Concentration and its Effect on Advertising:
Case Study: Iranian Food and Beverage Industries

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ARTICLE INFO	ABSTRACT
	Purpose: Todays, advertising intensity is different among various types of market structure. In other words, concentration as an important indicator of market structure plays significant role in the firms' decision about the amount of advertising expenditures. This study aims at analyzing the relationship between competition index (concentration) and advertising in the Iranian food and beverage industries. **Methodology:** Using a panel of 22 four-digit Iranian food and beverage industries, this study analyses the relationship between advertising intensity and concentration over the period 2007– 2019.
	Findings: The results show that an inverted U-shaped relationship exists between the advertising intensity and concentration. Also, the profitability has negative and export intensity has positive and significant effects on the advertising intensity. **Originality/Value:** The structure-conduct-performance (SCP) paradigm suggests that performance of the industry is affected by the conduct of the participants in the market, which is influenced by the companies' market structure.

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1. Introduction

Does competition increase or decrease advertising? Our purpose in this chapter is to advance the understanding of this question, and particularly the impact of advertising on price, by critically reviewing recent research, adding some new insight, and identifying areas for future research [1]. Industrial economics is one of the branches of economics that studies the mutual behavior of consumers with one another, producers with one another and producer with consumers. Environment in which firms operate is called a market [2]. Variables associated with each market can be divided into three groups: structural, behavioral and functional variables. Industrial economics based on, structure, conduct and performance pattern (SCP) and the causal relationship between them, deals with an analysis to evaluate an industry [3]. The market analysis requires knowledge of its structure. Market structure is related to its importance and characteristics. Decisive factors in defining the market is the number of firms, distribution and retail market power which can be measured by indicators such as market concentration [4]. Referring to the industrial economics literature it will be seen that in most empirical studies on market structure, concentration is used as a criterion for evaluating competition. There is no doubt that advertisement has gained a lot of attention and has greatly improved. Even though the advertisement was considered as a simple and marginal issue in the past, it is one of the most important issues to be considered today. Given that the advertisements are safe and away from overstatement and exaggeration, they cause welcome and support and consent of the consumers for the goods and services, which in turn, creates the conditions for economic development and improvement of society [5]. Advertising as a behavioral variable has a significant impact on the structure and functioning of markets. Advertisement by changing the consumer preferences causes a greater satisfaction of consumer's needs about the advertised product compare to the non-advertised product [6].

On the one hand, advertisement with the introduction of replacement goods can reduce the price elasticity of demand in the market [7, 8]. In addition, advertising can establish trust between producer and consumer and causes the credibility of a brand in the minds of consumers and thus a new asset as "brand name" firms in the portfolio assets of the advertiser which a few years after down cost, can be effective on the profitability and market share of these industries. Some economists believe that advertising through changing consumer preferences and demand function shift, leading to increased firm profitability and market share change is advertiser, means that advertisement with changing the interests of the consumers towards advertised goods, can lead to increased concentration or to act as a barrier to entry others into market that in this case, advertising is considered an anti-competitive [9]. At the same time advertising a new good can promote competition in the market and thereby reducing the concentration [3]. Advertising is not only effective on certain economic variables such as Sale, but also is affected of some other variables such as market competition, this means that the intensity of advertising in different markets, is different, however Iran has not done much researches about the impact of market structure on the amount of advertising done by firms in the market [6]. Identification and evaluation of products, businesses and industries in each country is the basic step in understanding the situation and the future of its industry and is an introduction to long-term strategic planning. Food and Beverage industries include major industries in country, which its relationship to health adds to the importance of it. The importance of food and beverage industries as one of the major industries in country on one hand and the advertising intensity Done by the firms in these industries on the other hand, makes the need to study more about these industries is felt. This study aims at analyzing the relationship between concentration and advertising intensity using a panel of the Iranian food and beverage industries during the period 2007 to 2019.

2. Literature review

The dynamic and tough competitive environmental conditions have led firms to adopt various tools to gain greater market share and profit. Advertising is one of the most popular ways of non-price competition. Either informative or persuasive [10], many firms allocate vast resources to use for advertising purposes. The growing importance of advertising intensity of firms has also attracted the attention of the industrial organization literature. However, the empirical evidence on the relationship between advertising intensity and market structure has not provided unanimous and convincing results. Moreover, empirical research asserts that the relationship between advertising intensity and market concentration is generally non-linear [11]. On the one hand, a part of existing studies finds inverted U-shaped relationship, implying that more concentrated industries invest in advertising more than competitive industries [12].

One of the issues raised in the industrial economy, is Communication mode of market elements, particularly how impact on other indicators of the market structure and behavior is. Variables concentration and advertising, including the most important indicators of the market structure and behavior are elements of that are used in most studies. The concentration is a structural variable that by showing the concentration of firms in a market and the degree of the market control by each of these firms shows the intensity of competition in the market. The higher the degree of concentration is a, market monopoly, and whatever the degree of concentration is lower, the market is closer to perfect competition [13]. Advertising is an attempt that causes one firm to sell more in an industry because creates brand loyalty of consumers towards a product or a particular commodity. Advertising is not only a communication tool and is considered to be competitive against other manufacturers, but is a means by which customers are aware of inventions and innovations in products of companies. About the relationship between concentration and advertising there are two following theories: The first theory is one-way relationship between concentration and advertising. Initial studies done in this area showed that the impact of concentration on advertising is linear. At the same time subsequent studies stressed on the nonlinear relationship between concentration and advertising, it means that advertising does not have much intensity in the market of perfect competition and monopoly in the market, but intensity of advertising in monopoly competitive market, particularly the multilateral monopoly is more, therefore we can say that there is a nonlinear inverse U-shaped relationship between concentration and advertising. Among the studies leading non-linear relationship between concentration and advertising, was Kaldor study and Silverman [14], which in the present study, nonlinear relationship between concentration and advertising is described as follows: The structure-advertising hypothesis posits that advertising is strategic tool and its level is determined by the degree of market concentration and inter-firm rivalry. Different companies handle advertising in different ways. In small and medium-sized companies, it can be done by the sales or marketing departments while large organizations might set up an advertising department. In both, it's important to have an advertising strategy to help them in the creation and communication of the commercials. Advertising refers to any paid form of non-personal presentation and promotion of ideas, goods or services by an identified sponsor. An advertising strategy is a plan to reach and persuade a customer to buy a product or a service. The market as an economic Institution and a mechanism includes a range of structures that starts at perfect competition and leads to complete monopoly, However, in any one of these markets there is no strategic reason for advertising, but advertising intensity on the imperfectly competitive markets, due to reasons such as distinction in the product and attract customers, is more [3]. Perfect competition in the market for homogeneous products, the risk of informative advertisement is possible, also this type of advertising has only a small effect on demand of advertiser firm. Therefore, no firm

has inspiration for the advertising because will achieve something by very low advertising. In other words, advertisers can benefit from the free ride advertising by others. Also in the perfect monopoly because other competitors do not face threat of other competitors, have any reason to advertise their products [15]. Sutton, also believed that the relationship between concentration and advertising is not a fixed relationship and does not increase uniformly, but there is an inverse U-shaped non-linear relationship between these two variables [16]. However, researches shows that in studies on the inverse U-shaped relationship between concentration and advertising, there is other remarkable point, so that there is a strong bond between the type of goods and costs of advertising, thus the advertising costs for consumer goods is higher than for intermediate and capital goods, ie advertising is appropriate to increase sales of consumer goods rather than capital goods; Lowe [17] and Ornstein [18] and Porter [19] were among those who believed in advertising costs between different groups of industries is different and concentration level is only one of the determinants of advertising intensity and other factors such as profitability, and industry type are effective In Meanwhile [20].

The second theory has emphasized that presence a one-way causal Relationship between concentration and advertising cannot be interpreted, because although the concentration affects intensity of advertising, but also advertising in turn affect the concentration and thereby price levels and profits. Of course comments on how this effect is not uniform. Some argue that advertising can make a good trust between producer and consumer and leads to establish the credibility of a brand in the mind of the consumer and affect the market share of a particular brand. On the other hand, advertising through changing consumer preferences and demand function shift, leads to increased advertising firm's market share and resulting in increased market concentration and act as a barrier to entry to others. Other word advertising is considered as an anti-competitive factor. At the same time advertising a new product with the introduction of replacements of a good can promote market competition and reduce concentration [8]. In this context the type of advertising can be a determining factor. Chamberlain, was of first people believed that advertising can be divided into two forms: Informative and Persuasive advertising. Informative advertising provides product-related information (such as price and characteristics) to consumer, making market competition more severe. Persuasive advertising generates subjective product differentiation by manipulating the consumer′s preferences. As a result, Persuasive advertisement may strengthen monopoly power, weaken market structure and raising concentration.

2. Data and Methodology

The model builds on previous work by Misra [2] as follows.

$$ADV_{it} = \beta_0 + \beta_1 HER_{it} + \beta_2 HER_{it}^2 + \beta_3 PROF_{it} + \beta_4 EXP_{it}\ \varepsilon_{it} \qquad \forall i = 1,2,\dots,22 \qquad (1)$$

Where i and t represent, respectively, the industrial subgroups (food and beverage industries four-digit code) and year and the other variables are defined as follows:

ADV: The advertising intensity is measured by the ratio of advertising expenditure to sales.

HER: Hefindahl[2] index of concentration of industry.

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[2] It is important to note that the concentration index Hirshman - **Herfindahl** is a common characteristic for calculation of concentration index that has been used in many empirical studies because of the strong theoretical basis.

PROF: Profitability index that is defined as the ratio of value added to sales

EXP: The export intensity is measured by the ratio of export expenditure to sales.

In Table (1), an overview of these variables is presented.

Table 1. Descriptive statistics

Variable	Description	Maximum	Minimum	Median
ADV	Advertising intensity	0.04266	0	0.0049
HER	Concentration	0.96334	0.00666	0.13395
PROF	Profitability	3.48615	0.02704	0.42696
EXP	Export intensity	0.86571	0	0.0957

Reference: Research calculations

An analysis of the statistics of the key variables shown in Table 1 show that on an average the industries of the Iranian food and beverage spend 0.4% of their total sales on advertising. The results further show that there is large variation in advertising intensity in the Iranian food and beverage Industries. There are a few industries in the Iranian consumer goods which spend around 4.2% of their total sales on advertising while there are some which do not incur any expenditure on advertising. The standard deviation of advertising intensity of industries of the Iranian Food and Beverage Industries is 0.57%. An analysis of the figures of Herfindahl index (HIC) shows that the mean value of HIC is 13% which indicates that the Iranian Food and Beverage Industries are moderately concentrated. However, there is large variation in concentration in the Iranian consumer goods. Some industries in the Iranian Food and Beverage Industries are highly concentrated while there are some industries which are having very low degree of market concentration. An analysis of figures of profitability shows that the mean value of the price-cost margin in the Iranian Food and Beverage industries is about 42%. Finally, the average of the export intensity is 9%.

3. Results and discussion

One of the major constraints facing the industry researchers in Iran, is the statistical limitations. The reason is the lack of information about the industrial workshops comply with codes of ISIC, in the years before 1995. This causes that static panel data techniques are faced with the time limit information. To fix this flaw, statistics and econometric experts propose the dynamic panel data approach. One method of the estimating dynamic panel data model is using the Arellano and Bond method [21]. This method is suitable for the data with small time period. In this method, the dependent variable enters the model with the specified intervals in order to consider the dynamic effects. In addition, explanatory variables may be correlated with disorder sentences that for this purpose Arellano and Bond offer two methods. One of these methods is the difference of variables first orders and another method is using the orthogonal deviations approach. Since the software used in this study, is Stata11 software, so the first order difference method was used to eliminate fixed effects and interrupted values of the dependent variables are used as instrumental variables. The pattern of model inspired by theoretical principals and empirical literature is specified as below:

$$ADV_{it} = \beta_1\left(HER_{i,t} - HER_{i,t-1}\right) + + \beta_2\left(HER_{i,t}^2 - HER_{i,t-1}^2\right) + \beta_3(PROF_{i,t} - PROF_{i,t-1}) + \beta_4(EXP_{i,t} \qquad (2)$$

$$- EXP_{i,t-1}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1})$$

In the above equation it is assumed that $E(\varepsilon_{i,t}, \varepsilon_{i,t-1}) = 0$ and $E(X, \varepsilon_{i,t}) = 0$ Where the X vector is the vector of explanatory variables in the model. This means that the covariance between the disturbances sentences in two consecutive is zero and explanatory variables have zero covariance with the terms of the disorder. In the Arellano and Bond method Sargan test statistic was used to determine the specification of the equation. In this test if the null hypothesis is accepted, it means that the equation is over specified and the model needs the instrumental variables. So interrupted values of the dependent variable must be used as instrumental variables to eliminate the correlation between explanatory variables and disturbance terms. Before estimating the model, the specification of equation should be tested. For this, Sargan test statistic is used. Sargan test results are presented in Table (2):

Table 2. Regression Results- Sargan Test

Statistics	Model
Test Statistic/ WaldChi 2	18.99
Degrees Of Freedom	46
P-Value	0.999

Reference: Research calculations

According to the results in Table (2), it is observed the null hypothesis based on the equation specification is not rejected. Therefore, to control the correlation between explanatory variables and disturbance terms using instrumental variables is necessary in the model. Then it is paid to estimate the model considering the instrumental variables. The results are as follows:

Table 3. Regression Results

| VARIABLE	COEFFICIENT	Z-VALUE
ADV_{t-1}	0.2846*	0.000
HER	0.0237*	0.000
HER^2	0.0171*-	0.000
PROF	0.0007**-	0.044
EXP	0.0055*	0.002
C	0.0010*	0.000
Number of Obs	….	220
Number of Groups	….	22

    * Significant at 1% level
    ** Significant at 5% level
  Reference: Research calculations

The results of the estimated regression model show that all the variables in both models are significant at least at 1% level. The coefficients of square of Herfindahl index of concentration in the model is negative and significant whereas coefficient of Herfindahl index of concentration are positive and highly significant (at 1% level). If we measure Herfindahl index of concentration on the horizontal axis (X-axis) and advertising intensity on the vertical axis, the results of the estimated regression model show that there is an inverted U-shape relationship between market concentration and advertising intensity in the Iranian Food and Beverage Industries. That is, highly concentrated Industries in the Iranian Food and Beverage engage themselves more intensively in advertising activity than either moderately or low concentrated industries.

The calculated result shows the level of the degree of concentration which in that ads intensity will reach its maximum value. In model, there is an inverse relationship between concentration and advertising intensity. So with increasing of concentration (reduction in market competitiveness), advertising intensity gets more and then, after reaching maximum ads intensity at a certain level of concentration (and get closer to full monopoly) advertising intensity reduce again. Maximizing

concentration level of advertising intensity also is obtained again from derivation of equations about concentration index: ${\partial ADV_{it}}\big/{\partial HER_{i,t}} = 0.0237 - 0.0342 HER_{i,t} = 0 \, , HER_{i,t} = 0.6926$
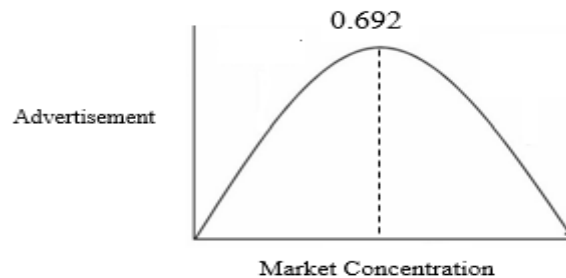
Fig. 1. Advertisement and market Concentration (Model 2)

The point is the same threshold point, per that advertising reaches its maximum, i.e. on average when in food and beverage industry concentration reaches to a level equivalent to the 0.6929 in Iran it will be maximum intensity to advertising.

The point of maximum advertising intensity is 0.6929 at a low level of concentration, a relatively small proportion of sales revenue would be devoted to advertising, as demand for the product is very price elastic. As concentration rises and price elasticity falls, so advertising becomes more Profitable and increases to a certain level of concentration HER*= 0.6929 but after this level advertising intensity is reduced because is not felt much competition from other competitors that there is no need to advertise the product. Therefore, it can be expressed that there is most advertising intensity on multilateral monopoly markets. There is interdependence between the multinational firms in a monopoly market, it means that the firm considers the reaction of rival firms to determine price level, any change in the price of competitors will be understood immediately by rival firms and price war may be established, finally, all rivals benefit reduces. But change in firms' advertising costs does not immediately retaliate by other firms because this is not immediate threat for the market share of others. If firm shows response to rival's advertising costs, considerable time is needed to receive the benefits of their advertising war. The negative and significant coefficient β_3 shows that for a given level of concentration, industries which earn relatively low price-cost margins engage themselves more rigorously in advertising activity than the industries which earn relatively high price-cost margins. Finally, the results of model estimation show that export intensity variable has a positive relationship with advertising intensity.

4. Concluding remarks

Advertising for a firm can be important for different reasons. One of these reasons could be rival firm's Clients deviation to the advertiser firm. Since advertising by changing in consumer demand operates as a tool to improve profitability in the market, therefore, firms allocate enormous costs for advertising to achieve higher profit. In order to manage the costs and benefits of advertising, the firms must reach level of advertising that revenue obtained from advertising, is higher than the costs. Considering that the behavior of firms is largely influenced by market structure, special attention to market structure can help firm's decision optimize their advertising. In the Perfect competition market because prices are given and fixed for firms, and manufactured goods, are homogeneous and similar there is not impetus for the non-price competition such advertising among producers. Also as in the perfect monopoly market exclusive firm determines its price and its demand curve is the same demand curve in the market and its decision in the market price is decisive, there will be no incentive for advertising, because with Advertising, the demand price decreases for the product. Therefore, it can be stated that the highest rate

of advertising exists in markets with multilateral monopoly structure to distinguish the product and to attract more customers. The main objective of this paper is to investigate the effects of Competition on Advertising in 22 4-digit codes Iranian Food and Beverage industries over the period of 2007-2019. The main model has been estimated by using of panel data technique. For this purpose, we used the more than 10 employee's statistics of industrial 4- digit firms and dynamic panel data technique for estimating the model. The main results of this paper reveal that, an inverted U-shaped relationship between concentration and advertising intensity is observed for consumer goods (Food and Beverage) industries, it Means that neither in the perfect competition market, because mobility of sources and factors of production is very high and market participants have sufficient information, not in the Perfect monopoly market, because market share is a firm that has power in setting prices, there is little incentive for advertising, instead advertising intensity in oligopoly market structure is at its maximum extent.

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