

TESTING JUSTIFICATION FOR SEGMENT BASED RELEVANT PRODUCT MARKET DEFINITION IN MERGER CONTROL: EVIDENCE FROM TURKEY

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ABSTRACT

In this paper, we aim to investigate whether different segments of beer products can constitute a separate relevant product market within the framework of competition law. This question gained importance when the merger between Anheuser-Busch InBev and SABMiller became subject to a Phase II investigation by the Turkish Competition Authority in March 2016, which ultimately ended with an unconditional clearance decision, based on an intact “beer” market, recognizing that the relevant product market regarding beer brands in Turkey must be wider than the premium segment. To answer the research question above concerning relevant product market definition, we implement a Hypothetical Monopolist Test in two steps. In the first step, the aggregate price elasticity of demand for the premium segment is estimated econometrically by using a nested logit demand model. This model tests whether products in the same group are closer substitutes than products in different groups. We conclude that the correlation of beers within the same group is not statistically significant. Since the data in our study are obtained at the retail level, the price elasticity of demand at the brewer level is derived from the estimate at the retailer level by using very conservative assumptions with regard to the pass-through rates. In the second step, the hypothetical monopolist test is implemented by using the critical elasticity which is calculated by using the profit margins for the premium beer segment at brewer/supplier level under both 5 percent and 10 percent SSNIP. It is seen that the actual elasticity of demand for the premium segment is larger than the critical elasticity (in absolute value) under both scenarios. These findings show that the relevant product market regarding beer brands in Turkey must be wider than the premium segment.

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I. INTRODUCTION

Marketing professionals divide beer products into several segments such as economy, mainstream, premium and super premium according to various factors. These factors include taste, origin, price of products, and the commercial strategies of firms. However, there is no precise definition of these categories in the marketing world and no clear lines exist between categories for positioning products in any one of these segments. Different market research reports may classify the same brand under different categories. The purpose or perspective of a marketing professional in classifying any given beer brand under a specific segment is likely to differ from that of a competition law enforcer/practitioner. While a marketing professional tries to position brands in order to create the overarching perception that consumers are offered many differentiated products and numerous choices for any taste, preference or budget, a competition law enforcer/practitioner tries to understand whether the degree of differentiation for consumers is sufficiently significant for deciding on the substitution possibilities among alternative products.

The aim of this paper is to investigate whether these different marketing segments can be considered as separate antitrust markets for the purposes of competition law. This question has gained a particular importance when the merger between Anheuser-Busch InBev (henceforth, AB InBev) and SABMiller was subjected to a Phase II investigation by the Turkish Competition Authority (henceforth, TCA) in March 2016.

In many jurisdictions, including the European Union, China and South Africa, the acquisition of SABMiller, the world's second largest brewer, by AB InBev, the world's largest brewer, required a significant and complex level of merger control analysis, and, in some cases, was only cleared with various negotiated conditions. In Turkey, the proposed transaction was examined in a Phase II investigation and was ultimately cleared without any conditions.¹

Despite the negligible market shares of both AB InBev and SABMiller in the overall beer market in Turkey, the TCA, in its Phase II Notice, took the view that there is a meaningful price gap between super premium/premium beers and standard beers, and that the transaction contained the risk of creating a dominant position if the 'super premium/premium beer segment' can be said to constitute a separate relevant product market.

The Turkish beer market is a tight duopoly. Anadolu Efes, the market leader, produces and sells its own brands and also distributes some brands of SABMiller. The second prominent brewer in the Turkish market is Türk Tuborg. It produces and sells its own brands and also distributes some brands of AB InBev. In the pre-merger situation, SABMiller held a non-controlling minority share (24 percent) in Anadolu Efes. The TCA argued that although AB InBev would not be acquiring control over Anadolu Efes,

¹ See Turkish Competition Board, Decision No. 16-19/311-140, June 1, 2016.

the mere acquisition of the non-controlling minority shares would create a unity of interest between AB InBev and Anadolu Efes, based on the fact that AB InBev would be sharing in the profit/loss of Anadolu Efes. Due to this alleged creation of a unity of interest between AB InBev and Anadolu Efes, the TCA further asserted that it was highly likely that AB InBev would prefer to terminate its ongoing distribution relationship with Türk Tuborg and start to distribute its products through Anadolu Efes. This would expand the product portfolio of Anadolu Efes within the premium/super premium beer segment, which might lead to the creation of a dominant position for Anadolu Efes within that segment as well as strengthening its dominant position in terms of the overall beer market. Therefore, the relevant market definition played a critical role in the assessment of the proposed merger.

This paper proceeds as follows: First, the case law and the previous economic analyses regarding the relevant market definition for beer segments are reviewed. Then, the principles of a standard hypothetical monopolist test are explained in Part III. In Part IV, the details of the econometric estimation of the demand for beer products are presented. The implementation of the critical loss test which is used for the relevant market definition is explained in Part V. Finally, the findings of this analysis are summarized in the conclusion which comprises Part VI.

II. CASE LAW AND PREVIOUS ECONOMIC STUDIES

Neither the TCA nor the European Commission has so far distinguished between separate markets for “premium” and “standard” beers in their previous decisions. The beer market is one of the most familiar and closely-watched markets for the TCA, and there have been numerous decisions where the market dynamics of the beer market have been examined in minute detail.² However, in none of these earlier cases has the TCA defined separate product markets for “premium” and “standard” beers. While the TCA has dealt with cases concerning the premium beer segment, it has not so far differentiated a separate market for premium beers.³

Similarly, although the European Commission has discussed whether a further segmentation of the beer market by type (such as lager, ale and stout,

² See Turkish Competition Authority cases; Decision No. 09-38/925-218, Anadolu Efes/Mey İçki (Aug. 25, 2009); Decision No. 08-52/802-328, Israel Beer/Carlsberg (Sept. 11, 2008); Decision No. 01-30/299-89, Yaşar Holding/Carlsberg (July 4, 2001); Decision No. 12-43/1325-437, Efes/Tanmer Pazarlama (Sept. 10, 2012); Decision No. 12-38/1085-344, Efes/Ekseli Gıda (July 18, 2012); Decision No. 12-38/1084-343, Efes/Çağ-Bil Meşrubat (July 18, 2012); Decision No. 11-64/1691-598, Anadolu Efes (Dec. 29, 2011); Decision No. 11-42/911-281, Efes (July 13, 2011).

³ See Turkish Competition Authority cases; Decision No. 03-42/463-202, Anadolu Efes/Brauerei Beck GmbH (June 12, 2003); Decision No. 02-70/843-347, Anadolu Efes/Miller Brewing Company (Nov. 14, 2002); Decision No.05-20/234-69, Anadolu Efes /Carlton and United Beverages/Foster’s Group (Mar. 1, 2005).

as in the UK) or by quality (for example, standard vs. premium) might be relevant in some countries, the question was ultimately left open and the European Commission has not so far distinguished a separate market for premium beers.⁴ The European Commission's findings in some of its decisions object to defining distinct product markets for the "standard" and the "premium" segments. For example, the European Commission's findings regarding a potential differentiation between the "standard" and "premium" segments in its *Interbrew / Brauergilde* decision largely support a unified product market.⁵

This stance in terms of market definition is also reflected in the case law of the federal courts in the United States, which have conducted their analyses in the beer sector in terms of the overall beer market in a number of cases.^{6,7} The Department of Justice (DoJ) has likewise historically defined the relevant product market involving the beer industry as "all beer." In 1966, the DoJ defined the beer sector as a single product market in *US v Joseph Schlitz Brewing Co.*⁸ Subsequently, during the DoJ's review of the *AB/InBev* merger in 2008, it confirmed that the relevant product market definition was "all beer."⁹ Most recently, the "all beer" product market definition was once again adopted in the DoJ's 2013 review of the *ABI/Grupo Modelo* merger.¹⁰

Similarly, the Competition Bureau of Canada has consistently held that the relevant product includes "all beer." An early example of this view was evinced

⁴ See Case COMP/M.6587 Molson Coors/Starbev (June 6, 2012); Case COMP/M.4952 Carlsberg / Scottish & Newcastle Assets (Mar. 7, 2008); Case COMP/M.4999 Heineken/Scottish & Newcastle Assets (Apr. 3, 2004); Case COMP/M.2569 Interbrew/Beck's (Oct. 26, 2001); Case COMP/M.3032 Interbrew/Brauergilde (Dec. 19, 2002).

⁵ Case COMP/M.3032 Interbrew / Brauergilde, 19 December 2002, para. 11.: "Different research and data consultancies in the drinks sector do not have common criteria to distinguish for instance premium, even "superpremium", and standard beer. The market investigation has shown, that even though the breweries tend to declare one or more of their brands to belong to the premium segment, there were no common criteria for these regroupings. Indeed, it appears that different aspects such as the price (e.g. 20% above the other beer prices), the geographic scope of distribution (e.g. nationwide), the marketing expenses or just the "image" attributed to a certain brand could be decisive."

⁶ *U.S. v. Pabst Brewing Co.*, 233 F.Supp. 475 E.D. Wisconsin (Sept. 22, 1964); *Oak Distributing Co. v. Miller Brewing Co.*, 370 F.Supp. 889, E.D. Michigan (Nov. 30, 1973); *State of N.Y. by Abrams v. Anheuser-Busch, Inc.*, 673 F.Supp. 664, E.D. New York; *Package Shop, Inc. v. Anheuser-Busch, Inc.*, 675 F.Supp. 894 D. New Jersey (Oct. 19, 1987).

⁷ For instance, in *State of N.Y. by Abrams v. Anheuser-Busch, Inc.*, 811 F.Supp. 848, E.D. New York Jan. 14, 1993, the District Court provided as follows: "The parties stipulated that relevant product market for this case is all beer: alcoholic and non-alcoholic; premium and super premium; imports and domestics. Not only have the parties stipulated to this fact, but the evidence clearly reinforced this designation."

⁸ *US v. Joseph Schlitz Brewing Co.*, 253 F Supp. 129 (ND Cal 1966) at 133-134, aff'd 385 US 37 (1966).

⁹ Competitive Impact Statement: *U.S. v. InBev N.V./S.A., et al.*, United States Department of Justice (November 14, 2008).

¹⁰ Competitive Impact Statement: *U.S. v. Anheuser-Busch InBev SA/NV and Grupo Modelo S.A. B. de C.V.*, United States Department of Justice (April 19, 2013), <https://www.justice.gov/atr/case-document/file/486551/download>.

in the Bureau's 1989 review of the merger between Molson Companies Limited and Elders IXL Limited (the parent company of Carling O'Keefe Breweries of Canada Limited). In 2003, the Bureau investigated the relevant product market in the beer sector during an inquiry into the Quebec beer market and concluded that beer segments were not sufficiently distinct from one another to constitute separate markets. Consequently, the Bureau adopted "all beer" as the relevant product market for the purposes of its inquiry.¹¹ Furthermore, during its 2007 review of Labatt's acquisition of Lakeport, the Bureau's economic expert concluded that "beer is beer"¹² while in the Bureau's most recent review (of the 2013 merger between AB InBev and Grupo Modelo), the Bureau approved the transaction without ever suggesting to the parties that it viewed the market as being narrower than "all beer."

In economics literature, the relevant market definition mostly depends on data about the price elasticities of demand. Hausman, Leonard and Zona have estimated the demand elasticities of beer products by using a three-stage budgeting approach.¹³ At the top stage, they estimate the overall demand for beer. In the middle stage, they group beer products into three segments: premium, popular and light. In the top and middle stages, they use a log-log specification for demand equations. At the third stage, they estimate the demand elasticities of beer products at brand level by using an Almost Ideal Demand System.¹⁴ They estimate that the conditional own-demand elasticity for premium beers is -2.7 . In the light of this finding, they have concluded that a hypothetical attempt to raise the price of premium beers would not be profitable if the prices of light and popular beers were held constant. Therefore, according to their findings, premium beers would not constitute a separate antitrust market.

Houška and Bil have assumed a two-stage budgeting, in which the overall beer expenditure is allocated between different beer segments in the upper level, and the demand for individual beer brands is estimated in the bottom level.¹⁵ They investigate the following beer segments: dark beers, imported beers, light beers (with low calorie content), craft beers (mostly only local and produced in limited amounts), non-alcoholic beers, and premium beers (representing the mainstream beer). They use the Linear Approximate Almost Ideal Demand System (LA-AIDS) to estimate the own-price elasticities for selected beer segments. They estimate that the price elasticity of demand for the

¹¹ "Inquiry Into the Quebec Beer Market," Competition Bureau Backgrounder (April 29, 2003) at 2.

¹² M. Aitken memo to Commissioner Scott, 2007.

¹³ Jerry Hausman, Gregory Leonard & J. Douglas Zona, *Competitive Analysis with Differentiated Products*, 34 ANNALES D'ECONOMIE ET DE STATISTIQUE 166 (1994).

¹⁴ Angus Deaton & John Muellbauer, *An Almost Ideal Demand System*, 70 AM. ECON. REV. 312 (1980).

¹⁵ Tomáš Houška & Jaroslav Bil, *Definition of relevant market in beer industry: Application of LA-AIDS model*, 30th International Conference on Mathematical Methods in Economics, Karviná, Czech Republic (Sept. 11–13, 2012) http://mme2012.opf.slu.cz/proceedings/pdf/055_Houska.pdf.

premium segment is -1.28 . Moreover, they conduct a Critical Loss Analysis to find out whether a relevant market narrower than “all beers” exists. In contrast to the conclusions reached by Hausman, Leonard and Zona, their results show that each of the analysed segments constitute a separate relevant market. They have concluded that the relevant market in the beer industry appear to be narrower than “all beers”.

Although both papers use variants of the same demand system (that is, the Almost Ideal Demand System), the differences in data and in estimation techniques yield different results about the elasticities of demand and the relevant market definition. In this paper, we use a different demand system known as nested logit demand, which allows us to estimate demand elasticities by grouping a large number of differentiated products into segments. The data content and the properties of the demand system employed are explained in the following parts.

III. HYPOTHETICAL MONOPOLIST TEST (SSNIP TEST)

The generally accepted method in competition economics for market definition is the Hypothetical Monopolist Test (HMT). The way that HMT is implemented by European Commission is explained in the *Notice on the definition of relevant market for the purposes of Community competition law*. According to this notice, the HMT is implemented by answering the question whether “customers of the undertaking(s) concerned would switch to readily available substitutes in response to a hypothetical small (in the range 5 percent to 10 percent) but permanent relative price increase in the products and areas being considered.” If the price increase results in loss of sales and if substitution is enough to make the price increase unprofitable, additional substitutes are included in the relevant market. If the price increase is not profitable for the hypothetical monopolist, then it is surmised that the products in the candidate market would be significantly constrained by the competitive pressure of alternative products, and the relevant market should be larger than the initial set of products. If this is the case, the test proceeds by adding the closest substitutes to the previous set of products and by applying the “small but non-transitory increase in prices” (SSNIP) for the newer candidate market. If the SSNIP is not yet profitable for the hypothetical monopolist, the test goes on by enlarging the candidate market by adding newer alternatives until the price increase tips into profitability. When the price increase is profitable at any step, it is accepted that the hypothetical monopolist is not significantly constrained by alternative products (or firms), and the current candidate set of products constitute the relevant product market.

As the HMT test measures the effect of a SSNIP on the demand for products in the candidate market, the HMT is also known as the SSNIP test. The prices of all other products outside the candidate market are kept constant. In European implementation, the SSNIP is assumed to be an increase between 5 percent and 10 percent; however, in the United States the price

increase may be lower or higher than 5 percent. In the current analysis, the European approach is applied and the test is implemented by taking both 5 percent and 10 percent criteria.

The crucial point in the hypothetical monopolist test is to choose a reasonable set of products for the first step of the test. This choice depends on the characteristics of the market and the features of the products and their use or perception in the eyes of the consumers. In the current analysis, it is reasonable to choose the “premium beer segment,” as it is called in market research reports, for the initial candidate market.

A practical way of implementing the hypothetical monopolist test is to use Critical Loss Analysis. Critical Loss is defined as the sales which the hypothetical monopolist loses in case of an SSNIP, and it leaves the profits of the firm unchanged compared to its level before the change in prices. It simply defines the level of decrease in sales which corresponds to a break-even point for the profit of the hypothetical monopolist. When the SSNIP causes the firm to lose sales exceeding the Critical Loss level, the price increase will not be profitable for the firm. In that case, the market would be larger than the initial candidate market. In implementing the hypothetical monopolist test, the analyst needs information on the Actual Loss that the hypothetical monopolist may incur in case of an SSNIP. The test relies basically on a comparison between the Critical Loss and the Actual Loss.

In practice, it is not easy to calculate or access information on the Actual Loss. Usually, competition law practitioners use internal documents or the results of past business strategies of firms, which may provide some guidance to assess the Actual Loss. A better alternative is to estimate the price elasticity of demand for the candidate relevant product market. In this paper, the demand elasticity of the “premium” segment of beers is estimated by using sophisticated econometric methods. Then, the Critical Elasticity, which is an equivalent measure for Critical Loss, is calculated. Critical Elasticity gives the threshold level of elasticity at which the price increase leaves the profit of the hypothetical monopolist unchanged compared to its level before the price increase. Therefore, the relevant market definition in this paper is based on the comparison of the Critical Elasticity of the hypothetical monopolist of premium beers to its actual price elasticity of demand.

IV. ECONOMETRIC ESTIMATION OF DEMAND FOR THE PREMIUM SEGMENT

In this section, the basic assumptions and steps of the econometric model are explained. The beer industry is characterized by product differentiation. The econometric model used in this section takes into account this aspect of the industry. In an industry where there are a lot of differentiated products, the most suitable method of analysis would be to use different types of logit demand models. In these models, it is assumed that a representative consumer chooses the

product which gives him the highest utility. The utility of the consumer depends on the price and other product characteristics. Data which are available in this economic analysis contain information on some properties of beer products, and help to construct meaningful explanatory variables.

The logit demand models for differentiated products were developed by Berry (1994)¹⁶ and are widely used in the competition economics. In this economic analysis, a nested logit demand model will be used. The advantage of this model is that it allows the use of linear estimation methods (that is, OLS, 2SLS, and panel estimation), and it can be used with aggregate data.

The nested logit model is an extension of the simple logit model. It relaxes some restrictions on the pattern of substitution imposed by the simple logit model.

In light of the above, it can be said that the nested logit demand model is a suitable method for estimating the demand elasticities of premium beers by using the data set that is available for this economic analysis.

In the econometric specification of the nested logit model, products for which the elasticities will be estimated are categorized as “inside goods.” There is also a category of “outside goods,” which are defined as the alternative products that a consumer will choose if the prices of all inside goods increase by the same percentage.

In the nested logit demand model used in this paper, beer products are divided into three segments (premium, mainstream and economy), and the share of the outside goods will be determined based on certain assumptions.

After estimating the parameters of the appropriate demand model, it will be possible to calculate the elasticity of demand for every brand as well as the aggregate elasticity for the premium segment. The aggregate elasticity of the premium segment will then be used as the measure of Actual Loss of the hypothetical monopolist of premium beers.

A. Data

The data used in this analysis have been collected by Nielsen, the market research company. It covers monthly sales revenues (in Turkish Liras) and volumes (in liters) of beer products sold by retailers in off-trade channels (supermarkets, groceries, kiosks, etc.) in the Turkish market between March 2013 and March 2016. The data also include information on product characteristics such as:

- the name of the producer or importer (Anadolu Efes or Türk Tuborg),
- the type of packaging (aluminium bottle, glass bottle or can),
- the volume of the product (237 ml, 250 ml, 275 ml, 330 ml, 355 ml, 382 ml, 440 ml, 450 ml, 500 ml, 550 ml, 750 ml or 1000 ml).

¹⁶ Steven T. Berry, *Estimating Discrete-Choice Models of Product Differentiation*, 25 RAND J. ECON. 242 (1994).

The monthly average price per liter for each product is calculated by dividing the monthly revenues by the monthly volume (in liters) of a brand and, then, to account for the effects of inflation, it is adjusted by the Consumer Price Index which is published by the Turkish Statistical Institute (TURKSTAT).

Non-alcoholic beers are not included in this analysis. There are 145 distinct products in the data set and 53 of these are categorized under the “premium” segment. Only ten products are classified in the “economy” segment. In this data, a single brand name is assigned to all product items with the same brand name but with different volumes or packaging materials. (For example, Efes Pilsen 500 ml in can packaging and Efes Pilsen 330 ml in bottle packaging are assigned the same brand name, such as Efes Pilsen.)

B. The Nested Logit Demand Model and The Results

The nested logit demand model is presented below:

$$\ln\left(\frac{s_{jt}}{s_{0t}}\right) = -\alpha \cdot p_{jt} + \sigma \cdot \ln(s_{jtlg}) + \theta' \text{product characteristics}_j + \text{firm}_f \\ + \gamma' \cdot \text{demand shifters} + u_{jt}$$

The dependent variable comes from the theoretical foundations of the logit demand functions as explained in Berry (1994),¹⁷ and it is the natural logarithm of the relative market share of each premium product j in month t to the total market share of “outside goods” in the same month t . Explanation for the other variables is given in Table 1 below:

Table 1. Variables in the nested logit demand model

Variable or parameter	Explanation
p_{jt}	Monthly average real price of premium product j in month t
α	Coefficient of p_{jt}
σ	Correlation coefficient
$\ln(s_{jtlg})$	Logarithm of the share of product j in the segment g to which it belongs in month t
θ'	Coefficient vector for product characteristics
volume _{j}	Dummy variables for each volume type
package _{j}	Dummy variables for each package type
strong _{j}	Dummy variable for products having alcohol content exceeding 6 percent
firm _{f}	Dummy variables for each producer/importer company
demand shifters	Different demand shifters like dummy variables for each month (January-December); dummy variables for periods in the data
γ'	Coefficient vector for demand shifters
u_{jt}	Error term

¹⁷ Berry, *supra* note 16.

The model has a correlation coefficient σ as the coefficient of $\ln(s_{jtlg})$, which is the logarithm of the share of product j in the segment to which it belongs. Product characteristics are captured by dummy variables indicating the volume (ml) and package type of a beer product and by dummy variables indicating whether a beer product is strong (alcohol content exceeding 6 percent). The producer or importer is also shown by a dummy variable. In order to capture the effects of some advertising restrictions imposed on the beer industry (along with the rest of the alcoholic drinks industry) in 2013, three dummy variables are created, each for 2013, 2014 and for the following period in the sample. Other alternative demand shifters that can affect beer consumption are dummy variables indicating the Ramadan period in which consumers stop or reduce their alcohol consumption due to their religious beliefs and seasonal dummy variables for capturing the seasonal effects. In addition, a set of month-fixed effects is used as an alternative demand shifter which captures month-specific effects on the consumers' choice of beer.

Since price is probably correlated with the error term u_{jt} , it is an endogenous variable. To correct the endogeneity bias in the model, it is usually recommended in the relevant literature that instrumental variables should be used. In demand models, these suitable instruments would be the cost variables. In the demand model used in this economic analysis, the following instrumental variables are used: one-period lagged values of the Producer Price Index (by assuming that the Producer Price Index is a general indicator of the change in production costs and that the current prices of beer adjust to the changes in production costs with a time lag of one month), the exchange rate of the Euro versus the Turkish Lira, the inflation-adjusted price of glass products, and the inflation-adjusted price of fuel. These are given in monthly variations. In addition, the quarterly real wage index for the beer industry is also taken into account. Since this wage index is calculated and published quarterly, its three-period lagged value is used as an instrumental variable.

The variable $\ln(s_{jtlg})$ is also assumed to be endogenous. Steven Berry suggests using the characteristics of other products in the same nest to solve the endogeneity problem related to s_{jtlg} .¹⁸ Berry, Levinson, Pakes (1995)¹⁹ also advice using the observed characteristics of other products as instrumental variables. These instruments are generally called BLP instruments shortly in the literature with reference to the initials of these authors. The identifying assumption in this advice is that product characteristics of other products are exogenous and uncorrelated with the unobserved product characteristics, like quality, which are in the error term. On the other hand, the characteristics of other products can be correlated with the price and the market share of the product under consideration. It is assumed that the "location" of brands in

¹⁸ Berry, *supra* note 16.

¹⁹ Steven Berry, Jerry Levinsohn, & Ariel Pakes, *Automobile Prices in Market Equilibrium*, 63 *ECONOMETRICA* 4 (1995).

the characteristics space is exogenous and the products that face good substitutes will tend to have low markups, whereas other products will have high markups. The markup and the market share of each brand will depend on the distance from its nearest neighbour. Since the price is composed of marginal cost plus a markup, it will be correlated with characteristics of other products. The same argument can be said for the market share of a product in the nest. Therefore, the product characteristics of other products can be used as valid and relevant instrumental variables. The BLP instruments used in this article are the mean of the volume of items in other segments, the mean of the volume of items of the rival firms, and the mean of indicators assigned to the packaging of the rival firms.

With the help of these instrumental variables, the demand model estimation can be performed by using the two-stage least squares method (2SLS).

The parameter σ is expected to be between zero and one. It determines the correlation of the utility of beers within a nest. If σ approaches one, the utility correlation among brands within a segment is very high and consumers perceive products of the same group as perfect substitutes for one another relative to other products. In this case, it is meaningful to divide beer products into segments. On the other hand, if σ approaches zero or if it is statistically zero, the correlation within the segment becomes zero and the model reduces to the simple logit.

The potential market size and the market share of outside goods are calculated by using two different data sets provided by Nielsen about the yearly total volume of beer in Turkey. As said previously, the main data set used in this article basically consists of monthly sales of beer products at brand level in Turkey. Nielsen reports another data which present only the yearly total sales of beers in Turkey. It is observed that the yearly total quantity of beers in the first data set is less than the total yearly quantity reported by Nielsen in the second data set. The reason of this difference is probably the fact that the first data set is a sub-sample of the second one. In the calculations used in this article, the yearly total quantity of beers in the second data is accepted as the potential market size. The difference between the total volume in second data and the total volume in first data is accepted as the total volume of the outside goods. Under this assumption, the market shares of the outside goods are calculated and shown in Table 2.

Table 2. Assumed market share of the outside goods

Year	Market share of the outside goods
2013	22.6%
2014	10.5%
2015	12.5%

For preparing data at monthly basis for the econometric work, the yearly market share of the outside goods is hold constant for all months in a given year.

The results of the estimations of the nested logit model using alternative specifications are presented in Table 3 below. According to our preliminary regressions, the seasons and the Ramadan period have no effect on the choice of a particular premium product with respect to brands in other segments and the effects of these factors can be said to be the same for all types of beers. Therefore, the regression results including these variables have been omitted from Table 3.

In 2SLS models, the coefficient of the price is -0.83 or -0.88 . They are both statistically significant. The estimate of the correlation within nest is not statistically significant.

The tests show that the instrumental variables are correlated with the endogenous variables (Underidentification test) and that the correlation is not weak (F-test). Furthermore, they are not correlated with the error term in Models 4 (Sargan test).

C. Elasticities

Since the parameter of correlation is not statistically significant, the price elasticities of demand for beer products can be calculated by using the estimate of the coefficient of price, the price level and the market share of every product j . The formulas for elasticities are as follows:

Own-price elasticity of demand for product j :

$$\varepsilon_{jj} = -\alpha \cdot p_j \cdot (1 - s_j)$$

Cross-price elasticity of demand for product k with respect to the price of j :

$$\varepsilon_{jk} = \alpha \cdot p_j \cdot s_j$$

The formula for the aggregate price elasticity of demand for premium products is derived by the authors as follows:

$$\varepsilon_{\text{premium}} = -\alpha \cdot p_{\text{premium}} \cdot (1 - s_{\text{premium}})$$

p_{premium} is the weighted average price of premium brands and s_{premium} is the aggregate market share of brands in the premium segment. The elasticities are calculated by using the results in Model 4.

The estimates of elasticities are summarized in Table 4 below:

Since data used in this article are at monthly level, the mean of the weighted average prices and the mean of the aggregate market shares of the beers in the premium segment are calculated by averaging their monthly values over 12 months in a particular year.

Table 3. The results of the nested logit models

Variable	Model 1	Model 2	Model 3	Model 4
	OLS	OLS month fixed effects	2SLS	2SLS month fixed effects
	Share of outside goods is det. by Nielsen data			
<i>p</i>	-0.018***	-0.018***	-0.833***	-0.880***
lnsjt_g	0.862***	0.862***	0.098	0.11
strong	-0.341***	-0.340***	2.506***	2.621***
250	0.302	0.299	-3.824***	-3.881***
275	-1.112***	-1.114***	-0.449	-0.181
300	0.024	0.02	-4.513***	-4.464***
330	-0.468**	-0.472**	-2.721***	-2.578***
355	-0.845***	-0.848***	-0.178	0.041
382	-1.588***	-1.589***	-0.976	-0.737
440	-0.790***	-0.792***	0.519	0.777
450	-1.095***	-1.098***	-0.562	-0.324
500	-0.041	-0.043	-3.665***	-3.798***
550	0.552**	0.552**	-3.285***	-3.432***
750	-1.327***	-1.332***	-1.357	-0.992
1000	-1.340***	-1.342***	-5.041***	-5.241***
1500	-1.785***	-1.790***	-9.656***	-9.814***
3000	-1.202	-1.201	11.840**	12.821**
5000	0.086	0.083	-7.303***	-7.364***
_bottle	-0.998***	-1.003***	3.506***	3.702***
can	-1.195***	-1.200***	2.865***	3.035***
pet	-2.269***	-2.272***	2.773**	2.866**
other firms	0.344***	0.343***	(omitted)	(omitted)
Pera	0.034	0.033	(omitted)	(omitted)
Tuborg	-0.063*	-0.062*	0.716***	0.754***
2013	-0.876***	-0.879***	-2.217***	-2.304***
2014	0.166***	0.165***	-0.580***	-0.618***
february		-0.004		0.018

march		-0.005		0.326
april		0.017		-0.054
may		0.025		-0.071
june		0.002		-0.14
july		0.027		0.167
august		0.026		0.319
september		-0.015		0.272
october		-0.02		-0.165
november		-0.018		-0.067
december		0.017		0.201
_cons	1.723***	1.724***	4.714**	5.057**
N	3111	3111	2824	2824
AIC	7580	7601	14000	14000
BIC	7744	7831	14000	15000
F test of excluded instruments for p			F(3, 2798) = 21.44 Prob > F = 0.0000	F(3, 2787) = 20.05 Prob > F = 0.0000
F test of excluded instruments for $\ln sjt_g$			F(3,2798) = 88.15 Prob > F = 0.0000	F(3, 2787) = 89.63 Prob > F = 0.0000
Weak identification test (Cragg-Donald Wald F stat.)			13.84	12.06
Underidentification test (Anderson canon. corr. LM stat.)			41.29	36.19
p -value for Anderson canon.corr. LM stat.			0.000	0.000
Sargan statistic			2.929	2.058
p -value of Sargan test			0.087	0.151

Note: Statistical significance levels are shown by asterisks *:10%, **: 5%, ***: 1%

Table 4. Summary statistics for beers in the premium segment in 2015 (Model 4)

Variable	Obs.	Mean	Std. Dev.	Min	Max
p^{premium}	12	11.03	0.164	10.82	11.33
s^{premium}	12	0.18	0.005	0.17	0.18
ε_{ij}	472	-12.83	5.46	-56.04	-7.30
ε_{jk}	472	0.043	0.11	0.00004	0.643
$\varepsilon^{\text{premium}}$	12	-7.99	0.156	-8.30	-7.76

The mean of the weighted average prices of the premium brands is 11.03 Turkish Liras per liter in 2015. This is an inflation-adjusted mean value over 12 months in 2015. The mean of the aggregate market shares of the premium segment is 18 percent. (The brands Efes Extra and Tuborg Special are included in the premium segment.)

The aggregate demand elasticity of the premium segment is calculated for every month separately by using the formula above. For this aim, first, the monthly values of the weighted average price and the aggregate market share of the premium beers are calculated from data, and are used along with the estimate of the price coefficient for calculating the aggregate elasticity of the premium segment. Then, the mean of aggregate demand elasticity of the premium segment is calculated by taking the average of its monthly values over 12 months in a particular year. For year 2015, the mean elasticity of the premium segment is found -7.99. This is higher than the elasticity of the premium segment estimated by Hausman, Leonard and Zona,²⁰ which is -2.7. According to Hausman, Leonard and Zona their estimate for the elasticity of the premium segment is already quite large and they contend that it is not possible to argue that the different segments of beer can be a separate antitrust market.

The mean of own-price elasticities of the individual premium brands is -12.83, which illustrates that demand for premium brands is on average quite elastic.

D. Derived Demand Elasticity at Wholesale Level

The price elasticities of demand for premium beer products presented above are estimated by using the data at retailer level. These elasticities may not be used directly in a Critical Loss analysis if one focuses on the relevant market definition for a merger between brewers (such as the merger between AB InBev and SABMiller).

One way of solving this problem is simply to assume that the retailers reflect any percentage change in their wholesale costs to their retail prices by the same percentage. In this case, the retail level elasticities will be equal to the wholesale level elasticities and they can be directly used in the Critical Analysis.

²⁰ Hausman, Leonard and Zona, *supra* note 13.

Table 5. Explanations for derived demand elasticity at wholesale level

Abbreviation	Explanation
ϵ_w	elasticity at wholesale level
ϵ_r	elasticity at retail level
ϵ_{rw}	elasticity of retail price with respect to wholesale price
w	wholesale price
p	retail price
$\frac{\partial p}{\partial w}$	pass-through rate between w and p .

Another solution is to use some additional information to derive the demand elasticities at wholesale level from retail level elasticities. The relation between elasticities at wholesale and retail levels is presented in the following formulas. The meanings of the parameters in these formulas are explained in Table 5.

$$\epsilon_w = \epsilon_r * \epsilon_{rw}$$

$$\epsilon_{rw} = \frac{w}{p} * \frac{\partial p}{\partial w}$$

For the purposes of this paper, we learn from industry sources that the ratio w/p is predicted as 0.852. As for the other terms in the relation above, it can be stated that if the retail market is monopolistic and the demand is linear, then the pass-through rate is theoretically 0.5. In reality, it is known that the retail beer market is far from being a monopoly and the pass-through rate is expected to be considerably higher than 0.5. In Table 6, the derived demand elasticity at brewer (wholesale) level is calculated by assuming that the retail level is very close to the monopolistic level, and therefore, the pass-through rate is slightly higher than 0.50. For example, it can be taken as 0.51. This is a very conservative approach, and the pass-through rate of a typical retailer is expected to be much higher in reality.

Even under very conservative assumption, it is calculated that the derived demand elasticity at wholesale (brewer) level is -3.47 . As shown in Table 6, when the pass-through rate of the retailer is assumed to be 0.60, the derived demand elasticity at wholesale level increases to -4.08 .

As a final word on this issue, it should be pointed out that in an academic article written by Besanko, Dubé and Gupta,²¹ the pass-through rate for beer was found to be 5.58 in the US market. This figure is quite higher than what is assumed in this paper for the Turkish market. Even if their estimation for the US market cannot be used directly for the Turkish market, it is a good

²¹ David Besanko, Jean-Pierre Dubé & Sachin Gupta, *Own-Brand and Cross-Brand Retail Pass-Through*, 24 *MARKETING SCIENCE* 123 (2005).

Table 6. Comparison of derived elasticity of wholesale level under conservative (where the retail market is assumed to be very close to a monopoly) and relaxed assumptions

Concepts	Calculation 1	Calculation 2
$\frac{\partial p}{\partial w}$	0.51 (Conservative assumption)	0.6 (Relaxed assumption)
$\frac{\partial w}{\partial p}$	0.852	0.852
ϵ_{rw}	0.435	0.511
ϵ_r	-7.99	-7.99
ϵ_w	-3.47	-4.08

indicator that the derived demand elasticity can be much higher than those calculated in this article in which a very conservative approach about the pass-through rate is adopted.

At this point, these derived elasticities can be used in a Critical Loss analysis to define the relevant market.

V. APPLICATION OF THE CRITICAL LOSS ANALYSIS

The aggregate elasticities of the premium segment, which are estimated above, can be used in implementing the Critical Loss Analysis (such as the Hypothetical Monopolist Test) for deciding on the boundaries of the relevant product market in the beer industry in Turkey.

At this point in our analysis, the Critical Loss (or, equivalently, the Critical Elasticity) should be calculated for the hypothetical monopolist of all premium brands. The Critical Elasticity can be calculated by the help of the formula below:

$$\text{Critical Elasticity} = \frac{1}{m + t}$$

The term m denotes the profit margin of the hypothetical monopolist and t is the SSNIP (for example, 5 percent–10 percent). The important issue in this analysis is to find a reliable estimate for the profit margin m . In this paper, by using information provided by industry sources it is predicted that the average profit margins for premium beers at wholesale level is 46.6 percent in 2015.

By using the formula above, the Critical Elasticity for 2015 is calculated and compared to the aggregate demand elasticity of the premium segment in Table 7 below. The aggregate demand elasticity of the premium segment can be accepted as the elasticity which is associated with the Actual Loss.

It is evident that the actual losses of the hypothetical monopolist are greater than the break-even loss level (that is, Critical Elasticity is lower than the Actual Elasticity) for both of 5 percent and 10 percent SSNIP, even with very conservative assumptions on the pass-through rates of a typical retailer. This result clearly shows that the relevant product market must be wider than the segment of premium beers.

Table 7. Critical Loss Analysis and Relevant Market Definition

Profit margin (m)	SSNIP	Critical Elasticity	Actual Elasticity based on the most conservative assumption	Conclusion
46.6%	5%	-1.94	-3.47	Relevant Market is wider than Premium Segment
46.6%	10%	-1.77	-3.47	Relevant Market is wider than Premium Segment

If the retailer's pass-through rate is higher than the conservative assumption used above, the possibility of a wider market definition increases significantly.

VI. CONCLUSION

This paper aimed to find an answer to the question of whether beer brands that are classified under the premium segment constitute a separate relevant product market for the purposes of competition law. For this purpose, the Hypothetical Monopolist Test has been implemented.

The first step of the test is to estimate the aggregate price elasticity of demand for the premium segment. The demand estimation has been done by using a nested logit model, which tests whether products of the same group are closer substitutes than products of different groups. It has been found that the correlation of beers within the same nest is not statistically significant.

The price elasticity of demand for the premium segment at the brewer level has been derived from the estimate at retail level by using very conservative assumptions regarding the pass-through rates at retail level. The demand elasticity at brewer level calculated in this way is at least -3.47 . If the assumption on the pass-through rates can be relaxed, the derived demand elasticity at brewer level would be even higher (in absolute value).

In the second step of the hypothetical monopolist test, alternative measures of the critical elasticity have been calculated by using information on the profit margin for the premium beer segment at brewer/supplier level under both 5 percent and 10 percent SSNIP scenarios. It has been shown that actual elasticity of demand for the premium segment is higher than the critical elasticity (in absolute value) under both scenarios of SSNIP.

These findings lead to the conclusion that the relevant product market regarding beer brands in Turkey must be wider than the premium segment.