ADVERTISING AS A STRATEGIC ACTION. CASE OF BREWING INDUSTRY IN UKRAINE

by

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Abstract

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by Yuliya Demyanyk

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Advertising promotes sales of beer and increases producer's share of market. However, no firm is able to capture the whole market, as any increase in advertising by a seller is usually offset by that of its rivals, leading to an all-around increase of advertising. Such an increase in aggregate level of advertising brings about two effects: an expansion of the market itself and a slight increase in individual shares of the market. Theoretically, an increase in market share, *ceteris paribus,* gives a producer some additional market power with an option to influence price of a product. Nevertheless, this study shows that advertising does not lead to increased shares of market in an amount sufficient to influence prices of beer, so competitiveness is preserved.

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GLOSSARY

Experience good. A good that must be consumed in order to have its quality released.

Search good. A good that does not have to be consumed in order to have its quality released. A consumer can ascertain its quality by inspection prior to procurement.

Brand awareness is a particular consumers' knowledge about an existing brand of a product. It is normally based on interview of consumers about their brand preferences in a certain period of time (usually in half a year), and measured in percentage points of interviewed individuals. The more percentage points of brand awareness correspond to a particular brand, the more the popularity of this brand. The resulted sum of all percentage points from one particular questionnaire can be greater that 100, as some individuals can point a couple of brands, which overlap as a result.

"Unaided" brand awareness is a particular consumers' knowledge about an existing brand of a product. It is normally based on interview of consumers about their brand preferences in a certain period of time (usually in half a year), and measured in percentage points of interviewed individuals. It is "unaided" in the sense that individuals have to name brands without the list of them available.

AGB is the private research company. Its role is to analyze the different advertising and consumption characteristics providing agencies with relevant information.

Ukrpivo (Ukrainian Brewery) is Ukrainian Joint Stock Company with the main functional role to coordinate and lobby interests of the industry.

Nash equilibrium is a **"**profile of strategies such that each player's strategy is an optimal response to the other player's strategies" (Fudenberg, Tirole, 1998).

Dominant strategy. A strategy "…if it pays at least as much as another in every contingency and more in some contingency" (Gardner, 1995).

Advertising war is a strategic situation in which each seller of a product increases it's advertising to offset that of its rivals, leading to an all-around increase of advertising.

INTRODUCTION

The purpose of advertising is to promote sales of beer and to increase producer's share of market. However, no firm is able to capture the whole market, as any increase in advertising by a seller is usually offset by that of its rivals, leading to an all-around increase of advertising. In this paper, I it is shown that advertising campaigns carried out by brewers lead to increased sales of beer without adversely affecting the competitiveness of the local brewing market.

Potentially, when every major producer's advertising strategies are equal, there is no effect on advertising shares, and the net effect is that resources are wasted by advertising campaigns. Fortunately, this is not the case for Ukrainian brewing industry; an increase in aggregate level of advertising brings around two effects: slight increases in individual shares of market and an expansion of the market itself. The former is feasible due to the impossibility of perfectly monitoring the actions of all firms in the market, and the latter is feasible, as all-around increase in advertising probably "steals" market share of other alcoholic and/or soft drinks.

Theoretically, an increase in market share, *ceteris paribus,* gives a producer some additional market power with an option to influence price of a product. Under monopolistically competitive structure of a market, however, producers of a product might not increase prices strategically. Nevertheless, the present work shows that advertising does not lead to increased shares of market sufficiently to influence prices of beer, so competitiveness is preserved.

The topic is interesting as many scientists are interested in the economic purposes of advertising and its impacts on social welfare. The International

Dictionary of Thoughts (1969) cites American President Calvin Coolidge who said: "Advertising is the life of trade". In the words of Leo-Arthur Kelmenson (1976), advertising is "the lubricant for the free-enterprise system". Furthermore, advertising is a relatively new industry in Ukraine. There are no institutions that prepare professionals; advertising agents (producers as well as advertising firms) learn by doing, and that is also why additional research in this field is important.

Although a perfectly competitive market for any good is socially optimal, there are no incentives to advertise one brand over another, as competitors would be able to "free ride on the advertising" (Becker and Murphy, 1993). In Ukraine, the beer market is not, however, perfectly competitive. It is monopolistically competitive with eight major firms producing about 85% of the entire market, and with the rest of the market shared by about 180 small producers.

While all firms realize that an advertising program is a key to successful business with all its positive factors like differentiating their products and possibly increasing profits, many economists argue that advertising increases product differentiation and, as a consequence, the monopoly power of individual firm. This, in turn, diminishes optimality of production and decreases social welfare. However, even if the monopoly power of brewers increases due to advertising, it is not necessarily a negative factor, as variety-loving consumers can benefit. For those some additional knowledge about more brands of a product increases their utility.

There are two possible ways to analyze the economic issue of advertising. The first is the determination of factors that affect the scale of advertising expenditures, and the second is the analysis of the effects of advertising on the various characteristics of trade (Kaldor, 1950).

We investigate the effect of advertising on sales, prices, and market shares. For the purpose of analysis, the brewing industry is interesting for several reasons. First, beer is a very popular product everywhere and it is highly advertised in every country it is produced or at least consumed. Second, the brewing industry itself exhibits "the close resemblance to the typical consumer-goods industry", (Kaldor, 1950). Furthermore, the brewing industry is important for the Ukrainian economy in the sense that brewers pay taxes, produce the favorite drink, and, according to the chief economist of Ukrpivo, Mrs. G.N. Korenkova (2000), during the last three years contributed about 1% to the Ukrainian GDP.

Following these ideas and taking into consideration the fact that advertising expenditures are substantial, it is found to be extremely interesting to analyze the purpose of such expenditures from the economic perspective.

Thus, the questions to be investigated are:

- ✓ Is advertising in the beer industry of Ukraine justifiable from an economic perspective?

- ✓ Why bother with advertising if it does not generate increasing market power?

This paper adopts a game theoretic perspective and attempts to answer these questions on the basis of econometric analysis.

It is shown that advertising positively influences sales of beer in Ukraine. At the same time, the direct effect of advertising on prices of beer is not significantly different from zero. This seemingly paradoxical situation may arise as the effect of advertising on a firm's share of the market is neutralized by the strategic interactions of other advertising firms. Particularly, it is shown that the effect of

advertising on sales of beer is robust, positive, and economically meaningful in Ukraine. If an average brewer increases television or outdoors advertising by 1 UAH in a certain period, it would lead to increased sales by about 3.4 liters in the same period, *ceteris paribus*.

Furthermore, advertising of beer positively affects share of brewing market in Ukraine. The result is robust and economically meaningful. Specifically, a one million UAH increase in television or outdoors advertising expenditures, *ceteris paribus,* leads to 0.1% increase in the share of market. Such increase is not sufficient to influence price of beer, as an increase in the share of market by 1 percentage point, *ceteris paribus,* must lead to increase in the price of beer by 2.4 UAH per liter.

So, the net result obtained is that a firm is not able to capture a big enough market share to influence price of a product by just advertising more, because such increases in advertising would be strategically offset by that of its rivals.

The plan of the thesis is as follows. Chapter II explores those economic aspects of advertising comparing different points of view of economists. Chapter III describes the Ukrainian brewing industry, data, the theoretical model construction, and the econometric analysis. Chapter IV presents concluding remarks and possible ways to improve the research on current topic.

Chapter 2

ECONOMIC ASPECTS OF ADVERTISING

Increased advertising expenditures would allow firms to promote sales, while leaving prices of beer unchanged. For the purpose of analysis, this chapter defines the different kinds of advertising and describes the possible purposes of them from an economic perspective.

2.1 Informative vs. Persuasive Advertising

One can make a distinction between two different types of advertising. *Informative advertising* describes peculiarities of a product, and *persuasive advertising* that is aimed at affecting consumers' tastes. Although it is sometimes difficult to distinguish the two types of advertising, Nelson (1974) suggests that persuasive advertising is usually used more often for "experience goods". The ratio of advertising to sales for those is three times greater than for "search goods".

However, for consumers of experience goods incomplete information about quality, price, or simply the existence of these goods could lead to product differentiation. This happens because, in reality, well-known and unknown products are different for consumers. If there have been successful match between taste and quality after a good was experienced, a consumer would not try any other unknown product-substitute unless it is cheaper enough (Tirole, 1998).

Consumers of search goods, though, are able to get information about products under consideration via both advertising and search. For monopolistically competitive markets price of a product increases due to increase of either cost of search or cost of advertising. If advertising becomes more expensive, consumers search more and vice versa (Butters, 1977). For "large-group" oligopolistic markets, however, advertising is always excessive, i.e. there is not enough search (Grossman and Shapiro, 1984). Moreover, the effect of informative advertising on sales is related to distribution and marketing of that product that usually diminishes search cost.

Informative advertising is integrated in "partial view" on advertising in general as it provides some knowledge to consumers helping them to make rational choices, while persuasive advertising is in "adverse view" as it is determined to "fool consumers" (Tirole, 1998).

Additionally, Marshal (Doyle, 1968) called informative and persuasive advertising as "constructive" and "combative" respectively, and pointed out that the former one is "beneficial" and the latter is "socially wasteful". Nonetheless, Alderson (ibid) argued that "all effective communication is persuasive…both recommendations must be presented persuasively if they are to have any effect on purchasing decisions".

More to the point, all types of advertising are persuasive, and all are informative (1950, Kaldor). He argues that all advertising services are provided to enlarge the number of prospective consumers supplying some information about the product. That information can be either full description of a product with some particular characteristics including prices or just the name of a company on a label.

Advertising about prices diminishes search costs for consumers and increases competition. As a result, social welfare rises (Carlton and Perloff, 2000). Non-price advertising *signals quality* of a product and solves the lemons problem (ibid). However, this does not always happen. In the case when advertising does not discover directly any quality of a product, for advertising to play a role of a signal, some assumptions should be satisfied (Kihlstrom and Riordan, 1984).

Kihlstrom and Riordan (1984) develop two models of advertising that explain the conditions under which it can be a signal of high quality of a product. Let's consider the first model in this section, and the second one later. Here, the model of our interest is appropriate for the new product appeared on the market because it assumes that the consumers are initially uninformed about the quality of the product, and later, due to dissemination of information, they become fully informed. In this case consumers make their conclusions about high quality of the product based upon large advertising expenditure.

Such idea has a rational behaviour foundation, and consistent with authors' ideas that advertising works as a signal for high quality firms, which is not the case for low quality firms. The authors argue that there is an additional possible explanation of increase in the sales of the high quality good. Rational consumer can initially follow an advertising to learn about two new products, and then purchase repeatedly only one of a higher quality. As a result, at the end of the day producers of a high quality product are the only advertisers, and the advertising works as a signal. Nonetheless, this model compares only two-quality firms (high and low) engaged in advertising. According to chief economist of Ukrpivo Ms. Korenkova (2000), there is evidence that in the Ukrainian brewing market only the biggest and the best producers use advertising for promotion, i.e. advertising does work as a signal of high quality.

The model described helps us to explain why consumers prefer brands of beer that are heavily advertised, although there is little informative content in the advertising services proposed. Figures A1 and A3 in the appendix, show that consumers' brand preferences match with the most advertised brands.

However, advertisers are aware of the possibility of advertising to be a signal. And if they want consumers to interpret it in such a way, they are supposed to "advertise how much they spend on advertising" (Becker and Murphy, 1993). As we see, no company is doing so and not even going to. Even more, the expenditures on advertising are treated as private and secret in most of the cases. Viewers of advertising can only guesstimate the approximate expenses of the company and then treat it as a signal, which can lead to biased results. This, of course, does not mean that advertisers are foolish. They are probably hiding advertising outlays in order to avoid *advertising wars*.

2.2. Effects of Advertising on Market Structure

The most important dispute in theory of advertising is about whether it leads to increased monopoly power or facilitates competition.

There is a theoretical suggestion (Telser, 1964) that advertising leads to an increased market power through product differentiation. Furthermore, advertising is anticipated to increase "the minimum optimal scale of firms in an industry", which in turn diminishes the number of firms on the market. However, Telser (1964) also argues that an increase of the scale of production "…depends more on nature of production costs than on advertising".

In spite of the offered scheme, Telser (1964) also states that there is no inverse relationship between advertising and competition. However, Kessides (1986) proposed that advertising even promotes competition as it reduces the search

costs of consumers, and "thereby [decreases] their loyalty and inertia". Moreover, in spite of Telser's analysis based on the effect of advertising on concentration of sales as a measure of monopoly power, Comanor and Wilson (1967) argue that concentration measure is "not [an] adequate indicator" for market power as it captures just one dimension of it.

As it was already mentioned earlier, advertising can be rather informative, so it can facilitate one crucial assumption of competition providing information. Sellers must perform some advertising actions if they want to be recognized on the market. They still might be unable to affect a market price, thus advertising would not destroy competitiveness of the market.

Even more, Jean Tirole (1998) emphasized, "…advertising reduces product differentiation associated with a lack of information about some products and fosters competition". However, as another side of the same coin, there is a fact that firms would not bother with advertising under perfectly competitive market structure, as a lot of competitors would be able to "free ride on the advertising" (Becker and Murphy, 1993).

So, it is found no whatsoever consensus on whether advertising leads to increased monopoly power or facilitates competition, and that is why we feel necessity to test the it statistically for the Ukrainian case.

Nonetheless, we shell see later in the industry description part of the current work that in Ukraine the situation can be described as a monopolistically competitive market with eight major producers, who produce about 85% of the entire market, and about 180 small producers.

Although the number of "major producers" is growing over time, it is still possible to argue that they do not steal each other's share of market but probably

grow in number as the market itself is growing. So, to maintain the already existent market share, there should be some barriers to entry. Do those barriers include costly advertising? Let's answer this question in the following section.

2.3. Advertising as a Barrier to Entry

Usually producers are able to maintain their monopoly power if there are some barriers to entry. Those barriers, according to Bain (Tirole, 1998), might be a one (or more) of the following: economies of scale (case of natural monopoly), absolute cost advantage, product-differentiation advantage, capital requirements, blockaded entry (case where incumbents compete as there were no danger of entry), and deterred entry. The question, though, is whether the result of advertising strategies causes some of those listed?

2.3.1. Economies of scale

If a firm exhibits economies of scale, it is more likely that it has more possibilities to advertise than the others. So, there is a simultaneity problem present, and we cannot cay for sure that advertising causes economies of scale and not the other way around. There is, however, economies of another scale present. As the evidence shows (AGB's, 1999; Tirole, 1998; Comanor and Wilson, 1967), the more funds a firm can devote for advertising (so to say in bulk), the lower the cost per advertising message becomes. More to the point, as Comanor and Wilson (1967) pointed out, that the effect of advertising on firms revenue "is subject to economies of scale" in the sense that bigger firms are able to spread those lower costs of advertising per message "over more units of output". This simply means that the cost of one unit produced is decreasing (in case the production involves advertising as a necessary factor) with a size of a firm.

2.3.2. Product Differentiation

Comanor and Wilson (1967) see advertising expenditures as "…both a symptom and a source of differentiation". The proper measures of product differentiation, which reflect "height of barriers to entry", are cross elasticities of supply and demand for products of incumbents and new comers. From the supply side, for the product like beer, differentiation comes from impossibility to imitate product by rivals, and that is why firms are to have sufficient funds available to make their product original, which includes advertising at some stage. From the demand side, as was already mentioned in the section 2.1, if consumers are not fully informed about the product, advertising leads to certain product differentiation providing some information to consumers by lowering cross-price elasticity of demand, which makes it "difficult…[for newcomers] to induce brand switching" (Kessides, 1986).

2.3.3. Absolute Cost Advantage

There are some problems that newcomers might face in case where incumbents indeed produce differentiated product (Comanor and Wilson, 1967). First problem is that entrants should sell their product at a price somewhat lower than price of branded product in order to attract consumers. Second, newcomers are to pay higher advertising costs, as they usually do not have enough funds to pay for advertising services "in bulk". Third, buyers normally are loyal to already known brands of a product, and that is why entrants should advertise more than incumbents in order to become recognized and to attract consumers for their product. This fact makes advertising to be a barrier to entry through absolute cost advantage of incumbents. However, an entrant would suffer "cost disadvantages" (Comanor and Wilson, 1967) only in case if her firm has a relatively small scale. In the opposite case, though, when the scale of production of an entrant is comparative to the one of an incumbent, the situation is more

comprehensive, as we are to take into considerations the reaction of the latter firms, which "could increase the risk and cost of entry" (ibid).

According to Kessides (1986), advertising expenditures should be seen as certain investment with "…high degree of sunkness characteristics". In the model developed by the author, advertising has a long-lasting effect on sales, while in case of Ukrainian brewing industry it is not. Nevertheless, there are still some important implications that could be made on the basis of that model. Mainly, a firm-entrant invests money (liquid assets) into "advertising capital", which does not pay back to the firm in case of the forced exit. The situation is somewhat different, although not riskless, for already established firms, as they are at least not afraid of absence of consumers.

Thus, sunk cost of advertising itself is a sufficient criterion for being a barrier to entry. Many times it is combined with an economies of scale and product differentiation, which simply means that advertising is a barrier to entry. However, advertising with described characteristics is not always a sufficient entry deterrent[1].

2.4. Advertising as a Strategic Action

Let's now turn to the second model described by Kihlstrom and Riordan (1984), which proposes the idea that if all firms but one in the industry use adverting as a promotion of their sales, non-advertiser will face some disadvantages because of the lack of the appropriate reputation. This idea greatly explains the fact that all firms are aware of possibility to be such "one non-advertising firm", and that is why they try to avoid it in a way of performing continuous advertising

[1] When advertising itself does not work as a barrier to entry, firms can perform some actions in order to deter or blockade entry (Kessides, 1986; Schmalensee, 1983). Kessides (1986) calls such behaviour as a "strategic commitments to deter entry".

campaigns. Also this is another extreme case that helps us to get a plausible explanation of greater returns to advertising of high quality products.

Roy Gardner (1995) presented a description of the game explaining benefits from non-advertising cigarettes. He showed that in case where no one advertises, profits of cigarettes producers are much higher than in the case when everybody advertises in the same amount. This happens because every player plays dominant strategy being afraid to be the one who does not advertise. As a result, *Nash equilibrium* achieved analogous to the one from prisoners' dilemma, i.e. everybody is losing instead of gaining from advertising. Such equilibrium is inferior for all players and perfectly suits an explanation of advertising strategies for brewers. In reality, players (advertisers) are not trying to avoid such equilibrium, as it is *dominant strategy* to play.

However, we have a deal with more than two players on the market who due to imperfect information and different production capacities (also due to different amounts of funding available) do not perform the same strategic advertising actions. That is why they still have a possibility to gain some additional market share by advertising. They can increase sales of beer due to increased demand for it, while some portion of this demand increase is due to advertising.

If the situation in the market described by Gardner (1995) indeed happens, the increase in advertising expenditures could be treated as "stimulation of wasteful expenditures" (Kaldor, 1950). However, it should not be treated as such in case where all brewers promote their sales, and achieve an expansion of the whole market for beer, i.e. they increase share of beer market in the entire market. Such behaviour is seen as "business stealing", when firms introduce their product and take consumers (steal share of market) from other producers (Tirole, 1998). "Other producers" could be as rivals of similar products in the industry (beer of

a different brand or a producer), as producers of close substituting products (soft drinks or/and other alcoholic drinks).

2.5. Effect of Advertising on Consumers' Utility

No one knows how to measure consumer's utility in practice, but still it is a very interesting and challenging theoretical issue to discover the effect of advertising on consumer's utility, as there are a lot of controversial economic points of view.

As a result of advertising, consumer satisfaction increases (Kaldor, 1950). Most consumers are variety lovers, and having some additional knowledge about more brands of a product increases their utility. Sometimes products do not differ considerably from each other, and it can be the case when consumers are better off because they just believe that products vary, or they only "think that they are better off" (Carlton and Perloff, 2000). Regrettably, we cannot find a way of comparing consumers' welfare before and after advertising was performed because we do not know how to measure consumer tastes. Carlton and Perloff also noticed this difficulty, saying that "there is no fixed basis" for making such a comparison.

However, television advertising could impose some negative factors on consumers' utility. When a preview trailer interrupts a favorite program of an individual, it disturbs him/her at some stage. Such thoughts overlap with "A simple theory of advertising" (Becker and Murphy, 1993). This "simple theory" postulates that advertisers choose the most popular TV programs for a product promotion (the maximization of popularity of a program is conditional to the budget constraint of an advertiser) to increase the compensation for advertising interruption by the quality of a program. As a result, Becker and Murphy found that even in very extreme case of complete compensation of such a kind,

advertisers benefit from "utility reducing ads that sufficiently rise marginal demands for the goods advertised".

An explanation for such a strange positive dependence between increased profitability of advertisers and decreased utility of viewers of advertising messages is proposed in the following way (ibid). For example "death, divorce, unemployment, and similar utility-lowering events" often provoke one to drink or smoke more. As a consequence, demand for beer and cigarettes might rise. This situation is similar to situation with lowering consumers' utility and increased demand for the product advertised.

2.6. Effects of Advertising on Informative Media

Advertisers pay to newspaper, radio, and TV industry for their services (Kaldor, 1950). They usually pay not only for advertisement itself or for the time of it's broadcasting, but also for the broadcasting of whole programs, in which preview trailers are inserted. Such payments normally promote development of freedom and sovereignty of stated industries.

There are several reasons why advertisers bear the additional costs of broadcasting programs as well as the costs of an advertising itself. Becker and Murphy (ibid) propose their version of this evidence. They suppose that main reason is compensation for disutility for viewers of the advertising. If the program is favorable and interesting, viewers do not mind much to see some advertisements as short breaks within the program.

Actually, one can explain the fact that advertisers prefer highly popular programs to insert their advertising materials in, as this guarantees the popularity of advertising and, as a consequence, increased demand for a product advertised.

Chapter 3

MODEL CONSTRUCTION

3.1. Description of brewing industry in Ukraine

Before independence Ukraine was a part of USSR having all industries centrally planned. Brewing industry was not an exception in that case. Only a particular fixed amount of beer could be sold with a fixed price. No market clearing mechanisms worked, which actually resulted in inefficient production.

Since 1991, a lot of changes happened in the brewing industry. Among them we can face privatization and sufficient conditions for attracting FDI. Seven firms in the industry have adequate foreign investments that allow them to promote local and foreign market penetration. Those firms are "Chernomor Brewery", OJSC "Slavutich", "Kolos Brewery", CJSC "Desna", "Krym Brewery", OJSC "Yantar Brewery", and OJSC "Rohan". The reasoning of investments into Ukrainian brewing industry is the following. Ukrainian brewers currently import equipment mainly from Western Europe and US. Moreover, as it is stated in "Country Commercial guide: Ukraine" (2000), US companies face great opportunities in the Ukrainian beer market as well as European ones because there are presently no local manufacturers for equipment and beer demand is potentially increasing in Ukraine as well as in adjacent CIS countries.

There are some domestic investments that allow CJSC "Donetsk Brewery", "Dnipro Brewery", and "Kiev Brewery" to advertise in order to promote their business.

There is one company CJSC "Obolon", that was the first mover in the Ukrainian market. "First mover" means that it was the first who invested in advertising programs, modern equipment, and, as a result, penetrated the market. Its share of market is sufficiently big even these days, despite the fact that more firms appeared in the market.

Moreover, among 189 firms in Ukrainian brewery industry, there are nine of them that use television and outdoors advertising. Fifty-six companies are united in association called Joint Stock Company "Ukrpivo". The main functional role of this association is to coordinate and lobby interests of the industry. It determines the main directions of technical reforms, organizes the distribution of scientific and economic information, and consults on technology, quality and certification of the product.

As we have already mentioned, Ukrpivo has a right to lobby for the industry interests in the Parliament and Government. According to Maryanchyk (2000), the main achievement was the act approved in 1996. It was about setting the minimal price of the imported beer equal .45 cents a liter. He also shown in his work that amount of beer imported gradually declined after establishment of the minimal price and continues to diminish these days. There are huge externalities present in the work of Ukrpivo, as all producers can benefit from industry-wide achievements of it.

Although "Obolon" is not a member of Ukrpivo, it still performs rather well on the market. That is why we cannot unambiguitly say about whether it is

Ukrpivo's effort or some other factors that explain performance of particular firms in the industry.

3.2. Data Description

Data for the analysis consist of panel observations for the period from January 1998 to December 2000 monthly. These observations from one hand include expenditures of nine major producers of beer in Ukraine for television and outdoor advertising. Those players have the biggest shares of market, with the one exceptional producer "Na Podoli" Kiev. The relatively smaller share of market for this firm should be rather explained by smaller capacity of production than by unpopularity of their product.

The data on nominal advertising expenditures are collected from private research company called *AGB*. These data are private and normally secret, but we have a right to use them for our empirical purpose.

From the other hand, there are panel data on production, revenues, and nominal prices of beer for all producers of beer in Ukraine for the same period of time. For the experimental point we are using production of beer as a proxy for sales. We believe that production is a good proxy for sales in case of monthly investigations, as far as the inventories of productions did not fluctuate significantly for such periods of time. Data source: JSC "Ukrpivo". Table A1 in the Appendix presents the formal summary statistics of advertising expenditures, sales and prices of beer.

However, there are some problems with the data we use. Unfortunately we have taken prices and revenues that producers receive selling their product in bulk instead of retail prices. Perhaps more to the point, we also do not have a

possibility to analyze brand-specific prices due to data unavailability. We could only find prices for particular beer producers averaged for all brands. It is clear that with successful advertising programs consumer's awareness of a brand increases, which leads to increased willingness to pay, i.e. to shifted demand curve for that particular brand. The dynamics of brand awareness is shown in the Figure A1. It is easy to see comparing this figure and the table A1 that the most popular brands are those that are mostly advertised. Here we feel necessary to match brands and producers to avoid any misunderstanding. The firm called "Desna" produces brands "Taller" and "Chernigovskoe", and "Donetskiy PZ" produces brands "Sarmat" and "Taller". The rest of the brands and producers have the same names. Moreover, we propose the dynamics of brand consumption (figure A2) for the argument sake pointing that consumption increases partially due to brand awareness (i.e. through advertising), and partially due to brand preferences (i.e. through real product differentiation). So, we want to evaluate the former partial effect in my model.

3.3. The Model

The tested hypothesis is that advertising matters in brewing industry for sales promotion, but it does not affect the competitiveness of the market structure. For this purpose the major hypothesis is subdivided into the chain of four (see figure 1 below). So, in the work it is expected to reject the following hypotheses.

Hypotheses:

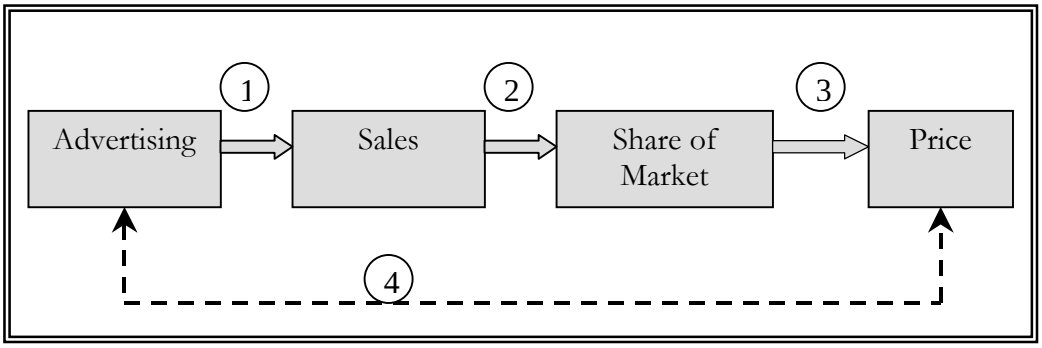
1. H_0: An increase in advertising does not lead to an increase is sales of beer in Ukraine (Berndt, 1991)

2. H_0: Advertising does not positively affect share of Ukrainian brewing market

3. H_0: An increased share of brewing market of a particular producer does not affect price of beer (Nelson *et al.*, 1992)

4. H_0: An increase in advertising expenditures leads to direct increase in price of beer (Nelson *et al.*, 1992)

Figure 1. Schematic presentation of the model



Notes: the numbers correspond to the numbers of the hypothesis tested.

In order to test these four hypotheses, lets state some assumptions of the model.

Assumptions:

A_1: There are many buyers of the product

A_2: Market is monopolistically competitive as there are several major producers of a product and HHI index of them is below 2000 over time, as shown on the figure A6.

A_3: There are two types of advertising available for brewers: TV and Outdoors advertising. Although there are three more types of the advertising programs available nowadays, particularly radio, newspapers/magazines, and Internet

advertising, we exclude Internet because it is difficult to control advertising on it and get data about costs. Also we include neither radio nor newspapers/ magazines advertising into the model because of specificity of the product. In Ukraine we do not have suitable magazines and newspapers to advertise beer there. The amount of advertising on the radio in case of beer is negligible. So, we are left with TV and outdoor advertising only.

A_4: The share of local brewing market equals the share of production (SOP), as a ratio of the particular brewer's production to the total amount of domestic production of beer. The precise market share would be more accurate variable in the model but unfortunately we do not have time series of imported beer available.

A_5: Production of beer equals sales, i.e. market is in equilibrium, and there is no excess demand or supply of beer in Ukraine.

The econometric model is, therefore:

$$Q_{it} = \alpha_{it0} + \alpha_1 TV_{it} + \alpha_2 OH_{it} + \alpha_3 SD_1 + \alpha_4 SD_2 + \alpha_5 SD_3 + \alpha_6 GDP_t + \varepsilon_{it} \quad (1)$$

$$SOP_{it} = \gamma_{it\,0} + \gamma_1 TV_{it} + \gamma_2 OH_{it} + \gamma_3 ER + \gamma_4 CPI_t + \gamma_5 SD_1 + \gamma_6 SD_2 + \gamma_7 SD_3 + \varpi_{it} \quad (2)$$

$$P_{it} = \eta_{it\,0} + \eta_1 SOP_{it} + \eta_2 ER_t + \eta_3 CPI_t + w_{it} \quad (3)$$

$$P_{iq} = \beta_0 + \beta_1 TV_{it} + \beta_2 OH_{it} + \beta_4 SD_1 + \beta_5 SD_2 + \beta_6 SD_3 + \nu_{it} \quad (4)$$

Here Q_{it} is the quantity of beer sold, TV_{it} is the television advertising expenditures, and OH_{it} are outdoors advertising expenditures by firm i in the month t. SD_1, SD_2, SD_3 are seasonal dummies for the first, second, and the third quarters respectively. SD_1 equals one if advertising was performed in the first quarter of a year and zero otherwise, similarly for SD_2 and SD_3. GDP_t is the real gross domestic product in month t. ER_t is the average for each month nominal exchange rate of UAH to USD. CPI is the consumer price index. P_{it} is the firm's i price of beer in the month t. SOP_{it} is the share of production for a brewer i in the month t.

As there are characteristics of nine producers advertising their product observed at 36 time periods available, we have a panel data model with 315 total panel observations.

It is appropriate to use real prices in the model in order to separate price changes due to advertising and changes due to inflation. Real variables were constructed in the following way. $P_t^{real} = P_t^{base}\left[\frac{P_t^{nom}}{P_t^{base}} - \pi_t\right]$, where π_t states for inflation, P_t^{nom} is the nominal price in UAH, P_t^{base} is the price in January 1998, and P_t^{real} is the real price. Advertising expenditures in real terms are presented as follows. $TV_t = ER_t \frac{TV_t^{\$}}{CPI_t}$, where ER is the exchange rate between USD and UAH, $TV^{\$}$ are nominal advertising expenditures in USD, and CPI is cumulative consumer price index in prices of January 1998. ER is included into the function because the advertising expenditures were given in USD initially.

Real GDP in the first equation, CPI and ER in equations (2) - (4) are control variables, which together with seasonal dummies might cause changes in dependent variables of the model.

The next section includes econometric analysis of the model and explains some of the peculiarities of it.

3.4. Econometric Analysis.

In this section we describe main peculiarities of the methodology used for the analysis. It is shown that it is inappropriate to use simple OLS methodology, as several major assumptions are not satisfied. Sample features suggest using GLS with random effects for the model. To confirm that the model specification fits well the given purpose, we performed several formal tests, which are briefly described in this section.

As far as we have a deal with panel data models, let's discuss some peculiarities of them. First of all, panel data combines time series and cross sections of variables. There are several possibilities to test such models. We can distinguish between fixed effects and random effects being present in it.

The usage of fixed-effects models assumes that the "…difference across units [that] can be captured in differences in the constant term…[However we can use this technique only in case where we can be sure that difference between producers are just]… parametric shifts of the regression function" (Greene, 2000). Random effects methodology uses the belief that individual "constant terms are randomly distributed across cross-sectional units" (ibid). Mundlak (1978, in Greene, 2000) argues that all individual effects are random and they can be treated as fixed only if some constraints are present in the sample.

If we assume random-effect model for the model, where intercept term α_{it} includes a constant and a random factor, i.e. $\alpha_{it} = \alpha + a_{it}$ and $a_{it} \sim$ iid $(0,\sigma^2)$. In order to test whether the assumption is satisfied, we perform Breusch and Pagan Lagrangian Multiplier test (Verbeek, 2000) for each equation of the model. In short, this test is done as follows. The first step is to estimate by simple OLS the regression with the fixed intercept term, then estimate the fitted residuals v_{it} from it. The second step is to calculate $\lambda_{LM} = \frac{nT}{2(T-1)}\left(\frac{\sum_{i=1}^{n}\left[\sum_{t=1}^{T} v_{it}\right]^2}{\sum_i \sum_t v^2{}_{it}} - 1\right)^2$ where, n is the number of cross-sections, and T is the number of time periods. Under the H_o that intercept-terms are not random terms, $\lambda_{LM} \sim \chi^2(1)$. More to the point, this test is appropriate for answering the question whether variance of the error term is constant or not, i.e. it is the test for heteroscedasticity. Greene (2000) proposed that the main common problem with panel-data models is heteroscedasticity. As we have also obtained the result suggesting that error terms are not homoscedastic, we should not use simple OLS methodology, as OLS-estimators would be incorrect in this case. More efficient estimators can be obtained applying the GLS (Generalized Least Square) methodology. Just to drive the point home, note that GLS estimator is "…a matrix-weighted average of between estimator and the within estimator, where the weight depends upon the relative variances of the two estimators" (Greene, 2000). This kind of estimator is more efficient than just between estimator (OLS estimator of the model where firm-average regressors and firm-average regressant are used), or the within one (fixed-effect estimator, obtained in the regression using deviations from firm-means).

To ensure that the random-effect estimators are more efficient than fixed-effect estimators, we perform Hausman specification test (Hausman, 1978) for each of the equation in the model. Hausman statistics is calculated as follows.

$\xi_H = (\hat{\beta}_{FE} - \hat{\beta}_{RE})'[\hat{V}\{\hat{\beta}_{FE}\} - \hat{V}\{\hat{\beta}_{RE}\}]^{-1}(\hat{\beta}_{FE} - \hat{\beta}_{RE})$, where $\hat{\beta}_{FE}$ is assumed to be less efficient estimator, and $\hat{\beta}_{RE}$ is the more efficient one. Under the null hypothesis, the statistics ξ_H has an asymptotic Chi-squared distribution with the number of elements in $\hat{\beta}$ -vector as the degree of freedom (Verbeek, 2000).

Furthermore, the regressors are supposed not to be correlated with the error term. However, Nelson, *et al.*, (1992) proposed the fact that there might be an endogeneity problem present in the model like mine. The authors proposed the idea for the case of advertising expenditures and prices of coffee. Also, Schmalensee (1986) pointed out "[neither]… advertising increase[s] profits…[nor] profits generate advertising. Both variables are jointly determined (i.e. endogenous)". Using the given sample, we detected endogeneity problem with TV advertising expenditures and prices. Note that here we are concerned with TV advertising only because outdoors advertising is much cheaper and normally can be afforded without any additional increases in revenue (AGB, 2000). The distribution of outdoors advertising is shown in the figure A5.

Moreover, we cannot simply analyze goodness-of-fit of the regression if we want to ensure ourselves that the model is correctly specified. The reason is that R^2 in random-effect panel models is not an appropriate criterion for determination of goodness-of-fit. The reason is that calculating the most efficient random-effect estimators when they are appropriate we obtain R^2 smaller than for either fixed-effect or OLS estimation (Verbeek, 2000). So, to ensure that all coefficients are

not statistically jointly zero we report Wald-χ^2 statistics, where the degrees of freedom correspond to the number of the regressants in the model.

3.4.1. Results

In this section we show four main results and provide the interpretation of them. They can be summarized as follows. Advertising positively influences sales of beer in Ukraine. At the same time, the effect of advertising on prices of beer is not significantly different from zero. This is practically feasible as the effect of advertising on share of market is very small, so is not sufficient to influence price. Detailed analysis of the results is the following.

1. The effect of advertising on sales of beer is direct, positive, and stable in Ukraine. The impacts of television and outdoors advertising on sales are statistically the same. Specifically, if a brewer increases TV or outdoors advertising by 1 UAH, it would lead to increased sales by about 3.5 liters, *ceteris paribus*.

The results are presented in the table 1.

Table 1. Effect of advertising on sales of beer

GLS with random effect model with Q_{it} as a dependent variable

Const	TV_{it}	OH_{it}	SD_1	SD_2	SD_3	GDP_t
-352.3	3.5*	3.4**	38.6	837.9*	348.6*	640.4*
(327.4)	(0.065)	(0.16)	(66)	(60.7)	(48.4)	(208.5)

*Notes: Robust SE are in brackets; significance at 1% (5%, 10%) level is denoted with * (**, ***) respectively. The number of observations is 315*

R^2_{within}= 0.38, $R^2_{between}$= 0.21, $R^2_{overall}$=0.21; Wald $\chi^2(6)$ =128.49, Prob > χ^2 = 0; Wald $\chi^2(2)$ = 0.01, Prob >χ^2 = 0.93; λ_{LM} = 2400, Prob >λ_{LM} = 0; $\xi_{Hausman}$=1, Prob > ξ_H= 0.92.

In the present analysis sales and advertising expenditures are considered at the same periods of time, although Harry Bloch (1993) suggests that advertising should be treated as an "investment in capital asset" in the sense that one should not take into account effect of the current advertising expenditures on sales, but lagged ones. It is however clear, that considering "long-lasting effect of advertising on sales" would not necessarily apply in case of advertising of beer. One thing, consumers' tastes may not persist. Also, one needs to investigate instantaneous impact of a flow variable (advertising) on sales, as firms are continuously advertising throughout the year. Finally, lags did not add anything econometrically.

By the statistics from Breusch and Pagan Lagrangian multiplier test one can see that the sample we use is very heteroscedastic, so OLS methodology with fixed effects is not an appropriate one, as we fail to accept the hypotheses that error term is homoscedastic and that the difference of cross-sections is systematic at 1% level of significance. Moreover, Hausman test statistics suggests that the model is correctly specified as, so with the probability 0.92 we fail to reject the hypothesis that the random-effect model is correctly specified.

By the "Test of Weak Exogeneity" (Johnston and Dinardo, 1997) we fail to reject the hypothesis of advertising to be exogenous variable.

Wald test statistics suggests that coefficients of outdoors and television advertising expenditures are statistically equal to each other. So, the obtained result implies that outdoors advertising, being cheaper and more irregular than the television advertising, nevertheless, has the same impact on sales. Specifically, a 1 UAH increase in television or outdoors advertising leads to about 3.5 liters increase in sales. The equal impact of the television and outdoors advertising on

sales is not *a priori* expected; indeed it goes against the conventional wisdom in the industry.

Calculating the elasticity of sales with respect to television advertising, we get 5.5%. Similarly, calculating the elasticity of sales with respect to outdoors advertising, we get 1.5%. Thus, sales are rather more elastic with respect to TV than to outdoors advertising, although neither elasticity is overly large. Even small elasticities are economically meaningful. Doubling average television advertising expenditures (spending 195998 UAH), an average firm can gain 5.5% of sales, which in monetary units equals 233698.5 UAH $(5\% \times \textit{average sales} \times \textit{average price}) = (0.05 \times 6402700 \times 0.76) = 233698.5$. Doubling average outdoors advertising (spending 54792 UAH), an average firm can gain 72991 UAH. Comparing costs and benefits, an average firm could gain about 1.2 times the amount spent on television advertising, and about 1.3 times the amount spent on outdoors advertising. Such result suggests that producers should employ outdoors advertising as a promotional strategy in the same amount as television advertising.

Apart from the main results, it is obtained that seasonal factors are important determinants of sales in Ukraine. Seasonal dummies SD2, and SD3 have positive significant coefficients with the biggest one corresponding to the summer. The increase in real income helps to explain increases in sales too, as predicted.

2. Advertising of beer positively affects share of brewing market in Ukraine. The result is robust and economically meaningful. However, television and outdoors advertising have statistically the same impact on market share. Specifically, a 1 million UAH increase in television or outdoors advertising expenditures, *ceteris paribus,* leads to about 0.1% increase in the share of market.

The main point of our work is to show that advertising does not affect market power at this stage. One component of market power is a sufficient share of market, and the other one is the ability to influence price (Comanor and Wilson, 1967).

For the analysis of the first component, the random-effect GLS methodology is used (table 2), as both Breusch and Pagan Lagrangian multiplier and Hausman tests suggest.

Television and outdoors advertising have statistically equal impact on share of brewing market, as we cannot reject the hypothesis of their equality based on Wald test statistics $\chi^2(2)$.

In spite of small R^2, one can see that all coefficients together are not equal to zero, as $\chi^2(6)$ is large.

Table 2. The effect of advertising on the share of market

GLS with random effect model with SOP as a dependent variable[2].

Const	TV_{it}	OH_{it}	SD_1	SD_2	SD_3	CPI	ER
0.093*	0.05**	0.11*	-0.04	-0.01	-0.07	-0.15	0.002
(0.024)	(0.01)	(0.04)	(0.01)	(0.01)	(0.02)	(0.26)	(0.003)

*Notes: Robust SE are in brackets; significance at 1% (5%, 10%) level is denoted with * (**, ***) respectively. The number of observations is 315*

R^2_{within}= 0.09, $R^2_{between}$= 0.14, $R^2_{overall}$=0.08; Wald $\chi^2(6)$=29.86, Prob >χ^2 = 0.0001; Wald $\chi^2(2)$ = 1.82, Prob >χ^2 = 0.17; λ_{LM} = 15.50, Prob > λ_{LM} = 0.0001; $\xi_{Hausman}$=0.43, Prob >ξ_H = 0.81.

The result suggests that 1 million UAH increase in television or outdoors advertising expenditures, *ceteris paribus,* leads to about 0.1% increase in the market

[2] Coefficients and standard errors of TV_{it} and OH_{it} are multiplied by 10^6

share. The interpretation is the following. Even if the larger advertiser were to double his maximum advertising expenditures, it would only be possible to increase his market share by about 0.1%. To conclude, the numbers show that advertising brings about a very small increase in the market share, practically negligible.

However, the share of market is not a complete indicator of a market power. The next analysis is perhaps more informative, as it captures the ability to affect price of a product produced. The following result generally shows whether firms increase price of beer if they manage to increase their shares of market sufficiently.

3. An increase in the share of market by 1 percentage point, leads to increase in the price of beer by 2.4 UAH per liter, *ceteris paribus*.

Table 3. The effect of share of market on price of beer

GLS with random effect model with Price as a dependent variable

Const	SOP	ER	CPI
1.21*	2.38*	-1.11*	0.12
(0.07)	(0.17)	(0.01)	(1.21)

*Notes: Robust SE are in brackets; significance at 1% (5%, 10%) level is denoted with * (**, ***) respectively. The number of observations is 315*

R^2_{within}= 0.42, $R^2_{between}$= 0.63, $R^2_{overall}$=0.49; Wald $\chi^2(3)$= 258.6, Prob > χ^2=0; λ_{LM} = 32.5, Prob >λ_{LM} = 0; $\xi_{Hausman}$=0.16, Prob >ξ_H = 0.79.

Prices of beer can be affected by already existing share of market (or increased due to advertising). They indeed are, as shown in the table 3, but one can see that the sufficiently big increase of SOP is needed to influence the price considerably.

Taking into consideration result 2 in present work, one can conclude that even if the larger advertiser were to double maximum advertising expenditures, it would only be possible to achieve a 0.24 UAH increase in price of beer per liter. Brewers cannot usually increase advertising expenditures that much due to budget constraint, so the following result shows that advertising expenditures do not influence price of beer significantly.

4. The effect of television and outdoors advertising on prices of beer in Ukraine is not statistically different from zero.

The results presented in the following table are obtained using random-effect model specification, which is chosen on the basis of Hausman tests applied to two model specifications. We failed to reject the appropriateness of the random-effect methodology.

Table 4. The effect of advertising expenditures on price of beer

GLS random-effect model with price as a dependent variable

Const	TV^{3}_{it}	OH_{it}	SD_1	SD_2	SD_3
0.72*	-0.04	0.02	0.07*	0.04**	0.05**
(0.05)	(0.03)	(0.08)	(0.02)	(0.02)	(0.02)

*Notes: Robust SE are in brackets; significance at 1% (5%, 10%) level is denoted with * (**, ***) respectively. The number of observations is 315*

R^2_{within}= 0.04, $R^2_{between}$= 0.39, $R^2_{overall}$=0.05; Wald $\chi^2(6)$= 10.64, Prob > χ^2 = 0.06; λ_{LM} = 1179, Prob >λ_{LM} = 0; $\xi_{Hausman}$=7.73, Prob >ξ_H = 0.17.

However, we should not rely completely on the random-effect specification, as Hausman test only shows it is only more efficient than the fixed-effect model, but does not show that specification is the best. Economic intuition helps us to

[3] Coefficients and standard errors of TV_{it} and OH_{it} are multiplied by 10^6

guestimate that prices of beer also depend on some factors as prices of raw materials, labor costs, technological innovations, etc. Unfortunately data do not allow us to include them into our model to control for. So, we are assuming that the price setting strategies depend mainly on external factors (internal factors being relatively stable). Moreover, a large increase in advertising leads only to a very small increase in share of market, and this effect is insufficient for price affection. Furthermore, producers would not probably increase the price for beer a lot, as they would be afraid of strategic offsetting actions of their rivals.

Theoretically, endogeneity is suspected to be present in the model (Dorfman and Steiner, 1954), i.e. that advertising is supposed to be higher when prices are higher through the effect on marginal revenue. But Nelson, et al. (1992) argue that pattern does not always hold because intensive advertising might be a way to compete against rivals, and that is why it might reduce the price of a product as a result. Nevertheless, on the basis of the Test for Weak Exogeneity (Johnston and Dinardo, 1997), we reject the hypothesis that TV advertising expenditures are correlated with an error term, so the endogeneity is not a problem for a given sample.

Chapter 4

CONCLUDING REMARKS

This study asks and answers two questions. The first is whether advertising in the beer industry of Ukraine is justifiable from an economic perspective. The second is why do producers bother with advertising if it does not generate increasing market power?

The answers this study gets are the following. Advertising expenditures are not "wasteful" for brewing industry in Ukraine. An increase in advertising expenditures leads to a considerable increase in sales of beer, thus causing the market for beer to expand. As demand increases, beer becomes more popular drink. Thanks to advertising, individuals prefer beer now to other alcoholic drinks and/or to other soft drinks. In addition, demand is also enhanced by diminished trade barriers (beer is exporting more), increased quality of the product (technological innovations), and better service provided with it (it is being served cold).

There is an evidence found that outdoors advertising, being cheaper and more irregular than the television advertising, nevertheless, has the same impact on sales and on the market shares as television advertising. This result is not *a priori* expected; indeed it goes against the conventional wisdom in the industry. However, even casual observation will point out that outdoors advertising keeps increasing nowadays.

Despite small increases in shares, advertising does not appear to raise prices of beer. This is explained by the demand expansion effect, shown previously. Moreover, "no increase in price" seems to be the most important strategy for a firm these days because imported beer appears to be cheaper than domestic. Russian "Baltika", for example, is accused of employing dumping price strategy in the Ukrainian market[4].

Another point of the work has been to discuss strategies of brewers in terms of advertising and price setting. Unfortunately we are limited in what we can say about price strategies, as we do not know production and cost characteristics of brewers that do advertise. However, with regards to advertising, we can draw some conclusions. Market for beer is expanding. If there, for example, was the market with all producers being equal in terms of production capacities and performing the same advertising strategies at the same time, given the increased sales proportional to growth of the market, we would be able to obtain the result described by Gardner (1995) for case of advertising of cigarettes where two firms on the market that advertise at the same time which actually lose instead of benefiting. Ukraine does nor appear to the dealing with such a situation, and domestic brewers just compete against each other.

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[4] More details are in Vitaly Sych. "Hopping Mad at Imports". *Kyiv Post. Business.* 17 May, 2001, p.22. Korenkova suggests imposing a "$0.45 minimum customs tax per liter of imported beer or non-tariff measures, such as quotas". However, a larger lesson is to be drawn from this suggestion. According to Ellis and Kitsul (2000) there is a special symmetry between a tariff on imports and a tax on exports, called "Lerner Symmetry" (1936). "Placing taxes upon imports to stimulate the import substituting industry decreases imports and increases the balance of trade. The pressures generated on the exchange rate lead, in the long run, to a higher-priced domestic currency, which leads to difficulty for exports competing in the world markets. The taxes upon imports (that is, the subsidy given domestic import-substitution industries) has led, in the end, to a lower trade altogether, and a tax being placed upon potential exporters." (Ellis and Kitsul, 2000). Thus, in order to gain the efficiency and optimality, there shouldn't be any tariffs or quotas imposed on Russian beer. Nevertheless, it ought to compete fairly in the Ukrainian market, without employing dumping strategies.

As prices are not affected by advertising, and sales are growing due to advertising and expanding market itself, we can suggest that the total effect of advertising is positive to the extent that producers benefit without affecting market structure. Unfortunately, we cannot compare the social welfare characteristics properly (with and without advertising for the same firms, or even for the similar ones), which are inherently difficult to make for a differentiated product with many varieties.

Note that we are not accounting for possible health problems that individuals might achieve consuming beer in increasing amounts. We simply assume that beer in a normal good in any sense, that increased consumption of it increases consumer's utility without any harm to his/her health.

For the proper investigation of brewer's strategies with regards to advertising, we need longer period of data to be available. The point is that brewers make their decision whether to advertise or not and how much to advertise at the beginning of a year. At that time they decide which part of the budget should be devoted for advertising, and what is the best strategy to advertise in order to achieve greater share of total advertising expenditures (STAE) (share of total means the fraction of all advertising performed on the market at a certain period of time). We have at our disposal the data for three years only, which is not sufficient for this kind of analysis. However, we see (on the figure A3) that advertising expenditures are growing from year to year, which suggests that each brewer tends to perform advertising greater than previous-year rival's advertising with an attempt to increase STAE and gain an additional share of market. So, this is a clear possibility for further research, which we hope would be done some years later when the data becomes available.

There are some problems with our research. There are a lot of regions in Ukraine where advertising does not make any sense at all. Those regions are rather poor, and some cheap local brands of beer are produced (or sold) there. For poor person the popularity of a product does not create any incentives to buy on the contrary to the price of that product. Also, it was proposed by Stewart (1980), that it is better to measure "effects of advertising by area tests" where the effects of heterogeneity of regions are accounted. We do not capture this effect in our work, and even more, our data does not capture any local advertising of smaller producers. We use data for major producers, which advertise on favorite television channels only. Theoretically such measurement error and selection bias could lead to wrong results obtained. Nonetheless, we believe that results we received are quite robust for sales and shares of local market as firms under consideration produce about 85% of the entire market, and do not normally advertise on small local TV channels.

We also have a suggestion for improvement of the work. We have a deal with local market with the meaning that we account for local beer production only, while taking into consideration the advertising of all brewers (including foreign). We believe it would be better if we construct share of market differently, i.e. to consider imported beer that is sold on Ukrainian market as well as domestic one. The most considerable exporter of beer to Ukraine is Russia. Russian brewers perform aggressive strategic actions in order to capture a bigger share of the expanding Ukrainian brewing market. It is not possible to do this in present work, as the data on consumption of imported beer in Ukraine available.

Note also that we do not also account for brand preferences and consumption even in the domestic market. In our work we assume that production equals sales, which is true for producers, but not always for retailers. As far as there are many substitutes of a particular brand of beer, even in case of increased demand

due to hot weather or some other external factors, production variable does not allow us to separate effects of advertising and the others.

To conclude, advertising in Ukraine is very new issue and the results obtained in this paper are preliminary. As the competition intensifies and HHI increases with time (figure A6), one may well see the emergence of oligopoly in Ukrainian brewing industry, when prices would surely be increased due to the combined effect of advertising and market power.

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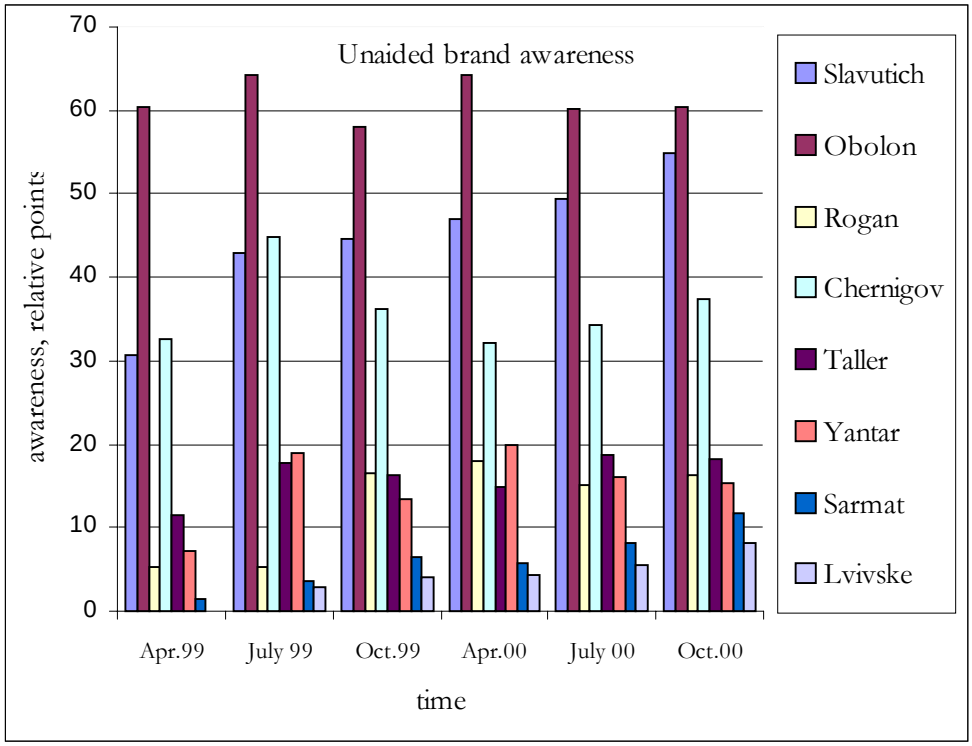
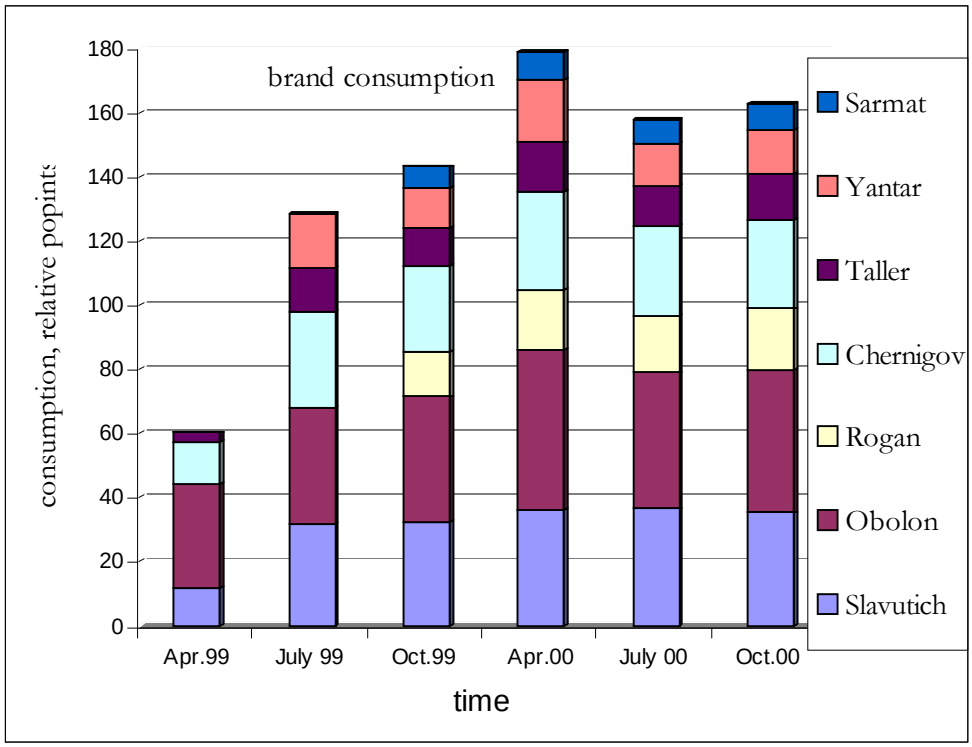
APPENDIX

Figure A1. The dynamics of "Unaided" Brand Awareness



Data source: AGB.

Figure A2. The dynamics of Brand Consumption.



Data source: AGB

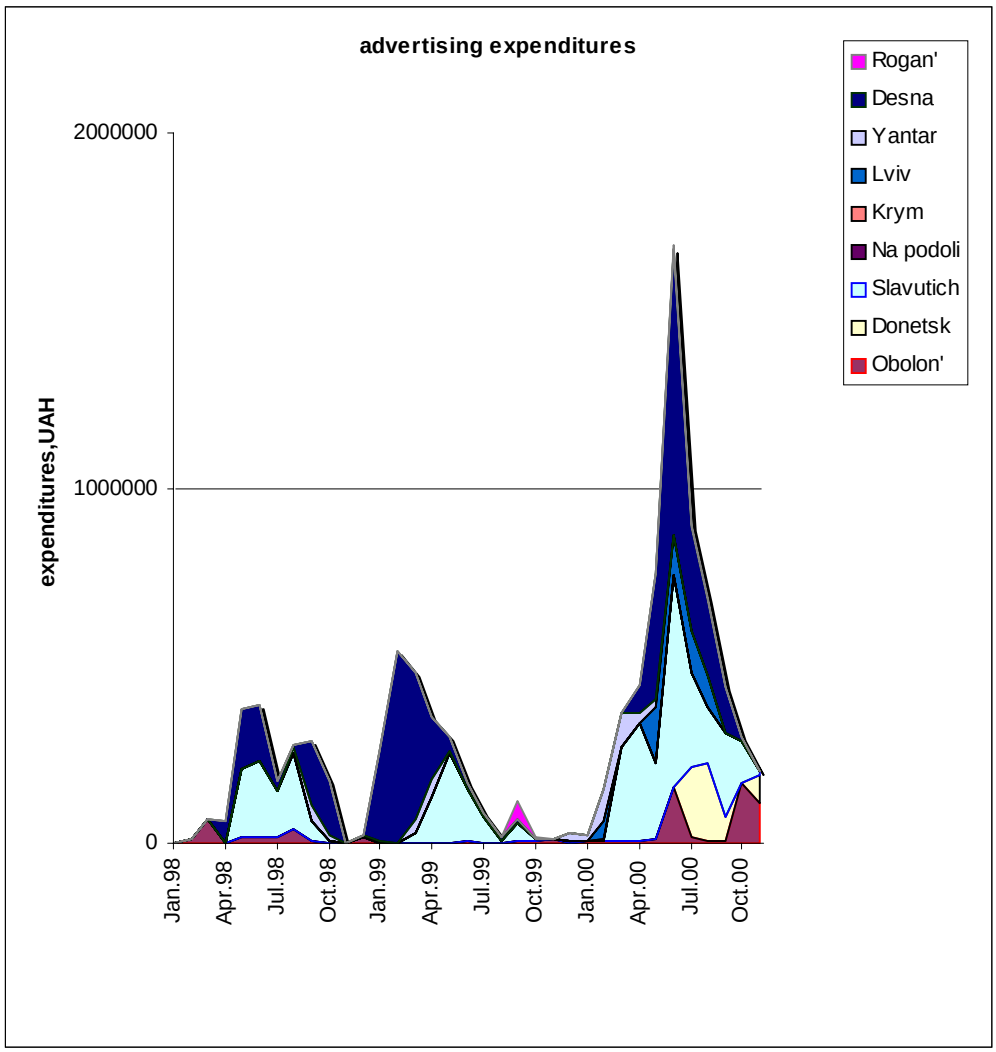
Table A1. Summary Statistics of Advertising Expenditures, Prices, Sales, Shares of market for advertisers of beer

Producer Variable	Donetsk Mean (St. d)	Slavutich Mean (St. d)	NaPodoli Mean (St. d)	Krym Mean (St. d)	Lviv Mean (St. d)	Yantar Mean (St. d)	Rogan Mean (St. d)	Desna Mean (St. d)	Obolon Mean (St. d)
TV advertising expenditures UAH	51690 (161967)	318824 (425637)	81 (434)	746 (1828)	50234 (128575)	43153 (83403)	348791 (562236)	7222 (29581)	61245 (129254)
Outdoors advertising expenditures UAH	11685 (38205)	183332 (290089)	0 (0)	1823 (5632)	0 (0)	4168 (12005)	11565 (24925)	16994 (30751)	18198 (21849)
Price of beer (P) UAH	0.69 (0.09)	0.98 (0.13)	0.61 (0.13)	0.72 (0.12)	0.65 (0.12)	0.72 (0.08)	0.66 (0.07)	0.75 (0.07)	1.09 (0.31)
Sales of beer (Q) 10000 L	625.9 (205.2)	943.6 (491.3)	39.1 (22.2)	243.6 (149.5)	156.4 (69.8)	596.5 (268.7)	963.5 (390.9)	618.3 (306.9)	1575.6 (715.1)
Share of market	0.095 (0.017)	0.133 (0.027)	0.006 (0.002)	0.035 (0.014)	0.023 (0.006)	0.087 (0.015)	0.142 (0.019)	0.088 (0.019)	0.231 (0.044)
Number of observations	35	35	35	35	35	35	35	35	35

Data Source: Author's calculations based on JSC Ukrpivo, AGB data.

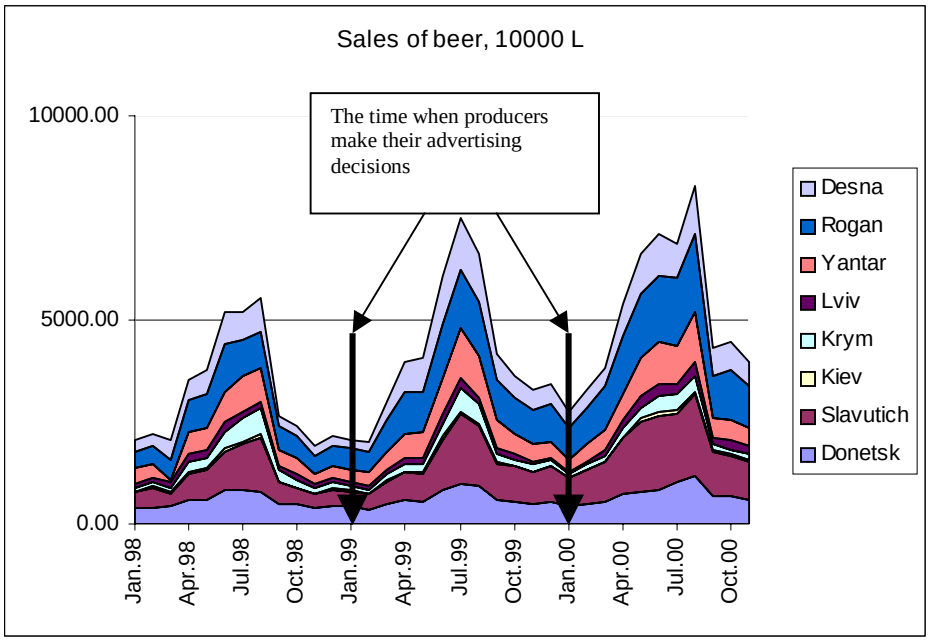
Notes: Share of market does not include imported beer. Overall mean for sales equals 640.27, for TV advertising expenditures it equals 97998.89, for OH - 27395.6, and for price overall mean equals 0.7636008.

Figure A3. The Dynamics of Advertising expenditures



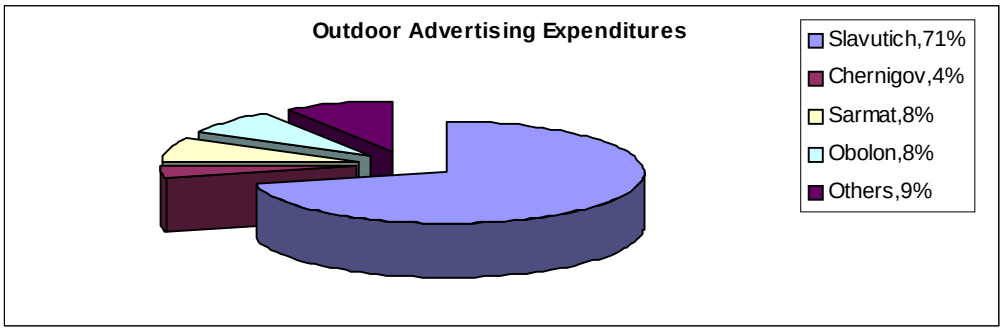
Data source: AGB

Figure A4. The Dynamics of Sales of beer (separated by brand)



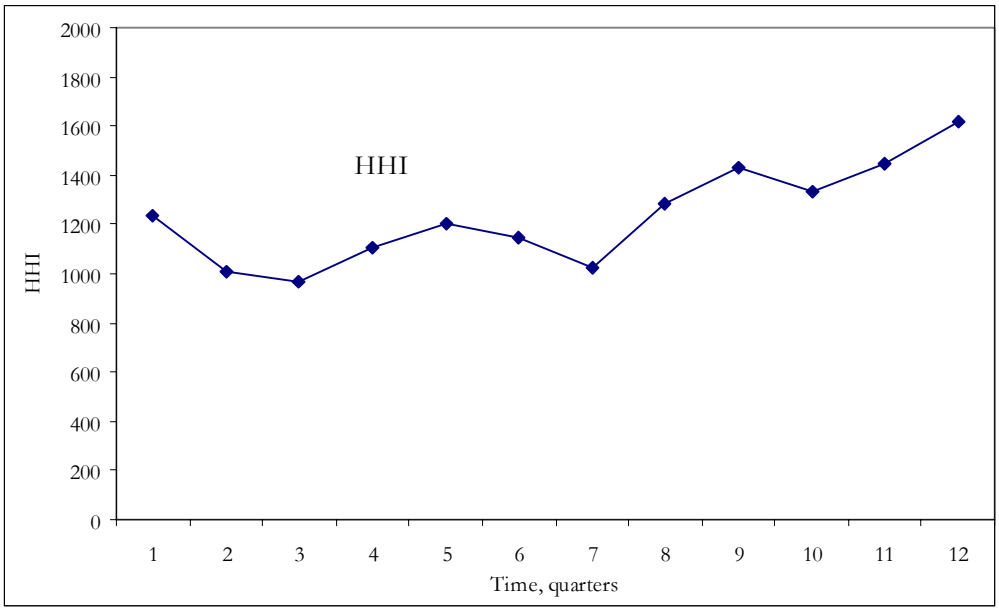
Data Source: Authors calculations based on Ukrpivo's data.

Figure A5. Distribution of Outdoors advertising expenditures by producers of beer in Ukraine



Data source: AGB

Figure A6. The dynamics of HHI index from Q1-1998 to Q4-2000



Data source: author's calculations based on data from Ukrpivo.