

**QUALITY OF AN EXPERIENCE GOOD: THE INTERACTION OF PRICE
AND ADVERTISING AS A DETERMINING FACTOR**

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QUALITY OF AN EXPERIENCE GOOD: THE INTERACTION OF PRICE AND ADVERTISING AS A DETERMINING FACTOR

ABSTRACT

This paper analyses the product quality in terms of its price and company's advertising investment. The central assumption is that the advertising investment of a collective brand member has a positive influence on its product quality until an advertising investment threshold is reached, after which the effect on product quality becomes negative. This change in the slope is explained because consumers perceive advertising effort as excessive, so they wonder if this means there's a problem with the quality of the product. Advertising investment is curvilinearly related to product quality with a higher slope for products with low price than for those with high price, and positively related to products with moderate price. The results obtained from a sample of Spanish companies that operate in an experience goods industry (i.e., wineries) evidence the proposed relationships. These results reveal the importance of advertising investment for product quality in industries in which the signal of quality is not only reliant on the collective and individual brands; and also suggest the complexities of implementing such investment to get product quality in companies depending on their price.

KEY WORDS: Product quality, Advertising investment, Price, Collective brand, Firm reputation.

1. Introduction

Quality¹ of experience goods is difficult to assess before purchase and, consequently, consumers rely heavily in extrinsic cues (Olson, 1977; Hite, Hite and Minor, 1991; Kustos et al., 2021; Gao et al., 2022). Researchers have examined the quality of these goods, by using firm reputation (e.g., Landon and Smith, 1998; Quagraine et al., 2003; Costanigro et al., 2010), collective reputation (e.g., Landon and Smith, 1998; Castriota and Delmastro, 2012; Li et al., 2019) and advertising investment (e.g., Kwoka, 1984; Hite et al., 1991; Reuter, 2009; Clark et al., 2009; Chenavaz and Jasimuddin, 2017), as its main determinants. Thus, consumers form their expectations about quality of an experience product relying on the company's reputation for quality, which has been measured through firm's past output quality (Landon and Smith, 1998). Expected quality of a company's product may also be influenced by collective reputation (Tirole, 1996; Castriota and Delmastro, 2012), i.e. by indicators of the average quality of products produced by a group of companies with which the company is identified. Finally, in this perspective of the quality-guarantee effect for experience goods, the advertising investment is positively related to quality (Klein and Leffler, 1981; Reuter, 2009) because companies that produce high-quality products use advertising investment, as a specific capital of the company, to assure consumers that they have a lasting commitment to quality (Archibald et al., 1983). Alternatively, our work extends this last idea by analyzing the advertising investment as a determining factor of product quality of a collective brand member.

¹ Quality can be broadly defined as superiority or excellence (Zeithaml, 1988). In this paper we focus on perceived quality, which, by extension, is defined as the judgment about a product's overall excellence or superiority. This humanistic-type quality concept involves the subjective response of people to objects and is a highly relativistic phenomenon that differs between judges (Holbrook and Corfman, 1985). According to Maynes (1976), all quality evaluations are subjective, either they come from managers, consumers or experts.

We focus on situations where the advertised brand name of a company coexists with a collective brand in which quality is certified through an external institution. A collective brand is a signal that distinguishes goods or services produced by firms belonging to an association, which is registered to guarantee the origin, nature or quality of certain goods and services (see Directive 89/104/CEE). For example, a Protected Designation of Origin (PDO) (e.g., wines of Rioja) is a public collective brand which is used to describe foodstuffs which are produced, processed and prepared in a geographical area using recognized know-how (see Loureiro and McCluskey, 2000). These situations have important academic implications because companies may cooperate with each other through a collective brand to promote high-quality products (Marette et al., 1999; Marette, 2005). However, at this point, our focus emphasizes the conditions in which collective brand members invest in advertising to provide information to consumers about the probability of receiving high quality of their own individual brands. In this sense, we assume a nonlinear relationship between advertising investment and product quality of collective brand members. Under this hypothesis, a company with a low level of advertising investment within the collective brand must have a lower quality than other companies with a moderated advertising investment in the same collective brand; otherwise, the advertising investment in the company brand would not be justified. However, for companies with a high level of advertising investment within the collective brand, consumers will perceive the advertising effort as excessive, so they will wonder if this implies that these companies have a weaker motivation to invest in product quality.

Quality has also been related to price (e.g., Reuter, 2009; Hite et al., 1991; Archibald et al., 1983), but this relationship has not yet been widely understood. The conventional view assumes that price acts as a sign of quality (Smallwood and Conlisk, 1979; Werner et al., 2021), so a high price is associated with high quality. However,

another perspective highlights that the relationship between quality and price is stronger for consumers who are not looking for objective information about product quality than for those who are looking for such information (Moorthy and Zhao, 2000). Our research extends these approaches by considering whether the nonlinear relationship between advertising investment and product quality of a collective brand member is moderated by the product price. We built on the idea of Moorthy and Zhao (2000) to argue that consumers of nondurable experience goods, such as wine, are unwilling to participate in significant information collection because the low levels of commitment and economic disbursement involved lead to the cost of information-seeking efforts outweighing potential benefits. For these goods the "information" of advertising and price can be absorbed by the consumer in a cheap way. Thus, price may be expected to positively moderate the curvilinear relationship between advertising investment and product quality.

The objective of this study is to examine the nonlinear relationship between the advertising investment and product quality of collective brand members, as well as the moderating role of the product price. The analysis is carried out in an experience goods industry, the Spanish wine industry, given the proliferation of public collective brands (i.e., PDO labels) in this industry and the diversity of brand types (coexistence of individual and collective brands). Concretely, PDOs are used in Spain by a wide range of companies under the control and authorisation of the titleholder (the Regulatory Council of each PDO), which certifies that products comply with certain common requisites, especially those concerned with quality, geographical origin, technical conditions or method of production.

2. Literature review

Economics has analyzed theoretically the role of advertising in the context of the quality-guarantee effect for experience goods (see Bagwell, 2007). In principle, the

argument of firm reputation (which has also been used in Management and Marketing; see Fernández-Barcala and González-Díaz, 2006) indicated in the previous section (i.e., a cost-saving company that provides a low-quality product renounces to its reputation and therefore to the profit that could be gained through repeated sales) assumes that the company is not “anonymous”. That is, a company must be identifiable to be rewarded with repeated purchases only when it provides high-quality products². However, a company may also acquire a “name” by advertising its brand. From this perspective, advertising is associated with high quality products, since a “known” company is reluctant to lose its reputation by offering a low-quality product. Therefore, advertising has a quality assurance effect that is reassuring even for first-time purchasers. This idea is supported by the Klein and Leffler’s theoretical model (1981) when it introduces advertising as a brand-name capital investment that can be lost if the company degrades its reputation.

This Klein and Leffler model (1981) even address the role of advertising in situations where consumers may be uninformed about the cost of producing a quality product. The underlying idea is that the firm’s dissipative advertising expenditure might signal its cost type and, in this way, influence consumer quality perceptions. Its argument highlights that consumers have uncertainty about these costs and do not know the price of the product that guarantees a minimum quality, which makes it economically feasible for brand name capital investments. In fact, “conspicuous” expenditures in specific assets (brand name) can provide consumers with information about the opportunity cost for the company if it cheats.

² The producer repeatedly provides the promised quality to show that it is not exploiting its information advantage with respect to the current quality (Fernández-Barcala and González-Díaz, 2006). Hence, the producer creates a reputation for its brand name that will be used as a guarantee for future consumers.

The value of information about the magnitude of company-specific capital sunk cost depends on advertising. Indeed, the role of these selling costs as a guarantee of quality supports Nelson's argument (1974) that advertising provides valuable information to consumers; specifically, the information that the company is advertising. A sufficient investment in advertising implies that a company does not commit to a deception about short-term quality and will supply products with a promised high quality, as advertising indicates the existence of a gap between price and production costs (Klein and Leffler, 1981). Consequently, they propose a positive relationship between advertising intensity and the level of product quality, the latter being difficult to determine before purchase.

Our work extends this idea, focusing on the nonlinear relationship between advertising investment of a collective brand member and its product quality in an experience goods industry. In addition, we assume that product price plays a moderating role on this relationship. We consider that these conditions that favor a high-quality of the company product within a collective brand are relevant.

2.1. Relationship between advertising investment and experience product quality of collective brand members as well as the moderating role of price

2.1.1. Relationship between advertising investment and experience product quality of collective brand members

A collective brand is a tool of differentiation available to companies (Benavente, 2013). For example, a PDO signals the origin, as well as a production process and minimum quality standards (MMAMRM, 2009). The role of the collective brand for its members is to mitigate market failures derived from information asymmetries between firm and consumer (Fernández-Barcala and González-Díaz, 2006). The individual brand is another way of differentiating and signaling because a company can develop a product with higher quality and signal it through its own brand and firm-level traceability

(Benavente, 2013). Although one cannot set a priori the rank of qualities implicit in the company brand and in the collective brand, according to the model of Klein and Leffler (1981), we consider that a company brand with a moderate level of advertising investment within the collective brand necessarily has a higher quality than other companies with a lower advertising investment in the same collective brand. Otherwise, the advertising investment in the company brand would not be justified (Benavente, 2013; Archibald *et al.* 1983); in fact, these advertising investments would become sunk costs that are lost if the company breaks its promise of higher quality (Klein and Leffler, 1981). Thus, we assume that a member of a collective brand with a moderate advertising investment has a higher product quality.

On the other hand, members of a collective brand with higher advertising investments will reach a threshold from which advertising reduces the quality of the company's product. This is explained through attributions (Weiner, 1986) in the field of Consumer behavior, which theoretically support that advertising investment could influence consumer's perceptions of quality. In principle, consumers might attribute a high perceived advertising as a sign of high product quality. In fact, consumers might think that the company wouldn't spend as much money if it didn't have a good product. However, an excessive or unreasonably high investment might indicate too much effort, and consumers would wonder if this effort hides any problem with the product (Kirmani, 1990; Ringold, 2021). This surplus may imply that the product cannot be sustained on its own merits and the company needs to spend a large amount of money to boost the product (Kirmani and Wright, 1989). This idea about consumers' perceptions on the appropriateness of advertising expenditures also suggests that consumers might have an advertising schemer's schema, that is, private theories about what advertising is trying to do (Wright, 1986). Consumers might have an underlying private theory in the sense that

a reasonable amount of advertising investing should be implemented to convey information to the market. However, consumers might also think that there is a line between transmitting information and being manipulative. The former might be acceptable while the latter is not. In short, this reasoning suggests a positive association between advertising investment of collective brand members and product quality up to an advertising effort threshold, from which the relationship between advertising investment and product quality becomes negative. Consequently, we propose the following hypothesis:

H1. The relationship between the advertising investment of a collective brand member and its product quality is nonlinear, with a positive slope at low and moderate levels of advertising investment and a negative slope at higher levels of advertising investment.

2.1.1.1. Interaction effect between product price and advertising investment of members in a collective brand on product quality

The relationship between price and quality perceptions has traditionally been examined through different streams of research. A positive relationship is assumed because companies that may charge a higher price are more willing and/or can take the necessary steps to improve product quality, even if they are expensive, risky or involve high upfront costs (Gerstner, 1985; Curry and Riesz, 1988; Moorthy and Zhao, 2000). Another explanation would be that a positive influence of price on quality is consistent with the notion that, in the absence of complete information, price is used as a quality signal (Smallwood and Conlisk, 1979; Jacobson and Aaker, 1987; Reuter, 2009). However, an alternative approach considers that the relationship between quality and price is affected by the degree to which the consumer is willing to seek information on the objective quality of the product, so that the value for money is stronger for consumers

who are not looking for objective information about the quality of the product than for those who seek such information (Moorthy and Zhao, 2000).

We extend this last idea to the case of an experience goods industry by analyzing the moderating role of product price of member companies of a collective brand in the nonlinear relationship between advertising investment and product quality. We assume that product price positively moderates the curvilinear relationship between company's advertising investment and product quality of collective brand members. According to the behaviour of information-seeking consumers, in experience goods markets that include non-durable goods (e.g., wine), consumers are unwilling to participate in significant information collection because the low levels of commitment and economic disbursement involved in these products lead to the cost of such information-seeking efforts likely to outweigh the potential benefits (Moorthy and Zhao, 2000). In fact, consumers are looking for less information about the quality of non-durable products than of durable products, *ceteris paribus*, because non-durable products are generally cheaper than durable ones and require less consumer engagement (Moorthy, Ratchford and Talukdar, 1997). In this sense, the "information" about advertising investment and product price can be absorbed by the consumer in a cheaper and easier way. In fact, brands with high prices are a sign of quality in the absence of complete information (Smallwood and Conlisk, 1979; Jacobson and Aaker, 1987; Reuter, 2009); and advertising expending plays an important role in quality (Kwoka, 1984; Hite et al., 1991; Reuter, 2009). Thus, we expect that companies that offer highly advertised products within the collective brand and have a high product price, will assure more their product quality than companies with a high advertising investment and low price.

This argumentation can also be built from theoretical model of Klein and Leffler (1981), which suggests that consumers necessarily must receive something when they

pay a higher price for an advertised brand. This implication would manifest itself in the case of companies that are members of a collective brand. Thus, some individual brands included within the collective mark “Champagne” are ranked on the “Global Top 100 wines and spirits brands” (see Intangible Business data, www.intangiblebusiness.com) regarding brand awareness (e.g., Moët & Chandon ranked 5 in 2006 and 7 in 2009) and in premium price positioning (e.g., Dom Perignon ranked 1 in 2006 and 2009, Krug 2 and Bollinger 7 in 2006) (see Benavente, 2020). According to Klein and Leffler (1981), in these situations the advertising of the brand name product indicates the presence of a gap between price and production costs. However, this brand name capital will be lost if the company supplies a lower quality than anticipated or promised. In this way, companies that sell products of high price and with a high advertising, will necessarily take more precautions in the production process. Eventually, it is to be expected that collective brand companies offering high-priced and highly advertised products will produce those products with a higher quality. This expectation suggests that the price of the product of the member companies of a collective brand positively moderates the relationship between advertising investment and product quality in the sense that companies that offer highly advertised products within the collective brand and have a high product price will have a higher product quality than companies with high advertising investment but with a low product price. Consequently, we propose the following hypothesis:

H2. The product price of a member of a collective brand positively moderates the curvilinear relationship between its advertising investment and its product quality.

3. Methodology and sample

3.1. Methodology

The methodology is based on the estimation of an econometric regression model to explain product quality. We use multilevel mixed-effects linear regressions because

they are useful to handle the existence of unobserved heterogeneity due to a hierarchical or nested data structure. Linear mixed models have both fixed effects and random effects. The fixed effects are like traditional regression coefficients and are directly estimated. The random effects are not directly estimated but are summarized according to their estimated variances. From a technical viewpoint, the random effects allow the consideration of the associated non-observed variables. In particular, we use mixed models with random intercepts, and the grouping structure of the data consists of four nested levels of clustering: $b = 1, \dots, B$ collective brands, with each collective brand integrated by $f = 1, \dots, f_b$ firms, with each f firm conformed by $i = 1, \dots, i_f$ products (each of which has $t = 1, \dots, t_i$ different annual observations).

First, we estimate four models with control variables as fixed effects. We gradually add random effects to test the convenience of the chosen design. Specifically, the model with four nested random effects can be specified as:

$$Q_{bfi}(t) = \beta_0 + \beta_1 P_{bfi}(t-1) + \beta_2 X_{bfi}(t) + (u_{bfi} + u_{bf} + u_b + \varepsilon_{Q_{bfi}(t)}) \quad (1)$$

where $Q_{bfi}(t)$ is the quality of product i of firm f in period t , P_{bfi} is the price of product i of firm f in period $t-1$, and $X_{bfi}(t)$ represents a set of control variables at the product and company level in period t ; $\varepsilon_{Q_{bfi}(t)}$ is a mean zero random variable with variance σ_ε^2 ; and the variables labeled u represent the different random effects introduced in the model, and they follow a Gaussian distribution with mean zero and variances σ_{bfi}^2 , σ_{bf}^2 and σ_b^2 , respectively.

Second, we estimate the baseline model. A firm's product quality in period t ($Q_{bfi}(t)$) is considered to be a nonlinear function (quadratic relationship) of firm advertising investment ($A_{bf}(t-1)$), as well as the variables of firm's reputation for quality ($R_{bf}(t)$) (which in turn depends on the quality of the firm's past output

$Q_{bf}(t-1)$; see Landon and Smith, 1998), collective reputation ($R_b(t)$) and the aforementioned control variables $X_{bfi}(t)$. Thus, the general model can be specified as:

$$Q_{bfi}(t) = \beta_0 + \beta_1 Q_{bf}(t-1) + \beta_2 R_b(t) + \beta_3 A_{bf}(t-1) + \beta_4 A_{bf}^2(t-1) + \beta_5 P_{bfi}(t-1) + \beta_6 X_{bfi}(t) + (u_{bfi} + u_{bf} + u_b + \varepsilon_{Q_{bfi}(t)}) \quad (2)$$

Finally, an extension of this model can be used to test whether the price of product i of firm f in the collective brand b , $P_{bfi}(t-1)$, can moderate the nonlinear effect of advertising investment on product quality. Thus, the third model can be specified in the following way:

$$Q_{bfi}(t) = \beta_0 + \beta_1 Q_{bf}(t-1) + \beta_2 R_b(t) + \beta_3 A_{bf}(t-1) + \beta_4 A_{bf}^2(t-1) + \beta_5 P_{bfi}(t-1) + \beta_6 P_{bfi}(t-1)A_{bf}(t-1) + \beta_7 P_{bfi}(t-1)A_{bf}^2(t-1) + \beta_8 X_{bfi}(t) + (u_{bfi} + u_{bf} + u_b + \varepsilon_{Q_{bfi}(t)}) \quad (3)$$

For all the models, the estimation procedure is multilevel mixed-effects linear regression with robust estimation for the variance/covariance matrix.

3.2. Sample, data and variables

The empirical analysis is performed on a sample of firms operating in the Spanish wine industry. The information on the sample and all the variables is obtained from several available databases. For the sample selection we use the population of companies registered in the 1102 section of CNAE-2009, which is the equivalent of code 2084 of the US SIC classification (wines, brandy and brandy spirits), and is found in the Bureau Van Dijk database. We exclude wineries that mainly produce brandy and other distilled high alcohol products. The final sample used for the empirical application is comprised of 462 wine references that belong to 162 wineries operating continually from 2009 to 2013. This sample of firms account for more than 60% of the Spanish wine industry. In this experience good industry, the collective brands for the wineries are the PDO labels.

The dependent variable, quality of product i of company f in period t ($Q_{bfi}(t)$), is proxied by the quality index of the wine produced by the company (Landon and Smith, 1998; Costanigro, McCluskey and Goemans, 2010). For every wine i produced by winery f , the wine quality index is obtained from the database entitled *Los Mejores Vinos de España Repsol*, which provides data about blind tasting quality scores by experts of Spanish wines (in a 100-point scale). For every wine there is one expert score. The reasons for using these data are based on the following: a) the 100-point scale allows for finer quality differences than consumer rankings based on a five-point scale. b) This publication offers a wide database with more than 1,000 wines ranked every year. And c) the quality ranking is based on blind tastings that are conducted every year once the wines are released to the market.

To explain the quality of the company's product, we consider the following variables. First, reputation of the company f (R_{bf}). Current quality of product i of firm f ($Q_{bfi}(t)$) is assumed to be a function of the firm's reputation for quality ($R_{bf}(t)$) (Shapiro, 1983; Quagrainie et al., 2003; Costanigro, McCluskey and Goemans, 2010), which depends on the firm's past output quality (Landon and Smith, 1998). This is represented by the average of first lag quality index ($Q_{bfi}(t-1)$) of the wines produced by the winery f (Landon and Smith, 1997).

Second, collective reputation (R_b). To proxy collective reputation, we employ an ordinal variable that distinguishes the reputation of the different PDOs and is based on the official requirements established to achieve PDO status (Sellers et al., 2018). If a wine is included in a particular PDO it will be indicated on the wine's label, which is available to consumers. The Spanish system, which is a translation of European regulations, establishes four categories for PDO wines: Estate Wine, Qualified Designation of Origin, Designation of Origin, and Quality Wine with Geographical Indication. Thus, this variable takes a value

of 4 for Estate Wines, 3 for Qualified Designations of Origin, 2 for Designations of Origin and 1 for Quality Wines.

Third, advertising investment expenditure of the company f (A_{bf}). It is gathered from the INFOADEX database (*Information for Advertising Expenditures* database), which provides detailed information on advertising expenditures made in Spanish media (print advertising -newspapers, magazines and supplements-, broadcast advertising -TV, cinema and radio-, outdoor and internet advertising). Given that the distribution of companies advertising investment is highly skewed, we consider the natural logarithm of the advertising investment. We use the one-period lag of advertising investment to overcome the potential endogeneity bias (see Murthi *et al.*, 1996) of using a contemporaneous index of advertising investment, as advertising is also a function of firm quality (Tellis and Fornell, 1988). Given that this index is based on last period advertising investment, it becomes an exogenous measure for the current period t .

Fourth, the price of product i (per bottle) of company f . The price is deflated by the Spain Consumer Price Index so that all prices are in constant euros. Given that the distribution of real wine prices is highly skewed, we consider the natural logarithm of the real price. We use a (one period) lagged price index to overcome potential endogeneity bias as price is also a function of quality (Landon and Smith, 1998).

Finally, this paper considers several control variables related to specific product and company characteristics. First, the characteristics of product i (X_{bfi}) are as follows. i) Type of wine. We consider various types of wines, including red, white, or others. This dimension is measured through two dummy variables: a dummy called “red wine,” which takes a value of 1 if the wine is red, and 0 otherwise (white or others); and one dummy called “white wine,” which takes a value of 1 if the wine is white, and 0 otherwise (red or others) (Cacchiarelli *et al.*, 2016). ii) Age of wine. We distinguish between “Joven,” “Crianza,” and

“Reserva,” which refer to the time of aging in barrels (Cacchiarelli et al., 2016). This dimension is measured through two dummy variables: one called “young wine,” which takes a value of 1 if the wine is not aged (“Joven”), and 0 otherwise (“Crianza” and “Reserva”); and one dummy called “Crianza wine,” which takes a value of 1 if the wine is crianza, and 0 otherwise (“Joven” and “Reserva”). iii) The grape’s year of vintage. This variable controls for older vintages having higher quality (Li et al., 2019; Wang, Niaura and Kantono, 2021).

Second, the following company $f(X_{bf})$ features. i) The size of the company measured through its asset volume. This variable is obtained from the SABI database and is deflated by the GDP deflator index. Given that the distribution of firm size is highly skewed, we consider the natural logarithm of the size. Company size can affect its product quality as larger companies have more financial resources to invest in quality (Castriota and Delmastro, 2012, 2014). ii) The age of the company. It is an ordinal variable independent of time that captures the age as a function of the company’s founding year. This information is obtained from the SABI database. The oldest firm in our database is assigned a score of 1, and then the next oldest firm is assigned a value of 2, and so on with all the firms that are part of our sample. The age of the company is usually associated with its quality (Morton and Podolny, 2002). As a company establishes itself, its quality spreads through positive word of mouth (Thomas et al., 1998). It is a proxy of consumer learning and learning-by-doing of firms (Castriota and Delmastro, 2012; 2014). iii) Market share of firm f in its collective brand (MS_{bf}). We use a (one-period) lagged market share to overcome a potential endogeneity bias (see Murthi *et al.*, 1996), as market share is also a function of quality (Jacobson and Aaker, 1987). Given that this index is based on last period market share, it becomes an exogenous measure for the current period t . In addition, and following Berger and Hannan (1997), for companies that operate in more than one collective brand, market share is calculated as the weighted average of the sales of each company for all the collective

brands in which it operates. A research perspective highlights that a high market share induces a higher quality image because widespread acceptance is a sign of quality (Smallwood and Conlisk, 1979; Moorthy and Zhao, 2000). Customers may feel that if a brand is widely purchased, other customers have indicated it to be a quality product (Jacobson and Aaker, 1987). However, a second view is that a higher market share results in a lower quality image. A high market share could decrease the perception of exclusivity generated by a focused differentiation strategy (Porter, 1980). And iv) the number of the firm's products appearing in the wine guide. Product quality could be influenced by this relative product breadth. In fact, a wider product assortment is a horizontal differentiation strategy that is more likely associated with higher levels of quality because quality can also be seen as the buyers' belief about the degree to which the seller adjusts their tastes (Castriota and Delmastro, 2012; 2014). Thus, product diversification can allow the transfer of product buyers' expectations of a quality to other lower quality products (Wernerfelt, 1988).

Table 1 shows the descriptive statistics and the correlation matrix of the variables used in the study.

<Take in TABLE 1>

4. Results

Table 2 shows the results of six mixed-effect linear regressions. These models differ in both the variables and the random effects added to each of them. Model 1 is a traditional regression model whose specification only includes control variables and the product price. Model 2 is a mixed-effects model that adds a random effect at the product level. Model 3 establishes two nested random effects (products nested within each firm). Model 4 incorporates a third level that considers collective brands. Model 5 and Model 6 coincide with equations 2 and 3 indicated in the methodology, respectively.

The likelihood ratio test is calculated to validate the preference of the estimated regressions with respect to the null model (the one that does not have explanatory variables). This test shows an improvement in the adjustment to a 99% confidence level in Models 1 ($\chi^2_{(12)} = 248.512$, p-value = 0.000), 2 ($\chi^2_{(13)} = 383.838$, p-value = 0.000), 3 ($\chi^2_{(14)} = 431.998$, p-value = 0.000), 4 ($\chi^2_{(15)} = 436.384$, p-value = 0.000), 5 ($\chi^2_{(19)} = 469.234$, p-value = 0.000), and 6 ($\chi^2_{(21)} = 472.698$, p-value = 0.000). Chi-square tests (denominated ANOVA in Table 2) are also calculated to analyze sequentially which of the estimated models has the greatest explanatory power. Thus, and because of the gradual increase in the maximum likelihood function, Model 2 is preferable to Model 1 ($\chi^2_{(1)} = 135.326$, p-value = 0.000), Model 3 to Model 2 ($\chi^2_{(1)} = 48.160$, p-value = 0.000), Model 4 to Model 3 ($\chi^2_{(1)} = 4.386$, p-value = 0.036), Model 5 to Model 4 ($\chi^2_{(4)} = 32.850$, p-value = 0.000), and Model 6 to Model 4 ($\chi^2_{(7)} = 36.314$, p-value = 0.000). However, Model 6 is not preferred over Model 5 ($\chi^2_{(3)} = 3.464$, p-value = 0.177). Similar conclusions are obtained if we evaluate the information criteria of Akaike (AIC) and Schwartz (BIC) and the log-likelihood. In this sense, we discuss the results of the last two regressions.

Regarding the goodness of fit, we have calculated three pseudo-R-squares. The indicators of Cox and Snell (63.78% and 64.05%) and Nagelkerke R-squares (64.75% and 65.03%) show high figures. Furthermore, the McFadden's rho (24.17% and 24.35%) is situated the range between 20% and 40% (Hensher and Johnson, 1981). In sum, these indicators show extremely good fits.

To test the nonlinear relationship between advertising investment and product quality, we use these mixed-effect linear regressions with panel data, as described in the Method section. Model 5 (see Table 2) shows the estimations of product quality as a function of advertising investment, squared advertising investment, product price and control variables. The variable advertising investment is significant and positive while

the squared advertising investment is significant and negative, which suggests a nonlinear relationship between advertising and quality, with a positive slope at low levels of advertising investment and a negative slope at high levels of advertising investment. Indeed, this nonlinear relationship follows an inverted U-shaped curve with a maximum threshold from which companies reduce their product quality (see Figure 1). The inflection point (or threshold) for the curve is

These results support H1 and the idea that the advertising investment of a collective brand member is related to its product quality nonlinearly. For members with a moderate advertising investment, and according to the model of Klein and Leffler (1981), they necessarily have a higher quality than other companies with a lower advertising investment in the same collective brand; otherwise, the advertising investment in the company brand would not be justified. A similar positive link between advertising spending and perceived quality is obtained by Moorthy and Zhao (2000) and supported by Nelson (1970) assumptions. However, companies with a high advertising investment reduce product quality. In fact, consumers might perceive advertising effort as excessive, so they wonder if this hides any problem with product quality (Kirmani, 1990; Ringold, 2021). This finding reveals the importance of advertising investment within collective brand in the commercialization of experience goods. An inverted U-shaped relationship result is also obtained by Moorthy and Hawkins (2005), but between advertising repetition and perceived quality for search and experience goods, holding that if the same ad is repeated too often, consumers may get irritated and bored, and this may inspire a degradation of perceived quality.

<Take in TABLE 2>

<Take in FIGURE 1>

Model 6, presented in Table 2, also includes the effects of company advertising investment and squared advertising investment (which act as independent variables), as well as a moderator variable (product price of firm) and the interaction between the independent variable and the moderator. Specifically, Model 6 shows the role of the interaction of product price and squared company advertising investment in relation to product quality. The significant positive coefficient of this interaction term in relation to product quality allows us to support H2. This positive sign suggests that the companies that offer highly advertised products within the collective brand and have a high product price, will take more care in production quality than companies with high advertising investment but with a low product price. To better interpret this interaction, the nonlinear relationship between advertising investment and product quality is plotted by distinguishing three groups of firms: the “high product price” companies (those located in the third tercile of higher price companies -price scores *in ln* of 3.219 and above), the “moderate product price” companies (those located in the second tercile of medium price companies -scores *in ln* above 2.565 and below 3.219) and the “low product price” companies (those located in the first tercile of lower price companies -scores *in ln* of 2.565 and below).

Figure 2 shows that the inverted U-shaped relationship between advertising investment and product quality only holds for companies with a high product price ($n = 154$) and for companies with a low product price ($n = 159$). The inflection points (or thresholds) for the curves are Hence, both sets of firms would be more likely to increase their product quality as their advertising investment increases (positive slope). And once a given threshold in advertising investment is reached, firms would tend to reduce their product quality in parallel with the increase of their advertising investment. It seems that for members of the collective brand with a high or a low product price, an

increase in advertising investment that exceeds the threshold is considered excessive compared to what it should have for its level of product price, so the consumer would wonder why the company is investing so hard in advertising and whether this means that there is any problem with the quality of the product. However, the slopes of the curvilinear relationship are softer for companies with a high product price than for companies with a low product price. Thus, consumers perceive a smaller drop in quality when they pay a higher price for a highly advertised brand. In fact, consumers might think that using expensive campaign elements (e.g., celebrities), which are used to reach high-level audiences who buy expensive products, generate perceptions of high prices (Kirmani, 1990).

For the subsample of firms of moderate product price ($n = 149$), the relationship between company advertising investment and product quality is largely positive. It seems that the "information" of the advertising and a moderate product price of these members of the collective brand can be absorbed by the consumer in a cheap way as signs of quality. In fact, a relatively recent phenomenon called the new wine "boom" (Roberts and Reagans, 2007) implies that markets may favour companies that have recently appeared on the market with very high-quality wines (Díaz, 2011) and moderate prices, so the advertising of the company can be highly regarded by the consumer of these fewer known products of moderate price. The relationship between advertising investment and product quality, largely positive, even suggests that companies with a moderate price and a high advertising investment within the collective brand will take more care in production quality than companies with high advertising investment and that have a high product price.

<Take in FIGURE 2>

With respect to reputation variables, the parameter of the variable that reflects company reputation shows a positive and significant effect on product quality. As it was expected, current quality of product of a firm is a function of the firm's reputation for quality (Shapiro, 1983; Quagraine et al., 2003; Costanigro, McCluskey and Goemans, 2010), which depends on the firm's past output quality (Landon and Smith, 1998). However, collective reputation is not significant. In any case, the estimated standard deviation for the collective brand is statistically significant to the 1% level in models 5 ($\sigma_b = 0.591$ (0.226), p-value 0.009) and 6 ($\sigma_b = 0.584$ (0.226), p-value 0.010), so there are differences in the quality of the products depending on the collective brand. Finally, regarding the control variables, the results show that market share within collective brand is negatively and significantly related to product quality (see Table 2). Thus, a higher market share is associated with lower quality. It seems that a high market share could decrease the perception of exclusivity generated by a focused differentiation strategy (Porter, 1980). In fact, companies with a higher market share can be perceived for offering lower quality products since the achievement of a high-quality strategy is facilitated by a perception of exclusivity (i.e., a low market share position could have a connotation of exclusivity) (Jacobson and Aaker, 1987).

5. Conclusions

This study examines the relationship between advertising investment and product quality of collective brand members in an experience goods industry, as well as the moderating effect of the product price. The central assumptions are that advertising investment has a curvilinear relationship with the experience product quality of collective brand member; and that product price can positively moderate this relationship.

The main academic contribution of this paper is the analysis of these relationships in the framework of collective brands of an experience goods industry, where consumers

can rely on a collective brand, which is an extrinsic sign of quality certified through an external institution. While previous research has analyzed the linear relationship between advertising investment and experience product quality of firms (e.g., Hite et al., 1991; Kwoka, 1984; Reuter, 2009), as well as the moderating role of consumer's advertising attitude (Moorthy and Hawkins, 2005), this study focuses on the nonlinear relationship and the moderating role of experience product price in the context of collective brands members. Our study considers situations of cooperation between members within a collective brand to promote high-quality products, but emphasizing the conditions in which these companies invest in advertising to provide information to consumers about the probability of receiving high quality of their own individual brands.

The results of the empirical application show an inverted U-shaped relationship between advertising investment and experience product quality of collective brand members. Thus, the product quality of collective brand companies reaches its maximum at intermediate levels of advertising investment. The results also reveal that product price positively moderates this curvilinear relationship, in such way that companies with a high advertising investment and with a high product price within the collective brand, will have a higher quality of their products than companies with a high advertising investment and a low product price.

This study has the following relevant managerial implications. The choice of a collective brand strategy has important consequences for companies in terms of advertising, price, and quality. The underlying question is whether managers value the effectiveness of collective brands in creating added value for companies. The finding that collective brand companies can have lower levels of product quality after they reach an advertising investment threshold (i.e., consumers suspect that excessive advertising effort can reflect that there is some problem with the product) supports the protection policy of

public collective labels developed in Europe, given that collective brands have systems of monitoring the quality of their member companies to avoid potential free riding. Thus, companies that do not invest in quality should be unable to use the collective brand name. In addition, if we extend the theoretical models of firm reputation (Klein and Leffler, 1981), the results obtained in this study suggest that consumers build their quality predictions on the product of a company using information about prior quality (in the previous year) of the company (company reputation). The value that consumers assign to individual brands implies that managers of these companies should provide constant information to the market on the characteristics of their products.

Furthermore, the results suggest that certain characteristics of the product, such as price, can play an important role in the relationship between the company advertising investment and product quality. Specifically, the product price of a member in a collective brand can help it to be more visible as a sign of quality when performing a high advertising investment, since this “information” of advertising and price can be obtained by the consumer in an easy way. Companies with high levels of advertising investment that also have a high product price within a collective brand would have a higher product quality than companies with high advertising investment and low price.

Although the goal of this study is to contribute to the understanding of whether product price can moderate the effect of advertising investment on product quality of a member of a collective brand in the context of asymmetric information, it has some limitations that restrict the generalisation of its results. First, the database only includes a sample of high-quality products (i.e., the best wines of Spain). This restriction limits the extent to which our results can be generalized to other groups of (low quality) products. Second, this study is based on aggregated information of advertising investment at a company level, but it does not consider advertising investment at a product level. Third,

the lack of information restricts the analysis of other factors that might explain the product quality, such as the strength of the collective brand and word-of-mouth of consumers. Finally, the area of study is an experience goods industry, the Spanish wine industry, and the effects should be analysed in other industries to generalise the results.

As further lines of research we suggest estimating advertising investment at a product level and analysing the influence of the strength of several collective brands and of word-of-mouth of consumers on the product quality of member companies. First, brand strength is one of the most important components of any model of brand equity and can be conceptualized both in terms of consumer attitudes toward the brand with respect to quality and behavioural dimensions such as brand loyalty and brand share (Smith and Park, 1992; Aaker, 1991). So, it is expected that the strength of the collective brand influences company's product quality. Second, we also suggest analysing the effect of word-of-mouth of consumers on the product quality of member companies. In the wine industry, internet-based apps like Vivino have become very popular in the last decade, allowing consumers to share their own valuations about the wines they taste. Nelson's theory (1974) predicts that the search for information of experience goods is characterized by a greater dependence on word-of-mouth and advertising (Klein, 1998). Thus, we might expect that word-of-mouth and electronic word-of-mouth will be related to product quality. Testing these relationships might offer interesting insights for managers.

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Table 1. Descriptive statistics and correlations

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1. Company reputation	1												
2. Collective reputation	0.022	1											
3. Advertising investment	0.015	-0.194	1										
4. Price of product	0.196	-0.034	-0.101	1									
5. White wine	0.030	0.115	-0.002	-0.119	1								
6. Red wine	0.088	-0.031	-0.104	0.116	-0.609	1							
7. Young wine	-0.062	0.004	0.008	-0.136	0.123	-0.366	1						
8. Crianza wine	-0.005	0.043	-0.029	-0.046	0.080	0.088	-0.495	1					
9. Grape's year of vintage	0.009	0.093	0.108	-0.263	0.081	-0.104	0.119	0.142	1				
10. Company market share within collective brand	-0.034	-0.050	-0.106	0.014	-0.016	0.028	0.057	-0.026	0.019	1			
11. Size of the company	0.155	-0.263	0.538	0.029	-0.026	0.042	-0.066	-0.072	-0.088	-0.059	1		
12. Age of the company	0.032	0.257	-0.221	-0.069	0.008	0.163	0.006	0.102	0.210	0.057	-0.471	1	
13. Number of the firm's products	0.026	-0.132	0.260	0.008	0.018	-0.129	-0.033	0.037	-0.020	-0.068	0.330	-0.270	1
Observations	462	462	462	462	462	462	462	462	462	462	462	462	462
Mean	91.211	6.268	9.667	2.898	0.087	0.797	0.5	0.197	2003.619	0.000	10.040	26.188	4.314
SD	1.351	2.229	2.150	0.777	0.282	0.403	0.501	0.398	3.932	0.007	1.493	12.771	2.731
Min	85	1	3.14	1.131	0	0	0	0	1979	0.000	4.394	1	1
Max	95	8	15.06	5.707	1	1	1	1	2010	0.152	12.966	48	17

Table 2. Results of the mixed-effects linear regression models (Standard errors in parenthesis and p-values in brackets)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Independent variables:						
Intercept	16.453 (48.269) [0.733]	6.440 (58.768) [0.913]	-6.640 (68.550) [0.923]	-8.944 (74.308) [0.904]	-27.977 (70.516) [0.692]	-34.068 (70.332) [0.628]
Company reputation					0.228*** (0.061) [0.000]	0.220*** (0.056) [0.000]
Collective reputation					0.013 (0.058) [0.823]	0.012 (0.055) [0.830]
Advertising investment					0.574*** (0.207) [0.005]	1.701*** (0.593) [0.004]
Advertising investment (squared)					-0.030*** (0.011) [0.007]	-0.090*** (0.031) [0.004]
Price of product	1.581*** (0.115) [0.000]	1.429*** (0.124) [0.000]	1.436*** (0.158) [0.000]	1.462*** (0.189) [0.000]	1.448*** (0.191) [0.000]	3.044*** (0.660) [0.000]
Interactions:						
Advertising investment x Price of product						-0.362** (0.143) [0.011]
Advertising investment (squared) x Price of product						0.020** (0.008) [0.015]
Control variables:						
<i>Product characteristics</i>						
White wine	0.182 (0.338) [0.590]	-0.037 (0.393) [0.925]	0.057 (0.352) [0.872]	-0.168 (0.385) [0.663]	-0.292 (0.343) [0.393]	-0.268 (0.362) [0.459]
Red wine	-0.104 (0.253) [0.681]	-0.253 (0.305) [0.407]	-0.249 (0.285) [0.382]	-0.462 (0.289) [0.109]	-0.525** (0.243) [0.031]	-0.507* (0.259) [0.050]
Young wine	-0.361** (0.181) [0.046]	-0.187 (0.195) [0.336]	-0.095 (0.195) [0.626]	-0.090 (0.199) [0.651]	-0.130 (0.194) [0.503]	-0.132 (0.190) [0.490]
Crianza wine	-0.724*** (0.208) [0.000]	-0.586** (0.230) [0.011]	-0.379** (0.190) [0.046]	-0.375 (0.250) [0.133]	-0.426* (0.251) [0.090]	-0.418* (0.250) [0.095]
Grape's year of vintage	0.035	0.040	0.046	0.048	0.045	0.046

	(0.024)	(0.029)	(0.034)	(0.037)	(0.035)	(0.036)
	[0.150]	[0.173]	[0.173]	[0.198]	[0.199]	[0.194]
Company characteristics						
Company market share within collective brand	-10.552***	-10.749***	-10.907***	-10.931***	-6.093***	-5.964***
	(2.713)	(2.183)	(1.764)	(1.661)	(2.116)	(2.164)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.004]	[0.006]
Size of the company	0.180***	0.151***	0.130*	0.154**	0.155**	0.165**
	(0.055)	(0.057)	(0.073)	(0.070)	(0.071)	(0.072)
	[0.001]	[0.008]	[0.076]	[0.027]	[0.029]	[0.022]
Age of the company	0.007	0.006	0.004	-0.001	-0.004	-0.003
	(0.007)	(0.007)	(0.009)	(0.007)	(0.006)	(0.005)
	[0.305]	[0.376]	[0.686]	[0.920]	[0.526]	[0.542]
Number of the firm's products	0.003	0.026	0.024	0.029	0.044**	0.045**
	(0.028)	(0.019)	(0.020)	(0.019)	(0.022)	(0.022)
	[0.920]	[0.181]	[0.219]	[0.122]	[0.044]	[0.042]
Observations	462	462	462	462	462	462
Log-likelihood	-846.477	-778.814	-754.734	-752.541	-736.116	-734.384
Null	-970.733	-970.733	-970.733	-970.733	-970.733	-970.733
Likelihood ratio test	248.512***	383.838***	431.998***	436.384***	469.234***	472.698***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
AIC	1,716.954	1,583.628	1,537.468	1,535.082	1,510.232	1,510.768
BIC	1,766.581	1,637.390	1,595.366	1,597.115	1,588.808	1,597.615
ANOVA		135.326***	48.160***	4.386**	32.850***	3.464
		[0.000]	[0.000]	[0.036]	[0.000]	[0.177]
						36.314***
						[0.000]
McFadden's rho	12.80%	19.77%	22.25%	22.48%	24.17%	24.35%
Cox and Snell R-square	41.60%	56.43%	60.74%	61.11%	63.78%	64.05%
Nagelkerke R-square	42.23%	57.29%	61.67%	62.04%	64.75%	65.03%
Random effects						
$\sigma_i / \sigma_{fi} / \sigma_{bfi}$		1.439***	1.109***	1.111***	1.104***	1.116***
		(0.078)	(0.125)	(0.107)	(0.123)	(0.121)
		[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
σ_f / σ_{bf}			0.910***	0.769***	0.536***	0.533***
			(0.122)	(0.175)	(0.179)	(0.180)
			[0.000]	[0.000]	[0.003]	[0.003]
σ_b				0.576**	0.591***	0.584***
				(0.234)	(0.226)	(0.226)
				[0.014]	[0.009]	[0.010]
σ_ε	1.512***	0.474***	0.476***	0.475***	0.490***	0.473***
	(0.063)	(0.073)	(0.066)	(0.091)	(0.100)	(0.102)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]

Prob<0.1; **Prob<0.05; ***Prob<0.01

Figure 1. Curvilinear company advertising investment-product quality (in ln) relationship.

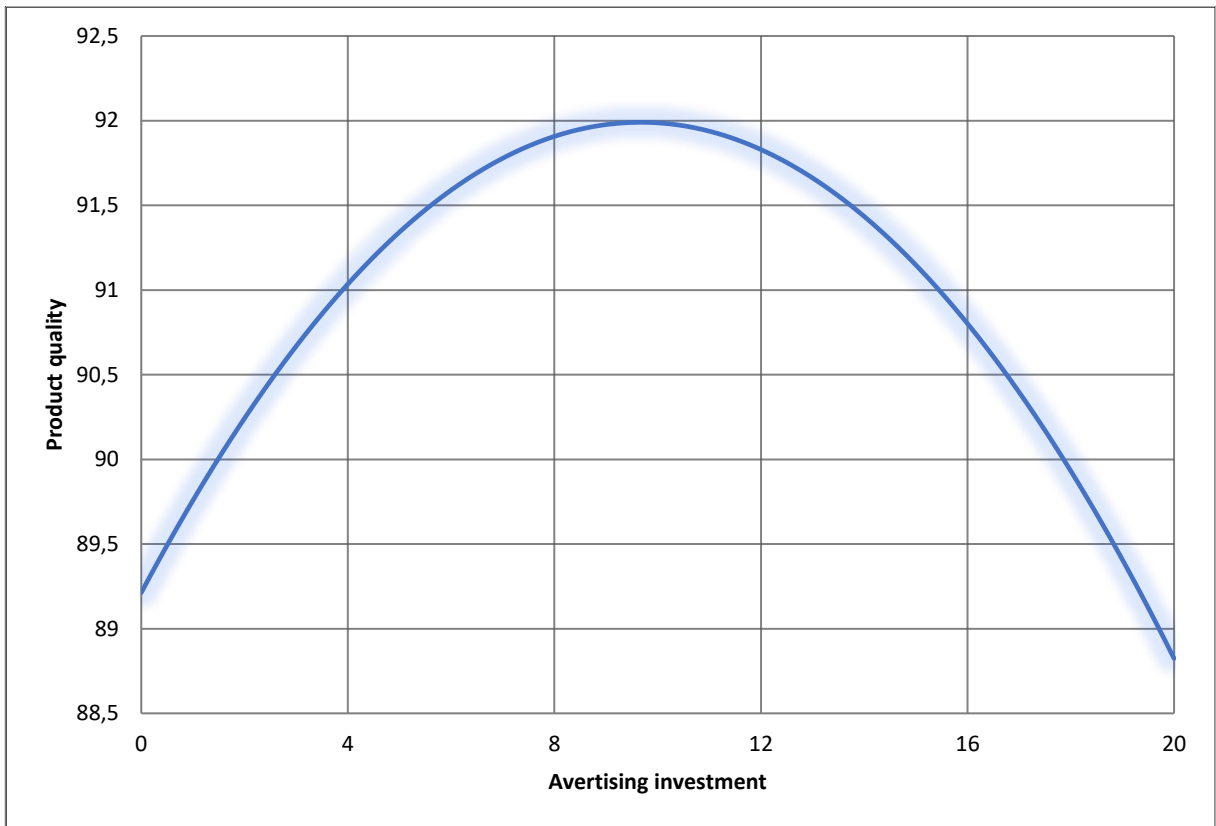


Figure 2. Moderator effect of product price within a collective brand on the curvilinear company advertising investment-product quality (in ln) relationship.

