HOSTED BY
ELSEVIER
Available online at www.sciencedirect.com
ScienceDirect
Wine Economics and Policy 8 (2019) 49–58
www.elsevier.com/locate/wep

Grapevine or informed selection: Significance of quality attributes in India's emerging wine market

Satish Y. Deodhar[a], Swati Singh[b,*], Nikita Tank[a]

[a]*Indian Institute of Management Ahmedabad, Vastrapur, Ahmedabad 380015, Gujarat, India*
[b]*Vivekanand Education Society Institute of Management Studies & Research, Hashu Advani Memorial Complex, 495-497, Collector's Colony, Chembur, Mumbai 400074, India*

Received 12 April 2018; received in revised form 24 January 2019; accepted 19 February 2019
Available online 22 February 2019

1. Introduction

India today is an important emerging market for wines. A number of reasons are contributing to its growth. With a projected population of 1.4 billion, India is likely to overtake China as the most populous country in the world by 2022 (UN, 2015). Thus, the absolute size of the Indian market is going to be large. Also, as borne out in studies by Anderson and Wittwer (2016) and Jiao (2017), while wine consumption in traditional wine-producing countries may fall, macroeconomic growth-phase of emerging markets in Asia is going to play a major role in driving the global demand for wine. Indeed, India has had the fastest GDP growth in the world in the recent past and that she is expected to continue with this trend in the future. For example, if India's average GDP growth rate in 2015 and 2016 was the highest at 7.55 per cent per year, the average GDP growth rate till 2020 is expected to be the highest at 7.43 per cent per year (World Bank, 2018). Well-travelled Indians belonging to the upper strata of society, coming mainly from metropolitan urban centres are getting hooked to wine drinking (Holland, 2017). With changing demographic profile and high-disposable income, they are adapting wine as a lifestyle projection tool (Singh and Srivastav, 2018) which primarily has been perceived as a western concept so far.

And this brings to the fore an important issue as to whether or not participants in this emerging market are aware of the various quality attributes of wines and are they making informed selection about purchase and sale of wines. There is no legacy of a mature wine industry in India for close to two millennia. Religious taboos (Bose, 1922) and official discouragement of alcohol consumption by governments since India's independence (GOI, 1949) has meant that market stakeholders have had limited access to refined nuances of wine consumption and perhaps production. On what basis are the market participants then making their selection of wines? Are they superfluous and based on grapevine, so to say; or are they making selections that are well-informed? The taste of the pudding is in the eating. Today, numerous brands of wine and their types are being bought and sold in India. The repeat purchase mechanism would ensure that a spatial equilibrium would exist in the market among wine prices and their quality attributes at a given point in time. Therefore, by employing the hedonic price analysis (Rosen, 1974), one can capture the value that this emerging market attaches to various wine attributes at a point in time. Such exercise would not only help identify what attributes are valued by the market but what information needs to be conveyed to consumers and producers regarding the finer nuances of wine attributes. In our understanding, no such study has been conducted so far in the Indian context.

With this context in mind, it becomes imperative to have a holistic understanding of the Indian wine market. Towards this end, in Section 2 we give a brief description of the history, size, and structure of the Indian wine market. In Section 3 we provide a brief summary of the quality attributes of wine, refer to a few studies conducted in understanding the market preferences, and describe the hedonic price analysis methodology that we employ for studying the Indian market. Thereafter, in Section 4 we introduce the data and the variables used for

*Corresponding author.
E-mail addresses: satish@iima.ac.in (S.Y. Deodhar), swati.singh@ves.ac.in (S. Singh), nikitat@iima.ac.in (N. Tank).
Peer review under responsibility of UniCeSV, University of Florence.

https://doi.org/10.1016/j.wep.2019.02.003

the hedonic price analysis. Section 5 reports the estimated econometric relationship between wine prices and wine attributes. Concluding observations are made in Section 6, and limitations and future scope of the research are addressed in Section 7.

2. Indian wine market

2.1. Historical perspective

Ironically, wine was known to Indians since Vedic times. *Circa* 700 BCE, the great Sanskrit grammarian Panini had defined alcoholic beverages with various names including one called *Kapisayana,* which was made from grape juice (Pillai, 1997). Later, *circa* 320 BCE, Kautilya, in his treatise *Arthashastra* made reference to two wines, Kapisayana and Harahuraka (Kangle, 1972). These two names were not mere generic references to liquors, for Kautilya provided list of other liquors such as *medaka* distilled from rice; *prasanaa* made from betelnut and barley; *maireya* made from jaggery, pepper, and fruits; and, medicinal *Ayurveda* alcohols such as *asawas* and *arishtas* made from wood-apple, molasses, honey and other ingredients. The two specific wines Kautilya referred to, are the early examples of appellations based on geographic indicators (GI), for Kapisayana and Harahuraka were the wine-producing north-western frontier regions of the Indian empire under Chandragupta Maurya (Mookerji, 1966). Consumption of wine did not seem to be a taboo in Vedic and Mauryan period, i.e., during the period extending beyond 1st millennium BCE. Even during the Golden Age of the Gupta dynasty *circa* 5th century CE, celebrated playwright Kalidas made abundant references to wine in his Sanskrit dramas.

However, post-Vedic texts such as the codes of conduct called *smrutis* and the Buddhist religious texts discouraged consumption of alcohol (Bose, 1922). Advent of west Asian religions into India also meant that conservative attitudes to consumption of alcoholic beverages got reinforced, although the late-entrant European colonialists did not shun alcohol. In independent India, one of the Directive Principles of state policy, codified in Article 47 of the Constitution of India also discouraged consumption of alcohol. Adopted in 1950, it clearly stated, "The State shall endeavour to bring about prohibition of consumption, except for medicinal purpose, of intoxicating drinks and drugs which are injurious to health" (GOI, 1949). If only a few Indian states such as Gujarat, Bihar, and Nagaland have banned alcohol consumption, most of the other states have allowed consumption but impose high levels of taxation on alcohol sales. Moreover, central government has imposed customs duty of 150 per cent on wine imports. Furthermore, historically, while high domestic production and consumption of Indian made foreign liquors (IMFL) such as whisky was possible due to abundant availability of molasses, wine production was constrained by limited cultivation of grapes in India. Altogether, both figuratively and literally, Indian wine consumer was in a predicament echoed by the 13th century Persian poet Rumy – "Either give me more wine or leave me alone!" (Barks, 1995).

2.2. Modern scenario

Data for 2015 indicates that the global wine production has crossed 28 billion litres. Of the total, four countries that dominate production are France, Italy, Spain and the US with a combined market share of close to 60 per cent. Similarly, four countries that dominate world wine consumption are the US, France, Italy, and Germany with a market share of 41 per cent. Significantly, China has already emerged as a major wine producer and consumer with a global market share of 4 per cent and 6.5 per cent, respectively. In comparison, Indian wine market is in a nascent state with global market share of about 0.04 per cent and 0.07 per cent, respectively (WI, 2017). However, with the fast growing GDP and population combined with changing lifestyle, this emerging market holds a promise for the future.

If we look at India's modern history starting with her independence in 1947, a very limited amount of wine was being produced in the state of Goa till late 1960s. In the early 1970s, Shaw Wallace set up a winery at Hyderabad for its 'Golconda' range and UB Group started a winery at Baramati in collaboration with Bosca of Italy (Gryphon, 2017). However, the real push for production of grapes and wines on an organized scale was received in 1980s when Champagne Indage plant was set up in 1984 in the state of Maharashtra (ILO, 2009). Later, Mahagrapes, a consortium of about 15 farmer cooperatives was formed in 1991 to promote exports of table-grapes from Maharashtra. While the grape varieties required for wine-making were different than the table-grape varieties, this initiative gave a big push to the production of grapes in Maharashtra. Mindful of generating rural and agricultural employment with a bent towards sustainable production that gives a competitive edge (Vecchio, 2013), the 2001 industrial policy of the state of Maharashtra announced a planned creation of 'Wine Parks' in grape growing districts such as Nashik and Sangli. Importantly, under this policy, excise duty on production of wine has been completely waived till 2021. With these developments starting from 1980s, wine production in India in general and Maharashtra in particular increased significantly. Today, with more than 8000 acres under wine-grape cultivation in India, Maharashtra alone accounts for about 92 per cent of the total acreage (Gawande et al., 2017). Within Maharashtra, Nashik itself accounts for 80 per cent of the wine-grape cultivation, earning the epithet 'the wine capital of India'. Alongside, that the farmers are being ensured of sustainable livelihood is exemplified by the fact that wineries are extending 10-year assured buyback contracts with farmers (BS, 2017).

The rise in production of wine-grapes is a reflection of growing demand for wine. As per one estimate, the value of wine consumption in India in 2008 was about ₹3 billion which amounted to $60 million (JBC, 2008). Thereafter, average sales of wines have risen at an annual rate of about 12 per cent during the period 2009 and 2014. This growth rate was higher than the annual sales growth in whisky and beer by an average rate of about 3.5 per cent (Holland, 2017). Today there are about 2.5 million wine consumers in India who consume a

total of about 24 million litres of wine. Of the total wine consumption, more than 80 per cent of it is in metropolitan areas of Mumbai, Delhi, Bangalore, Goa, and Pune; with Mumbai alone accounting for almost 40 per cent of the total consumption (ILO, 2009). In order to serve these consumers, there is competition among wine brands, both domestic and foreign. There are a total of 93 wineries in India of which 75 are in Maharashtra alone (TOI, 2016). Moreover, the list of wine importers in India is also growing with every passing year. Today, there are more than 300 wine importers in India (Export Genius, 2017). In 2015, of the total consumption of wine in India, 70 per cent of it was accounted for by domestically produced wines and imports accounted for the rest. Recent figures show that the total value of wine sales in India were more than $2.5 billion in 2017 (Statista, 2017). Domestic wines include many names such as Sula, Fratelli, Four Seasons, Grover, York, and a few others. Foreign brands like Moet Hennessy, Vuove Cliquot, E&J Gallo, and Pernod Ricard also exist among the domestically produced wines, for India allows 100 per cent FDI in wineries (ET, 2009; CID, 2017). India also exports small quantities of wine. For example, in 2016, India's wine exports had reached $8.35 million, 70 per cent of which went to Holland, UAE, Japan, Qatar, and France, in that order (IE, 2010).

The above description indicates that Indian wine industry has acquired the stylized features of a monopolistically competitive market (Chamberlin, 1965). There is intra-industry trade where numerous wine brands, both domestic and foreign, are competing to capture consumers' attention. Wine is not a homogeneous product and there is no unique single price for the wines. With the presence of product differentiation among many brands, a cluster of prices exists for the differentiated wines sold in the Indian market. It may be a small, niche market in comparison to markets in other countries; however, the absolute size of this emerging market just cannot be ignored. For example, wine production of domestic Indian brands was 11.5 million litres in 2015, which was larger than that of the countries such as Belgium, Luxembourg, and South Korea. Similarly, India's wine consumption of 16.2 million litres in 2015 was larger than that of the countries such as Turkey, Luxembourg, and the Philippines (WI, 2017). While the countries mentioned here are not significant producers and consumers of wine, the comparison gives a sense of the size of this emerging Indian market.

3. Wine attributes and research methodology

In a nascent but rapidly growing multi-billion rupee Indian wine market, is there sufficient awareness about quality attributes of wine among the market participants? On what basis wine selection must be getting made at this time? Are the choices made being superfluous and based on grapevine, so to say, or are they being made keeping in mind the well-informed wine attributes? These questions are important, for unlike other food products, wine has multifarious hidden and sensory quality attributes. For example, among others, one is the appellation based on GI, which identifies a particular wine with a particular growing region. In fact, as per the GI registry of the World Trade Organization (WTO), no wine from any part of the world but from Champagne county in France can be called as Champagne. Apart from region of origin, there are many important attributes of wine such as colour (red/white/blush pink), fizz (still/sparkling), grape variety and blend, and, methods of producing, storing, bottling, and sealing. Some claim that these boil down to five basic attributes– sweetness (or dryness), acidity (tart), tannin (bitterness), fruit (dark/light flavours), and body (alcohol). Organoleptic test to ascertain some of these quality attributes has a six-stage 's' process – see, swirl, sniff, sip, swish, and swallow or spit (NVWCT, 2016).

Of course, consumers may not go through the details of all quality attributes or do formal testing every time they consume wine. However, if wines of various kinds are being produced and sold among a certain clientele in major metropolitan regions of India, then the repeat purchase mechanism may ensure that wines are being traded for their select choices of attributes and for their specific prices. If data on wine prices and their attributes are available at a point in time, it could enable one to find a spatial equilibrium relationship between the wine prices and their multiple attributes. This may give clue to the importance of or the lack of it, attached to different quality attributes of wines. And, if one is able to discover the importance of different quality attributes of wine, producers could come up with newer blends and/or educate consumers about other important wine quality attributes that may be getting ignored.

Numerous studies have been conducted on understanding productivity of wine sector (Sellers-Rubio et al., 2016; Vidal et al., 2013); quality attributes of wines (Johnson and Bruwer, 2007; Perrouty et al., 2006; Gil and Sánchez, 1997), and the choices consumers make in wine markets around the world (Hollebeek et al., 2007; Lockshin et al., 2006; Lockshin et al., 2009; Mtimet and Albisu, 2006; Mueller and Szolnoki, 2010; Nunes et al., 2016; Agnoli et al., 2016; Hall, 2016). A comprehensive review of this literature is covered by Lockshin and Corsi (Lockshin and Corsi, 2012). Among other features, this literature review documents studies conducted on comparisons of old world and new world wines and markets, segmentation of wine-consumers in developed countries, and value attached by consumers to sustainable or green wine practices. The review also suggests that there has been a predominance of one-off convenience sample studies which are difficult to interpret for generalizable results.

Contemporary wine literature deals with wine quality and its relationship to pricing both for old world and new world countries (Angulo et al., 2000; Bombrun and Sumner, 2001; Corduas et al., 2012; Estrella Orrego et al., 2012; Roberto Luppe et al., 2009; Zelený, 2017). It has been noted that price acts as a key element for wine purchase both by knowledgeable as well as novice customers (Gergaud and Livat, 2007; Lockshin et al., 2017). Among the other determinants, choices are made on the basis of country, grape, region, production methods, brands, and winery (Ferro and Benito Amaro, 2018; Kelley et al., 2015; Nallaperuma et al., 2017; Robertson et al., 2018; Sillani et al., 2017). Oczkowski and Doucouliagos (2015)

examined theoretical relation between the price of wine and its quality through 180 hedonic wine price models developed over 20 years, covering many countries and found positive correlation between the two despite consumers' lack of information about wine's quality.

Shane et al. (2018) study on export pricing literature revealed that brand and region of origin acts as major influencers of premium pricing of Australian wine in the UK market. Studies *on terroir* (special characteristics of a place that impart unique qualities and style to the wine) for the old-world markets shows that it plays an important in the production and appreciation of wines (Gergaud and Ginsburgh, 2010; Prata-Sena et al., 2018). However when the same is examined for the new-world wines it was found that here too terroir helps in influencing sensory attributes, commanding premium price, and takes priority especially when consumers are not able to judge intrinsic qualities of wine (Costanigro et al., 2010; Cross et al., 2011; Cross et al., 2017; Kontkanen et al., 2005).

While a large body of literature has focused attention on wine markets from the old world and the new world, only a few studies have been conducted for emerging markets (Fensterseifer, 2007; Tang et al., 2015; Yu et al., 2009). For example, a study by Camillo (2012) covered an online survey in China which received a little more than 400 responses. In this study, intrinsic factors such as health-related motivation and knowledge acquired through tasting were found to be important. Moreover, among other things, extrinsic factors such as brand, country of origin, and visits to wineries were also identified as the influencing factors among the Chinese. Camillo, however, does mention that other emerging markets such as India need to be studied. And, till date, no study has been conducted on the Indian wine market. The need for such a study is underscored by the observation (Jiao, 2017) that emerging markets are sensitive to macroeconomic business cycles, and, demand, not from developed markets, but from emerging markets would be a powerful factor affecting wine prices.

In this context, we study the hitherto unexplored Indian wine market. Towards this end, we employ Rosen's (Rosen, 1974) theory of hedonic prices and spatial equilibrium to the Indian wine market. Essentially, this involves a cross-sectional analysis of wine prices and wine attributes at a point in time, where the repeat purchase mechanism ensures different consumers and producers settling on selection of different wines, wine quality attributes, and their retail prices. In a spatial equilibrium among competing wines, price of any particular wine would turn out to be the sum total of the shadow prices of the various attributes of the wine. For example, Schamel et al., (1998) estimated a hedonic pricing model for US wine market. Their study showed that the estimated price elasticity of sensory quality was larger for white wine, indicating that U.S. consumers were willing to pay a higher quality premium for white wine compared to red wine. The results also suggested regional reputation and individual quality indicators being more important to U.S. consumers of red wine. They concluded that differentiating wines on the basis of regional origin as a quality attribute may have a higher payoff for regions primarily growing red wine.

Following Rosen (1974) and Schamel et al., (1998), we characterize the utility maximization problem of a consumer as follows:

$$\text{Max } U = f(W, X) \quad \text{s.t.} \quad M - P_W - X = 0, \tag{1}$$

where arguments of the utility function U are wine (W) and a composite numeraire good (X) representing all other goods. W is a vector of N attributes of wine, where amount of its Kth attribute is denoted by W_K. M is the income and P_W is the price of wine. We make an implicit assumption that per period a consumer purchases one bottle of wine and that the price of the numeraire good is normalized to 1. The marginal rate of substitution (MRS) between the Kth attribute of wine and the numeraire good X is given by:

$$MRS = \frac{\delta f(W,X)/\delta Wk}{\delta f(W,X)/\delta X} \tag{2}$$

In equilibrium, when utility (U) is maximized, the MRS must be equal to the ratio of the shadow price of the attribute W_K and the price of X. X being the numeraire good, therefore, the following equilibrium condition emerges:

$$\text{MRS} = \frac{\delta f(W,X)/\delta W_K}{\delta f(W,X)/\delta X} = \frac{\delta P_W}{\delta W_K}, \tag{3}$$

where $\delta P_W / \delta W_K$ represents the marginal implicit price of the wine attribute W_K.

Further, the utility function can be written as:

$$U = f(W_1, \ldots, W_K, \ldots W_N, M - P_W) \tag{4}$$

Solving (4) for an explicit functional form for P_W by keeping utility at its maximised value U^* and keeping choices of W_{-K} constant at their optimal values Z_{-K}^*, one can generate a consumer's bid curve B as:

$$B = g(W_K, W^*_{-K}, U^*) \tag{5}$$

Ceteris paribus, the bid curve B shows the maximum amount that a consumer would be willing to pay for wine as a function of the attribute W_K. Higher the amount of W_k in W, higher would be the bid price B. Thus, B will be a positively sloped function with respect to W_K. Moreover, we assume diminishing marginal utility with respect to W_K, and, therefore, the bid curve B would be a concave function with respect to W_K. Based on different consumers' preferences/incomes, there would be different bid curves, say $B^I(W_K)$ & $B^J(W_K)$ for two different consumers I and J.

Similarly, on the supply side, we can sketch out an offer curve C for a representative wine producer with respect to the attribute W_K as follows:

$$C = h(W_K, W^*_{-K}, \pi^*) \tag{6}$$

The offer curve C of a representative wine producer shows the minimum price at which it would be willing to sell a unit of wine as a function of the attribute W_K while keeping all other attributes (W_{-K}^*) and profit (π^*) at the optimal level. The offer curve C is positively sloped with respect to W_K, for additional amount of W_K can be offered only at a higher price. Moreover, offer curve C is a convex function with respect to W_K, for it exhibits increasing marginal cost of providing additional units of

W_K. Based on different wine producers' production technology and cost, there would be different offer curves, say $C^R(W_K)$ and $C^S(W_K)$ for two different wine producers R and S.

In a monopolistically competitive market for wines, there are different wine producers selling different kinds of wines to different consumers at different prices. Producers must be coming out with wines that they differentiate on the basis of the very many wine attributes. Similarly, consumers must be choosing wines on the basis of the varying combinations of the wine attributes going into the making of a wine. In the marketplace, a spatial equilibrium of the tangencies of the bid and offer curves would decide which wines get sold at what price. If one has a cross-sectional data on wine prices and the quality attributes of wines, the equilibrium relation between wine price and quality attributes can be estimated econometrically in the following form:

$$P_W = V(W_1, \ldots, W_K, \ldots, W_N), \quad (7)$$

Coefficient of the attribute W_k in the estimated regression Eq. (7) would be $\delta P_W / \delta W_K$, which we described in Eq. (3) as the marginal implicit price of the attribute W_K. Of course, while the best fit estimated Eq. (7) need not be linear, the coefficients would measure the relative premium attached to the attributes among themselves.

4. Data description

The spatial equilibrium concept underlying hedonic price analysis warrants that data points be collected at a particular point in time. Keeping this in mind, data on wine prices and wine attributes were collected on a single day on Monday, 27th March 2017. This was a normal day without any holiday or festival. The city of Mumbai is the commercial capital of India and the largest consumer of wines accounting for close to 40 per cent of the wine sales in India (Holland, 2017). Therefore, the data was collected from the city of Mumbai which is a representative data for the Indian market. In Mumbai, we chose one of the largest suburban grocery stores, Haiko Supermarket, which caters to the upper strata of the society located in the suburb of Powai. This particular shop had a wide variety of wines on offer in the shelves. A total of 206 stock keeping units (SKUs), i.e., different wine types and brands, were on offer in the shelves. The wines consisted of domestic brands, foreign brands produced domestically, and imported brands. We identified the quality attributes of wine that a consumer would know by reading the label and by physical examination of the wine bottles. The key attributes can be classified into regional affiliation of brands, wine-grape varieties, physical attributes of the wine, and the bottle shape, alcohol content, and vintage. Importantly, of course, prices for all the 206 wines were noted down. The description of the data on all the variables is provided in Table 1 below.

In Table 1, from Chenin Blanc (CHBL) to Sauvignon Blanc (SVBL) are the white wines, from Cabernet Sauvignon (CBSV) to Chianti (CHNT) are red wines, and others are a blend of different two grape-varieties, some white some red. A few of the wines with multiple grape-varieties get included in the base

Table 1
Variable definitions and the wine count.

Variable	Definition	Wine Count
PRICE	= Retail Price of Wine, (Rs/750 ml) [Minimum Rs. 500, Maximum Rs. 8647]	206
NWWB	= 1 if New World wine brand, else 0	58
OWWB	= 1 if Old World wine brand, else 0	92
CHMP	= 1 if it is a Champagne, else 0	02
SPRK	= 1 if it is a Sparkling wine, else 0	25
RED	= 1 if it is a Red wine, else 0	114
PINK	= 1 if wine has Blush Pink colour, else 0	22
CLUB	= 1 if the bottle has a club shape, else 0	54
CORK	= 1 if the bottle has cork closure, else 0	130
CHBL	= 1 if the wine is Chenin Blanc, else 0	10
RSWH	= 1 if the wine is Riesling White, else 0	02
VGNR	= 1 if the wine is Viognier, else 0	06
CHRDN	= 1 if the wine is Chardonnay, else 0	16
SVBL	= 1 if the wine is Sauvignon Blanc, else 0	16
CBSV	= 1 if the wine is Cabernet Sauvignon, else 0	14
SNGV	= 1 if the wine is Sangiovese, else 0	08
SHIRZ	= 1 if the wine is Shiraz/Syrah, else 0	16
GRNCH	= 1 if the wine is Grenache, else 0	02
ZNFDL	= 1 if the wine is Zinfandel, else 0	04
MRLT	= 1 if the wine is Merlot, else 0	23
PNNR	= 1 if the wine is Pinot Noir, else 0	04
MTSV	= 1 If Montepulciano Sangiovese, else 0	02
MLBC	= 1 if the wine is Malbec, else 0	02
CRMNR	= 1 if the wine is Carmenere, else 0	02
PNTG	= 1 if the wine is Pinotage else 0	04
MTPCN	= 1 if the wine is Montepulciano, else 0	04
CHNT	= 1 if the wine is Chianti, else 0	02
MRCB	= 1 if wine is Merlot + Cabernet, else 0	10
MROT	= 1 If wine is Merlot + Other, else 0	01
SHCB	= 1 if the wine is Shiraz + Cabernet, else 0	06
SHOT	= 1 if the wine is Shiraz + Other, else 0	02
CHRPN	= 1 if wine is Chardonnay + Pinot Noir, else 0	04
RSRV	= 1 if the wine is a Reserve, else 0	25
ALCHL	= Alcohol by Volume in wine, (% ABV) [Minimum 8% & Maximum 14.5%]	206

dummy. While the definition of a Reserve wine varies, it signifies that the wine has been aged for at least a few years and kept in oak barrels. For example, Spanish Reserva is a wine that must be aged for 3 years and the wine must be kept in oak barrels for at least 6 months during the 3-year period (Wine Folly, 2014). Similarly, on an aesthetic dimension, about 27 per cent of the wine bottles had a club shape rather than a cylindrical one. Among them there were 2 champagne SKUs as well. We retained the 2 champagne observations for the hedonic price regression to understand if part of their price premiums could be due to the shape of the bottles. Most of the attributes of such kind have been captured by dummy variables taking value 1 or 0. Moreover, alcohol in wines, measured as alcohol by volume (ABV) varied from 8 per cent to 14.5 per cent. Furthermore, price of wines ranged from Rs. 500 per bottle to as high as Rs. 8647 for Champagne. Among various regions, price of Indian brands varied from Rs. 500 to Rs. 1500; price of old-world wine brands from countries like France, Italy, Spain, and others varied from Rs. 1500 to Rs. 6000; and price of new-world wine brands from Chile, US, Argentina, Australia and others varied from Rs. 1250 to Rs. 5000. The way dummies are defined, the base dummy

observation turns out to be young (not reserve), non-sparkling, domestically produced, Indian white wine brand, stored in cylindrical bottle with non-cork closure, and made from mixed grape varieties.

5. Regression estimation and inferences

To choose the functional form for the hedonic price Eq. (7), a particular Box-Cox transformation of the variables is used for which the data fits well. Since all independent variables except ALCHL (alcohol content) are dummy variables taking values 1 or 0, transformations such as the Log-Log, Lin-Log, and first-differences could not be used. Exponential functional form fits the data best which can be described by the equation:

$$P_W = e^{[\beta_o + \sum_{K=1}^{33} \beta_K W_K]} \quad (8)$$

Converting the equation in its logarithmic form, one can estimate the following equation econometrically:

$$\ln P_W = \beta_0 + \sum_{1}^{33} \beta_K W_K \quad (9)$$

The above function is valid only for positive values of P_W, which makes sense as wine prices will always be positive. Here the coefficient β_K demonstrates a constant percentage change in P_W due to a unit change in the quality attribute W_K; i.e., $\beta_K = [(1/P_W)*(\delta P_W / \delta W_K)$. Moreover, the Constant term β_0 captures all other factors that potentially could affect the wine price and are not covered by the wine attributes we have captured in the equation.

We estimate Eq. (9) for the data described in Section 4, which consists of observations on 206 wines and 33 explanatory variables (W_K). The results of the estimation are reported in Table 2 below. We do not estimate Eq. (9) for Indian wines, old-world wines, new-world wines, and white or red wines separately, for Indian market has not matured enough to consider these categories as separate products. It is pertinent to know that while Chinese market is quite big today; a decade ago Chinese consumers had little knowledge of wines, most respondents did not know white wine, and they assumed that all wines were red wines (Liu and Murphy, 2007). A recent wine survey carried out in India also infers that Indian consumers do not yet have a refined knowledge about wines and their tastes; and, that they seem to be buying a wine in shop based on a combination of attributes such as price, brand, region of origin, alcohol content, shape, and type of bottle closure (Essays, 2017). The explanatory variables mentioned in Section 4 capture all the above attributes in the form of dummy variables and estimation of a single equation would bring out the relative importance of such attributes including whether or not market makes a statistically significant distinction between red wines and white wines. Importantly, although we have a comprehensive coverage of wine SKUs, the number of observations is still only 206. Therefore, removal of a substantial number of observations for separate estimation of equations based region and/or white or red wines would reduce degrees of freedom associated with the mean standard error of the estimated coefficients. We did check results for separate regressions on white and red wines though. The results were very similar to the integrated regression, however, statistical significance and tests were not that encouraging.

Table 2
Hedonic price regression estimation.

Variable	Coefficient Value	T-Statistics
Constant	5.502[a]	16.126
NWWB	0.782[a]	11.232
OWWB	0.988[a]	13.665
CHMP	1.002[a]	5.432
SPRK	0.079	0.654
RED	0.026	0.267
PINK	0.017	0.165
CLUB	0.167[b]	2.386
CORK	0.095[c]	1.933
CHBL	−0.131	−1.029
RSWH	0.194	0.856
VGNR	0.046	0.316
CHRDN	−0.098	−0.884
SVBL	−0.051	−0.461
CBSV	−0.158	−1.613
SNGV	0.153	1.343
SHIRZ	−0.051	−0.534
GRNCH	−0.489[b]	−2.348
ZNFDL	0.128	0.791
MRLT	−0.183[b]	−2.062
PNNR	0.332[b]	2.042
MTSV	−0.325	−1.580
MLBC	0.163	0.753
CRMNR	−0.333	−1.563
PNTG	−0.316[b]	−2.129
MTPCN	−0.290[c]	−1.890
CHNT	−0.002	−0.011
MRCB	0.216[c]	1.968
MROT	−0.117	−0.409
SHCB	−0.167	−1.213
SHOT	−0.060	0.286
CHRPN	0.203	−1.210
RSRV	0.188[a]	2.793
ALCHL	0.084[a]	3.430

[a]Significant at 0.01 two-tail test,
[b]significant at 0.05 two-tail test,
[c]significant at 0.10 two-tail test.

Multiple R^2 and the Adjusted R^2 of the regression are 0.783 and 0.741, respectively. The overall significance of all regression coefficients is confirmed with a high F-statistics value of 18.796. Also, the estimated χ^2 values of B-P-G and Glejser test were very low and not significant to reject the null hypothesis of homoscedasticity. Moreover, the independent dummy variables were tested for multicollinearity using Klein's rule and VIF. Auxiliary R^2 values for all the significant variables in the regression were lower than the overall R^2. Similarly, VIF values for the significant variables in the regression were much lower than the thumb rule VIF value of 10. Table 3 reports these regression diagnostics.

The estimated hedonic price equation throws up quite interesting inferences. The coefficients of variables associated

Table 3
Diagnostic tests for the regression.

Test	Method	Statistics
1. Goodness of Fit	Multiple R^2	00.783
	Multiple R^2_{Adj}	00.741
2. Overall Significance	F Statistics	18.796[a]
3. Homoscedasticity Test	B-P-G χ^2	00.851[b]
	Glejser χ^2	00.000[b]
4. Multicollinearity	Klein's Rule	00.716[c]
	VIF	03.515[d]

[a]Significant at 0.01 two tailed test,
[b]not significant at 0.01 and 0.05 two tailed test,
[c]highest auxiliary R^2 among significant variables in the regression is less than overall R^2,
[d]highest among significant variables in the regression and less than critical value of 10.

with old-world wine brands, new-world wine brands, champagne, reserve wines, and alcohol content show strong statistical significance at 1 per cent two-tail test. *Ceteris paribus*, in spatial equilibrium, an old-world wine brand carries an average premium of about 99 per cent over the base Indian wine of similar kind. This premium is about 21 percentage points more than the premium attached to the new-world wine brands. While Champagne carries a premium of 100 per cent, a Reserve wine seems to fetch 19 per cent premium over the young Indian base wine. Interestingly, *ceteris paribus*, each additional unit of (% ABV) of alcohol fetches a premium of about 8.4 per cent. Perhaps this goes to show that Indian consumers value higher alcohol content in wine. The premium on alcohol could have got affected by tax policy if government were to charge lower tax-rate on lower alcohol content. However, tax on wines is not linked to alcohol content. Sales tax on wines in the city of Mumbai, from where the wine data has been collected, is an ad valorem tax of 20 per cent on price, irrespective of level of alcohol content. In fact, 16 per cent of it is refunded to sellers by way of promotion (India Today, 2017). There is also no excise duty on wine manufacturing in the state of Maharashtra. Even the custom duty on imported wines is not linked to alcohol content. Therefore, there is no incentive to customers to choose lower alcohol wines on account of lower tax rate. The coefficient of the alcohol variable; therefore, captures purely the customers' premium for higher alcohol content.

We would also like to note that traditionally, Indians who consume liquor have been drinking whisky which has an alcohol content of at least 40 ABV. In comparison to that, alcohol content in most wines is about 16 ABV or less (Wine Folly, 2013). In this sense, wines have much less alcohol content. The ABV in the data we collected ranges from 8 to 14.5 with an average of 13. Among these, the average ABV for the 56 observations on Indian wines is also 13 and the alcohol content ranges from 10 ABV to 14 ABV. Thus, ABV is not relatively low in Indian wines as compared to the old world wines or the new world wines. What the regression coefficient captures is that wines sold in India may improve their return by increasing alcohol content. Of course, ABV cannot be raised too high, for wines in general do not have too high alcohol content as compared to whisky. In fact, hot and spicy Indian food may need to be paired with lower alcohol wines (Spices Inc, 2018). Therefore, while alcohol content can be increased somewhat to cater to existing consumer liking; over time, other attributes of wine including the need to pair-up spicy foods with lower ABV, it being a lifestyle drink, and a healthy option over other drinks can be promoted. And, in this context, firms may initiate branding exercise for their wines.

The coefficient for club-shaped bottles is strongly significant at 5 per cent two-tailed test. There is a premium of about 17 per cent for club-shaped bottles over cylindrical-shaped ones. Since Champagne is filled in club-shaped bottles, the effective premium for Champagne, therefore, would be 117 per cent. Let us consider the results with respect to wine-grape varieties. The coefficient for the red wine dummy is statistically very insignificant. This means that *ceteris paribus*, there does not seem to be any preference for red wine over white wine or *vice versa*. The 206 observations on wines contained 23 varieties of wine-grapes. The names of these wine-grape varieties were clearly mentioned on the labels of wine bottles. Except for a few red wine-grape varieties, coefficients of most of the wine-grape varieties was statistically insignificant. The red wines Pinot Noir and Merlot-Cabernet do seem to enjoy a premium of 33 per cent and 22 per cent at 5 per cent two-tailed and 10 per cent two-tailed test, respectively. For the Grenache variety there is a negative premium of 49 per cent at 5 per cent significance level, two-tailed test. Similarly, Pinotage and Merlot also have a negative premium of 32 per cent and 18 per cent at 5 per cent significance level, two-tailed test. Neither any of the white wine grape-varieties nor any other wine with blend of 2 wine-grapes showed any statistically significant premium.

A wine with cork closure showed a premium of about 9.5 per cent over a wine with other forms of closure such as a screw-on cap at 10 per cent significance level, two-tailed test. While collecting the data, we could only figure out whether or not the sealed closures are of cork or screw-on cap. However, we could not identify whether or not the corks were real or synthetic. The same would be true of an Indian wine consumer. Even with repeat-purchase phenomenon, Indian wine consumer may not necessarily make out the difference between synthetic and real cork. Therefore, the 9.5 per cent premium captures only the 'perceived' premium attached to cork closure by an Indian consumer.

6. Concluding observations

Wine was not a taboo in ancient India; however, it received discouragement during the medieval times leading up to post-independence era. Today, however, barring a few states in India, consumption of wine is not discouraged. In fact, to promote employment and farmers' income, states like Maharashtra have given excise duty exemption to wineries. Wineries are also ensuring sustainable livelihood to farmers by way of

10-year assured buyback contracts (BS, 2017). From the demand side as well, with the prospect of continued rapid GDP growth, burgeoning metropolitan population, globalization, and the consequent changes in lifestyle; demand for wines has been increasing and the trend would continue in the future. In this context, it becomes imperative to know the premiums attached to different wines and their attributes resulting from selections made by producers and consumers in the wine market. For this purpose, we employed the hedonic price analysis methodology to Indian data. The idea is that repeat purchase mechanism and spatial equilibrium in a monopolistically competitive wine market would reveal importance attached to various wine attributes at this time, giving cues both to producers and consumers on what new wines they could produce or consume, and, what new information about quality attributes of wines needs to be conveyed and understood.

Our study shows that there is distinct and significant premium to old-world and new-world wines, in that order, as compared to Indian wine brands. High customs duty cannot be the culprit for the premium, for India allows 100 per cent FDI in wineries, and, importantly, customs duty also offers protection to domestic brands to raise their prices. In the absence of high customs duty, while prices may get lower in general, the relative premium to foreign brands will remain. If Indian brands are to become popular, brand building exercise will have to be strengthened. For example, Sula Wines promotes wine tourism by organizing Sula Fest in its wineries. Its on-farm use of solar power also gets highlighted as a sustainable farming practice. While a substantive overall premium for Champagne was expected, part of the premium is related to the club-shape of the Champagne bottle, for we find a premium for club-shaped wine bottles as compared to cylindrical ones.

While alcohol content in wine is always much lower than that in other liquors such as whisky (Wine Folly, 2013), we see a premium attached to higher alcohol content of wines. Perhaps the culture of drinking high-alcohol whisky spills over to wines as well. But then, while whiskies are not necessarily paired with meals, wines are! In fact, Indians eat relatively spicy and hot foods compared to consumers in the West. And, therefore, they may want to pair their meals with low alcohol wines which do not accentuate the heat of the spicy food. Therefore, while alcohol content can be increased somewhat to cater to existing consumer liking; over time, other attributes of wine including the need to pair-up spicy foods with lower ABV, it being a lifestyle drink, and a healthy option over other drinks can be promoted. And, in this context, firms may have an opportunity to initiate branding exercise for their wines. Spicy foods also make tannins in wines more pronounced giving it a bitter taste. Therefore, one may avoid cabernet blends of red wines which are high in tannins. Similarly, a tad sweeter dry wines help offset the meals that are too hot and spicy. Consumer awareness campaigns on the above mentioned issues may have to be initiated in the nascent Indian market (Spices Inc, 2018).

Our analysis also shows that there is no premium for red wine in general over white wine or *vice versa*. If the perceived health benefits of red wine (Catalgol et al., 2012; Higgins and Llanos, 2015) are to be believed, *ceteris paribus*, one would have expected some premium for red wines in the market. If at all brands would like to convey this message, perhaps they have not been successful. For all wines, names of wine-grapes are clearly mentioned on the labels of wine bottles. However, except for a few red wine grape-varieties we did not find any premium to most of the grape-varieties. Therefore, grape-varieties in general do not seem to impact wine selection and price of wines. In the nascent Indian market, as an extension activity, perhaps consumers need to be informed about specific quality attributes of different wine-grape varieties.

7. Limitations and future scope

Ours is the first exploratory econometric study with an application of hedonic price analysis to the Indian wine market. It gives broad market-driven signals about the importance of wine attributes in the nascent Indian market. The fact that the constant term in the regression equation was statistically significant shows that there are other factors than those captured in the study that also influence premiums attached to wines. For example, one of the dummy variables captures only the perceived premium for cork closure over screw-on cap, for the variable is silent on whether or not the cork is real or synthetic. While we use many explanatory variables in the estimation of hedonic price equation, most of the variables are dummy variables except the one that captures alcohol content. In this, we are constrained by the fact that in the nascent Indian market, decisions are mostly made by extrinsic factors that are apparent on the wine bottle; such as shape, closure, region of origin, reserve, wine varieties, etcetera; which can be captured by dummy variables. Our data collection was based on the idea of spatial equilibrium in wine prices at a given instance, and the sample size was constrained by the limited variety and data availability at this juncture of the Indian market.

However, there is a scope to build on this study as the market matures and more data become available. Hopefully, in the near future, scanner data from retail stores could be had which can elicit customer backgrounds and their preferences better. Of course, if the taste of the pudding is in the eating, the ultimate test of the wine is in the drinking. There is a good scope, both for increasing consumer awareness about wines and grape-varieties; and conducting organoleptic and contingent valuation studies on consumer choices.

Acknowledgements

We would like to thank the two anonymous reviewers for devoting their time and making valuable suggestions to the earlier draft of this manuscript.

References

Agnoli, L., Capitello, R., Begalli, D., 2016. Behind intention and behaviour: factors influencing wine consumption in a novice market. Br. Food J. 118 (3), 660–678.

Anderson, K., Wittwer, G, 2016. Evolving consumption patterns and free trade agreements: Impacts on global wine markets by 2020. Working Paper No. 0116 ISSN 1837-9397, Wine Economics Research Centre, The University of Adelaide.

Angulo, A.M., Gil, J.M., Garcia, A., Sanchez, M., 2000. Hedonic prices for Spanish quality wine. Br. Food J. 102 (7), 481–493.

Barks, C., 1995. Constant Conversation. Translated Poem in The Essential Rumi. HarperCollins, New York, NY, 94.

Bombrun, H., Sumner, D., 2001. What determines the price of wine?. AIC Issues Brief 18, 1–6.

Bose, D., 1922. Wine in Ancient India, 20. K.M. Connor & Co, Calcutta, 24.

BS, 2017. High output, demand from wine industry to ring in good times for grape farmers. Article in Business Standard (BS), 17th February. Available at: (⟨https://www.business-standard.com/article/companies/high-output-demand-from-wine-industry-to-ring-in-good-times-for-grape-farmers-116021700276_1.html⟩) (Accessed 6 August 2018).

Camillo, A., 2012. A strategic investigation of the determinants of wine consumption in China. Int. J. Wine Bus. Res. 24 (1), 68–92.

Catalgol, B., Batirel, S., Taga, Y., Ozer, N., 2012. Resveratrol: french paradox revisited. Front. Pharmacol. 3, 141.

Chamberlin, E., 1965. The Theory of Monopolistic Competition: A Re-orientation of the Theory of Value 8th ed Harvard University Press, MA (originally published in 1933).

CID, 2017. The Atlas of Economic Complexity. Centre for International Development (CID) at Harvard University. Available at: ⟨(http://atlas.cid.harvard.edu/explore/?Country=104&partner=undefined&product=833&productClass=HS&startYear=undefined&target=Product&year=2016⟩) (Accessed 15 February 2018).

Corduas, M., Cinquanta, L., Ievoli, C., 2012. The importance of wine attributes for purchase decisions: a study of Italian consumers perception. Food Qual. Prefer. 28 (2), 407–418.

Costanigro, M., McCluskey, J.J., Goemans, C., 2010. The economics of nested names: name specificity, reputations, and price premia. Am. J. Agric. Econ. 92 (5), 1339–1350.

Cross, R., Plantinga, A.J., Stavins, R.N., 2011. What is the value of terroir?. Am. Econ. Rev. 101 (3), 152–156.

Cross, R., Plantinga, A.J., Stavins, R.N., 2017. Terroir in the new world: hedonic estimation of vineyard sale prices in California. J. Wine Econ. 12 (3), 282–301.

Essays, U., 2017. Consumer behaviour: Indian wine. Available at: (⟨https://www.ukessays.com/essays/marketing/consumer-behaviour-indian-wine-consumers-marketing-essay.php?Vref=1⟩) (Accessed 5 August 2018).

Estrella Orrego, M.J., Defrancesco, E., Gennari, A., 2012. The wine hedonic price models in the 'Old and New World': state of the art. Revista de la Facultad de Ciencias Agrarias, UNCuyo. 44(1), pp. 205–220.

ET, 2009. Diageo to exit wine market, focus on vodka & whisky biz, Article in Econimic Times (ET) , 16th July. Available at: (⟨https://economictimes.indiatimes.com/industry/cons-products/liquor/diageo-to-exit-wine-market-focus-on-vodka-whisky-biz/articleshow/4781843.cms⟩) (Accessed 8 May 2018).

Export Genius, 2017. Wine Import in India – Data Analysis of Indian Wine Market of Q2 2017. Available at: (⟨http://www.exportgenius.in/blog/wine-import-in-india-data-analysis-of-indian-wine-market-of-q2-2017-84.php⟩) (Accessed 11 November 2017).

Fensterseifer, J.E., 2007. The emerging Brazilian wine industry: challenges and prospects for the Serra Gau´cha wine cluster. Int. J. Wine Bus. Res. 19 (3), 187–206.

Ferro, G., Benito Amaro, I., 2018. What factors explain the price of top quality wines?. Int. J. Wine Bus. Res. 30 (1), 117–134.

Gawande, S., Shukla, P., Mishra, A., 2017. Study on wine policies, regulations and standards in Maharashtra, India. Sci., Technol. Public Policy 1 (2), 12–22 (Available at) ⟨(http://article.sciencepublishinggroup.com/pdf/10.11648.j.stpp.20170101.12.pdf)⟩.

Gergaud, O., Ginsburgh, V., 2010. Natural endowments, production technologies and the quality of wines in Bordeaux. Does terroir matter?. Econ. J. 118 (June), F142–F157.

Gergaud, O., Livat, F., 2007. How do consumers use signals to assess quality? American Association of Wine Economists Working Paper, 3, pp. 1–22.

Gil, J.M., Sánchez, M., 1997. Consumer preferences for wine attributes: a conjoint approach. Br. Food J. 9 (1), 3–11.

GOI, 1949. Article 47, Part IV (Directive Principles of State Policy), Constitution of India, 23. Available at: (⟨http://lawmin.nic.in/olwing/coi/coi-english/coi-4March2016.pdf⟩) (Accessed 31 October 2017).

Gryphon, 2017. History of wine in India. Available at: (⟨http://www.gryphonbrands.com/history_wine.htm⟩) (Accessed 11 November 2017).

Hall, D., 2016. Exploring wine knowledge, aesthetics and ephemerality: clustering consumers. Int. J. Wine Bus. Res. 28 (2), 134–153.

Higgins, L.M., Llanos, E., 2015. A healthy indulgence? Wine consumers and the health benefits of wine. Wine Econ. Policy 4, 3–11.

Holland, S., 2017. India Wine Insider: The Consumer Outlook, Available at: ⟨http://www.sonalholland.com/india-wine-insider.pdf⟩ (Accessed 11 November 2017).

Holland, S., 2017. India wine insider: The consumer outlook, Available at: ⟨http://www.sonalholland.com/india-wine-insider.pdf⟩ (Accessed 11 November 2017).

Hollebeek, L.D., Jaeger, S.R., Brodie, R.J., Balemi, A., 2007. The influence of involvement on purchase intention for new world wine. Food Qual. Prefer. 18, 1033–1049.

IE, 2010. Drink to That. Available at: ⟨https://indianexpress.com/article/news-archive/web/drink-to-that/⟩ (Accessed 13 September 2018).

ILO, 2009. Indian Wine Industry, Industry Reports, Delhi: India Law Offices (ILO), Available at: ⟨http://www.indialawoffices.com/ilo_pdf/industry-reports/wineindustry.pdf⟩ (Accessed 11 November 2017).

India Today, 2017. Cheerless in Nashik, article issued on 6th March in India Today. Available at: ⟨https://www.indiatoday.in/magazine/states/story/20170306-maharashtra-devendra-fadnavis-withdraw-tax-exemptions-wine-industry-india-985857-2017-02-27⟩ (Accessed 9 January 2019).

JBC, 2008. Comprehensive Study of Indian Wine Market. JBC International, Washington D.C. (Available at) ⟨http://www.indianwineacademy.com/comprehensive_study_iwm.pdf⟩.

Jiao, L., 2017. Macroeconomic determinants of wine prices. Int. J. Wine Bus. Res. 29 (3), 234–250.

Johnson, R., Bruwer, J., 2007. Regional brand image and perceived wine quality: the consumer perspective. Int. J. Wine Bus. Res. 19 (4), 276–297.

Kangle, R., 1972. The Kautiliya Arthasastra 1st edition Motilal Banarsidas, Delhi, 155.

Kelley, K., Hyde, J., Bruwer, J., 2015. US wine consumer preferences for bottle characteristics, back label extrinsic cues and wine composition: a conjoint analysis. Asia Pac. J. Mark. Logist. 27 (4), 516–534.

Kontkanen, D., Reynolds, A.G., Cliff, M.A., King, M., 2005. Canadian terroir: sensory characterization of Bordeaux-style red wine varieties in the Niagara Peninsula. Food Res. Int. 38 (4), 417–425.

Liu, F., Murphy, J., 2007. A qualitative study of Chinese wine consumption and purchasing: implications for Australian wines. Int. J. Wine Bus. Res. 19 (2), 98–113.

Lockshin, L., Corsi, A., 2012. Consumer behaviour for wine 2.0: a review since 2003 and future directions. Wine Econ. Policy 1, 2–23.

Lockshin, L., Wade, J., d'Hauteville, F., Perrouty, J.P., 2006. Using simulations from discrete choice experiments to measure consumer sensitivity to brand, region, price, and awards in wine choice. Food Qual. Prefer. 17 (3–4), 166–178.

Lockshin, L., Mueller, S., Louviere, J., Francis, L., Osidacz, P., 2009. Development of a new method to measure how consumers choose wine. Aust. N. Z. Wine Ind. J. 24 (2), 37–42.

Lockshin, L., Corsi, A.M., Cohen, J., Lee, R., Williamson, P., 2017. West versus East: measuring the development of Chinese wine preferences. Food Qual. Prefer. 56, 256–265.

Mookerji, R., 1966. Chandragupta Maurya and His Times 4th edition Motilal Banarsidass, Delhi, 119.

Mtimet, N., Albisu, L.M., 2006. Spanish wine consumer behavior: a choice experiment approach. Agribusiness 22 (3), 343–362.

Mueller, S., Szolnoki, G., 2010. The relative influence of packaging, labelling, branding and sensory attributes on liking and purchase intent: consumers differ in their responsiveness. Food Qual. Prefer. 21, 774–783.

Nallaperuma, K., Bandyopadhyay, A., Lockshin, L., 2017. A comparative analysis of experts' and consumers' perceptions of regionality in Australian wine purchase decisions. J. Wine Res. 28 (3), 194–215.

Nunes, F., Madureira, T., Oliveira, J.V., Madureira, H., 2016. The consumer trail: applying best-worst scaling to classical wine attributes. Wine Econ. Policy 5 (2), 78–86.

NVWCT , 2016. The six steps of wine tasting: See, swirl, sniff, sip, swish and …. Article by Napa Valley Wine Country Tours (NVWCT). Available at: ⟨http://www.winecountrylimos.com/blog/six-steps-wine-tasting-see-swirl-sniff-sip-swish/⟩ (Accessed 24 July 2018).

Oczkowski, E., Doucouliagos, H., 2015. Wine prices and quality ratings: a meta-regression analysis. Am. J. Agric. Econ. 97 (1), 103–121.

Perrouty, J.P., d'Hauteville, F., Lockshin, L., 2006. The influence of wine attributes on region of origin equity: an analysis of the moderating effect of consumer's perceived expertise. Agribusiness 22 (3), 323–341.

Pillai, S., 1997. Indian Society Through Ghurye: A Dictionary. Popular Prakashan, Mumbai, 369.

Prata-Sena, M., Castro-Carvalho, B.M., Nunes, S., Amaral, B., Silva, P., 2018. The terroir of Port wine: two hundred and sixty years of history. Food Chem..

Roberto Luppe, M., Lopes Fávero, L.P., Prado Belfiore, P., 2009. Hedonic pricing models and the evaluation of attributes: the case of wines from Brazil, Argentina and Chile. Esic-Mark. 134, 27–47.

Robertson, J., Ferreira, C., Botha, E., 2018. The influence of product knowledge on the relative importance of extrinsic product attributes of wine. J. Wine Res. 29 (3), 159–176.

Rosen, S., 1974. Hedonic prices and implicit markets: product differentiation in pure competition. J. Political Econ. 82, 34–55.

Schamel, G., Gabbert, S., von Witzke, H, 1998. Wine quality and price: A hedonic approach. In: Daniel Pick (Ed.), Global Markets for Processed Foods: Theoretical and Practical Issues. Westview Press, Boulder, Colorado, pp. 211–221.

Sellers-Rubio, R., Sottini, V., Menghini, S., 2016. Productivity growth in the winery sector: evidence from Italy and Spain. Int. J. Wine Bus. Res. 28 (1), 59–75.

Shane, E., Murad, M.W., Freeman, S., 2018. Factors influencing price premiums of Australian wine in the UK market. Int. J. Wine Bus. Res. 30 (1), 96–116.

Sillani, S., Miccoli, A., Nassivera, F., 2017. Different preferences for wine communication. Wine Econ. Policy 6 (1), 28–39.

Singh, S., Srivastav, P., 2018. Sula wines: a foray into uncharted territory. South Asian J. Bus. Manag. Cases 7 (1), 11–20.

Spices Inc, 2018. Pairing Wine with Spicy Food, access. Available at: ⟨https://www.spicesinc.com/p-517-pairing-wine-with-spicy-food.aspx⟩ (Accessed on 12 September 2018).

Statista, 2017. Wine, India, Market Directory. Available at: (⟨https://www.statista.com/outlook/10030000/119/wine/india⟩) (Accessed 12 September 2018).

Tang, V.C.M., Chetchik, A.T., Cohen, E., 2015. Perception of wine labels by Hong Kong Chinese consumers. Wine Econ. Policy 4, 12–21.

TOI, 2016. Association wants GST cover for wine. Article in Times of India (TOI), 5th August. Available at: (⟨https://timesofindia.indiatimes.com/city/nashik/Association-wants-GST-cover-for-wine/articleshow/53552792.cms⟩) (Accessed 11 November 2017).

UN, 2015. World population prospects: The 2015 Revision, 4, Available at: ⟨(https://esa.un.org/unpd/wpp/publications/files/key_findings_wpp_2015.pdf⟩) (Accessed 16 February 2018).

Vecchio, R., 2013. Determinants of willingness-to-pay for sustainable wine: evidence from experimental auctions. Wine Econ. Policy 2 (2), 85–92.

Vidal, F., Pastor, J.T., Borrás, F., Pastor, D., 2013. Efficiency analysis of the designations of origin in the Spanish wine sector. Span. J. Agric. Res. 11 (2), 294–304.

WI, 2017. World Statistics, accessed from Wine Institute (WI) site Available at: ⟨http://www.wineinstitute.org/resources/statistics⟩ (Accessed 12 November 2017).

Wine Folly, 2013. Älcohol Content in Wine and Other Drinks, 23 December. Available at (⟨https://winefolly.com/tutorial/alcohol-content-in-wine/⟩), (Accessed on 9 January 2019).

Wine Folly, 2014. What is a reserve wine? Well, that depends. Available at: (⟨http://winefolly.com/tutorial/reserve-wine-well-depends⟩), (Accessed on 29 March 2018).

World Bank, 2018. Global outlook, Ch. 1, p. 4, Global Economic Prospects, Available at: (⟨http://pubdocs.worldbank.org/en/799661512062615376/Global-Economic-Prospects-Jan-2018-Regional-Overview-SAR.pdf⟩) (Accessed 9 April 2018).

Yu, Y., Sun, H., Goodman, S., Chen, S., Ma, H., 2009. Chinese choices: a survey of wine consumers in Beijing. Int. J. Wine Bus. Res. 21, 155–168.

Zelený, J., 2017. A relationship between price and quality rating of wines from the Czech Republic. J. Int. Food Agribus. Mark. 29 (2), 109–119.