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ECONOMETRIC ANALYSIS OF CONCENTRATION IN THE DRINKS MARKET

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A. SUMMARY AND CONCLUSIONS

In the study, merger of breweries Laško and Union is analysed. Effects of merger are studied on the whole drinks market, because Laško controls Radenska, producer of carbonated drinks and water, while Union controls Fructal, producer of fruit juice and tea.

The study incorporates three main components of an analysis of the existence and exercise of market power, namely analysis of the relevant market, econometric estimation of elasticities, simulation of the increase in equilibrium prices that would result from a horizontal merger (acquisition), and an analysis of barriers to entry in the market.

The empirical evidence suggests that the movement of prices and quantities in each of the basic segments of the drinks market (beer, wine, fruit juice and tea, and carbonated drinks and water) is not independent of the movement of prices and quantities in the other segments. The relevant market is thus the entire drinks market. In the case of the market segment for beer, this implies that a change in concentration, and hence a potential change in price, would have a statistically significant effect on movements in the price and quantity of (at least some of) the other segments of the drinks market.

In 2001, drinks market sales were worth around SIT 104 billion. The market segment for beer accounted for around 23%, fruit juice and tea for around 30%, carbonated drinks and water for around 28% and wine 19% of the relevant market by sales.

The change in equilibrium prices is estimated by a model of the demand for drinks. The specification of the model is adapted to take account of the fact that the drinks market is a differentiated products market. The model specification encompasses three stages of demand decisions. The top level represents demand for all drinks, the middle level consists of demand functions for the market segments for beer, fruit juice and tea, and water and carbonated drinks, while demand at the brand level is empirically characterised by demand functions for the Laško, Union, Radenska and Fructal brands. This specification is motivated by the fact that in modelling the effects of a change in market concentration, the possible interplay between drinks market segments as well as the existing links between Laško and Radenska and between Union and Fructal must be taken into account.

Own-price and cross-price elasticities of demand for the Laško, Union, Radenska and Fructal brands are obtained by simulation of the demand model. A comparison of the own-price and cross-price elasticities is a key indicator of the potential increase in post-merger (post-acquisition) market power of the firm being analysed. The estimated price elasticities of the Laško and Union brands are large (-1.9 and –2.2, respectively) and statistically significant. Empirical results indicate that both main players in the market segment for beer are already coordinating their actions. The price elasticities of the two brands in the water and fruit juice segments (Radenska and Fructal, respectively), which are already controlled respectively by Laško and Union, are also large (-3.4 and -2.8) and statistically significant.

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Using the estimated elasticities, the change in equilibrium prices following the acquisition of control over all four brands is simulated. The estimated increase in the equilibrium price is not statistically significantly different from zero for any of the brands analysed.

The empirical evidence thus implies that the increase in market power caused by the horizontal merger (acquisition) analysed would not enable a sustained and significant (e.g. 5%) increase in prices.

The study also analyses substitution with the existing products marketed by foreign brewers, and market entry by new foreign brewers. The estimated demand function for brands of imported beer implies that the most serious distortion of the structure of the market is caused by the government maintaining high rates of customs duty on beer imports. The estimated price (customs duty) elasticity of beer imports is very large, yet at the end of 2001 the effective rate of customs duty on beer was still around 26%. If customs duty were significantly reduced, the large price elasticity of demand for imported beer (-3.4) implies that product substitution alone would cause a sizeable increase in beer imports (equivalent to the volume of beer consumption of the marginal customers of Union).

A reduction in customs duty, which would occur on Slovenian entry to the EU in 2004, would also strongly increase the likelihood of entry as well as the range and quantity of beer imports. This is because a drastic cut in customs duty would allow the import price to cover higher advertising expenditures and network investments (sunk costs), which are necessary for market entry. Because of low transportation costs (every town in Slovenia is less than 120 km away from the nearest foreign brewery) likelihood and promptness of entry are even higher.

In view of the large market shares of the individual producers and the large unconditional price elasticities in the market segment for beer, a greater danger than the abuse of market power through price increases is predatory pricing by firms that are financially much stronger than the other (current) players in the beer segment.

B. DOCUMENTATION

1. Relevant market

The concept of the relevant market in competition analysis differs from the concept of the market in traditional economic analysis. While the economic concept of the market refers to a group of products and geographical territories among which prices are linked via arbitrage, the market as used in competition analysis denotes one or more products and an arbitrary geographical area in which collective action by all firms (as through collusion or merger) would result in a profit-maximising price that significantly exceeds the competitive price[2]. For a competition authority it is generally only this notion of the relevant market that matters; thus, for example, the US competition authorities define the relevant market as the smallest market in which a hypothetical monopolist or cartel could induce a small (e.g. 5%) but significant non-transitory increase in price[3].

Although the administrative definition of the relevant market is generally uncontroversial, its very nature makes empirical testing highly problematic. The traditional approach to empirically identifying the relevant market relied on three simple tests of the extent of the

[2] See e.g. Massey (2000).
[3] The SSNIP test (see USDJ (1997)).

market: the volume and types of product flows, cross-price elasticities, and price correlations. In the late eighties and early nineties three new empirical methods came into use: the partial adjustment approach of Horowitz, (Granger) causality testing and residual demand modelling[4].

These approaches to testing the relevant market are very simple, and their adequacy therefore rests (implicitly) on strong assumptions[5]. Furthermore, using such simple methods, it is not possible to isolate the testing of the relevant market entirely from the analysis of actual competitive structure within the relevant market. Even before testing the relevant market it is therefore necessary to at least sketch answers to the key questions of which firm could potentially abuse its increased market power and against which others. For this reason, the more complex tests of the relevant market (dating from the nineties) rely on structural models. Tests of the relevant market based on structural models are considerably less reliant on assumptions, that is on the need for *a priori* specification of relationships between variables in the context of which the relevant market is being analysed. The use of structural models in the analysis of market structure also obviated the need for direct verification of the actual extent of the relevant market in testing for the existence of market power.[6]

Specification of the test of the relevant market. In the present study the relevant market is analysed by means of causality testing, the analysis of a structural model of the demand for drinks and the analysis of residual demand. Because of scarce empirical evidence (short time series, missing data, incomplete coverage of data, different sources of data, etc.) this multiple approach to testing made conclusions more reliable.

In order to get round the (often mentioned) shortcomings of an ordinary test for causality in analysing the relevant market, the causality test is specified more broadly than in the original analysis in which it is proposed[7]. The main problems with using a simple causality test in analysing the relevant market stem from unmodelled (omitted) variables, since a simple causality test involves only two variables. For this reason, two changes are made in the present analysis. First, causality is analysed not only for the price variables but also for the product flow variables (i.e. quantities sold), the rationale being that, as mentioned above, the nature of product flows is itself one of the simple independent criteria for identifying the relevant market[8]. Secondly, a causality testing procedure is chosen in which the consequences of (potentially) missing variables are minimised. Specifically, causality is tested in the context of a vector autoregression (VAR) model of the drinks market. The VAR model with exogenous variables takes account of all potential segments of the drinks market and thus captures effects that cannot be captured in simple causality testing (and which may lead to a misleading value of the Granger causality test statistic). The number of additional variables and lag structure are, however, limited by the available degrees of freedom (the short time span of the available time series).

In determining the extent of the relevant market it is crucial to ascertain whether the variables (prices and quantities) in any given segment of the relevant market being analysed are exogenous for those in the other market segments. In the event that exogeneity for the

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4 See e.g. Kaserman and Zeisel (1996).
5 See e.g. Kaserman and Zeisel (1996).
6 See e.g. Willig (1991), Werden (1997) or Hausman and Leonard (1997).
7 The use of causality tests in testing the relevant market was proposed in an analysis of the structure of the petroleum market in the US; see Slade (1986).
8 See e.g. Massey (2000) or Kaserman and Zeisel (1996).

variables (prices and quantities) of a particular drinks market segment cannot be rejected, the relevant market must be redefined more narrowly. The reason is that in such cases a coordinated price change by firms in the analysed segment of the drinks market would not be significantly affected by the variables (prices and quantities) in the other parts of the market being tested[9].

Testing the relevant market. As mentioned above, the first step in the causality testing of the relevant market was a simple causality test of prices and product flows, while the second was accomplished through a VAR model.

The simple causality test was used to analyse the relationships between transactions in the main market segments of the total drinks market, namely beer, wine, fruit juice, carbonated drinks and (mineral) water. Causality tests were made between prices and product (quantity) flows. All of the variables under analysis were specified in terms of growth rates (a test for the presence of a unit root was rejected for all variables).

The testing was carried out on bi-monthly data for the period from the beginning of 1997 to the middle of 2002. For beer, tea, carbonated drinks, water and juice, Gral-ITEO data were used directly, while the data for wine were estimated using data from the Statistical Office of the Republic of Slovenia (SORS) and Gral-ITEO[10].

The values of the test statistics are shown in Tables 1 and 2. The tests on the price variables are given in Table 1 and those on the quantity variables are given in Table 2. Test statistics are given for all pairwise combinations of prices and quantities in the market segments described; the value of the F-statistic is shown for each combination. A bold value of the F-statistic indicates that the test is statistically significant at the 10% level.

The values of the test statistics in Table 1 indicate that the null hypothesis of no causality is rejected at 10% in seven cases out of thirty combinations. Each of the analysed price variables is present in at least one statistically significant relationship. Each market segment can be linked to any other via such significant relationships.

The values in Table 2, where causality between real product (quantity) flows is analysed, decisively confirm the interrelatedness of the total drinks market. The degree of linkage between product flows in the analysed segments of the drinks market is very large, since a large majority of the analysed causal relationships are statistically significant (of 30, only 12 are insignificant). Only between water and tea, wine and water and wine and fruit juice do the data fail to reject the null hypothesis of no relationship. Simple causality analysis of product flows thus implies that the relevant market must encompass all of the drinks market segments considered, since product flows of none of the analysed segments are exogenous for product flows in each of the others.

Even a simple causality test is therefore capable of rejecting a definition of the relevant market that does not include at least the market segments for beer, fruit juice, water and carbonated drinks.

[9] This procedure for constructing the relevant market is even part of the official definition of the relevant market; see e.g. the SSNIP test in USDJ (1997) or EU Commission (1997).

[10] Gral-ITEO (owned by GFK AG, Nürnberg) is private provider of retail scanner data. See section on sources of data.

A more precise empirical analysis of causality (regression relationships) among segments of the drinks market is possible using a VAR model in prices, which is shown in Table 3. The autoregressive model of the four segments of the drinks market contains four endogenous and two exogenous variables. The endogenous variables are the prices of beer, wine, fruit juice (comprising fruit juice and teas) and water (which includes carbonated drinks). The two exogenous variables are food prices and wages (in the tradable sector); both enter the model with a lag of one quarter. The model was estimated on growth rates of quarterly SORS data for the period 1996/I to 2002/II. In addition to conventional diagnostic tests, Table 3 reports the results of exogeneity testing (likelihood ratio tests). All variables in the model (in growth rates) were pretested for the presence of a unit root.

The values of the diagnostic statistics in Table 3 indicate that the model is statistically admissible and therefore appropriate for testing causality. The value of the test statistic (the likelihood ratio, distributed as chi-squared with three degrees of freedom) for the test of the exogeneity of the analysed price variables (shown in the final row of the table) is highly significant in the case of all variables. The hypothesis of the exogeneity of prices can therefore be rejected for all analysed segments of the drinks market (i.e. for beer, wine, fruit juice and water).

Further illustrative evidence that the relevant market is the entire drinks market is provided by graphical analysis of the effect of exogenous disturbances in the growth of the price in each of the analysed drinks market segments on the growth of the price in each of the other segments. Figure 1 shows the effects of (one standard error) disturbances in the growth of prices in each of the analysed market segments on the prices of all other market segments, together with their confidence intervals. It is evident that there is not one segment of the drinks market in which price is insulated from disturbances in the growth of the prices in all of the others. The charts in Figure 1 clearly reveal that exogenous disturbances in the price of beer (and wine) have a significant effect (over a period of up to three quarters) on the prices of all three (!) other segments of the drinks market, a fact that is of key significance for the definition of the relevant market.

The actual sign of responses is not important in testing the relevance of (causality within) the drinks market; only the significance of the responses matters. It is nevertheless worth mentioning that the effect of the price of wine on that of beer could be interpreted in terms of complementarities of alcoholic drinks[11].

Based on all the empirical evidence considered, it is therefore impossible (*a priori*!) to reject the hypothesis that the relevant market is the entire drinks market. Further econometric evidence (the magnitude of the own and cross-price elasticities), cited below as part of the estimation of demand functions, reinforces this conclusion.

Size and breakdown of the relevant market. Total drinks market sales in 2001 were around SIT 104 billion. In the period 1997-2001 analysed here, the market grew by around 10% per annum in real terms or 17% per annum in nominal terms. Alcoholic drinks accounted for around 41% of total consumption in 2001. Their share of the market followed a downward trend over the period, falling from over 50% in 1997.

[11] See e.g. Leung and Phelps (1991).

Comprehensive data on the composition of the drinks market, covering both off-licence sales and consumption on licensed premises, are unavailable. The composition and size given in Table 4 are estimated by the methods explained in the section on data. The main sources were SORS for aggregate quarterly data and Gral-ITEO for a more detailed bi-monthly breakdown of soft drinks and beer. Estimated market shares were also tested using data for the hotels and catering sector from the Monthly Statistical Review of SORS.

The detailed composition of the market is shown in Table 4, which gives estimated segment shares for beer, wine, carbonated drinks, water, fruit juice and tea and the market shares of the analysed brands in 2001.

Beer sales account for around 23% of the total drinks market and were worth around SIT 24 billion in 2001. The market shares of the other segments are as follows: wine 19%, carbonated drinks and water 28% and fruit juice and tea 30%.

As for the analysed brands' shares of their respective segments in 2001, Laško had 50% and Union 41% of the market segment for beer. The remainder was shared by foreign producers (3.3%) and other Slovenian brewers. The shares of the other two analysed brands in their respective segments were somewhat smaller than in the beer segment. Radenska had 26% of the market segment for carbonated drinks and water, and Fructal had 38% of the market segment for fruit juice and tea.

A merger of the Union and Laško breweries (or the acquisition of one by the other) would also leave the merged entity in control of the Radenska and Fructal brands. The relative demands for individual brands within the controlled portfolio are an important issue in merger analysis. As can be seen from Table 4, the combined share of all Laško-branded products in the portfolio controlled by the merged entity would be 38%, that of Union would be 31%, that of Radenska 12% and that of Fructal 19%.

2. A model of demand

Model specification. Faced with an increase in market concentration (a merger or acquisition), a competition authority must evaluate the change in efficiency that could result, as well as the effects of altered market power. This is because an increase in efficiency (of the enlarged firm) increases both overall social welfare and the firm's profits, while an increase in market power increases profits but reduces welfare. Because the possibility of failing to achieve efficiency gains is a private risk for the firms involved in the merger (or acquisition), a (conservative) competition authority will content itself with evaluating only the change in market power caused by the merger. Only in the worst case (where increased concentration does not lead to efficiency gains) are the social welfare effects of the merger limited to the effects of altered market power; hence the action of a competition authority that is concerned only with market power is conservative.[12] Generally, therefore, analyses of the change in market structure caused by a merger or acquisition are not concerned with estimating efficiency gains, but only the potential change in market power.

In this analysis we likewise estimate only the price effects of a potential increase in market power due to increased concentration in the drinks market. Empirical testing of market power is generally based on the analysis of own-price and cross-price elasticities. Even a simple

[12] See e.g. Willig (1991); on possible efficiency effects, see Hausman, Leonard and Zona (1994).

comparison between the ratio of cross-price to own-price elasticities and the magnitude of the (proportional) markup of price over marginal cost is indicative, on certain assumptions, of the nature of the market structure[13]. In estimating the effect of more complex changes in concentration within a market, especially a differentiated products market, knowledge of fixed elasticities by itself is not enough in order to estimate the potential effects on prices. The point here, of course, is not only the appropriateness or inappropriateness of the estimated elasticities[14], but also and more importantly the existence of three key elements in the analysis of the effects of a merger, namely the specification of a model of demand, the assumed nature of coordination in the market and the form of the marginal cost function[15].

A structural model of demand is a central component of an analysis of altered market power. The specification and estimation of a model are empirically challenging tasks, particularly where the analysis concerns a market for differentiated products. While specifying the model is difficult enough, selecting the appropriate data is harder still.

Estimating demand functions naturally involves specifying a complete structure of the demand decision. In the case of a market for differentiated products with customer loyalty, demand can be modelled as a multistage budgeting process[16]. This approach to specification is required partly in order to reflect actual consumer decision-making, but mainly for the sake of empirical tractability. On one hand, demand functions cannot be estimated at the level of (mutually differentiated) brands, as these are generally too numerous, while on the other hand the analysis of a change in market concentration (horizontal merger or acquisition) must take account of cross-price elasticities between brands, since market power in a differentiated products market stems from control of a brand portfolio, and a knowledge of these cross-price elasticities is crucial to evaluating the “cannibalisation” effect caused by the merger or acquisition[17]. Empirical evidence shows that, even in developed (differentiated products) markets, competition between brands is intense, and a knowledge of cross-price elasticities in horizontal merger analysis is therefore very important[18].

A multistage demand model also greatly facilitates empirical characteristics of the conduct of firms in a differentiated products market, i.e. whether they exhibit coordinated behaviour (whether through explicit collusion or tacitly, with a leader or without) or act in uncoordinated fashion.

While multistage demand modelling is widespread in empirical analysis of differentiated products markets, a variety of basic demand function specifications are available. The most frequently used are the linear and logit systems of demand functions and the “Almost Ideal

[13] See e.g. Bresnahan (1989) or Willig (1991).
[14] The so-called cellophane fallacy arises from an inappropriate comparison with the status quo (see e.g. Massey (2000)).
[15] On the key elements necessary for simulating the effects of concentration see e.g. Werden (1997) or Hausman and Leonard (1997).
[16] Modelling the demand for differentiated products as a multistage budgeting process was first proposed by Gorman (see e.g. Blackorby and Shorrocks (1995)). In model-based analyses of the structure of markets in differentiated products (such as cereals or beer) it is standard to assume a multistage budgeting process. See e.g. Cotterill and Haller (1997), Hausman and Leonard (1997), Hausman, Leonard and Zona (1994), Pinkse and Slade (2000).
[17] See e.g. Cotterill and Haller (1997) or Hausman (1994).
[18] See e.g. Hausman, Leonard and Zona (1994).

Demand System" or AIDS[19]. While the theoretical differences between these demand functions are large, other researchers' experience in analysing the effects of mergers is that econometric estimates of price changes are not very sensitive to the choice of demand specification[20]. The linear and logit demand systems make strong assumptions about the nature of demand (at least some of the following are assumed: that demand is homothetic, elasticities are constant, cross-price elasticities with respect to a particular product are the same for all products, etc.), while the AIDS model imposes few restrictions (it is not necessary to assume either homotheticity or symmetry of cross-price elasticities[21]).

The model of demand employed here assumes a multistage demand decision process. Besides, demand functions are specified and estimated for all brands controlled by Laško or Union prior to merger (acquisition). Otherwise, in simulating the merger (acquisition), it would not be possible to take account of the increased control (increased room for manoeuvre) of the new firm, i.e. its internalisation of the potential benefits of "cannibalisation". Figure 2 shows the stages of the consumer's decision-making process in the drinks market that are analysed in the model. Dotted lines denote controls existing already before analysed merger takes place.

We now discuss the general specification of the demand model.

The demand functions at the lowest, i.e. brand, level are specified as a slightly modified form of AIDS[22]. The demand function for brands is specified as follows:

$$\Delta(d_{is}) = \alpha_i + \beta_i \Delta \log(q_s) + \Sigma \gamma_{ij} \Delta\log(p_{js}) + \Sigma\rho_j \Delta\log r_{js} + \varepsilon_{is} \quad (1)$$

where d_{is} is the share of sales of brand i in total sales in market segment s, q_s is real demand in market segment s, p_{js} is the price of the jth brand in market segment s, and r_{js} is advertising expenditure on brand j in market segment s. The parameters α_i, β_i, γ_{ij} and ρ_j in the AIDS model are of course not elasticities, but elasticities can be derived from them. It is clear that the demand system specification (1) directly allows the basic (assumed) features of (Bertrand) competition in a differentiated products market to be taken into account, namely that a) the strategic variable for competition in the short run is price and b) the firm acts in an uncoordinated manner (it seeks to increase its own brands' share of the market segment)[23].

At the next stage, i.e. the market segment level, the demand functions are specified as log-log equations. Thus, the demand function for market segment s takes the form:

$$\Delta\log(q_s) = \chi_s + \delta_s \Delta\log(q) + \Sigma \eta_{sk} \Delta\log(p_k) + \Sigma \omega_{sk} \Delta\log(r_k) + \xi_s \quad (2)$$

where q is real demand in the total drinks market, p_k are prices in market segment k and r_k is advertising expenditure in market segment k. In this equation, again, the parameters δ_s, η_{sk} and χ_s are not elasticities, but elasticities can be derived from them.

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[19] The logit specification is used, for example, in the analysis of Nevo (1998), the linear specification in Cotterill and Haller (1997) and the AIDS specification in Hausman and Leonard (1997). On the AIDS specification see Deaton and Muellbauer (1980).
[20] See e.g. Werden (1997).
[21] Slutsky symmetry.
[22] See Deaton and Muellbauer (1980)
[23] See e.g. Willig (1991).

At the top level the demand function for all drinks is a conventional demand function in growth rates:

$$\Delta\log(q) = \theta + \lambda\, \Delta\log(p/P) + \kappa\Delta\log(D) + \sigma\Delta\log(x) + \varsigma \qquad (3)$$

where p is the aggregate price in the drinks market, P is an index of food prices, D is real disposable income and x is a variable capturing the effect of changes in habits and tastes (often referred to in the literature as a "shift variable").

In the demand model, at the market segment and brand levels, possible additional, explicitly not identified, factors are specified by nontrivial error structure. Possible interconnectedness of product flows and prices between drinks market segments, suggested by the causality testing of the relevancy of drinks market, is taken into account by assuming non-zero cross correlations of errors, that is assuming $cov(\xi_t , \xi_s) \neq 0$, for market segments t and s. At the level of brands, Radenska is already controlled by Laško, and Fructal by Union. In the model, existing controls are specified by non-zero cross correlations $cov(\varepsilon_{is} , \varepsilon_{jt}) \neq 0$ between Laško and Radenska and between Union and Fructal; all other cross correlations on the brand level are, by assumption, equal to zero.

Model estimation. The drinks market demand model consisting of the equations in (1), (2) and (3) was estimated for the period from the beginning of 1997 to the middle of 2002. Quarterly SORS data were used at the top level and bi-monthly data (primarily from Gral-ITEO but partly also from SORS) were used at the market segment and brand levels. Data on the price of wine were estimated from both sources (Gral-ITEO and SORS) .

In the estimation of the equations in (1), (2) and (3), the explanatory variables entered with an *a priori* lag length of zero or one period. The final specification was selected on the basis of the appropriate statistics (DW, Chow and RESET). In the equations in which the explanatory price (or quantity) variables entered contemporaneously (i.e. with no lag), estimation was carried out by means of a simple instrumental variables (IV) method. The instruments were chosen from among the following variables: lagged prices (quantities) from the same level, a dummy variable for season (summer vs. rest of year), drinks industry wages (lagged), the cost of living, and import prices for products in the same market segment.

Because the demand for drinks has a strong seasonal component, seasonal dummies (summer vs. rest of year) were included in all estimated demand functions.

The demand system is specified in such a way that the parameter estimates cannot be interpreted directly as elasticities. Instead the elasticities must be calculated by simulating the total model of demand. It is less evident that the elasticities are also not constant. They depend on relative prices (market shares) both of individual brands and of market segments. It is worth reiterating that the demand system specification does not assume homotheticity or Slutsky symmetry. This large degree of parametric flexibility is a crucial advantage of the demand model specification employed here over, for example, a logit or pure log-log demand system[24]. An obvious implication of this property is that each cross-price elasticity must be derived explicitly from a simulation model, since the elasticity matrix is asymmetric.

[24] See e.g. Hausman, Leonard and Zona (1994).

The model specified and estimated in this paper contains equations for the total drinks market, market segments (beer, carbonated drinks and water, and fruit juice and tea) and brands (Laško, Union, Radenska and Fructal).

Because the own-price and cross-price elasticities are non-linear functions of the estimated demand function parameters, variables with low statistical significance were generally not excluded and the equation reestimated, particularly since the specification is relatively fixed in advance through the choice of demand system[25].

The tables show only economically important variables. They therefore do not show the seasonal dummies and the instrumental variables that were required due to the endogeneity of prices or quantities. The variable names in the tables are heuristic and indicate the content of the variable. The nature of the variables, i.e. whether they enter as growth rates or first differences and/or whether they are real or nominal can be seen from the specification of the total demand model given by equations (1), (2) and (3). Variables for which instruments are used are indicated by the superscript "I" in the lags column. The usual statistics are shown in the tables. Since the time span of the data is short, all equations were also tested for stability. The tables therefore give the significance level for the simplest Chow test of structural stability and the RESET test for non-linear functional form.

At the market segment and brand levels, two groups of tables are presented. The first group of tables (denoted by "a") presents standard LS (instrumental variables) estimates of demand equations (1) and (2). The second group of tables (denoted by "b") presents the results of using the SUR method, by which asumed error structure is taken into account. In estimating the drink segment equations, SUR is used to allow for mentioned interconnectedness of product flows and prices between drinks market segments, suggested by the causality testing of the relevancy of drinks market. Similarly, at the level of brands, SUR is used for estimating the equations for Laško and Radenska and, separately, the equations for Union and Fructal. In this way, any effects of existing common control over Laško and Radenska and, separately, over Union and Fructal are taken into account. Tables with SUR estimation results on the market segments level are marked by SUR_s, while those on the brands level by SUR_b1 (for Laško and Radenska) and SUR_b2 (for Union and Fructal).

In the model simulation of the merger, SUR version of equations are used.

The drinks market. Table 5 shows estimates of the demand for the total drinks market. The explanatory variables include the relative price of drinks, real disposable income and the habits and tastes variable. The relative price variable is calculated as the ratio of drinks and food price indices. Real disposable income is calculated as total disposable income deflated by the cost of living. Because demand for drinks (or its composition) has altered since 1996 partly because of changes in habits and tastes, i.e. general changes in consumer demand caused by rising standard of living[26], the price and income variables were, as mentioned, supplemented by a "shift variable" proxying changing habits. A variable representing the

[25] This is standard in studies of market structure in other countries, since the selected functions are very simple and built systematically, while at the same time, as mentioned, the estimated elasticities are non-linear functions of the parameters of the demand function (see e.g. Cotterill and Haller (1997) or Hausman, Leonard and Zona (1994)).

[26] For example, per capita beer consumption in households in the period under review grew from 19l to 25l per annum, while per capita wine consumption fell from 9.7l to 7.8l per annum.

number of border crossings by Slovenian residents was used as the proxy for habits and tastes in the demand function at the top level.

The statistical properties of the estimated equation are satisfactory. The elasticity with respect to the relative price is negative, although insignificant, while both the income elasticity and the habits variable are highly significant.

Only in the equation for the total drinks market can the estimated coefficients be interpreted as elasticities without simulating the entire model. However, parameters of total drinks demand indirectly enter the estimation of price elasticities of demand at the level of drinks segments. We give the following simple illustration of the procedure for simulating these indirect effects on the elasticities.

Since the equations at the next highest stage of modelling (the market segments for beer, carbonated drinks and water, and fruit juice and tea) include a variable for the demand for all drinks, it is necessary in analysing, for example, the effect of a change in the price of beer to take account of the aggregate effect of the beer price on demand for all drinks. Consider the indirect effect of an increase in the price of beer on consumption of beer that results simply from a contraction in total demand for drinks (leaving the composition of demand unaltered). Since the share of beer in the total drinks market is around 23%, the effect of a hypothetical 1% rise in the price of beer on demand for all drinks (other things equal) is 0.23%*(-0.78)=-0.18%. This is also the size of the indirect effect on demand for beer via the variable for total drinks demand. Since the relevant coefficient is 1.230 (Table 6a), the indirect reduction in demand for beer due to the increase in the beer price 1.230*(-0.18%)=-0.22%, which is by no means negligible.

Drinks market segments. As mentioned, this analysis considers the market segments for beer, carbonated drinks and water, and fruit juice and tea, on which firms entering the studied merger are present. The other market segment, namely wine, is represented only by its price and is therefore exogenous for the model. The estimated demand functions (all of which have the general form given by equation (2)) are shown in Tables 6 to 8. The price elasticities in these equations are of course only conditional, since they do not capture the total effect of the relevant drinks prices upon the quantities demanded. As illustrated above, the indirect change in the demand for all drinks exerts a sizeable price effect.

Table 6 gives the estimated parameters of the beer demand function. The statistical properties of the equation are satisfactory. The conditional own-price elasticity is negative, large (-1.40, or -1.76 by SUR) and statistically significant. The conditional cross elasticity with respect to the price of wine is large and statistically significant, while the conditional cross-price elasticity with respect to water is insignificant. The indirect price effect (via the variable for the total demand for drinks) is very strong and significant.

Advertising expenditure is statistically significant (t-statistic is greater than 2.0 or 1.6 in the respective models).

The estimated price elasticity (-1.40 or -1.76) is of course conditional. In using the estimated model to analyse the effect of a change in prices within the market segment for beer, the indirect effect due to the reduction in demand for all drinks must also be taken into account. As shown above, this is equal to -0.22% in the case of a one per cent increase in the beer price. The total reduction in the quantity of beer demanded due to a one per cent price rise is therefore 1.40%+0.22%=1.62%, or more if the SUR estimates are used. This large (unconditional) price elasticity of demand for beer is a further illustration that the relevant market is substantially wider than the market for beer alone.

Table 7 presents the estimated parameters of the demand function for carbonated drinks and water. The estimated function is statistically sound. The conditional own-price elasticity estimated by SUR (-4.80) is larger than the ordinary estimate (-4.13). Both are statistically significant. The conditional price elasticities are of the correct signs and are significant, except for the conditional elasticity with respect to the price of wine. The price of fruit juice and tea is excluded from the equation, since the elasticity is highly insignificant. The indirect effect of price on real demand for carbonated drinks and water is again sizeable (-0.20%).

The estimated equation for the market segment for fruit juice and tea is shown in Table 8. The statistical properties are worse than those of the beer and water equations in that the Chow test indicates functional instability. The conditional own-price elasticity is of the expected sign, statistically significant (at the 10% level) and large (-4.00, or -3.11 by SUR). The conditional cross-price elasticities with respect to water and carbonated drinks and wine are large but insignificant (at 10%). The t-statistic of fruit juice advertising expenditure is only 0.5. The indirect price effect on demand for fruit juice and tea (-0.15%) is rather smaller than for beer or for carbonated drinks and water, reflecting the smaller estimated coefficient for the demand for drinks.

Brand-level demand functions. Tables 9 to 12 present estimates of the demand functions for each of the four analysed brands: Laško, Union, Radenska and Fructal.

As explained above, the specified demand functions are part of an AIDS specification (see equation (1) in the section on model specification).[27] Potential explanatory variables for estimating the equations given by (1) include, in systematic order, own price and own advertising expenditure, the prices and advertising expenditures of brands at the same stage of the budgeting process, and real (quantity) demand for products in the market segment to which the analysed brand belongs. As noted earlier, these postulated variables of the demand function are dropped, and the equation reestimated, only if corresponding t-statistic is very low (less than 0.5). There are two reasons for this. First, (insignificant) values of relevant parameters are a key part of the documentation of the structure of the market. And secondly, the unconditional price elasticities are non-linear functions of these parameters (they are obtained by simulation of the model), and hence in estimating the variance-covariance matrix of elasticities, which is key to the conclusions of the analysis, the significance or insignificance of a particular parameter matters less than the overall variance-covariance matrix of the estimated parameters (as shown in expression (4)).

Since the brand-level demand functions have the AIDS form, the parameter estimates cannot be interpreted directly as conditional elasticities, let alone unconditional elasticities. We therefore review the estimated demand functions only briefly, making a few purely statistical remarks. The total (own-price and cross-price) elasticities are analysed separately as part of the model-based simulation of changes in market concentration.

As mentioned, on the brands level SUR estimation (for Laško and Radenska, and separately for Union and Fructal) is used to take into account already existing market structure.

[27] See Deaton and Muellbauer (1980).

The estimated function for Laško (shown in Table 9) is statistically satisfactory. Two parameters are significant (at the 10% level): demand for beer at the market segment level, and the price of imported beer. Similar comments apply to the demand function for Union, which is presented in Table 10. The latter is likewise statistically satisfactory and contains two significant variables (at 10%), namely the price and advertising of Laško.

The demand function for Radenska, given in Table 11, is less satisfactory than those for Laško and Union. The simple Chow test indicates possible functional instability, although the value of the Ramsey RESET test is adequate. The DW test is also not entirely satisfactory. Two variables are statistically significant (at the 10% level): the price of other brands of water and demand for carbonated drinks and water at the market segment level.

The demand function for Fructal (Table 12) is statistically satisfactory. Both the Chow and the Ramsey tests indicate that the function is stable. The DW statistic is acceptable. The estimated coefficients have the correct signs and one is significant; namely Fructal price.

3. Simulating the effects of a horizontal merger (acquisition) in the drinks market

Estimating unconditional own-price and cross-price elasticities. Econometric estimates of the unconditional elasticities among the analysed brands Φ are obtained by simple simulation of the demand model consisting of the estimated equations (1), (2) and (3). The only slightly more complicated task is estimating the variance-covariance matrix of the matrix of elasticity estimates. The latter is obtained in the usual fashion by the expression

$$\mathrm{cov}(\mathrm{vec}(\Phi)) = (\partial\, \mathrm{vec}(\Phi)/ \partial\, \psi^t)\, \Sigma\, (\partial\, \mathrm{vec}(\Phi)/ \partial\, \psi^t)^t \qquad (4)$$

where $\psi = (\beta^t, \gamma^t, \delta^t, \eta^t, \lambda)^t$ is a vector of coefficients on prices and quantities in the demand model, Φ is the elasticity matrix and Σ is the variance-covariance matrix of the estimated parameters of the model. Derivatives are of course calculated at the estimated values of parameters.

Merger simulation modelling. Until recently, competition authorities took a very simple and clear-cut approach to establishing a potential increase in market power. Typically, the first step was to define the relevant market and the second was to look at shares of the relevant market in order to assess whether a legally prescribed market share threshold was exceeded. Although elasticity concepts first appeared in antitrust policy and allied legal practice (in foreign countries) more than forty years ago, it is only recently that attempts have been made to simulate changes in market power directly using estimates of own-price and cross-price elasticities. Thus, the concept of the relevant market, which previously was crucial to assessing the size (excessiveness) of market share, nowadays matters only for the specification of the model with which the elasticities are estimated[28].

Of course, (econometrically) estimated elasticities cannot be used to evaluate directly the probability that the horizontal merger/acquisition will result in a sustained rise in prices (e.g. of 5% or more) in the relevant drinks market. Only simulation of the new post-merger equilibrium can answer this question.

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[28] See e.g. Werden (1998).

When the elasticities are known, a horizontal merger/acquisition can be simulated. However, the nature of conduct (coordinated action) in the post-merger market must be assumed. In this analysis we will assume, like most analyses of market structure in the available foreign literature, that the drinks market is a differentiated products market and that firms in the market employ Nash-Bertrand pricing. Accordingly, each firm sets the price of the brand it controls in such a way as to maximise profits taking the assumed prices of its competitors' brands as given. This assumption about conduct in the drinks market in Slovenia is empirically justified later.

Although marginal costs may change following the merger, we will assume in simulating the change in concentration in the drinks market that the merger (acquisition) under analysis will not trigger new market entry or a change in marginal costs. Clearly, both assumptions can only increase the robustness (conservatism) of the estimated increase in market power or estimated permanent increase in prices caused by the altered concentration in the market.

Following the analysed merger (acquisition) in the drinks market the merged entity will set prices of the brands ($p_1, \dots, p_k$) that were autonomous prior to the merger/acquisition but are now under its control in such a way as to maximise joint profits. Thus, post-merger, for the new merged entity the following will hold[29]:

$$d_j + \Sigma\, ((p_k - mc_k)d_k / p_k)\Phi_{kj} = 0,\ j=1,\dots,n \qquad (5)$$

where d_j are the market shares of each of the brands controlled by the new firm, mc_k is the marginal cost of the k-th brand and Φ_{kj} are the estimated own-price and cross-price elasticities.

It is clear that equation (5) is just a generalisation of the usual equation for a differentiated products market with Bertrand competition:

$$(p_j - mc_j)/p_j = -1/\Phi_{jj} \qquad (6)$$

which holds for the case where each player j controls only the individual brand j[30]. Equation (6) will be used in the empirical work only in order to illustrate the appropriateness of the assumption that the analysed (drinks) market is governed by Bertrand competition. Using relationship (6), we compare the estimated own-price elasticities Φ_{jj} and direct corporate accounting data on the price-cost margin.

Denoting the vector of market shares by d and the vector of price-cost margins ($(p_k - mc_k)/p_k$, $k=1,\dots,n$) by μ_1, it follows from (5) that the condition for post-merger (Nash-Bertrand) equilibrium in the drinks market is:

$$\mu_1 = -\,(\mathrm{diag}(d))^{-1}\,(\Phi^t)^{-1}\,d \qquad (7)$$

The relevant variance-covariance matrix is of course again obtained simply by:

$$M = \mathrm{cov}(\mu_1) = (\partial\mu_1 / \partial\,\psi^t)\,\Sigma\,(\partial\mu_1 / \partial\,\psi^t)^t \qquad (8)$$

Denote the vector of pre-merger price-cost margins by μ_0:

[29] See e.g. Nevo (1998) or Hausman, Leonard and Zona (1994).
[30] See e.g. Bresnahan (1988).

$$\mu_0 = (-1/ \Phi_{jj}, j=1,...,n) \tag{9}$$

Then it is clear that by a trivial transformation of the margins we obtain the vector:

$$\pi = ((1- \mu_{0j})/(1- \mu_{1j}) - 1, j=1,...,n) \tag{10}$$

which gives the increase (change) in the equilibrium prices of the individual brands caused by the analysed merger (acquisition) in the drinks market. The vector π therefore expresses price effects of the simulated change in market power that results from the analysed (horizontal) merger (acquisition).

We reiterate that the price increase π is estimated on the assumption that the marginal cost of each brand is unchanged post-merger; if the merger (acquisition) were to enhance efficiency the price increase would of course be smaller. In deliberately disregarding efficiency gains from the merger (acquisition) we therefore increase the conservatism of our conclusions[31].

The simulated vector of price changes (the change in market power) π after acquisition of joint control over the analysed brands is of course only a point estimate. Since the elasticities Φ are econometric estimates, the variance-covariance matrix Ξ for the simulated post-merger price effect π must also be estimated if we are to assess the statistical significance of the price effect of the increase in market power being analysed. This variance-covariance matrix can be estimated in simple fashion by using the following equation:

$$\Xi = \text{cov}(\pi) = (\partial\pi / \partial\psi^t)\, \Sigma\, (\partial\pi /\partial\psi^t)^t \tag{11}$$

When analysing the change in concentration in the drinks market, i.e. the merger (acquisition) between Union and Laško, the estimation of the price effect must of course take account of the fact that they already control the Fructal and Radenska brands, respectively. An estimate of the price increase given by (10) would therefore be biased, since it also captures the price effects stemming from increased concentration in the drinks market caused by the already completed acquisitions of Fructal by Union and Radenska by Laško. In analysing the effect on market power (the price increase) that would result from joint control of Union and Laško the crucial price increase is therefore:

$$\pi^* = ((1- \mu_{0j}^*)/(1- \mu_{1j}) - 1, j=1,..,n) \tag{12}$$

where the price-cost margin μ_{0j}^* is estimated by the equation:

$$\mu_0^*= - (\text{diag}(d))^{-1} ((\Phi^*)^t)^{-1} d \tag{13}$$

and Φ^* is the elasticity matrix Φ in which all cross-price elasticities except those between Laško and Radenska on the one hand and between Union and Fructal on the other are set to zero. The variance-covariance matrix for π^* must also be recalculated; the appropriate equation is of course analogous to equation (11), i.e.:

$$\Xi^* = \text{cov}(\pi^*) = (\partial\pi^*/\partial \psi^t)\, \Sigma\, (\partial\pi^* /\partial \psi^t)^t \tag{14}$$

[31] The scale of possible efficiency gains is illustrated in, for example, Hausman, Leonard and Zona,(1994).

As in all other equations for estimates of variance-covariance matrices, derivatives in (14) must be calculated at the point estimates of parameters ψ.

Estimating unconditional elasticities. The estimated demand functions at the different stages of the budgeting process are shown in Tables 5 to 12. The model parameters directly estimated and presented, as noted earlier, are not elasticities. Unconditional own-price and cross-price elasticities must be calculated by means of a simulation of the model, since induced changes in demand at all levels must be taken into account.

The elasticity matrix estimated by simulation of the model for the analysed brands is shown in Table 13. Using equation (4) the relevant variance-covariance matrix of the elasticity estimates was also estimated. Associated standard errors, obtained from the diagonal elements of the variance-covariance matrix of the elasticity estimates, are given in parentheses beneath the estimated elasticities in Table 13.

Table 13 shows that the own-price elasticities are high and statistically significant at under 5%. Union has a distinctly larger price elasticity (-2.20) than Laško (-1.89), although the difference is not statistically significant. Radenska has the largest own-price elasticity (-3.36).

The point estimates of the cross-price elasticities (between Union, Laško, Radenska and Fructal), while high, are not statistically significant. The highest cross-elasticities are those of the quantity of Radenska with respect to the prices of Laško and Union beers, the quantity of Fructal with respect to the price of Radenska, and the quantity of Union with respect to the price of Laško. We reiterate that due to the general nature of the demand system specification the elasticity matrix is not symmetric; it does not impose Slutsky symmetry.

Estimating the price-cost margin. Using the estimated elasticity matrix and the assumed nature of competition in the market, the price-cost markup can be estimated.

If the market is assumed to be Bertrand then each player controls only its own brand(s) and its strategic variable is price. Under this assumption the equilibrium price-cost markup μ_0 is given by equation (9). The relevant values are given in the first column of Table 14.

If we take account of the fact that in the status quo the cross-price elasticities between the Laško and Radenska and the Union and Fructal brands can already be exploited for strategic price-setting, the appropriate equilibrium markups μ_0^* can be estimated using equation (13). The estimates are given in the second column of Table 14.

Following the change in concentration in the drinks market (merger or acquisition) that is the subject of this analysis the merged firm will be able to exploit the cross-price elasticities between all four brands, namely Laško, Union, Radenska and Fructal, in making its pricing decisions. The altered price-cost margin μ_1 that results from the increased market power of the merged entity is estimated using equation (7). The existing market shares of the analysed (jointly controlled) brands in the total brand portfolio of the merged entity were used in the estimation. The estimates are given in the final column of Table 14. Standard errors, estimated as previously described, are given in parentheses for all the estimates of price-cost margins in Table 14.

The estimated price-cost margins enable direct testing of the assumption of Bertrand competition in the drinks market. According to internal accounting data for Laško, for example, sales of the portfolio of Laško-branded products used in estimating the demand function exceeded production costs by around 71.5% in 2001 . The accounting data thus imply a price-cost margin of 0.42. Even if the entire range of products is included for Laško, the estimated price-cost margin from accounting data remains virtually the same at 0.42. Table 14 allows us to conclude that the actual value (0.42), calculated on the base of direct accounting data for Laško, is within an interval of one standard error around the estimated price-cost margin, irrespective of the assumed relationship between Laško and Radenska. Comparison of the model estimates and the actual accounting values of the price-cost margin confirms that the assumption of Bertrand competition in the drinks market here analysed is reasonable, since the difference between the two values lies within a ten per cent confidence interval.

Estimating the change in equilibrium prices. Competition authorities generally have to assess the increase in market power following a merger (acquisition) in terms of the scope for a permanent significant increase in price without a substantial reduction in quantity.[32] The last step in analysing the effect of altered market concentration is therefore to estimate the new equilibrium prices of the brands following the merger (acquisition) of Union and Laško. In estimating the induced increase in equilibrium prices we must of course take account of the fact that both Laško and Union already control other brands, namely Radenska and Fructal respectively, and can thus already exploit the cross-price elasticities between Laško and Radenska or Union and Fructal in seeking to maximise their profits. The price increase must therefore be estimated using equation (12) and the appropriate variance-covariance matrix using equation (14).

Table 15 shows the final estimates of the change in equilibrium prices after the analysed change in market concentration, i.e. after the merger (acquisition) of Laško and Union. Joint control of all brands would allow the merged firm to exploit all own-price and cross-price elasticities of the Laško, Union, Radenska and Fructal brands in its strategic pricing decisions. The estimated changes in equilibrium prices are shown in Table 15. Standard errors of the estimates are given in parentheses and can be used to check whether (at a given significance level) the point estimates are significantly different from zero (or from some other hypothesised value).

The estimates in Table 15 indicate that the post-merger change in equilibrium prices would not be significantly different from zero for any of the brands (even at a significance level of 20%). The very choice of the AIDS demand system makes the conclusion even stronger. Linear and logit demand systems, namely, result in much lower computed post merger prices[33].

To recap the results of the simulation: the model-based estimates indicate that the two brewers are in fact acting in a coordinated manner in the market segment for beer even prior to their horizontal merger or acquisition, or that Laško may have slightly greater freedom of action due to greater advertising effectiveness. Since the relevant market is wider than the market segment for beer, however, the key strategic weapon of producers in a differentiated products market is rendered less effective. Since the key effects are indirect, or in other words because of substitution with the other segments of the market, even an explicitly coordinated change

[32] See e.g. the SSNIP test in USDJ (1997).
[33] See Crooke et al. (1997).

of price (as through horizontal merger or acquisition) cannot result in a statistically significant increase of prices. Because of the large market shares of the individual producers and the large unconditional price elasticities in the beer segment of the drinks market in Slovenia, a greater danger than the abuse of market power through price increases is predatory pricing by the firms that are financially much stronger than the other (current) players in the beer segment.

4. Market entry

Introduction. In contemplating a price increase a firm will generally estimate what proportion of customers it will lose as a result. Those who would cease to purchase the firm's products in response to even a small increase in relative prices are the firm's marginal customers. In contemplating a price increase in a differentiated products market (a market governed by Bertrand pricing) the proportion of marginal customers is crucial. A large proportion of loyal (inframarginal) customers is not enough to allow a safe price increase if the proportion of marginal customers is even slightly larger. Thus, in a differentiated products market, a firm with an own-price elasticity of 2 will not find it worthwhile to raise prices by 5% even with only a 10% proportion of marginal customers.[34]

The own-price elasticities of both Laško and Union are close to 2 (see Table 13), implying that for each of them a proportion of marginal customers any greater than 4%-5% of all beer drinkers is large enough to make a potential price increase unprofitable, and that a proportion of marginal customers of Laško and Union combined in excess of 9% of all beer drinkers prevents a profitable increase in beer prices of the two firms after the merger (acquisition).

Since the post-merger combined share of the Laško and Union in the market segment for beer would be around 90%, it is easiest to estimate the proportion of marginal customers by estimating residual demand, which primarily consists of demand for imported beers. Estimating the demand for imported beer is all the more important since, while the market share (by value) of imported beer is under 4%, the potential capacity of foreign brewers who are already present in the market in Slovenia could comfortably absorb an extra 10% of total beer demand without entry by further foreign brewers. At the same time, no town in Slovenia is more than 120km away from the nearest foreign brewery. The associated transportation problems (and costs) are therefore unimportant.

The demand function for imported beer is specified as part of the AIDS system of demand equations (represented by equation (1)), and hence analogously to the demand functions for the drinks brands in the model. Consequently, the price elasticity of demand for imported beer must likewise be estimated by simulation of the total demand model.

The demand function for imported beer is presented in Table 16. The statistical properties of the estimated equation are satisfactory. The parameter estimates are significant at 10% with the exception of the price of Laško. The coefficients do not directly represent elasticities with respect to the two prices or the effective customs duty rate, and must therefore, as stated, be

[34] See Hausman and Leonard (1997). The crucial importance of marginal customers and the limited role of the proportion of loyal customers is well illustrated by a successfully contested antitrust case against Eastman Kodak, which at the time of the hearing had around 70% of the market segment for colour film in the USA. Since its own-price elasticity of demand was around 2, a share of marginal customers of as little as 10% was enough to make a price increase unprofitable for Kodak. See e.g. Werden (1998).

estimated by simulation of the model. The model-based estimates of the elasticities with respect to the import price and customs duty are given in Table 17.

The unconditional elasticities are both statistically significant and large; a one per cent reduction in the effective rate of customs duty, for example, could increase consumption of imported beer by 3.4%.

Since imported brands have a small share of the market segment for beer, the indirect effect of a change in either the price of imported beer or rate of customs duty (due to corresponding drop in total beer consumption) is relatively small. On the other hand, the direct effect due to substitution by other (domestic) beers is all the greater. The conditional cross-price elasticity with respect to Laško-branded products is large (and statistically significant), while the unconditional elasticity is insignificant (see Tables 16 and 17).

The demand function for imported beer implies that the most serious distortion of the structure of the beer segment of the drinks market is caused by the government maintaining high rates of customs duty on beer imports. This is because the price (customs duty) elasticity of imported beer implied by the estimated demand function is very high, yet the effective rate of customs duty on beer was still around 25% at the end 2001. A drastic reduction in customs duty would probably cause an even bigger rise in imports, since the price of imported beer (given a lower rate of customs duty) could cover also the necessary sunk costs (more intensive advertising and network investment) of new entrants into the market.

Entry or supply-side substitution. The very small size of the Slovenian beer market relative to the capacity of major brewers means that the difference between entry and supply-side substitution is unimportant. We emphasise that the distinction between producers who undertake supply-side substitution and those who enter the market is connected to the question of the opportunity costs of increased supply. Producers who substitute products are present on the market even before the change in concentration (horizontal merger or acquisition), so face lower costs of substitution than those who could potentially enter the market due to the increase in concentration[35]. In the case of producers who enter the market and have significant sunk costs (of investing in a market in which they have no prior presence), the issue is both the likelihood and rapidity of entry and the scale of the new supply of beer.

Because of the capacity available to the foreign brewers already present on the Slovenian market, supply-side substitution in response to a significant reduction in customs duty would alone (based on the estimated demand function for imported beer) strongly increase the supply of imported beer.

A reduction in customs duty, which would occur on entry to the EU in 2004, would also strongly increase the likelihood of entry as well as the range and quantity of beer imports. As already noted, a drastic cut in customs duty would allow the import price to support higher advertising expenditure and network investment. Even now the two largest brewers distribute only a small part of their output through major (purely) domestic wholesalers[36]. There is therefore little scope to abuse market power by restraining the distribution of increased beer imports (by limiting access to shelves).

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[35] See e.g. Willig (1991).
[36] Laško only sells large quantities through two wholesalers, and only 23% through the larger of the two (Laško internal data).

5. Data

Data sources. Analyses of market structure in other countries are usually undertaken using retail scanner data. Only with the availability of (mass) scanner data has it even become possible to undertake correctly the kinds of study of the structure of demand necessary for the analysis of market structure[37]. The present analysis is likewise based largely on the available retail scanner data for beverages (fast-moving consumer goods), although cross-checks with available official data were carried out, because of the imperfect coverage, short time span and lack of geographic disaggregation dimension of the data , and in order to verify the quality of the data. Data from the following sources were used: the (private) data provider Gral-ITEO (abbreviated as Gral), the Statistical Office of the Republic of Slovenia (SORS), Laško, the (private) data provider MEDIA and the Economic Institute of the Law School .

Gral was the source of retail scanner data on sales volumes and nominal sales values for individual brands or products in the market for beer and soft drinks. The soft drinks data include time series on carbonated drinks, water, iced teas and fruit juice. The data are bi-monthly and cover the period from January/February 1997 to May/June 2002. Only geographically aggregated data (for whole country) are available.

SORS was the source of data on prices of alcoholic and soft drinks, supply quantities of alcoholic and soft drinks available for the domestic market, the value of sales of aggregate alcoholic and aggregate soft drinks, and the value and volume of drinks imports. The data on prices of alcoholic and soft drinks comprise 15 different categories of drink for Slovenia as a whole and for the cities of Ljubljana, Maribor, Koper and Novo Mesto; the corresponding price data are monthly and extend from January 1994 to June 2002. The data on available supply quantities cover 24 different categories of drink; data are monthly and extend from January 1997 to December 2001. The data on sales of alcoholic and soft drinks, the broadest categories covered, are quarterly and run from the first quarter of 1999 to the last quarter of 2001. In constructing the SORS sales data for the period prior to 1999 quarterly SORS data for narrower categories were used, namely data for consumption of beer, wine, spirits, fruit juice, mineral water and other non-alcoholic drinks in hotels and catering establishments. These data run from the first quarter of 1995 to the last quarter of 1998 and were obtained from the Republic of Slovenia Monthly Statistical Review, published by SORS.

SORS also provided external trade data. These are monthly data on the value and volume of imports of water, beer, wine, and fruit and vegetable juice. The data cover the period from January 1997 to August 2002.

Data on customs duty rates were obtained from the website of the Ministry of Economic Relations and Development, and data on the breakdown of drinks imports by country of origin were taken from the SORS website.

MEDIA provided data on advertising expenditure. The data are monthly and cover the period from January 1997 to July 2002. They capture spending on beer advertising in total and broken down for Laško and Union, and spending on advertising for fruit juice.

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[37] Scanning of retail data, usually for fast-moving consumer goods, was introduced in the USA in the 1980s (the Nielsen database). See e.g. Hausman and Leonard (1997).

The macroeconomic data of the Economic Institute of the Law School consist of data on consumer demand, hotels and catering sector output, retail prices, costs of living, average wages in the drinks industry, private sector wages, public sector wages, overall drinks prices and household income.

Overview of data preparation. Since Gral data are the only sufficiently detailed data on drinks market spending at the level of brands (and individual products), the brand-level analysis used Gral data almost exclusively. SORS data at this level of disaggregation were used only in constructing instruments for estimating equations and in constructing effective customs duty rates and import prices.

The analysis at the market segment level used both Gral and SORS data, since the Gral data did not cover the wine segment. At the level of the total drinks market only SORS data and data from the Institute's own databases were used.

MEDIA was the sole source of data on advertising expenditure at both the brand and market segment levels.

Verification of the data was carried out by comparing the SORS data and aggregated Gral data.

All variables entering the demand model equations and the causality analysis were tested for the presence of a unit root.

Data construction. It was necessary to transform and convert the data obtained from the sources described in preparation for further analysis. The requirement for uninterrupted time series for the period 1997-2002 at least necessitated a large amount of work, particularly in constructing the brand-level variables.

The bi-monthly Gral data were aggregated as required by the three-stage budgeting process for the demand for drinks employed in the model. The sales values and volumes by individual products were aggregated by brands (lowest level), and the brand-level values and volumes were aggregated up to the level of market segments (higher level). For example, for Laško beer, the sales values and volumes for all products (cans or bottles, 0.5l or 0.33l, etc.) were aggregated together. The brand-level price was obtained by dividing aggregate sales by aggregate volume. Aggregation at the higher level, e.g. the market segment for beer, was done analogously.

The following beer brands were selected: Laško, Union, Gosser and Kaiser. Laško beer was defined as Zlatorog Club in cans and bottles of 0.33l and 0.5l and Zlatorog Pivo in cans and bottles of 0.33l and 0.5l. Union beer was defined as Union Pils in cans and bottles of 0.33l and 0.5l and Union Pivo in cans and bottles of 0.33l and 0.5l. Gosser beer was defined as Gosser products in cans and bottles of 0.33l and 0.5l. Kaiser beer was defined as Kaiser products in cans and bottles of 0.33l and 0.5l.

The following brand groups were selected for carbonated soft drinks: Coca Cola, Radenska, Union and foreign brands. The values and volumes of sales in each brand group were aggregated.

The following brand groups were selected for water: Laško, Radenska, Union, foreign brands and the Tempel brand. Foreign brands of water were defined as covering San Antonio, Evian, Guizza, San Benedetto, Jamnica and Spar.

The following brand groups were selected for iced tea: Laško, Radenska, Union and foreign brands. Foreign brands of tea were defined as covering Pfaner, Rauch, Vindija, Spar, Ybbstaler and Lipton.

The following brand groups were selected for fruit juice: Radenska, Union, foreign brands and the Fructal brand Fruc. Foreign brands of fruit juice were defined as Coca Cola, Parmalat, Pfaner, Rauch, Rottaler, Spar, Vindija and Ybbstaler.

The effective customs duty rate was calculated using data on actual customs duty rates (published on the Internet) and data on the composition of drinks imports.

Monthly data, e.g. advertising data, data on drinks industry wages and SORS data on prices and quantities, were converted into bi-monthly data. Bi-monthly data were created from consecutive months of data by adding the two values in the case of flow variables or taking the mean in the case of stock variables.

To construct data on the prices and volume of wine, data originally in quarterly form were converted to monthly data using a special quadratic programming algorithm and then converted to bi-monthly data. Quarterly data from the Republic of Slovenia Monthly Statistical Review (published by SORS) on the value of sales of non-alcoholic and alcoholic drinks in hotels and catering establishments for the period 1997-1998 (SORS) and data on quarterly demand for non-alcoholic and alcoholic drinks for the period 1999-2001 (SORS) were transformed in this way. As a check on the above process of data construction the aggregate bi-monthly Gral data on the value and volume of sales of soft drinks and beer were converted, using the same algorithm, to monthly data, and then reconverted to bi-monthly data.

Interpolating missing data. All data necessary for estimating the drink demand functions at the brand and market segment levels were obtained from Gral in the case of beer, water, fruit juice and tea. No (retail scanner) data on wine were available from Gral.

The time series for the quantity of wine was constructed using SORS and Gral data. The first step was to construct a quarterly series for the volume of wine sold. Quarterly SORS data on wine sales in the hotels and catering sector for the period 1997-1998, quarterly SORS data on alcoholic drink sales for the period 1999-2001 and annual SORS data on consumption and prices of wine and beer for all years analysed (taken from the Statistical Yearbook) were used.

The interpolation was carried out by first estimating a quarterly time series for sales of alcoholic drinks. SORS data on beer and wine sales up to 1998 and data on sales of alcoholic drinks for the period 1999-2001 were used to calculate a series for alcoholic drinks. Since the data coverage is different (the first captures only sales in hotels and catering establishments while the second captures total consumption) it was necessary to estimate the transition from 1998/IV to 1999/I specially; an appropriate growth rate was estimated so that the final estimated annual data for 1998 and 1999 were equal to the annual SORS data (given in Statistical Yearbook) for the same period. Data on wine sales were then estimated by deducting beer sales from sales of alcoholic drinks, using the Gral data for calculating the growth of beer sales, and using the annual SORS data in 2001 to set the level, since the Gral data only cover sales in retail outlets and can only be used to estimate growth rates.

The quantity of wine was obtained by dividing the estimated sales of wine by the price of wine (SORS monthly data).

Reliability of the data employed. The data employed were drawn from various sources and in some instances overlapped. This permitted testing of the data.

The aggregated Gral data for consumed quantities were tested by regression on SORS data for available supply quantities. The growth rates of the consumed quantities of beer, water, fruit juice and tea (Gral data) were “explained” by current and lagged growth rates of the available supply quantities based on SORS data. Lagged values of the SORS data were used in view of the fact that the Gral data refer to actual consumption, while the SORS data refer to growth in the quantities available to the domestic market (supply).

The results of the cross-checking are shown in Table 18. It is clear that the movements in the quantities of beer, iced tea, fruit juice and water sold, quantified using SORS data on available supply, provide a very good explanation of movements in the quantities of the same drinks, quantified using Gral (aggregated retail scanner) data on spending.

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STATISTICAL ANNEX

Table 1
Exogeneity test for prices (test of relevant market)

Prices	F-stat
DLOG(WATER_P) -> DLOG(WHITE_WINE_P)	0.066
DLOG(WHITE_WINE_P) -> DLOG(WATER_P)	0.033
DLOG(JUICE_P) -> DLOG(WHITE_WINE_P)	0.770
DLOG(WHITE_WINE_P) -> DLOG(JUICE_P)	1.672
DLOG(BEER_P) -> DLOG(WHITE_WINE_P)	0.003
DLOG(WHITE_WINE_P) -> DLOG(BEER_P)	0.303
DLOG(CARB_P) -> DLOG(WHITE_WINE_P)	0.053
DLOG(WHITE_WINE_P) -> DLOG(CARB_P)	0.000
DLOG(TEA_P) -> DLOG(WHITE_WINE_P)	0.794
DLOG(WHITE_WINE_P) -> DLOG(TEA_P)	**2.842**
DLOG(JUICE_P) -> DLOG(WATER_P)	0.140
DLOG(WATER_P) -> DLOG(JUICE_P)	**2.791**
DLOG(BEER_P) -> DLOG(WATER_P)	0.147
DLOG(WATER_P) -> DLOG(BEER_P)	**12.563**
DLOG(CARB_P) -> DLOG(WATER_P)	0.108
DLOG(WATER_P) -> DLOG(CARB_P)	0.096
DLOG(TEA_P) -> DLOG(WATER_P)	0.003
DLOG(WATER_P) -> DLOG(TEA_P)	1.417
DLOG(BEER_P) -> DLOG(JUICE_P)	0.979
DLOG(JUICE_P) -> DLOG(BEER_P)	0.015
DLOG(CARB_P) -> DLOG(JUICE_P)	**3.326**
DLOG(JUICE_P) -> DLOG(CARB_P)	1.410
DLOG(TEA_P) -> DLOG(JUICE_P)	**4.706**
DLOG(JUICE_P) -> DLOG(TEA_P)	0.372
DLOG(CARB_P) -> DLOG(BEER_P)	**3.330**
DLOG(BEER_P) -> DLOG(CARB_P)	0.008
DLOG(TEA_P) -> DLOG(BEER_P)	0.042
DLOG(BEER_P) -> DLOG(TEA_P)	0.139
DLOG(TEA_P) -> DLOG(CARB_P)	0.015
DLOG(CARB_P) -> DLOG(TEA_P)	**3.091**

Notes:
P – Price
BEER – Beer
CARB - Carbonated soft drinks
WATER-Water
JUICE - Fruit juice
TEA - Iced tea
WINE – Wine
Period of estimation 1997/1-2002/6; bi-monthly data.

Sources: Gral ITEO; Statistical Office of the Republic of Slovenia; authors' estimates.

Table 2
Exogeneity test for quantities (test of relevant market)

Quantities	F-stat
DLOG(CARB_Q) -> DLOG(TEA_Q)	1.562
DLOG(TEA_Q) -> DLOG(CARB_Q)	2.383
DLOG(BEER_Q) -> DLOG(TEA_Q)	**3.971**
DLOG(TEA_Q) -> DLOG(BEER_Q)	0.497
DLOG(JUICE_Q) -> DLOG(TEA_Q)	**6.747**
DLOG(TEA_Q) -> DLOG(JUICE_Q)	**6.496**
DLOG(WATER_Q) -> DLOG(TEA_Q)	0.148
DLOG(TEA_Q) -> DLOG(WATER_Q)	1.285
DLOG(WINE_Q) -> DLOG(TEA_Q)	1.130
DLOG(TEA_Q) -> DLOG(WINE_Q)	**2.664**
DLOG(BEER_Q) -> DLOG(CARB_Q)	**9.840**
DLOG(CARB_Q)->DLOG(BEER_Q)	**5.666**
DLOG(JUICE_Q) -> DLOG(CARB_Q)	**8.346**
DLOG(CARB_Q)->DLOG(JUICE_Q)	**4.974**
DLOG(WATER_Q) -> DLOG(CARB_Q)	**6.844**
DLOG(CARB_Q)->DLOG(WATER_Q)	**9.013**
DLOG(WINE_Q) -> DLOG(CARB_Q)	1.372
DLOG(CARB_Q)->DLOG(WINE_Q)	**2.623**
DLOG(JUICE_Q) -> DLOG(BEER_Q)	**5.530**
DLOG(BEER_Q)->DLOG(JUICE_Q)	**10.015**
DLOG(WATER_Q) -> DLOG(BEER_Q)	**4.925**
DLOG(BEER_Q)->DLOG(WATER_Q)	**8.225**
DLOG(WINE_Q) -> DLOG(BEER_Q)	1.789
DLOG(BEER_Q)->DLOG(WINE_Q)	**3.562**
DLOG(WATER_Q) -> DLOG(JUICE_Q)	**5.455**
DLOG(JUICE_Q)->DLOG(WATER_Q)	**7.711**
DLOG(WINE_Q) -> DLOG(JUICE_Q)	0.891
DLOG(JUICE_Q) -> DLOG(WINE_Q)	0.476
DLOG(WINE_Q) -> DLOG(WATER_Q)	0.955
DLOG(WATER_Q)->DLOG(WINE_Q)	1.618

Notes:
Q - Quantity
BEER - Beer
CARB - Carbonated soft drinks
WATER -Water
JUICE - Fruit juice
TEA - Iced tea
WINE – Wine
Period of estimation 1997/1-2002/6; bi-monthly data

Sources: Gral ITEO; Statistical Office of the Republic of Slovenia; authors' estimates.

Table 3
VAR in drinks prices

	Beer	Wine	Fruit juice	Water
Beer	0.211	0.719	0.905	0.314
	(0.9)	(2.3)	(2.0)	(3.1)
Wine	-0.449	0.600	-0.098	0.120
	(-2.3)	(2.4)	(-0.3)	(1.4)
Fruit juice	0.136	-0.064	0.109	0.136
	(1.2)	(-0.4)	(0.5)	(2.7)
Water	0.233	-0.376	1.053	-0.103
	(0.5)	(-0.6)	(1.2)	(-0.5)
Constant	-0.003	-0.001	-0.042	0.001
	(-0.3)	(-0.04)	(-2.1)	(0.2)
Food prices	0.838	0.687	4.122	0.651
	(1.0)	(0.6)	(2.5)	(1.7)
Gross wages (tradable sector)	0.376	-0.429	-0.293	-0.003
	(2.3)	(-2.0)	(-0.9)	(-0.04)
R^2	0.38	0.46	0.52	0.61
LRT	7.2	7.1	8.2	18.0

Notes:
Period of estimation 1996/I-2002/II; quarterly data.

Sources: Statistical Office of the Republic of Slovenia; Economic Institute of the Law School internal data; authors' estimates.

Table 4
Market shares in 2001 (by value of sales)

Shares of all drinks	
Beer	0.23216
Wine	0.18492
Carbonated drinks and water	0.28159
Fruit juice and tea	0.30133
Shares of alcoholic drinks	
Beer	0.55663
Wine	0.44337
Shares of non-alcoholic drinks	
Carbonated drinks	0.25158
Water	0.23148
Fruit juice	0.43985
Tea	0.07709
Shares of beer	
Laško	0.50090
Union	0.40772
Radenska share of carbonated drinks and water	0.26097
Fructal share of fruit juice and tea	0.37970
Brand shares in the portfolio of merged firm	
Laško	0.37645
Union	0.30642
Radenska	0.12402
Fructal	0.19311

Sources: Gral ITEO; Statistical Office of the Republic of Slovenia; authors' estimates.

Table 5

Total drinks market

	Coefficient	T-stat	Lags
Relative prices	-0.78	-0.6	0^I
Real disposable income	1.41	2.1	0
Habits and tastes	-0.81	-2.4	0
R^2	0.72		
DW	1.79		
CHOW(p)	0.66		
RESET(p)	0.63		

Notes:
Period of estimation 1997/I-2002/II; quarterly data.
Supperscript "I" in the last column denotes variable with instruments.

Sources: Statistical Office of the Republic of Slovenia; Economic Institute of the Law School internal data; authors' estimates.

Table 6a

Market segments – Beer

	Coefficient	T-stat	Lags
Beer price	-1.40	-2.1	0^I
Carbonated drinks and water price	0.18	0.3	1
Wine price	2.81	3.3	0^I
Total demand for drinks	1.23	6.9	0^I
Beer advertising	0.03	2.0	1
R^2	0.95		
DW	1.99		
CHOW(p)	0.55		
RESET(p)	0.26		

Notes:
Period of estimation 1997/1-2002/6; bi-monthly data.
Superscript "I" in the last column denotes variable with instruments.

Sources: Gral ITEO; Economic Institute of the Law School internal data; MEDIA; Statistical Office of the Republic of Slovenia; authors' estimates.

Table 6b

Market segments – Beer (SUR_s)

	Coefficient	T-stat	Lags
Beer price	-1.76	-3.2	0^I
Carbonated drinks and water price	0.56	1.2	1
Wine price	2.85	4.0	0^I
Total demand for drinks	1.21	7.9	0^I
Beer advertising	0.02	1.6	1
R^2	0.95		
DW	1.85		

Notes:
Period of estimation 1997/1-2002/6; bi-monthly data.
Superscript "I" in the last column denotes variable with instruments.

Sources: Gral ITEO; Economic Institute of the Law School internal data; MEDIA; Statistical Office of the Republic of Slovenia; authors' estimates.

Table 7a

Market segments – Carbonated drinks and water

	Coefficient	T-stat	Lags
Carbonated drinks and water price	-4.13	-1.9	0^I
Total demand for drinks	0.92	4.3	0^I
Beer price	0.95	1.7	0^I
Wine price	1.33	1.3	0^I
R^2	0.91		
DW	2.01		
CHOW(p)	0.82		
RESET(p)	0.21		

Notes:
Period of estimation 1997/1-2002/6; bi-monthly data.
Superscript "I" in the last column denotes variable with instruments.

Sources: Gral ITEO; Economic Institute of the Law School internal data; MEDIA; Statistical Office of the Republic of Slovenia; authors' estimates.

Table 7b

Market segments – Carbonated drinks and water (SUR_s)

	Coefficient	T-stat	Lags
Carbonated drinks and water price	-4.80	-2.7	0^I
Total demand for drinks	0.87	4.8	0^I
Beer price	0.88	1.8	0^I
Wine price	1.59	1.8	0^I
R^2	0.91		
DW	1.92		

Notes:
Period of estimation 1997/1-2002/6; bi-monthly data.
Superscript "I" in the last column denotes variable with instruments.

Sources: Gral ITEO; Economic Institute of the Law School internal data; MEDIA; Statistical Office of the Republic of Slovenia; authors' estimates.

Table 8a

Market segments – Fruit juice and tea

	Coefficient	T-stat	Lags
Fruit juice and tea price	-4.00	-1.6	0^I
Total demand for drinks	0.65	1.8	0^I
Fruit juice and tea advertising	0.01	0.6	0
Wine price	1.68	1.0	0^I
Carbonated drinks and water price	0.87	0.8	1
R^2	0.50		
DW	2.03		
CHOW(p)	0.07		
RESET(p)	0.68		

Notes:
Period of estimation 1997/1-2002/6; bi-monthly data.
Superscript “I” in the last column denotes variable with instruments.

Sources: Gral ITEO; Economic Institute of the Law School internal data; MEDIA; Statistical Office of the Republic of Slovenia; authors’ estimates.

Table 8b

Market segments – Fruit juice and tea (SUR_s)

	Coefficient	T-stat	Lags
Fruit juice and tea price	-3.11	-1.5	0^I
Total demand for drinks	0.66	2.2	0^I
Fruit juice and tea advertising	0.01	0.5	0
Wine price	1.74	1.2	0^I
Carbonated drinks and water price	0.77	0.8	1
R^2	0.50		
DW	2.01		

Notes:
Period of estimation 1997/1-2002/6; bi-monthly data.
Superscript “I” in the last column denotes variable with instruments.

Sources: Gral ITEO; Economic Institute of the Law School internal data; MEDIA; Statistical Office of the Republic of Slovenia; authors’ estimates.

Table 9a

Brands – Laško

	Coefficient	T-stat	Lags
Laško price	-0.09	-0.9	1
Beer demand	0.05	1.7	0
Union price	0.19	1.4	1
Laško advertising	0.002	0.9	1
Imported beer price	0.07	1.9	1
R^2	0.37		
DW	2.22		
CHOW(p)	0.77		
RESET(p)	0.49		

Notes:
Period of estimation 1997/1-2002/6; bi-monthly data.

Sources: Gral ITEO; Economic Institute of the Law School internal data; MEDIA; Statistical Office of the Republic of Slovenia; authors' estimates**.**

Table 9b

Brands – Laško (SUR_b1)

	Coefficient	T-stat	Lags
Laško price	-0.09	-1.0	1
Beer demand	0.05	2.0	0
Union price	0.19	1.6	1
Laško advertising	0.002	1.1	1
Imported beer price	0.07	2.1	1
R^2	0.37		
DW	2.22		

Notes:
Period of estimation 1997/1-2002/6; bi-monthly data.

Sources: Gral ITEO; Economic Institute of the Law School internal data; MEDIA; Statistical Office of the Republic of Slovenia; authors' estimates.

Table 10a

Brands – Union

	Coefficient	T-stat	Lags
Union price	-0.16	-1.1	1
Laško price	0.21	2.0	1
Beer demand	0.02	1.1	1
Laško advertising	-0.004	-2.0	1
Imported beer price	0.03	0.9	2
R^2	0.34		
DW	2.17		
CHOW(p)	0.14		
RESET(p)	0.84		

Notes:
Period of estimation 1997/1-2002/6; bi-monthly data.

Sources: Gral ITEO; Economic Institute of the Law School internal data; MEDIA; Statistical Office of the Republic of Slovenia; authors' estimates.

Table 10b

Brands – Union (SUR_b2)

	Coefficient	T-stat	Lags
Union price	-0.18	-1.5	1
Laško price	0.23	2.6	1
Beer demand	0.02	1.5	1
Laško advertising	-0.004	-2.2	1
Imported beer price	0.03	1.1	2
R^2	0.34		
DW	2.13		

Notes:
Period of estimation 1997/1-2002/6; bi-monthly data.

Sources: Gral ITEO; Economic Institute of the Law School internal data; MEDIA; Statistical Office of the Republic of Slovenia; authors' estimates.

Table 11a

Brands – Radenska

	Coefficient	T-stat	Lags
Radenska price	-0.28	-1.3	0^I
Price of other carb.drinks	0.41	1.9	0^I
Carb. drinks and water demand	0.05	2.5	0
R^2	0.44		
DW	1.67		
CHOW(p)	0.06		
RESET(p)	0.24		

Notes:
Period of estimation 1997/1-2002/6; bi-monthly data.
Superscript "I" in the last column denotes variable with instruments.

Sources: Gral ITEO; Economic Institute of the Law School internal data; MEDIA; Statistical Office of the Republic of Slovenia; authors' estimates.

Table 11b

Brands – Radenska (SUR_b1)

	Coefficient	T-stat	Lags
Radenska price	-0.28	-1.4	0^I
Price of other carb.drinks	0.42	2.1	0^I
Carb. drinks and water demand	0.05	2.8	0
R^2	0.44		
DW	1.66		

Notes:
Period of estimation 1997/1-2002/6; bi-monthly data.
Superscript "I" in the last column denotes variable with instruments.

Sources: Gral ITEO; Economic Institute of the Law School internal data; MEDIA; Statistical Office of the Republic of Slovenia; authors' estimates.

Table 12a

Brands – Fructal

	Coefficient	T-stat	Lags
Fructal price	-0.40	-2.0	0^I
Fruit juice and tea demand	0.05	0.8	1
R^2	0.35		
DW	1.96		
CHOW(p)	0.92		
RESET(p)	0.26		

Notes:
Period of estimation 1997/1-2002/6; bi-monthly data.
Superscript "I" in the last column denotes variable with instruments.

Sources: Gral ITEO; Economic Institute of the Law School internal data; MEDIA; Statistical Office of the Republic of Slovenia; authors' estimates.

Table 12b

Brands – Fructal (SUR_b2)

	Coefficient	T-stat	Lags
Fructal price	-0.33	-1.8	0^I
Fruit juice and tea demand	0.03	0.6	1
R^2	0.35		
DW	2.00		

Notes:
Period of estimation 1997/1-2002/6; bi-monthly data.
Superscript "I" in the last column denotes variable with instruments.

Sources: Gral ITEO; Economic Institute of the Law School internal data; MEDIA; Statistical Office of the Republic of Slovenia; authors' estimates.

Table 13

Matrix of price elasticities

	Laško	Union	Radenska	Fructal
Laško	-1.887 (0.45)	0.332 (0.50)	0.427 (0.33)	-0.064 (0.11)
Union	0.021 (0.47)	-2.201 (0.57)	0.348 (0.26)	-0.052 (0.09)
Radenska	0.089 (0.20)	0.085 (0.19)	-3.361 (0.96)	0.175 (0.28)
Fructal	-0.121 (0.16)	-0.115 (0.19)	-0.089 (0.15)	-2.814 (0.98)

Sources: Gral ITEO; Economic Institute of the Law School internal data; MEDIA; Statistical Office of the Republic of Slovenia; authors' estimates.

Table 14

Price-cost margin

	No mergers		Current situation		Post-merger	
	Coefficient	Std. error	Coefficient	Std. error	Coefficient	Std. error
Lasko	0.530	(0.13)	0.555	(0.14)	0.624	(0.27)
Union	0.454	(0.12)	0.450	(0.12)	0.483	(0.25)
Radenska	0.298	(0.09)	0.342	(0.14)	0.398	(0.24)
Fructal	0.355	(0.12)	0.326	(0.13)	0.262	(0.17)

Sources: Gral ITEO; Economic Institute of the Law School internal data; MEDIA; Statistical Office of the Republic of Slovenia; authors' estimates.

Table 15
Change in equilibrium prices of brands

	Growth in prices	Standard error
Laško	0.183	(0.50)
Union	0.065	(0.37)
Radenska	0.094	(0.22)
Fructal	-0.087	(0.11)

Sources: Gral ITEO; Economic Institute of the Law School internal data; MEDIA; Statistical Office of the Republic of Slovenia; authors' estimates.

Table 16

Brands – imported beer

	Coefficient	T-stat	Lags
Beer demand	0.020	1.54	0
Effective customs duty rate	-0.077	-2.56	0
Laško advertising	-0.001	-1.58	0
Imported beer price	-0.035	-2.53	0
Laško price	0.086	2.33	1
R^2	0.92		
DW	1.82		
CHOW(p)	0.62		
RESET(p)	0.03		

Notes:
Period of estimation 1997/1-2002/6; bi-monthly data.

Sources: Gral ITEO; Economic Institute of the Law School internal data; MEDIA; Statistical Office of the Republic of Slovenia; authors' estimates.

Table 17

Elasticity of imported beer consumption

	Coefficient	Std. error
Effective customs duty rate	-3.40	(0.90)
Imported beer price	-2.14	(0.41)
Laško price	1.49	(1.29)

Sources: Gral ITEO; Economic Institute of the Law School internal data; MEDIA; Statistical Office of the Republic of Slovenia; authors' estimates.

Table 18

Tests of data reliability

Beer quantity – Gral

	Coefficient	T-stat
Beer quantity – SORS	0.561	9.72
Beer quantity – SORS (-1)	0.392	7.05
R^2	0.88	
DW	2.06	

Fruit juice quantity – Gral

	Coefficient	T-stat
Fruit juice quantity – SORS (-l)	0.596	3.56
Fruit juice quantity – SORS (-2)	0.630	2.83
R^2	0.87	
DW	2.12	

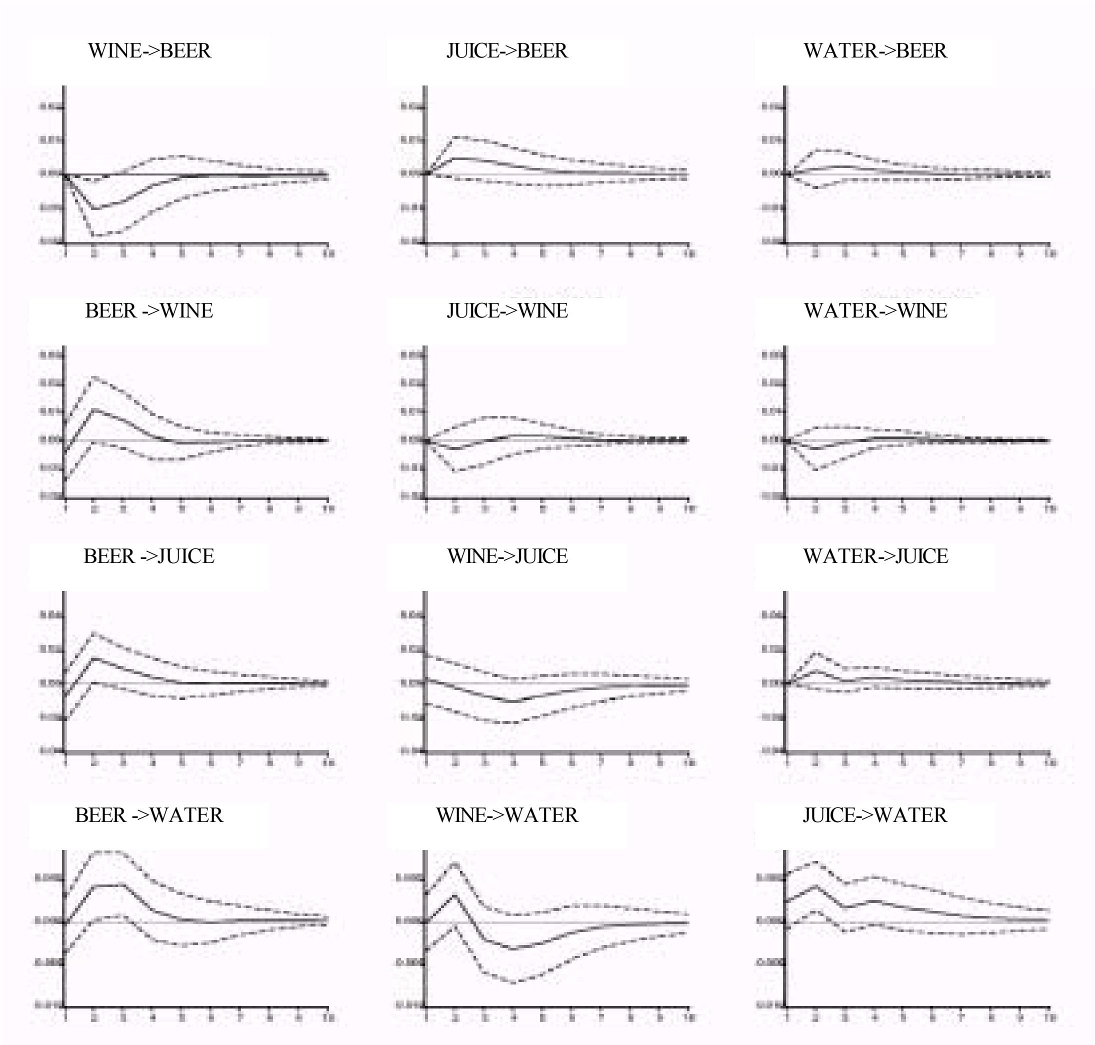
Tea and water quantity – Gral

	Coefficient	T-stat
Tea and water quantity – SORS	0.594	11.78
Tea and water quantity – SORS (-l)	0.302	6.39
R^2	0.88	
DW	1.99	

Notes:
Period of estimation 1997/1-2002/6; bi-monthly data.
All variables are in rates of growth

Sources: Gral ITEO; Statistical Office of the Republic of Slovenia (SORS); authors' estimates.

Figure 1
VAR in drinks prices (test of relevant market)



Notes: Responses to one standard error impulses.

Sources: Statistical Office of the Republic of Slovenia; authors' estimates.

Figure 2
Three-stage budgeting model of the demand for drinks