of price increase (t) is above 5% (or 10%) for all products of the hypothetical monopolist, then it is possible to contend that the hypothetical monopolist would be able to increase its prices by 5% (or 10%) to maximize its profits and that the relevant market is comprised of the products in question. On the other hand, if the price increase is below 5% (or 10%) for some products of the hypothetical monopolist, the closest substitute product will be added to the product set and the FERM test is continued.

FERM tends to define a narrower market than SSNIP. This is because in FERM, price increases by the hypothetical monopolist is generally followed by an increase in the product prices outside the candidate market. This will emphasize the profitability of the hypothetical monopolist stemming from the initial price increase, leading to a narrower market definition in comparison to SSNIP.

The Competition Board utilized the FERM test to define a market for the first time in a 2012 decision concerning predatory pricing in the market for ro-ro transportation[55]. This decision found that if all ro-ro lines between Turkey and Europe were operated by the same hypothetical monopolist, then the monopolist would be able to profitably raise its prices in all lines above the 5% threshold[56] used in the SSNIP test (para. 45). In other words, this price hike would not lead to consumers switching from ro-ro transportation to road transportation at a level that would make the relevant price increase unprofitable for the monopolist. The FERM analysis started by estimating an econometric demand model for products (ro-ro lines) that could potentially be included in the relevant market. Afterwards, the hypothetical monopolist test was applied, using the coefficients acquired from the econometric demand model, the price elasticities of product demand based on these coefficients, and the other information in the data set[57]. Another decision where the Competition Board defined the market using the FERM method is for a 2017 concentration transaction, which also concerned ro-ro transportation[58].

[55] Board Decision dated 1.10.2012 and numbered 12–47/1413–474
[56] At 8.09%, on average.
[57] ICN (2013), p. 66
[58] Board Decision dated 9.11.2017 and numbered 17–36/595–259.

2. NUMERICAL ANALYSES TO ESTABLISH SIGNIFICANT REDUCTION IN COMPETITION

2.1. Price Concentration Models

Price concentration model, used primarily in merger/acquisition files, is based on the "*structure-conduct-performance*" theory developed by Bain. According to this well-known theory, market structure determines/affects the performance of firms in the market through their conduct. Market concentration ratio is used as a proxy variable since it shows market structure[59]. In the market power hypothesis, concentration affects firms' performance, i.e. profit margins, through their pricing behavior. The relevant hypothesis may be transformed into a testable statement as follows: If high concentration is related to high prices/profit margins, mergers and acquisitions which significantly increase concentration in a certain market would also increase anti-competitive concerns in that market.

In general, price concentration models estimate the statistical relationship of market prices with other factors which affect market demand, with cost elements and with variables that measure market concentration [such as *Herfindahl-Hirschman Index* (HHI) or The *Four-Firm Concentration Ratio* (CR4)][60]. In these models, the relationship between the variables in question are estimated using econometric methods[61]. In price concentration models, the "*relevant market*" must first be defined and data must be collected at the level of this market.

In the price concentration model, dependent variable is price[62]. Independent variables are the concentration variables, cost variables and demand elements mentioned above. The primary goal here is the concentration variable. HHI and CR4 as well as the number of firms in the market may be used as a concentration variable[63].

As mentioned before, price concentration models are mainly used in mergers/acquisitions. In such transactions, this analysis economically examines whether the concentration transaction in question would result in price increases[64]. On

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[59] OFT (1999), *Quantitative Tecniques in Competition Analysis,* Research Paper 17, OFT 266, p. 87
[60] KALKAN, E. (2013), *Rekabet Kurumu'nda Birleşme-Devralma İşlemlerinin Değerlendirilmesinde Yapılan İktisadi Analizler: Besler/Turyağ ve AFM/Mars Kararları*, Competition Journal, No: 14(3), p.42
[61] KALKAN, E. (2013), p.43.
[62] Average price in the market or product prices may be used.
[63] KALKAN, E. (2012a), *Türkiye Konserve Ton Balığı Piyasası İçin Bir Fiyat-Yoğunlaşma Modeli*, Competition Journal, No:13 (3), p.143
[64] BISHOP, S. and M. WALKER (2010), p. 625

the other hand, these models may also be used in dominant position cases. In dominant position cases, the question tested may be expressed as "*Does the high market share of the company allow it to profitably raise its prices above competitive prices?*" The analysis concerned can also be applied to those types of agreements between undertakings which restrict competition. In such cases, the model seeks to answer the question "*Does agreement between the firms restricting competition allow the firms to profitably raise their prices above competitive prices?*" Thus, price concentration models seek to answer the question in competition law's main field of interest directly[65].

In the 2010 Besler/Turyağ[66] and 2011 AFM/Mars[67] files brought before the Competition Board, the potential effects of the relevant concentration transactions on the prices were estimated by the price concentration model[68].

In the Besler/Turyağ transaction, Besler, which is under the Ülker Group umbrella, would increase its shares in Turyağ, establishing de facto control over the company. In this transaction, the relevant product market was defined as the vegetable oil, industrial margarine and consumer margarine markets. The transaction primarily affected the industrial margarine market. This is because Ülker Group, as the market leader, would acquire the third largest player in the industry, decreasing the number of independent players in the market from four to three. The final examination process concerning the transaction utilized a price concentration model in order to estimate the effect of the concentration on prices[69] [70].

In the AFM/Mars transaction, the companies requested the authorization of the Board for a joint venture between AFM Uluslararası Film Prodüksiyon Ticaret ve Sanayi A.Ş. and Mars Sinema İşletmeciliği A.Ş., both in the business of operating movie theaters in various provinces in Turkey, which aimed to ensure joint control over the movie theaters operated by the undertakings. The Competition Board took this transaction under final examination since it posed a risk of significantly decreasing competition in

[65] BISHOP, S. and M. WALKER (2010), p. 625
[66] Board Decision dated 12.10.2010 and numbered 10–64/1355–498
[67] Board Decision dates 17.11.2011 and numbered 11–57/1473–539
[68] KALKAN, E. (2013)
[69] KALKAN E. (2013), p.44–47
[70] In the decision concerned, the Competition Board concluded that there would be no change in control following the commitments undertaken by the parties, and the price concentration analysis conducted during the examination process was not evaluated.

the market by creating a dominant position. The price concentration model was applied during the final examination process in addition to classical structural analysis (market shares, concentration ratios, barriers to entry and potential competition), in order to reveal the potential transaction's effect on prices.

The relevant product market was defined under the file as the movie theater services market. In terms of the relevant geographical market, 38 separate relevant markets were defined within the provinces of İstanbul, Ankara, İzmir and Antalya where the transaction examined caused concentrations and the file looked at the effects of the transaction on local competitive conditions within the five geographical market where the two undertakings could put competitive pressure on each other. One of the sections of the relevant decision, titled "*The Effect of the Notified Transaction on Final Consumer Prices*," includes the economic analysis conducted within the framework of the price concentration model (para. 86 ff.).

The relevant analysis uses the monthly discount and full-price ticket numbers and box office income, rent costs, employee payments and other total costs as the data set. Following the definition of local markets, average market price, HHI and relevant cost variables were calculated.

As a result of the regressions and tests conducted, HHI's effect on prices were found to be statistically significant, while the effect of the cost items were found to be insignificant in general. In light of the econometric forecasts and calculations in the file, it was estimated that, following the transaction, movie ticket prices could go up 16% in the Western Ankara market, 37% in the Ümraniye/İstanbul market, 32% in the Etiler-Levent/İstanbul market, 13% in the Şişli/İstanbul market and 7% in the Taksim-Beyoğlu/İstanbul market, where AFM and Mars Sinema exert competitive pressure on each other within the provinces of Ankara and İstanbul.

The parties of the transaction offered a structural commitments package (which envisaged the divestiture of some movie theaters) during the final examination stage. Within the framework of the commitments package, the divestitures would leave the HHI ratios in four of the markets unchanged, with an HHI increase in the Western Ankara market only. In this case, the model used in the analysis estimated a price increase of 1.3%, with no increase in prices in the other markets. As a result of this observation, the Competition Board concluded that the commitments package presented by the parties would eliminate the competitive concerns of significant

restriction of competition in the aforementioned five markets, and therefore authorized the transaction subject to the conditions of the commitments in question.

2.2. Merger (Concentration) Simulations

Merger simulations comprise a complementary approach for the aforementioned structural model and are experiencing wider use in the recent years. As is known, structural approach in competition law and economics involves the definition of the relevant market followed by the calculation of the market shares of the transaction parties (or market concentration ratios), and thereby requires conducting an orthodox competition analysis. However, structural approaches may not produce the desired results, particularly where product differentiation is concerned. Merger simulations, on the other hand, try to reveal directly how much the prices would increase after the merger and what kind of effects this would have on both consumer and total welfare. Probably the most essential difference of this approach is the fact that it does not require a market definition. In fact, similar to the FERM test method, results of the merger simulation, i.e. potential price increases, may even help in defining the market. On the other hand, this method does require technical expertise, that is to say, knowledge and experience in the fields of economic modelling and econometrics.

Merger simulations basically try to find a direct answer to the question competition authorities seek to answer[71]: *"How will the prices and consumer welfare change after the merger?"*. To that end, the simulation method is structurally based on an approach focused on demand-substitution, but it does take firm conduct and potential efficiency gains on the supply-side to calculate and pre- and post-merger price-output equilibrium[72]. This method also allows estimating the possible effects of the remedies presented by the parties (unbundling, divestiture, etc.) in response to a competition-decreasing outcome following the merger (high price increases, a loss of welfare, etc.)[73]. The simulation is generally conducted within the following stages[74]:

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[71] BISHOP, S. and M. WALKER (2010), p.628

[72] KORKUT, Ş. D. (2013), Rekabet Analizlerinde Kullanılan Niceliksel Yöntemler Üzerine Bir Not, Competition Article, Turkish Competition Authority, https://www.rekabet.gov.tr/tr/Sayfa/Yayinlar/diger-calismalar/rekabet-yazilari?icerik=4b6b1bd3-9c10-44c3-b4a7-7b685b687357 Accessed: 8.1.2019, p. 2

[73] KORKUT, Ş. D. (2013), p. 2

[74] ÇELEN, A. (2010), *Yatay Yoğunlaşmaların Tek Taraflı Etkilerinin Belirlenmesinde Talep Tahmini ve Simülasyon Tekniklerinin Uygulanması*, Doctorate Thesis, Turkish Competition Authority, p. 41–48, PİŞMAF, Ş. (2018), *Yoğunlaşmaların Kontrolünde Modern Bir Araç Olarak Yoğunlaşma Simülasyonu: Türkiye Akaryakıt Dağıtım Sektörü Üzerine Varsayımsal Bir Uygulama,* Competition Journal, No: 20(1), Turkish Competition Authority, p. 10–11. Korkut, Ş. D. (2013), p.2–3

In the first stage, a demand system and its parameters are projected. The main goal of this is to estimate the price- and cross-price elasticities to be used in the next stages of the simulation. To that end, the demand function to be used is selected at the outset. If the elasticities were calculated in another study, they may be used in the simulation directly, provided they are reliable. The primary demand functions used in estimating elasticity parameters are linear and log-linear functions, discontinuous choice demand functions (standard logit, nested logit and random coefficient logit models), almost ideal demand system (AIDS) and proportionality-calibrated almost ideal demand system (PCAIDS). After the demand function to be used in the simulation is selected, the parameters which will determine the elasticity coefficients must be estimated.

The second stage involves calibrating the demand system. In this stage, shifting parameters in the demand system must be calculated in order to ensure that the selected demand system yields the pre-concentration equilibrium. Pre-merger equilibrium values (product prices and market shares) as well as the elasticity parameters estimated in the first stage are used to calibrate the demand system.

The third stage is acquiring the marginal cost curves for the products. This involves making an assumption on the type of competition between the firms in the market (Cournot-quantity competition, Betrand–price competition). In practice, the Bertrand oligopoly model (Bertrand-price competition) with its strategic decision variable of price is preferred in those markets with differentiated products[75]. Within the framework of the selected competition model, a simultaneous solution of the first order conditions of profit maximization for the products of the firms will give the marginal costs of those products. In general, this model assumes that the marginal costs of the products do not change after the merger, in line with the fixed marginal cost assumption.

The fourth stage is the calculation of the prices and quantities after the merger, i.e. the simulation stage. This is where post-merger price increases are estimated.

Merger simulation is a model that is used particularly where differentiated products are concerned. With sufficient data sets and appropriate modelling, merger simulations are capable of directly estimating the size of the unilateral effects. For instance, with the collection of supermarket data for branded consumer products getting easier in the recent years (use of scan track data), the data set difficulties in merger simulations for

[75] ÇELEN A. (2010), p. 37

fast moving consumer goods have been overcome[76]. On the other hand, the disadvantage of this model is the fact that it does not capture competition parameters other than the price (such as service, quality, terms of delivery)[77].

As seen from the explanations above, there are two doctorate theses published by the Competition Authority on the subject of merger simulations requiring intensive technical knowledge. The first of these, Kalkan (2010)[78] uses a nested logit model to show how a hypothetical merger between the second and third largest players of the Turkish cola drink market (Pepsi and Cola Turca/Ülker) would affect prices. The study estimates a rise of 15-21% in the prices of the parties to the merger, with the market prices increasing by 16-22%, and that the consumer surplus would decrease by 8-10%. The other doctorate study, Çelen (2010), uses standard and nested logit demand models to apply merger simulation to hypothetical mergers in the beer sector. Lastly, in his chief expert thesis, Pişmaf (2018) applies merger simulation to hypothetical concentration scenarios in the fuel distribution sector in order to analyze the potential impact of such concentrations on prices and consumer welfare.

There are a limited number of Competition Board decisions that include merger simulation analyses. The first of these is the decision concerning the predatory pricing claims in the ro-ro transportation market, mentioned previously in the section explaining the FERM test[79]. The decision in question used merger simulation analysis as a tool to define relevant market within the framework of the FERM test[80].

Another decision using merger simulation also concerns the ro-ro transportation market[81]. In the 2017 decision taken in relation to the acquisition of six companies including the Ulusoy Group company Ulusoy Ro-Ro İşletmeleri A.Ş. by UN Ro-Ro İşletmeleri A.Ş., merger simulation was used in order to reveal the unilateral price effects of the transaction in question. The logit demand model used in this file is the same as the model used in the 2012 ro-ro decision mentioned above. The analysis estimated that the average prices in the Çeşme-Trieste line would go up by 10.9%,

[76] BISHOP, S. and M. WALKER (2010), p. 658
[77] BISHOP, S. and M. WALKER (2010), p. 660
[78] KALKAN, E. (2010), *Demand Estimation, Relevant Market Definition and Identification of Market Power in Turkish Beverage Industry*, Doctorate Thesis, Turkish Competition Authority
[79] Board Decision dated 1.10.2012 and numbered 12-47/1413-474
[80] ICN (2013), p. 66
[81] Board Decision dated 9.11.2017 and numbered 17–36/595–259

and the prices of the Pendik-Trieste, Mersin-Trieste and Pendik-Toulon lines would rise by 2.1% on average.

Another decision which used merger simulation was taken in 2014 and concerned Lesaffre et Compaigne's acquisition of control over Dosu Maya, which was previously controlled by Yıldız Holding[82]. Lesaffre is active in Turkey through Öz Maya. In accordance with the results of the merger simulation, it was projected that the parties to the transaction could increase their prices by over 20%, and that the general level of average prices in the market could rise by up to 12% following the merger[83].

2.3. Diversion Ratio and Upward Pricing Pressure Analysis

Diversion ratio and upward pricing pressure analysis is another method utilized to reveal the unilateral effects of mergers/acquisitions. The diversion ratio between the two competing firms A and B can be defined as the percentage of sales lost by firm A to firm B in case the former increases its prices. The statistics in question can be seen as a measure of the substitution relationship between competing undertakings. A high diversion ration between the products of two companies mean that these products are close substitutes for each other, and that a merger between the two companies would cause significant unilateral effects.

The diversion ratio approach may be explained by the following hypothetical example[84]. Assume a motor vehicle market comprised of the two premium brands A and B, two mid-segment brands C and D as well as other brands. When A increases its prices, some consumers would switch their demand to other brands. Supposing that, of the aforementioned consumers switching their demands to other brands, 60% have chosen B, 15% C, 15% D and 10% the other brands, then the diversion ratio between A and B would be 60%, between A and C as well as A and D would each be 15%. The diversion ratio above shows that brands A and B are closer substitutes for each other than other brands. If, hypothetically, A and B were to merge, this newly established firm would be able to profitably increase its prices without any concern for having a majority of the consumers switching their demand to other brands. In other

[82] Board Decision dated 15.12.2014 and numbered 14-52/903-411.
[83] Board Decision dated 15.12.2009 and numbered 14-52/903-411, p. 20
[84] XIAO-RU WANG, E. (2013), *Economic Tools for Evaluating Competitive Harm in Horizontal Mergers*, Practical Law Company http://www.crai.com/sites/default/files/publications/Economic-Tools%20for-Evaluating-Competitive-Harm-in-Horizontal-Mergers.pdf Accessed: 8.1.2019, p.3

words, before the merger a unilateral price increase by A may not be profitable while after the merger, a unilateral price increase would become profitable since the diversion ratio between A and B is much higher than between other firms.

One method used in calculating diversion ratios is to utilize historical observations and data from the cases encountered by companies in the past. For instance, one resource might be win/loss reports prepared by any of the companies, showing the distribution of the sales lost by the company among the competitors that won these sales or the distribution of the sales won by the company according to the competitors losing those sales[85].

In addition, where the sales amount of the two firms are known and where own price elasticities as well as cross price elasticities between the two can be calculated, diversion ratio may be derived from those data. The mathematical formula for the diversion ratio (DR) calculated from the first company towards the second is as follows[86]:

$$DR_{1,2} = -\frac{\varepsilon_{1,2}}{\varepsilon_1}.\frac{Q_2}{Q_1}$$

In the diversion ratio formula $\varepsilon_{1,2}$ represents cross price elasticity and shows the change in the demand for the second product when there is a change in the price for the first product. ε_1 is the own price elasticity of the first product and represents the change in the product's own demand when there is a change in its price. Q represents the sales amounts of the first and second products at the calculated elasticity. As a result, diversion ratio is the ratio of the sales switched to the second firm in response to a price increase by the first firm to the total sales lost by the first firm.

Price elasticities of the first firm plays an important role in calculating the diversion ratio. The higher the level of switching from the first firm to the second (the higher the cross price elasticity between the two firms), the higher the diversion ratio. Following an acquisition between these two firms, the risk of economic losses as a result of price

[85]DOJ and FTC (2010), *Horizontal Merger Guidelines*, US DOJ and FTC.,https://www.ftc.gov/sites/default/files/attachments/merger-review/100819hmg.pdf Accessed: 8.1.2019, p.20
[86] ICN (2013), p.55

increases would get lower in total since most of the consumers lost by a price increase by the first firm would switch to the second firm and this second firms would already be under the umbrella of the same economic entity. This positive situation for the merging firms would increase the tendency by one of the firms to raise prices.

In certain cases, market shares may also be used as an indicator of the diversion ratio. If the products of the firms in the market are equally close to each other, then market shares may be used to calculate diversion ratios. This method assumes that sales lost by one firm (for instance, due to price increases) would be transferred to other firms in accordance with their market shares.

In this case the formula would be:

$$DR_{1,2} = (\text{market share of the } 2^{nd} \text{ firm}) / (1 - \text{market share of the } 1^{st} \text{ firm})$$

According to this formula, all other factors being equal, the higher the market shares of the merging parties (firm 1 and firm 2) are, the higher the diversion ratio would be. This shows that if one of the merging firms holds dominant position, then the diversion ratio would be high. As stated before, this method can be used if all the brands in the market are equally close to each other. Consequently, it is possible to calculate diversion ratios through market shares in homogeneous product markets where there is not much product differentiation between the brands, such as the milk market[87]. On the other hand, in markets with product differentiation, calculating diversion ratios through market shares would lead to misleading results.

Once the diversion ratio is calculated, price cost margin data must also be acquired to reveal potential price increases, i.e. unilateral effects, post-merger. The relevant analysis is called Upward Pricing Pressure (UPP). This analysis is included in the New Horizontal Mergers Guidelines published in 2010 by the US Department of Justice and the Federal Trade Commission[88]. Cost efficiencies are taken into account in UPP analyses and it is noted that such efficiency increases may keep price hikes low. The mathematical formula for UPP is as follows:

[87] XIAO-RU WANG, E. (2013), p. 3
[88] DOJ and FTC (2010), p.20

$$YDFB_1 = (p_2 - c_2).DR_{1,2} - E_1.c_1$$

In the above equation, *p* and *c*, refers to the prices and marginal costs[89] of the firms, respectively. $DR_{1,2}$ refers to the diversion ratio (DR) from the first firm to the second, while *E* refers to the rate of efficiency gains that would be achieved by the first firm following the merger if it were to raise its prices. As shown by the formula, a high diversion ratio (DR) and high margins increases competitive concerns post-merger. One of the greatest advantages of this type of analysis which takes diversion ratios into account is the fact that it does not need a classical relevant market definition.

The decision where the Competition Board utilized diversion ratio and upward pricing pressure analysis was taken in 2014 concerning Lesaffre et Compaigne's (Öz Maya) acquisition of control over Dosu Mayacılık, which was previously controlled by Yıldız Holding[90]. This decision includes a UPP analysis based on diversion ratios in addition to a merger simulation. It is calculated that the parties of the transaction, Dosu and Öz Maya, would have cost efficiency gains at around 5% and that they would be able to raise prices even under the assumption that the other firms would keep their prices fixed[91].

3. ECONOMIC ANALYSES USED IN AGREEMENTS AND CONCERTED PRACTICES RESTRICTING COMPETITION[92]

As is known, cartels, the most severe infringements in competition law, are the primary priority of competition authorities around the world. In competition law practice, economic/numerical analyses are mostly applied in order to define relevant markets and determine the effects of concentrations on prices and welfare; however, if required, economic analyses may be used to complement legal analyses for cartels and similar agreements and concerted practices restricting competition. This section will introduce

[89] It must be stated that variable costs are also used in practice, due to the difficulties in observing marginal costs.
[90] Board Decision dated 15.12.2014 and numbered 14–52/903–411
[91] Board Decision dated 15.12.2014 and numbered 14–52/903–411, p.20
[92] For detailed information on the subject, see KORKUT, Ş. D. (2015) *"Kartellerin Semptomları ve İktisadi Teşhisi: Yolun Neresindeyiz?"*, *Competition Journal,* No:16(3).

certain economic methods used in cases concerning agreements and concerted practices restricting competition, followed by some Board decisions on the subject.

Economic methods used to identify any collusive relationship between undertakings seek to answer the questions of whether undertakings' conduct comply with competitive behavior, whether there was a structural break in the undertakings' conduct within the investigated period, whether the conduct of the undertakings suspected of anti-competitive collusion is different from those of the competing undertakings in the market, and whether the outcomes observed in the market are more in line with a collusive model rather than a competitive one. Analyses conducted with that goal in mind focus on price movements primarily. Accordingly, the price level of the overall market, price levels of the individual undertakings and the change in prices in the course of time are examined[93]. In addition to price movements, factors including market shares, capacities, costs and demands as well as their relationship with prices are taken into account in order to distinguish anti-competitive prices formed as a result of agreements between undertakings from competitive prices.

3.1. Structural Break Analysis - The Chow Test

Structural break test is a type of analysis utilized in cases of agreements restricting competition and concerted practices, and it is more widely used to reveal whether an agreement exists between the undertakings. One of the firsts of its type, the Chow test allows the identification of any structural changes in the data set which includes a time series, and thus provides information on whether there was a structural change in firm conduct both before and after any potential structural break points[94], and whether we can thus infer the existence of an agreement. The Chow test uses the "F test" to examine whether there is significant difference between the coefficients or regression equations of two separate samples selected from the same statistical universe. The test for this verification is called the Chow test[95].

The Chow test was used in an 2017 Competition Board decision for an investigation concerning the claim that companies in the insurance sector increased their prices

[93] Board Decision dated 19.8.2009 and numbered 17-23/383-166 575
[94] Such as the potential start and end dates of an agreement.
[95] WOOLRIDGE, J. M. (2003), "*Introductory Econometrics: A Modern Approach",* Second Edition, Thomson, US, p. 431–432

collectively, and that they were thus engaged in an agreement or concerted practice restricting competition[96].

The decision in question economically questioned whether insurance companies set their premium rates jointly. In that framework, monthly average nominal premium levels of the companies under investigation were examined for the period of January 2010-April 2016.

In addition to the graphical analysis, the decision also examined statistically, through the use of the Chow test, whether there was a structural break in the relevant data set after the second half of 2015. The test performed concluded that there was indeed a break in the average nominal premium levels in the traffic insurance branch after August 2015 (para. 588). It was found that the average automobile premiums at the nominal level entered a significant upwards trend in the second half of 2015 in comparison to the other periods. The break in average nominal automobile premiums observed in the graphical analysis was also revealed statistically by the Chow test (para. 596). On the other hand, the decision allowed the possibility that the premium increases observed through the Chow test in the second half of 2015 could be connected to the cost increases which affected the premium assessments in the same period, and as a result, no definite economic conclusion was drawn for anti-competitive cooperation.

3.2. Variance/Standard Deviation Analysis[97]

Another type of analysis performed in cases of agreements and concerted practices restricting competition is variance/standard deviation analysis. As is known, variance is a measure of distribution and shows how different a certain set of data is from average. If the data is distributed similar to the average, this means variance is low. The basis of the variance analysis is the prediction that undertakings would not make frequent and large changes in the prices they agreed, and that prices would be less responsive to the changes in external factors[98]. For that reason, it is expected for the

[96] Board Decision dated 19.7.2017 and numbered 17–23/383-166.
[97] For the role, theoretical framework and implementations of variance/standard deviation analysis in detecting cartels, see ÇÖRÜŞ, S. (2012), *Kartellerin Tespit Edilmesinde Davranışsal Tarama Teknikleri,* Theses of Competition Experts, Turkish Competition Authority, Ankara
[98] KORKUT, Ş. D. (2015), p.20

prices to be more stable with fewer fluctuations in periods of collusion or cooperation, which would result in lower variance/standard deviation.

Obviously, a comparison must be made to determine the measure against which the prices could be said to fluctuate less, i.e. according to which criteria the variance/standard variation would be lower. These criteria may be a "*clean period*" when we are sure that the agreement restricting competition did not exist, or the prices of the "*innocent*" firms that are known not to participate in the agreement[99]. In such a comparison, that is to say, when comparing the competitive period to the agreement period, it is expected that fluctuations and therefore variance/standard deviation to be higher during the competitive period.

Variance analysis was utilized in the investigation decision on the traffic insurance market mentioned under the previous subtitle[100]. The examination performed within that context did not reveal a period in which premiums and rigidity of the premiums were high (in which variance was low) for all parties under investigation (Decision para. 689). On the other hand, the Competition Board utilized standard deviation analysis in another decision in 2016, concerning claims of vertical price maintenance[101].

3.3. Difference in Differences Analysis

Difference in differences analysis is an econometric method used to reveal cartel price increases or, for mergers/acquisitions, price increases after the transaction. According to the analysis in question, average prices of the market with the competition infringement (treatment group) is compared to those in the competitive market with similar characteristics (control group)[102]. The analysis concerned finds the effect of the cartel by taking "*the difference in average prices between the market with the alleged cartel and the competitive market*," and subtracting from it "*the same prices during a period without infringement*." A counterfactual assumption is utilized to predict that all market changes encountered in the control group would have been encountered in the treatment group if the cartel had not existed[103]. In other words, all variables affecting

[99] KORKUT, Ş. D. (2015), p.20
[100] Board Decision dated 19.7.2017 and numbered 17–23/383–166
[101] Board Decision dated 16.11.2016 and numbered 16–39/659–294
[102] CHAPSAL, A. and D. SPECTOR (2009), *What can be learnt from econometric studies in cartel cases*?", *Law and Economics Concurrences* No: 1–2009, Accessed: 08.1.2019, p. 44
[103] CHAPSAL, A. and D. SPECTOR (2009), p. 44

the price of the products in the treatment group (with the exception of the cartel parameter/effect) is assumed to similarly affect the prices of the products in the control group.

The Competition Board performed the analysis in question not in a cartel case, but in an examination of vertical price maintenance[104]. In this case, the treatment group (the group committing the alleged infringement) was comprised of Aygaz dealers, while the control group (competitive group) was comprised of Aygaz competitors. The difference in differences analysis was intended to eliminate the effects of the supply/demand changes on average prices. In other words, the goal of the analysis was to take the competitors' prices that did not involve vertical price maintenance, eliminate other factors related to the sector, and analyze to what extent average prices increased.

[104] Board Decision dated 16.11.2016 and numbered 16–39/659–294

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