

**Factors influencing the purchase behaviour of consumers for
organic wine: An analysis of household panel data**

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Declaration of originality

This dissertation contains four scientific articles written by me as the first author. All articles have been submitted to peer-reviewed journals, all listed in Thomson Reuters Web of Science:

1. Schäufele, I. and Hamm, U. (2017), “Consumers’ perceptions, preferences and willingness-to-pay for wine with sustainability characteristics: A review”, *Journal of Cleaner Production*, Vol. 147, pp. 379–394.
2. Schäufele, I., Pashkova, D. and Hamm, U., “Which consumers opt for organic wine and why? An analysis of the attitude-behaviour link”, submitted to *British Food Journal*, first upload: 05/03/2018, second after major revisions: 25/04/2018.
3. Schäufele, I. and Hamm, U. (2018), “Organic wine purchase behaviour in Germany: Exploring the attitude-behaviour-gap with data from a household panel”, *Food Quality and Preference*, Vol. 63, pp. 1–11.
4. Schäufele, I. and Hamm, U., “Wine consumers’ reaction to prices and organic labels at the point of sale. An analysis of household panel data” submitted to a scientific journal.

The present dissertation is based on empirical research carried out within the project “Demand analysis of organic wine” funded by the Federal Office for Agriculture and Food (BLE) within the framework of the Federal Programme for Organic Agriculture and Other Forms of Sustainable Agriculture (BÖLN). The data basis (household panel data) for the project was provided by the GfK Verein. Prof. Dr. Ulrich Hamm was the project leader and provided feedback and advice at all stages of the research process. The project idea was developed by both of us. I developed the research approach and carried out the data analysis.

Apart from the journal articles listed above, the following publications and presentations were based on selected results of the dissertation:

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6. Schäufele, I. and Hamm, U. (2017), “Analysis of the real purchase behaviour of organic wine consumers”, in Rahmann, G., Andres, C., Yadav, A.K., Babalad, H.B., Devakumar, N., Goel, S.L., Olowe, V., Ravisankar, N., Saini, J.P., Soto, G. and Willer, H. (Eds.), *Innovative Research for Organic 3.0*, pp. 658–661.
7. Schäufele, I. and Hamm, U. (2017), “Einstellungen und Präferenzen deutscher Öko-Weinkonsumenten”, in Wolfrum, S., Heuwinkel, H., Reents, H.J., Wiesinger, K. and Hülsbergen, K.J. (Eds.), *Ökologischer Landbau weiterdenken - Verantwortung übernehmen, Vertrauen stärken*, Dr. Köster, Berlin, pp. 704–707.
8. Schäufele, I. and Hamm, U. (2017), “Einstellungen und Präferenzen deutscher Öko-Weinkonsumenten”, presentation at *14. Wissenschaftstagung Ökologischer Landbau*, Freising, Germany, 09/03/2017.
9. Schäufele, I. and Hamm, U. (2017), “Kaufverhalten und Verbrauchereinstellungen für Bio-Wein”, in Bund Ökologische Lebensmittelwirtschaft e.V. (Ed.), *Die Bio-Branche 2017: Zahlen, Daten, Fakten*, published as well in: *Agra-Europe*, 2017, Vol. 7, Dokumentation 23–24, pp. 26–27.
10. Schäufele, I. and Hamm, U. (2017), “Wine consumers’ attitudes towards sustainability cues and their real purchase behaviour – Data from a household panel”, in *Proceedings of the 11th conference of the American Association of Wine Economists in Padua*.
11. Schäufele, I. and Hamm, U. (2017), “Wine consumers’ attitudes towards sustainability cues and their real purchase behaviour – Data from a household panel”, presentation at the *11th Annual American Association of Wine Economists Conference*, Padua, Italy, 30/06/2017.

12. Schäufele, I. and Hamm, U. (2018), “Nachfrageanalyse Öko-Wein. Abschlussbericht zum gleichnamigen Forschungsprojekt im Rahmen des Bundesprogramms ökologischer Landbau und anderer Formen nachhaltiger Landwirtschaft. Universität Kassel”, available at: <http://orgprints.org/32644/>.
13. Schäufele, I. and Hamm, U. (2018), “Quality cue or budget constraint? The role of price for purchase decisions towards organic wine investigated with real market data”, presentation at the *12th International European Forum (163rd European Association of Agricultural Economists Seminar) on System Dynamics and Innovations in Food Networks*, Innsbruck-Igls, Austria, 06/02/2018.

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List of abbreviations

AAEA	Agricultural and Applied Economics Association
AAWE	American Association of Wine Economists
ABC	Attitude-Behaviour-Context
ANOVA	Analysis of variance
BLE	Bundesanstalt für Landwirtschaft und Ernährung (Federal Office for Agriculture and Food)
BMEL	Bundesministerium für Ernährung und Landwirtschaft (Federal Ministry of Food and Agriculture)
BÖLN	Bundesprogramm Ökologischer Landbau und andere Formen nachhaltiger Landwirtschaft (Federal Programme for Ecological Farming and Other Forms of Sustainable Agriculture)
CSR	Corporate social responsibility
EAAE	European Association of Agricultural Economists
EAN	European Article Number
GfK	Gesellschaft für Konsumforschung
GGOFF	Generalized Goodness-of-functional Form
GI	Geographical Indication
GLM	Generalized Linear Model
KMO	Kaiser-Meyer-Olkin
LM	Lagrange multiplier
MSA	Measure of sampling adequacy
NEP	New Ecological Paradigm
OECD	Organisation for Economic Co-operation and Development
OIV	International Organisation of Vine and Wine
PCA	Principal component factor analysis
PDO	Protected Designation of Origin
PGI	Protected Geographical Indication
SOR	Stimulus-Organism-Response

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TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
U.S.D.A.	U.S. Department of Agriculture
VBN	Value-Belief-Norm
WTP	Willingness-to-pay

1 Introduction

1.1 Problem statement

The organic wine market is rapidly expanding. Since 2004, the world's organic grape-growing area has increased four-fold and reached 379,555 ha in 2016 which amounts to a share of 5.3 % of the world's grape-growing area. By far the greatest part of the organic grape growing area (86 %) lies in Europe. Spain and Italy are the largest organic grape producing countries, each with more than 100,000 ha and high organic shares (Spain: 12 %; Italy: 16 %). In Germany, the organic grape growing area is comparatively small (8,000 ha) (Lernoud and Willer, 2018).

At the same time, Germany is the most important wine-importing country in the world (International Organisation of Vine and Wine, 2017) and also the world's leading importer of organic wine, mainly from Spain and Italy (Dejas and Hofmann, 2013). A significant growth of organic wine imports from Spain and Italy is expected in the coming years due to large organic land conversion rates of more than 30 % in 2016 (Lernoud and Willer, 2018). Finally, Germany is also the market leader for organic food and beverages in Europe (Sahota, 2018). Therefore, Germany is a highly interesting country for a deeper analysis of the organic wine market.

While a lot is known about the development of the organic grape growing area, market data on production volume and retail sales is scarce (Willer, 2014). Moreover, there are no official statistics on organic wine consumption. Most research on organic wine purchase behaviour is still based on surveys rather than on actual market data. For Germany, recent survey data show that 26 % of wine consumers buy organic wine, however, only 3 to 4 % do so on a regular basis. Organic wine consumers differ significantly from non-organic wine buyers: they consume wine more regularly, have a higher wine knowledge, income and formal education (Szolnoki and Pabst, 2017). However, surveys are based on consumers' self-reports of food purchases and therefore are often biased and tend to overestimate organic food consumption (Buder, 2011). Hence, it is important to analyse real purchase data in order to check the validity of the existing survey results.

Studies on purchase behaviour for organic wine further revealed a specific preference for local German wine and for direct sellers, i.e. wineries, cooperatives and wine cellars (Hoffmann and Szolnoki, 2010; Janssen *et al.*, 2012). These results are in line with consumers' general preference for organic food of local origin (Hempel and Hamm, 2016) and indicate that German wine producers might profit from organic production. However, the current reality of the wine

market seems to suggest the opposite. High organic import ratios show that consumers' stated preferences in surveys differ from their real purchase behaviour. This points to the existence of an attitude-behaviour gap, i.e. people state that they desire local, organic, environmentally friendly or socially fair products but they do not act accordingly (Auger and Devinney, 2007; Carrington *et al.*, 2010).

Consumers' wine choice is usually based on origin (e.g. Defrancesco *et al.*, 2012), grape variety (e.g. Gustafson *et al.*, 2016) and price (e.g. Panzone, 2014). In earlier studies, many authors therefore questioned the importance of the organic label when it comes to wine choice (Bazoche *et al.*, 2008; Delmas and Grant, 2008; Mann *et al.*, 2012). The reasons were often attributed to organic wine's negative quality image (Delmas and Grant, 2008; Mann *et al.*, 2012; Stolz and Schmid, 2008) or to the price barrier, i.e. the organic price premium (Bernabéu *et al.*, 2008; Chiodo *et al.*, 2011; Mann *et al.*, 2012). In more recent studies, however, the organic label is perceived as a sign of quality and consumers actually seem to be willing to pay price premiums (Pagliarini *et al.*, 2013; Wiedmann *et al.*, 2014). Recent results thus call into question the findings and conclusions of earlier studies on the low relevance of organic production for the choice of wine or at least suggest that these may no longer hold true.

When analysing consumers' purchase behaviour for organic wine, the general shift of the wine industry towards more sustainable production methods needs to be recognised. Various sustainability approaches have been developed over the past years such as voluntary standards (e.g. organic, fair-trade), national programs (e.g. California Sustainable Winegrowing) and programs in local areas or by groups of winegrowers (e.g. VIVA Sustainable Wine) (Mariani and Vastola, 2015). Even though the certification scheme of organic agricultural production covers just the environmental pillar – not the social or economic ones – consumers regard organic wine as a sustainable alternative (Wegmann, 2015) and expect that organic producers fulfil requirements concerning social and environmental responsibility (Mueller Loose and Remaud, 2013). The issue of sustainability is highly relevant for the present thesis, in particular because whether or not consumers will purchase organic wine depends on how they perceive the efforts of the producer regarding sustainability (Bonn *et al.*, 2016). A recent study on German wine consumers found a sustainability-oriented consumer segment (29.5 % of wine consumers in Germany). This segment consumes wine more often, is willing to pay higher prices, have higher incomes and belong to the older age group (Klohr, 2017).

The problem statement demonstrates that in light of

- i. the growing international competition in the German organic wine market,
- ii. the lack of consumer studies based on actual market data,
- iii. the evidence for an attitude-behaviour gap,
- iv. the ongoing debate on the relevance of the organic label for the choice of wine and
- v. the ongoing international sustainability movement in the wine industry,

a need to analyse the German organic wine market on the basis of consumers' actual purchase data is evident.

1.2 Research objectives

The overall aim of the dissertation is to investigate factors affecting consumers' real purchase behaviour for organic wine. On the basis of the analysis, recommendations for stakeholders of the German wine market shall be given on how to develop the market for organic wine through targeted marketing actions. To these ends, the study attempts to answer the following specific research questions:

1) Do wine consumers prefer organic production? To answer this question the dissertation intends

- a) to reveal the extent to which attitudes towards organic agriculture and other sustainable production methods affect real purchase behaviour for organic wine and to what extent an attitude-behaviour gap exists,
- b) to assess the value consumers assign to organic (vs. conventional) production and
- c) to figure out if local/domestic production is seen as an additional benefit by organic wine consumers.

2) What are potential factors that might hinder the purchase of organic wine and the translation of attitudes into behaviour? To answer this question the dissertation intends

- a) to examine socio-demographic characteristics that influence the purchase of organic wine and
- b) to identify the extent to which prices and price promotions influence purchase behaviour for organic wine.

1.3 Data basis

The data basis for the thesis at hand was provided by the market research institute GfK (Gesellschaft für Konsumforschung) and is drawn from the household panel survey *ConsumerScan*. About 30,000 German private households participated in this survey. The data set comprises information on consumers' actual food purchases combined with an annual survey which includes attitudinal statements and socio-demographics. The data set therefore contains all the necessary parameters required to answer the research questions on the basis of real purchase data. The following sections describe the advantages and challenges of working with household panels in general and the GfK data set in particular.

Achieving a representative sample of private households in Germany is the basic requirement for the GfK household panel. Purely random sampling is not feasible because 95 % of contacted households refuse to participate in the panel. Therefore, proportional quota sampling with the following quota characteristics is applied: region, household size, number of children under the age of 15, age of the head of household and occupational group of the main earner. Nevertheless, as many random elements as possible are applied within data collection. For example, sampling points (regional entities) are collected through stratified sampling (Günther *et al.*, 2006; Kuß *et al.*, 2014).

A huge advantage of panel data compared to cross-sectional data is the possibility to observe changes in purchase behaviour over a certain period of time. Therefore, it is important to hold the panel constant with regard to the above mentioned household characteristics. This cannot be fully achieved in reality since households leave the panel for many reasons, for example, death, moving to another country or high perceived work effort. This "loss" is referred to as panel mortality. Households which drop out need to be replaced by households of the same structure. For reasons of reliability the constant data pool which is used for the present thesis only consists of households which report constantly over a defined period (for example, 12 months) (Kuß *et al.*, 2014).

Participating households are provided with a scanner device to constantly record purchases of fast moving consumer goods. This is done either through the scan of EAN (European Article Number) codes on the product itself or – for non-coded products – through a code book. This means that, compared to retail panels, theoretically all stores used for shopping are covered in the household panel including direct purchases, organic stores or specialised shops. However, as the panel focuses on private households in Germany, wine purchases in restaurants, bars or

hotels, i.e. out-of-home consumption, as well as retail purchases of tourists or public institutions are not considered (Kuß *et al.*, 2014).

The present study focused on households who bought wine at least once in the period between December 2014 and November 2015. This data set contained the latest available data at delivery.

1.4 Research approach

A multi-stage research design that combines exploratory, causal and descriptive research approaches (Wrenn *et al.*, 2002) was applied in order to find answers to the research questions of the thesis while considering the given characteristics of the household panel data set. Four consecutive research studies were carried out. First, an exploratory literature review was conducted to generate insights and ideas as a starting point for the household panel data analyses (see section 3.1). The subsequent research studies were of a causal and descriptive nature. The second research study analysed causal relations between attitudes, socio-demographics and behaviour through multivariate regression analyses (see section 3.2). Following this, a descriptive approach was applied to identify consumer segments relevant for the marketing of organic wine (see section 3.3). Finally, two regression based analyses were conducted to figure out the causal effect of organic labels and prices on the purchase of wine (see section 3.4). In the following, the concrete procedure of the research approach is presented. The details of the data analysis are presented later on in each of the results sections.

A systematic and comprehensive review of the literature on consumers' perceptions, preferences and willingness-to-pay for wine with sustainability characteristics provided the basis for this research. The focus was laid on the global topic of sustainability due to the fact that various sustainability programs and labels have been developed over the past years which compete with the organic certification system for consumers' attention. The aim of the review was to determine the state of the art and to uncover research gaps for the empirical analyses (see section 3.1).

In a second step, households' budget share for organic wine was used as target variable in order to draw conclusions on wine consumers' preferences for organic wine and their real purchase behaviour (research question 1a). The causal effect of attitudes towards organic, sustainable, environmentally friendly and local food on households' organic wine budget share was examined through a multiple regression analysis to figure out if stated preferences are predictors of actual purchase behaviour. Socio-demographic characteristics were then added to the model

to elicit the characteristics of wine consumers and factors that may hinder the purchase of organic wine (research question 2a detailed in results section 3.2).

Next, a cluster analysis was conducted to identify consumer segments based on their attitudes towards the consumption of organic, sustainable, environmentally friendly and local food. The wine purchase behaviour of the different clusters was examined to figure out if attitudes are in line with purchase behaviour and to draw conclusions on a potential attitude-behaviour gap (research question 1a). In addition, socio-demographic characteristics for each cluster were described (see section 3.3).

In a further step, the value consumers assign to organic compared to conventional production (research question 1b) was investigated through an estimation of willingness-to-pay values based on real price data. The method of the hedonic price analysis was chosen because implicit prices for different wine characteristics help show the relative importance of organic production compared to other product attributes. It was further analysed if organic wine produced in Germany commands an additional price premium (research question 1c) to draw conclusions on organic wine consumers' preferences for domestic production (see section 3.4).

Finally, to gain knowledge on potential factors that might hinder the purchase of organic wine and the conversion of attitudes into behaviour, the effect of prices and price promotions on the purchase volume of (organic) wine within a single purchase situation was studied through a multiple regression analysis (research question 2b). Again, socio-demographic characteristics were added this time in order to gain knowledge on the profile of wine consumers (see section 3.4).

1.5 Outline of the thesis

The second chapter describes the theoretical framework for the dissertation and offers some background on consumer behaviour theory. The first sub-chapter provides a basic theoretical framework for the dissertation: the Stimulus-Organism-Response (SOR) model. In the second sub-chapter, theoretical perspectives on two close antecedents of purchase behaviour – attitudes and purchase intentions – are presented in order to motivate the investigation of real market data for consumer behaviour research. The third sub-chapter introduces Alphabet Theory which is based on environmental behaviour theory. Alphabet Theory forms the specific framework of this dissertation.

The results section contains four research articles published or submitted to international scientific journals listed in Thomson Reuters Web of Science. At the time of the submission of the dissertation two of the articles were already published and two others were in review.

The first article “Consumers’ perceptions, preferences and willingness-to-pay for wine with sustainability characteristics: A review”, published in the Journal of Cleaner Production, aims to identify the state of the art and research gaps. The Alphabet Theory is used to assess the articles found in the review process. The results are differentiated by the type of production method, e.g. sustainable, environmental friendly, organic or local. The second article “Which consumers opt for organic wine and why? An analysis of the attitude-behaviour link”, submitted to the British Food Journal, aims to analyse the causal effect of attitudes and socio-demographics on wine consumers’ real purchase behaviour for organic wine. The chapter deals with drivers and barriers of organic wine purchases. The third article “Organic wine purchase behaviour in Germany: Exploring the attitude-behaviour-gap with data from a household panel”, published in the journal Food Quality and Preference, explores the attitude-behaviour gap by means of a cluster analysis. Moreover, by identifying consumer segments the article provides suggestions for the development of targeted marketing strategies. The fourth article “Wine consumers’ reaction to prices and organic labels at the point of sale. An analysis of household panel data”, submitted to the journal Renewable Agriculture and Food Systems, deals with consumers’ price behaviour for organic wine in a real market context. The article investigates consumers’ willingness-to-pay and price sensitivity to assess the value consumers assign to organic production and to figure out if price is a major barrier for the purchase of organic wine.

The discussion section contains a critical reflection on the data basis of this thesis followed by a discussion on the market potential for organic wine, and the merits and limitations of the dissertation.

Finally, conclusions for the marketing of organic wine are drawn and recommendations for future research are given.

The dissertation closes with a summary.

2 Theoretical framework

The dissertation at hand is aimed to analyse factors affecting wine consumers' actual purchase behaviour in order to give recommendations for the marketing of organic wine. Therefore, this study is built on theoretical foundations of consumer behaviour research which aims to understand and explain consumers' behaviour. Consumer behaviour covers all processes associated with the selection, purchase, usage and disposal of products ranging from pre-purchase issues over purchase issues up to post-purchase issues (Solomon, 2015). The main focus of this study is the actual purchase decision of consumers.

2.1 Basic framework

The relatively young area of consumer behaviour research within the field of marketing has developed from the 1950s onwards when a more consumer-driven orientation has begun to replace sales-oriented marketing approaches. Consumer behaviour is nowadays an interdisciplinary study area built on knowledge of various behavioural sciences such as psychology, sociology, social psychology, anthropology and economics (Schiffman *et al.*, 2010). Satisfying consumers' needs and wants is the key quest to develop successful marketing strategies, consumer behaviour research is therefore an essential part of the marketing discipline (Kotler *et al.*, 2016).

In order to explain purchase behaviour, simplified theoretical frameworks have been developed. There exist many different models of purchase and decision making with different degrees of complexity regarding the number of factors included. Most often structural models of cognitive control have been applied to explain consumer decisions (Kroeber-Riel and Gröppel-Klein, 2013). From this traditional, rational perspective, the consumer is seen as a problem-solver who passes the following steps one after another: problem recognition, information search, information processing, evaluation of alternatives, choice of an alternative, decision making and consequences of decision making. However, purchase decisions of low cognitive control do not allow for such a sequential order; therefore, some of the steps are skipped or modified. This is particularly true for the purchase of consumer goods. For impulse purchases, the model cannot be applied (Foscht *et al.*, 2017).

To overcome limitations of the above explained phase model, a behavioural perspective based on internal psychological factors was chosen as the basic framework for the present thesis: the SOR model, the prevailing paradigm of empirical consumer research. Psychological factors such as emotions, motives and attitudes take centre stage in the SOR model. They are non-observable and take place internally within a consumer's organism (O=Organism). These

internal processes (O) are affected by observable stimuli (S=Stimuli) and finally result in the observable response part of behaviour, i.e. consumers' purchase decision (R=Response). The observable stimuli (S) include marketing activities (product, price, place and promotion) and also other environmental influences such as economic, technological, social and cultural aspects which affect the purchase of a product (Foscht *et al.*, 2017; Kroeber-Riel and Gröppel-Klein, 2013).

The SOR model makes consumer behaviour accessible for empirical analysis (Kroeber-Riel and Gröppel-Klein, 2013) and is therefore used as the basic framework for the present thesis: the main focus is on how the internal psychological constructs affect consumers' actual purchase behaviour for organic wine. Moreover, the influence of external marketing stimuli is analysed.

2.2 Attitudes and purchase intentions to predict behaviour

An attitude is a lasting evaluation of an object in order to satisfy motives and is the driving force of consumer behaviour. Therefore, attitudes are key variables to explain and predict consumer behaviour. The formation of attitudes is described in many different models which put focus either on cognitive or on affective processes. Cognition includes the persons' beliefs about an attitude object, i.e. the attributes consumers assign to a product. Within the basic attitudinal model consumers actively search for information and develop a set of product attributes at the beginning of the decision-making process. In the next step, the affective component of attitudes which points to the feelings consumers have about an attitude object leads to an overall evaluation of a product such as liking or disliking. Product evaluations (affect) are shaped by beliefs (cognition) and they in turn lead to a behavioural intention and finally to actual behaviour. It is important to recognise that this standard model of attitude development refers to complex purchase decisions characterised by problem recognition, information search and the evaluation of alternatives while within purchase decisions of limited complexity (habitual or impulse buying) beliefs about a product are not formed actively (Foscht *et al.*, 2017; Kroeber-Riel and Gröppel-Klein, 2013; Solomon, 2015).

Since attitudes are stable over time (Foscht *et al.*, 2017), many studies rely on the elicitation of attitudes to conclude on future purchase behaviour. However, a direct attitude-behaviour relation only holds true if several factors do not interfere. To improve the forecasting power of purchase decision models, the attitude-behaviour relation has been extended in various ways.

Fishbein's Theory of Reasoned Action (TRA) (Ajzen and Fishbein, 1977) is one of the historically most important attitude models in social psychology which has improved the

predictive power of simple attitude-behaviour models to explain purchase behaviour. The addition of the construct *attitude towards behaviour* is one of the most significant modifications. It takes into account that even though the evaluation of an attitude object is positive, situational conditions such as high prices or poor availability may lead to a negative attitude towards the behaviour in question that then again will determine the actual behaviour better. The second modification of the model is the consideration of *subjective norms*, i.e. the perceived social norms a consumer wants to comply with. Moreover, purchase intention is included as a moderating variable in between attitude and behaviour. To increase the predictive power of the Theory of Reasoned Action, Ajzen (1985) developed the Theory of Planned Behaviour (TPB) by including the construct *perceived behavioural control*, i.e. the control a person believes to have over a certain purchase decision. This construct refers to external control and internal abilities (Foscht *et al.*, 2017; Kroeber-Riel and Gröppel-Klein, 2013).

The described models require that certain conditions are given and therefore have often been criticised. They postulate that purchase behaviour is cognitively controlled, i.e. that complex decision making occurs. This does not typically hold true for everyday purchases which are predominantly executed habitually or on impulse. Behavioural purchase patterns happen uniformly without cognitive participation and emotional processes; the same products are bought repeatedly and customer loyalty is high. Impulse purchases are characterised by high emotional participation. Purchases on impulse are largely affected by in-store stimuli such as shelf position, displays and background music or by an activating design of the product itself. For purchase situations of low cognitive control attitudes are less likely to predict behaviour (Foscht *et al.*, 2017; Kroeber-Riel and Gröppel-Klein, 2013).

As a result, the direct predictive capacity of attitudes for purchase behaviour in general is rather low and there is a continuing controversy over the certain degree to which attitudes influence behaviour (Kroeber-Riel and Gröppel-Klein, 2013; Solomon, 2015). Purchase intentions are considered to be correlated stronger with attitudes but are difficult to anticipate. A temporal distance between initial purchase intentions and actual purchase behaviour exists. In the meantime several factors could hinder actual purchase behaviour, for example, the desired product may be out of stock or other uncontrollable factors may intervene. Moreover, consumers may be exposed to additional information sources such as personal contacts or ads which at their extreme could lead to a change of already existing purchase intentions (Foscht *et al.*, 2017). This is why even purchase intentions do not directly lead to actual purchase behaviour. For purchase decisions of low complexity such as impulse or habitual buying,

purchase behaviour is not intentional, i.e. purchase intentions do not develop before the purchase decision is made (Solomon, 2015).

The classification of consumer goods is one determinant of the cognitive complexity a consumer assigns to a purchase decision (Foscht *et al.*, 2017). Since wine is a product of high variation in quality and price (Costanigro *et al.*, 2007; Mueller Loose and Szolnoki, 2012), a general classification is not appropriate. Wine bought on a regular basis with minimal cognitive effort (for everyday use) can be assigned to the category of convenience goods. Compared to shopping goods – which differ either in price or quality – consumers do not compare alternatives due to homogeneous product characteristics. Wines with unique characteristics and high prices for which consumers make great efforts regarding information search and final purchase can be allocated to the category of specialty goods (Foscht *et al.*, 2017; for a general consumer goods classification see Kotler and Keller, 2013). Accordingly, purchase decisions vary strongly in their complexity and cognitive control and thus the influence of attitudes and intentions on purchase behaviour.

This section demonstrates how challenging the prediction of consumers' actual purchase behaviour is when relying solely on attitudes and purchase intentions. However, actual market data has been only scarcely examined due to difficulties in accessibility and high costs. This points to the specific value of the present thesis.

2.3 Explaining pro-environmental purchase behaviour: the Alphabet Theory

Assessing, understanding and changing environmental behaviour is crucial in order to cope with the negative effects of humans on the natural world, for example, global warming, urban air pollution, water shortages and loss of biodiversity (Steg and Vlek, 2009). The influence of consumption on the environment is a major reason for the challenges the society faces today. The purchase of environmentally friendly products is seen as an important field of action to prevent or decrease the above mentioned negative effects. Pro-environmental purchase behaviour is therefore an important research area of the social sciences, in the literature also referred to as green purchase behaviour and included within the wider category of ethical, sustainable or socially responsible consumer behaviour (Joshi and Rahman, 2015). In order to explain why positive attitudes do not necessarily translate into actual purchase behaviour, the TRA and the TPB have been applied most often in studies on ethical purchase behaviour. Many of these studies focused on specific products with ethical/sustainable attributes such as organic, eco-friendly, fair trade or animal welfare (Carrington *et al.*, 2010).

However, the TRA and the TPB have often been criticised due to their cognitive focus and the neglect of external environmental influences that precludes the depiction of real-life purchase decision making. Even though the TPB accounts for this criticism by adding perceived behavioural control, it only considers individuals' perceptions of contextual factors and not the conditions of the external environment. Therefore, the TPB fails to explain actual purchase decisions of consumers and only elaborates on antecedents of decision making. Specifically in the research area of environmental behaviour it has been recognised that affective elements need to be included into theoretical models in order to increase the predictive power of environmentally significant behaviour. Many modifications have therefore been proposed by various studies to explain environmental significant behaviour and to better understand the gap between attitude and behaviour (Carrington *et al.*, 2010; Joshi and Rahman, 2015; Kroeber-Riel and Gröppel-Klein, 2013; Steg and Vlek, 2009).

The present investigation accounts for consumers' complex decision-making process through the implementation of cognitive as well as affective processes and, moreover, by the inclusion of personal and situational factors. In order to satisfy these requirements, the Alphabet Theory – a holistic framework for explaining organic and local food purchase behaviour – is applied. Developed by Zepeda and Deal (2009) the Alphabet Theory (see Figure 1) combines the most prominent theories to explain environmentally significant behaviour. The formation of attitudes is explained by the Value-Belief-Norm (VBN) Theory (Stern *et al.*, 1999), which is a composition of the Value Theory (Schwartz, 1994), the New Ecological Paradigm (NEP) (Dunlap and Van Liere, 1978) and the Norm Activation Theory (Schwartz, 1977). The VBN-Theory only explains the overall tendency of individuals to act pro-environmentally. To get an overall understanding of consumers' behaviour, contextual factors stemming from consumers' environment are included referring to Guagnano's Attitude-Behaviour-Context (ABC) Theory (Guagnano *et al.*, 1995). Supplemented with the constructs knowledge, information seeking, habit and demographic data, the framework is most suitable to explain why attitudes not always completely translate into purchase behaviour. A detailed description of the Alphabet Theory is given in section 3.1.3.

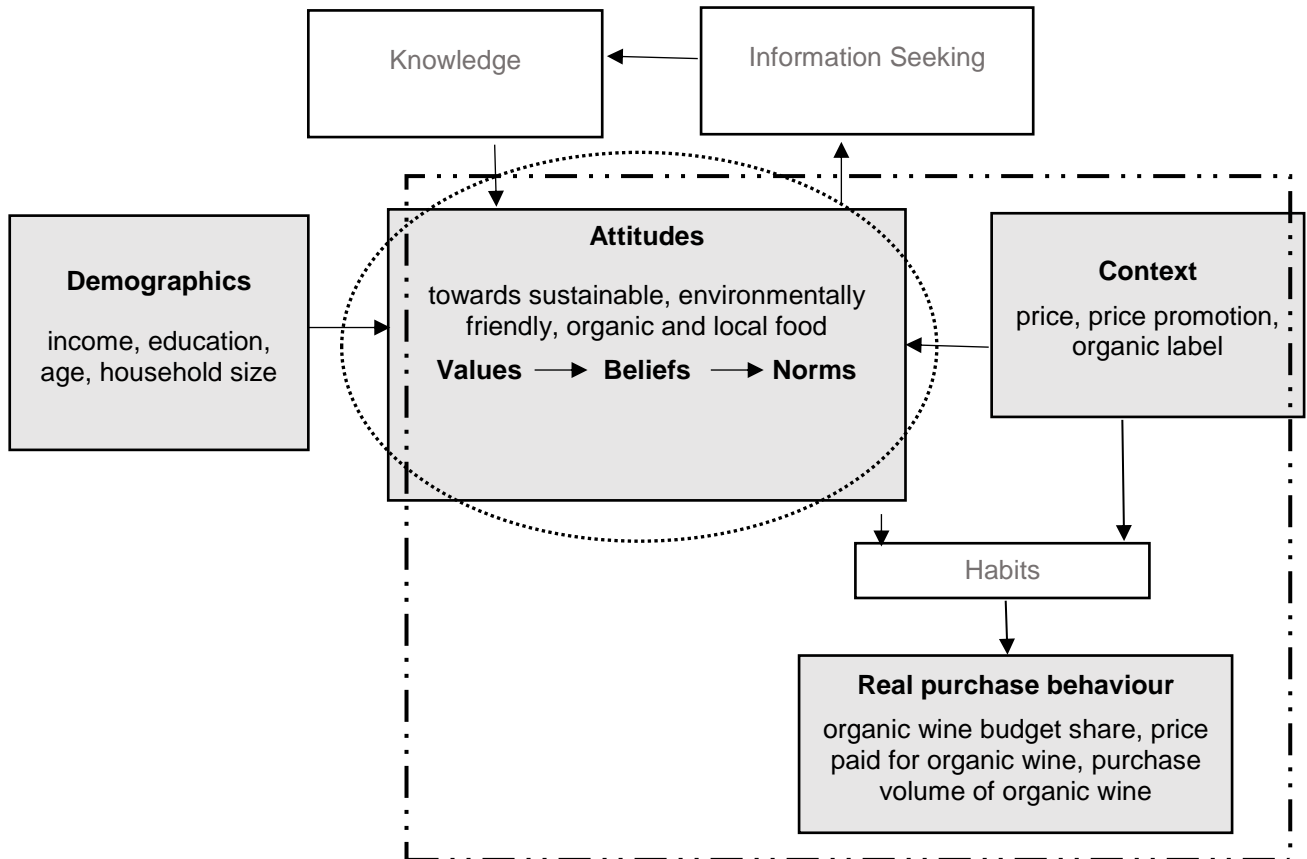


Figure 1: Conceptual framework of Alphabet Theory based on Zepeda and Deal (2009) (1).
 (..... VBN-Theory, - - - - - ABC-Theory)

In Figure 1 the conceptual framework of the Alphabet Theory and its application in the present thesis are shown. The variables used in the analysis in order to answer the given research questions are printed in bold letters. Attitudes towards sustainable, environmentally friendly, organic and local products build the centre of the research. The main focus is on how these attitudes are related to real purchase behaviour measured by organic wine budget share, real prices paid for organic wine and purchase volume of organic wine. In order to explain probable attitude-behaviour inconsistencies and the often observed attitude-behaviour gap the dissertation gives attention to purchase context (price, price promotion and organic label) and demographics (income, education, age and household size).

3 Results

3.1 Consumers' perceptions, preferences and willingness-to-pay for wine with sustainability characteristics: A review

This chapter represents an article published by the author of this dissertation and Prof. Dr. Ulrich Hamm as a co-author. Any reference to this chapter should be cited as:

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3.1.1 Abstract

The aim of this review article is to identify the state of the art and research gaps in consumer perceptions, preferences and willingness-to-pay (WTP) towards wine with sustainability characteristics. In an effort to cover all relevant literature, we searched for scientific articles published between January 2000 and March 2016. The search resulted in 34 articles which were analysed in detail. To assess the reviewed articles, the Alphabet Theory, which is a framework for explaining environmentally significant behaviour, was used. The review differentiates the results for consumers' wine choice by the type of production method, e.g. sustainable, environmental friendly, organic or local.

A considerable number of consumers across different countries had positive perceptions regarding these different production methods and reported a willingness to pay a premium for wine with characteristics of sustainable production. However, on average, consumers' awareness of the broad concept of sustainability regarding wine seemed low in some European countries and North America. In particular, organic and sustainability labels were often perceived as quality indicators. In most cases, the studies focused on the environmental aspects of sustainability; environmental soundness was given most often as a determining factor in purchase decisions regarding wine with characteristics of sustainable production. Overall, social and economic aspects were only just examined.

The results suggest that producing and marketing wine with sustainability characteristics is a promising strategy for quality differentiation, particularly for wine that is both local and organic. Moreover, marketers, retailers and producers will likely profit from developing information campaigns with a focus on environmental, as well as social and economic aspects to increase consumers' knowledge of sustainable wine production, thus creating preferences and influencing purchase behaviour. Gaining a deeper understanding of consumers' attitudes

and their buying motives regarding different sustainability attributes is recommended for future studies. Since none of the articles examined purchase behaviour in real market scenarios with real market transactions, future research should focus, for example, on the analysis of household panel data as evidence of an attitude behaviour gap was found.

Keywords: wine, sustainable, organic, willingness-to-pay, Alphabet Theory, attitude-behaviour-gap

3.1.2 Introduction

Compared to other food products, consumers' wine choice is more complex (Lockshin and Hall, 2003). Wine is one of the most differentiated products on the food market. The quality of wine is associated with the region of origin and differs strongly within vintages and wine producers. Consumers have to deal with many different cues on wine labels. It is well known that key wine choice drivers are the country of origin and the region of production (Defrancesco *et al.*, 2012; Jaeger *et al.*, 2013; Yang and Paladino, 2015). Furthermore, grape variety (Gustafson *et al.*, 2016), price (Panzone, 2014) and brand (Drennan *et al.*, 2015) are important elements for consumers' wine choice. In addition to these traditional wine characteristics, sustainable production has become a relevant issue for the global wine industry; the corresponding certifications indicate new attributes for consumers' wine choice (Klohr *et al.*, 2013). Since they cannot verify the production method of the purchased product even after consumption, sustainability cues are credence attributes. As these kinds of attributes cannot be accurately evaluated by consumers, the expectations they generate have an effect on consumers' perceived quality and sensory experiences (Fernqvist and Ekelund, 2014). Hence, it is important to identify how sustainability characteristics influence consumers' perceptions, preferences and WTP in relation to the various traditional wine quality cues. The aim of this review article is to identify the state of the art and research gaps on consumers' wine choice behaviour regarding different sustainability characteristics.

This review considers sustainability in reference to the OECD (Organisation for Economic Co-operation and Development) Sustainable Development definition wherein sustainability involves economic, social and environmental issues (Strange and Bayley, 2008). Different production systems in the wine industry regarding at least one of three sustainability issues were covered in the search strategy. Thereby, a special focus was put on organic, local and fair trade wines.

In recent years, various sustainable winegrowing programs implemented by the government, retailers or wine industry associations have evolved in the global wine industry (Forbes and DeSilva, 2012). The main focus of sustainability was primarily on environmental aspects (Forbes and DeSilva, 2012; Szolnoki, 2013). The review of Christ and Burritt (2013) revealed that the main areas of environmental concern in wine production were water (use and quality), solid waste (organic and inorganic), energy use and greenhouse gas emissions, chemical use, land use issues and impacts on ecosystems.

Organic wine production is mainly focused on the avoidance of synthetic chemical fertilisers and pesticides. Different legal rules regarding organic wine exist in different parts of the world – for example in the USA (United States Department of Agriculture, 2000), and the EU (EU Commission, 2012). The corresponding standards for certification and labelling differ between “wine made with organic grapes” and “organic wine”, depending on the percentages of organically grown grapes and the use (or non-use) of sulphites. In the EU, organic wine is made using a limited amount of sulphites, while in the US organic wine is not allowed to contain any sulphites. While many wine producing countries (USA, Canada, Australia, etc.) have already had established standards for “organic wine” since 2000, the EU certification regulations did not cover “organic wine” until the 2012 harvest. However, the new EU regulations allow organic wine growers to use the term “organic wine” and the EU organic logo on their label (EU Commission, 2012). Through this regulation, consumers are enabled to clearly distinguish organic wines from conventional wines and new opportunities to market organic wines have evolved. As Europe-based vineyards constituted over 80 per cent of the world’s total organic grape growing area in 2014 (Willer *et al.*, 2017), the EU regulations on “organic wine” were an important measure for the global organic wine market.

A further aspect of agriculture which is often claimed to be sustainable, is local production. Kneafsey *et al.* (2013) reviewed the social, environmental and economic impacts of local production in a scientific and policy report on local food systems and short food supply chains. They presented studies which attribute economic benefits for regional economies and for producers on the farm level to local production. Additionally, they found evidence of the social benefits of local production, e.g. the creation of a consumer-farmer relationship based on trust. Furthermore, they referred to sources which claim local production systems as more environmentally friendly because of shorter transportation distances and a more beneficial carbon footprint. However, they also pointed out several articles which inferred that local food might not imply better performance in terms of energy use and environmental footprint due to smaller production units. Therefore, the studies on local wine in this review did not necessarily

address sustainability in the environmental sense, but sustainability from a social and economic perspective of regional economies.

In contrast to the concept of organic production, there is no official definition of the term “local” and no governmental certification process. Thus, local wine differs considerably from wine which is labelled based on third-party certification, as is organic wine or certified sustainable wine. In a review on consumers’ perceptions and preferences for local food, Feldmann and Hamm (2015) showed that consumers’ definition of local food ranged from distances and political or natural boundaries, to more holistic approaches that also included emotional and/or ethical dimensions such as personal relations with or within the region. For this review, local wine was defined as wine that is produced and sold within the same demarcated geographical region. According to this definition the term “local” was clearly separated from GIs (Geographical Indications) like PDO (Protected Designation of Origin) and PGI (Protected Geographical Indication), which can be sold over large distances and are defined and granted by the EU (EU, 2012). Moreover, quality wine is usually characterised with this distinction to emphasize the strong relation between special wine characteristics and origin. The impact of GIs on consumers’ wine choice is well known as the review of Lockshin and Corsi (2012) has shown: The region or country of origin is a key element in consumers’ wine choice, moderated by other wine characteristics, such as price or grape variety and consumers’ wine involvement. Sustainable wines from emerging countries are often associated with fair trade. In 2016, more than 50 wine producers in Africa and South America were certified by the global Fairtrade Association. The Fairtrade Foundation guarantees that farmers and workers get fair prices. An additional premium should help their community to invest in essential services such as education, sanitation and health (Fairtrade Foundation, 2016).

In a review on consumer behaviour for wine in general, Lockshin and Corsi (2012) stated that only a small consumer segment was willing to purchase organic and sustainable wine. We assume that with the outlined market developments, in particular, since the EU regulation on organic wine in 2012, academic interest towards consumers’ perceptions and preferences of wine with characteristics of sustainable production has grown. In an effort to give an overview on the current state of the art and research gaps in consumer behaviour towards wine with characteristics of sustainable production, a systematic review of all relevant scientific literature in the timespan from January 2000 until March 2016 was conducted. To gain insights into the processes that determine buying behaviour, the results of the articles were analysed using the Alphabet Theory framework.

Alphabet Theory is based on current consumer theories aiming to improve the knowledge of why consumers buy organic and/or local foods. Through the merging and extension of existing theories on environmental behaviour into the Alphabet Theory, gaps in explaining consumer behaviour could be closed. Moreover, Alphabet Theory was already successfully applied in a literature review regarding consumers' perceptions and preferences for local food (Feldmann and Hamm, 2015). Some important findings were made, owing to the linkage of the different theories, which made it possible to reveal a number of important interactions between the determining factors of local food consumption.

3.1.3 Theoretical model: Alphabet Theory

The Alphabet Theory is a framework for understanding organic and local food purchase behaviour developed by Zepeda and Deal (2009) as a result of their consumer research. They combined the Value-Belief-Norm (VBN) Theory (Stern *et al.*, 1999) and the Attitude-Behaviour-Context (ABC) Theory (Guagnano *et al.*, 1995) and supplemented them with knowledge, information seeking, habit and demographic data in a framework to explain why consumers buy organic and/or local food (Figure 2).

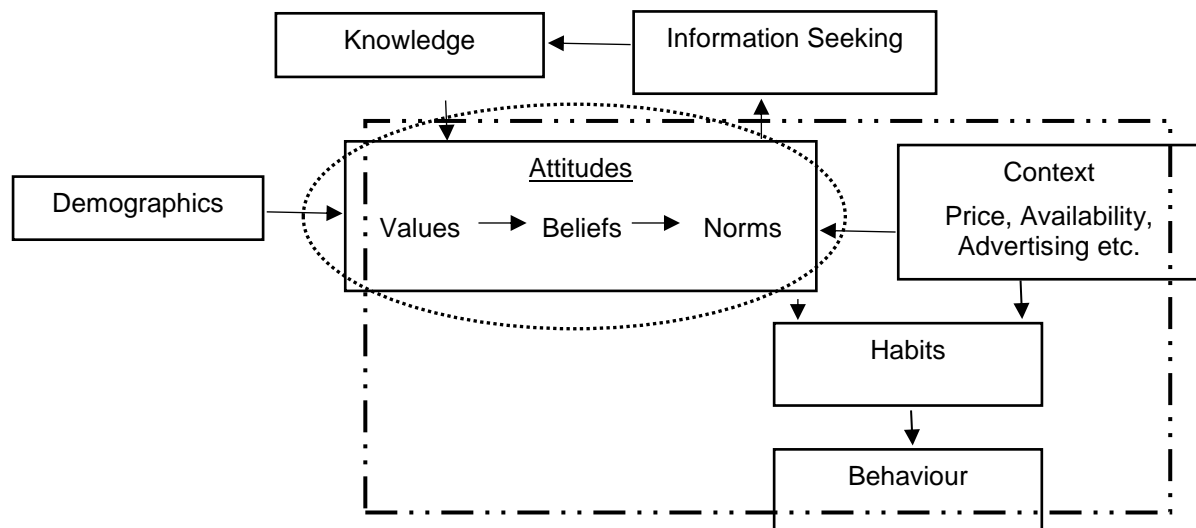


Figure 2: Conceptual framework of Alphabet Theory based on Zepeda and Deal (2009) (2)

(— · · — VBN-Theory, ······ ABC-Theory)

The VBN-Theory is a composition of the most prominent theories explaining environmentally significant behaviour: Value Theory (Schwartz, 1994), the New Ecological Paradigm (NEP) (Dunlap and Van Liere, 1978) and Norm Activation Theory (Schwartz, 1977). The VBN-Theory can be employed as an explanation of how attitudes form and how they subsequently influence one's behaviour (Stern *et al.*, 1995). VBN-Theory alone only explains the general predisposition of individuals to act pro-environmentally. To get an overall understanding of consumers' behaviour, it is necessary to also take the environment in which an individual is acting into account (Stern, 2000).

In Guagnano's ABC-Theory, behaviour is the result of attitude and context. Contextual factors are external conditions which mediate between attitudes and behaviour and may also change them (Guagnano *et al.*, 1995). When context is neutral, the attitude-behaviour relationship is strongest. If the context is positive or negative, effectively compelling or prohibiting the behaviour in question, the attitude-behaviour relationship approaches zero (Stern, 2000). Price, availability and advertising are common contextual factors when it comes to food purchases. The effect of the context depends on the strength of attitudes and the context itself. Attitudes can outperform context or vice versa (Guagnano *et al.*, 1995). For example, a slightly higher price for organic wine is not a purchase obstacle for people who are very committed to these products. However, if organic wine is not available close to consumers' homes, they will not buy it even though they have very positive attitudes towards organic wine. It is important to mention that the same contextual factors may have different influences on people with different attitudes or beliefs. For example, a higher price of an organic wine compared to a conventional wine may be a financial obstacle to purchase for some people; for others the higher price can be a predictor for higher quality (Stern, 2000).

Both VBN-Theory and ABC-Theory do not account for information seeking behaviour, knowledge, habits and demographic data. Information seeking leads to more in-depth knowledge of, for example, organic production practices and could thereby influence attitudes. Zepeda and Deal (2009) detected major differences in the information seeking behaviour of consumers, depending on their share of organic purchases. Moreover, habits play an important role in food purchasing behaviour. Zepeda and Deal (2009) showed that values, beliefs and norms influence where consumers habitually went shopping. Dietary restrictions (e.g. for vegetarians or vegans) as well as cooking habits, also affected organic food purchases. A further element of Alphabet Theory are demographics, which can influence consumer behaviour indirectly through attitudes.

3.1.4 Methodology

An online literature search was conducted using the databases Web of Science, Science Direct and AgEcon, which provide high-quality, peer-reviewed journal articles and contributions to scientific conferences in the agricultural sector. The following Boolean search terms were defined based on the presented research questions and the outlined research boundaries:

((consumer* OR buyer* OR wine drinker*) AND (wine*) AND (local* OR regional* OR social* OR fair trade OR eco-* OR organic* OR sustainable* OR sustainability OR environment* OR production method*))

The wildcard asterisk (*) was applied after a word stem to retrieve all articles that include words starting with this word stem. The search was restricted to the title, the abstract and the keywords and limited to the timespan 2000–2016. We finished the search on the 22nd of March 2016. In the Science Direct database, it was not possible to use the asterisk after “eco-“ because that led to invalid search results. Moreover, in the AgEcon database, a more general search term ((wine drinker* OR consumer* OR buyer*) AND (wine*)) was applied because the software platform of AgEcon is only able to handle limited Boolean search strings. Additionally, it was not possible to restrict the search to a time span or to title, abstract and keywords, which is why “anywhere in records” was searched and the articles were reviewed manually.

The search in Web of Science (515), Science Direct (232) and AgEcon (565) yielded a total of 1,312 articles. The total hit list output was manually screened by evaluating the title and/or the abstract for relevance. The articles had to be empirical studies published in scientific journals and written in English. Contributions to scientific conferences were only considered if they appeared in the online AgEcon catalogue. This resulted in a preliminary list of articles of which the full-text was then screened.

The articles were analysed regarding the eligibility criteria (=consumer studies with the main focus on wine with characteristics of sustainable production). Articles were excluded if they were either unrelated to consumers, e.g. studies mainly focusing on the supply chain or on the management/business level, or if their main focus was not on wine with sustainability characteristics. In some of the omitted studies, the attribute ‘organic’ was analysed only as an additional attribute, with the main focus being on, for example, resveratrol-enriched or non-sulphited wines. Furthermore, those studies were excluded whose subject was the origin of wines, but not local wine as defined for our study purpose. Articles, partly from the same authors, analysing the same research questions with identical data, were excluded. Moreover, duplicates were eliminated. After the study selection had been done, the reference lists of the

articles were reviewed to make sure that we had not missed a relevant article not covered by our search terms. This resulted in no additional articles. In the end, our search generated a sample of 34 articles: 25 from Web of Science, four from Science Direct and five from AgEcon. A list of these articles with some additional information on data collection and main thematic areas can be found in the annex.

In an effort to get an overview of the research area, the articles were read systematically and information regarding motivation, methodology, sample size, survey country and the key findings were extracted. In addition, the records were classified as either a quantitative or a qualitative approach. In the next step, the key findings were assigned to the elements of Alphabet Theory.

3.1.5 Overview of the selected studies

From 2000 to 2007, nearly half of the period under research, just two articles were published. From 2008 to 2012, at least one article, but no more than three, were published per year. In the period from 2013 to 2016, the minimum number of published articles was 4 and the maximum 7.

Overall, the studies focused on organic (13), local (7), sustainable (7), environmentally friendly (6), and environmentally sustainable (5) wine; one study examined corporate social responsibility (CSR) (see Table 2 in appendix: study focus). Three of the studies on sustainable wine included all three sustainability dimensions, two considered social and environmental aspects and two focused only on environmental issues (see Table 2 in appendix: conceptualisation of the study focus). The concepts environmentally sustainable and environmentally friendly covered organic and/or biodynamic wine in four studies. Likewise, the study on CSR and one study on sustainable wine considered organic wine.

As no official definition and regulation of the term “local” exists, many authors came up with their own definition to analyse consumers’ behaviour regarding local wine. The applied constructs were distances (kilometers), wine regions, political boundaries and direct sales from wine producer to final wine consumer. Political boundaries ranged from regions and communities, to states and countries (see Table 2 in appendix: conceptualisation of the study focus).

The studies were conducted in several countries as shown in Table 1. Most of the studies were undertaken in the USA, Italy and France. Quite a few studies were conducted in the UK,

Germany, Spain and Canada. Since two of the studies used a cross-national approach, the sum of countries is larger than the number of articles.

Table 1: Study countries

Country of study	Number of articles (N=34*)
USA	10
Italy	9
France	5
UK	3
Germany	3
Spain	3
Canada	3
Others	6

*Please note: Several articles were conducted in more than one country. The sum of the figures is therefore greater than 34.

Most of the studies, (30) applied a quantitative market research approach; three studies were qualitative, while only one used a mixed approach. None of the reviewed studies examined purchase behaviour in real market scenarios. Most drew conclusions on purchase intention through the investigation of consumer preferences and stated WTP. For this purpose, consumers were asked if they were willing to pay a premium, e.g. for an organically produced wine. Sometimes consumers were additionally invited to indicate an exact amount of money or a specified margin. Direct questioning has some drawbacks, as it requires no monetary commitment; the trade-off between price and other attributes that characterises real purchase situations will not occur (hypothetical bias) and direct questioning may cause a social desirability bias. Therefore, the elicited WTP is often overestimated, which in turn is seen as an attitude-behaviour gap. To lessen the outlined problems, most of the reviewed studies included an experiment to get more realistic preferences and WTP values. In choice experiments and conjoint analyses, consumers evaluate products with different attribute combinations as a whole (indirect measurement). In addition, an obligatory purchase may be included to be incentive-aligned. Binding auctions aim to reveal consumers' real value for a good through bidding and belong to direct measurement (Martínez-Carrasco *et al.*, 2015; Miller *et al.*, 2011).

3.1.6 Results

3.1.6.1 Demographics

In the study by Zepeda and Deal (2009), demographics were discussed as poor proxies for preferences; different motives explaining organic and local food purchases were highlighted. However, Alphabet Theory states that demographics could influence consumer behaviour indirectly through attitudes. In the studies reviewed, demographic characteristics were used to explain consumers' attitudes and purchase behaviour. Broad consistency was observed for gender, the living area and income: Women (Barber *et al.*, 2010; Loureiro, 2003; Mann *et al.*, 2012; Pomarici and Vecchio, 2014; Sellers, 2016; Vecchio, 2013), people with higher incomes (Loureiro, 2003; Pomarici *et al.*, 2016; Sellers, 2016; Woods *et al.*, 2013), and people living in an urban area (Mann *et al.*, 2012; Pomarici and Vecchio, 2014; Sellers, 2016) had stronger behavioral intentions for different sustainability characteristics. However, local wine seemed to be different. Italian consumers who bought wine directly from a wine producer were characterised as being males with low to medium income (D'Amico *et al.*, 2014). Additionally, Woods *et al.* (2013) detected a positive effect of living in a rural area on local wine consumption in the US, and Grebitus *et al.* (2013) showed that men paid more for wine with a lower distance traveled than women in a study on German consumers.

Some of the research papers did not find any significant relationship between demographics and behavioural intentions (Brugarolas *et al.*, 2010) or could not find a correlation at least for age (D'Amico *et al.*, 2016; Grebitus *et al.*, 2013; Mann *et al.*, 2012; Sogari *et al.*, 2015) education (Loureiro, 2003; Mann *et al.*, 2012) and income (D'Amico *et al.*, 2016; Grebitus *et al.*, 2013). Other studies revealed conflicting results with regard to age. Sogari *et al.* (2015) and Bernabéu *et al.* (2008) showed that younger people had a more positive attitude towards wine with sustainability characteristics. Furthermore, Woods *et al.* (2013) indicated it was more likely that younger people had tried local wine in the Northern Appalachian States. However, older consumers had a higher WTP (Sellers, 2016; Vecchio, 2013) and purchase probability (Pomarici and Vecchio, 2014) for wine with sustainability claims. Alphabet Theory explains these conflicting results through the ignored effects of context (e.g. price) on the attitude-behaviour relation. This link will be further explained in the paragraph on context.

3.1.6.2 Information seeking and knowledge

Zepeda and Deal (2009) illustrated that higher levels of knowledge regarding organic farming practices may lead to the purchase of organic food. The review provides evidence for this relationship. Regarding the influence of information, the studies of Wiedmann *et al.* (2014) and Ay *et al.* (2014) provided empirical evidence that a higher level of information was related to a more positive perception or a higher preference for organic wine. In the study of Wiedmann *et al.* (2014), consumers were informed that organic viticulture stands for healthy, safe, and environmentally friendly products without any qualitative disadvantages. This information increased consumers' evaluation of organic wine in a wine tasting test procedure. In their experiment, Ay *et al.* (2014) first gave a general definition of organic agriculture and then gradually provided participants with further information on the negative effects of conventional (wine) production (greenhouse gas emission, health, and water consumption). Each round led to a higher cumulative WTP value for organic wine. Different results were reported by Bazoche *et al.* (2008) who conducted an experimental study including a tasting and an auction mechanism. Information on the harmful consequences of pesticide use did not have a significant effect on consumers' WTP for organic and environmentally friendly wine. However, adding visual information (labels, no tasting) compared to blind tasting significantly increased consumers' WTP. Bazoche *et al.* (2015) studied the impact of labels with three pesticide levels: integrated/sustainable label, organic label and biodynamic label. Only the biodynamic wine was chosen significantly more often when logos were shown. This effect increased when information on the labels was available.

In the study of Kim and Bonn (2015), US consumers indicating a greater knowledge of organic wine stated a significantly higher willingness to purchase and to recommend organic wines. On the other hand, people with a higher overall wine knowledge only had a higher behavioural intention to recommend organic wine. The motivation behind these intentions differed across the two consumer groups. Consumers with a higher organic wine knowledge were encouraged to buy organic wine because of the perceived environmental friendliness. In contrast, people with higher overall wine knowledge were driven by trust (reputation, awareness) in the winery/wine. These results lend credence to the causal link between knowledge, attitudes and behaviour referred to in Alphabet Theory. Basically, Mann *et al.* (2012) got the same result for Swiss consumers: A high level of information regarding wine in general led consumers to prefer organic wine. Two further studies confirmed that the level of knowledge about organic products was directly related to the acceptance of organic wine for Spanish consumers (Brugarolas *et al.*,

2010) and the probability of paying a premium price for organic wine with no added sulphites for Italian consumers (D'Amico *et al.*, 2016).

Several studies examined labels, logos or claims with sustainability characteristics. As most of the studies used the term “label” and those that used “logo” or “claim” essentially meant the same concept, we continue to use the term “label”. In a qualitative study on South African consumers’ affective responses to visual images and words on the front labels of organic wines, Van Tonder and Mulder (2015) revealed the importance of images when buying organic wine in a retail environment. Organic labels should contain ‘natural’ images. Female consumers especially indicated that organic wine should distinguish itself from conventional wine on store shelves and that organic wine labels should be innovative and ‘new’ (Van Tonder and Mulder, 2015). Forbes *et al.* (2009) found that the majority of New Zealand consumers desired wine labels which indicate environmentally sustainable production practices and information about these production practices on them. Zepeda and Deal (2009) showed that the motivation behind searching for information about sustainable production methods depends on the attitudes towards this issue, which are, in turn, reinforced by consumers’ information levels. Hence, according to Alphabet Theory sustainability labels could lead to stronger attitudes and the demand for more in-depth information and the use of further information sources.

Consumers’ awareness of social and environmentally sustainable labels was quite poor in an Italian study (Pomarici and Vecchio, 2014) and even lower compared to the organic label in a cross-national study (Mueller Loose and Remaud, 2013). However, in the US, the trust in and the awareness of social and environmentally sustainable labels was higher than in Canada and Europe (Mueller Loose and Remaud, 2013). Moreover, few of the participants in focus group discussions with British consumers were aware of the general concept of sustainability and did not see a link between wine and sustainability. Indeed, participants only displayed mild interest and considerable skepticism with regard to information on sustainability on the back label (Soosay *et al.*, 2012). Similarly, the study of Ginon *et al.* (2014) revealed that French consumers knew little about labels indicating environmental sustainability. However, organic labels seemed to be well known and correctly understood (Ginon *et al.*, 2014). Pomarici and Vecchio (2014) showed that previous awareness of the precise meaning of the environmental and the social sustainability label of Italian consumers was significantly related to the probability of buying. Likewise, purchase penetration and label awareness correlated significantly (Mueller Loose and Remaud, 2013) and knowledge of the environmental label increased Italian consumers’ WTP premiums for the environmental labelled wine (Vecchio, 2013). Sellers

(2016) showed that Spanish consumers with a higher level of knowledge about sustainable products had higher WTP values, while the level of knowledge about wine culture had a negative impact on the willingness-to-pay a price premium. However, Pomarici *et al.* (2016) showed that the consumer segment found to be highly interested in environmentally friendly wines was characterised by individuals who considered themselves more experienced regarding wine, paid more attention to the information on the back-label and were more affected by grape variety when choosing wine. These findings underline the influence of knowledge on consumers' attitudes and its effect on the search for even more information as described in the Alphabet Theory.

With regard to local wine, one study on consumers of the Northern Appalachian states examined the influence of overall wine knowledge on local wine consumption. Woods *et al.* (2013) found that average and above average wine knowledge positively influenced the probability of local wine consumption.

3.1.6.3 Attitudes

So far, the review showed that consumers' purchase behaviour is affected by demographics and knowledge. In this correlation, attitudes act as a mediator whose development needs to be further investigated. Values, beliefs and norms shape consumers' attitudes towards the purchase of organic and local food (Stern *et al.*, 1999). Zepeda and Deal (2009) showed, that environmentalist values lead to the belief that an environmentalist norm can be supported through the purchase of organic food. The formation of attitudes through values and beliefs and their impact on the purchase behaviour for wine with sustainability characteristics was a major subject in the investigated articles. Regarding attitudes towards the environment, the results of the reviewed studies on organic wine did not paint a clear picture: US consumers' perceptions of environmental benefits of the product and of sustainable practices of organic wine producers had a positive effect on behavioural intentions towards organic wine (Bonn *et al.*, 2016). In this connection, trust was important in efforts to enhance perceptions of sustainability practices of retailers and the impact of organic wine's health-related benefits (Bonn *et al.*, 2016). This suggests that consumers are more likely to purchase organic wine if they trust the retailer selling the product. The study of Kim and Bonn (2015) additionally revealed that trust in the winery was, besides taste, the main factor influencing consumers' behavioural intentions to purchase organic wine. Moreover, D'Amico *et al.* (2016) showed that environmental consciousness and curiosity led consumers to pay a higher price for organic wines without added sulphites. In a cross-national study, Mueller Loose and Remaud (2013) found that both environmental and

social fairness benefits were associated with organic labels. However, consumers' perception of environmental friendliness had neither an effect on the purchase of organic wine (Kim and Bonn, 2015; Mann *et al.*, 2012) nor on the consumption of organic wine (Mann *et al.*, 2012), nor on the preference for organic wine (Rahman *et al.*, 2014). Alphabet Theory would explain these results with an absence of trust in the organic label (VBN) or a lack of information (knowledge) regarding organic certification (Zepeda and Deal, 2009). Further reasons might be high prices, poor availability (context) or being stuck in a routine (habits), which will be investigated in the next two chapters.

Health effects were found to be an important motivator for organic wine purchases. The health attributes of organic wine had a positive effect on US consumers' behavioural intentions (Bonn *et al.*, 2016). Mann *et al.* (2012) presented that perceiving organic wine as healthier than other wines was the best predictor for Swiss consumers' choice of organic wine. Fotopoulos *et al.* (2003) indicated that for Greek organic food buyers, the organic label had a health-related aspect while the non-buyers associated it with the control-attention paid during the production process. However, both groups found the organic label very important when it comes to purchasing wine.

Regarding the importance of taste perception and its influence on behaviour, the reviewed articles indicated different results. In the study of Kim and Bonn (2015), taste perception was, besides trust in the winery, the main factor influencing US consumers' behavioural intentions to purchase organic wine. In contrast, Mann *et al.* (2012) showed that few Swiss consumers detected any advantages in terms of the taste of organic wine. However, attitude towards taste did not affect the choice between organic and other wine. Furthermore, Pagliarini *et al.* (2013) found that consumers were not able to distinguish between organic and conventional wines in a blind tasting. Consumers preferred organic wine only in an informed situation. This indicates that the willingness-to-pay a premium for organic wine may be due to consumers' specific attitudes and involvement in sustainability issues. The study of Wiedmann *et al.* (2014) showed that appearance and taste of a wine presented as organic by storytelling was judged to be better than that of conventional wine regardless of their knowledge and attitude towards organic products in general. This indicates that organic wine was associated with higher quality and that a halo effect stems from storytelling.

Sogari *et al.* (2015) shed light on the causal relationship of beliefs, attitudes and the purchase of sustainable wine. The belief that sustainable products provide benefits for the environment and the belief that certified sustainability labels will guarantee high quality standards were

significantly and positively related to the attitude towards wine with a sustainability label and the importance of sustainability aspects when purchasing wine. Moreover, the belief that labelling wine as sustainable gives producers economic support was not related to the attitude towards sustainable wine. Additionally, Sogari *et al.* (2016) showed that Italian consumers with a positive attitude towards sustainable wine and a higher value of environmental protection were willing to pay higher price premiums for sustainable labelled wine. Results of this study lend credence to the causal link of consumers' values, beliefs and attitudes on purchase behaviour as described in the VBN-Theory.

New Zealand consumers believed sustainable wines to be of equal or better quality than conventional wines and were prepared to pay a higher price for these wines (Forbes *et al.*, 2009). Barber *et al.* (2010) confirmed that environmental attitudes were related to wine tourists' purchase intention for an environmentally friendly wine. Environmental behaviour acted as a mediator. Furthermore, a relationship between environmental involvement and wine tourists' environmental attitudes was verified. Additionally, Pomarici *et al.* (2016) confirmed that consumers with a higher interest in environmentally friendly wines spent more for wines consumed at home and the consumer segment with a low involvement in environmentally friendly wines was mainly focused on the price when it comes to wine choice.

In a study on Colorado wines, Loureiro (2003) elicited a higher WTP for environmentally friendly and local wines by consumers who cared more about the local attribute when purchasing wine. Most of the participants stated they bought Colorado wines in order to support the local wineries and the local economy. Additionally, participants who perceived the image or reputation of Colorado wines at a low level showed a lower WTP for environmentally friendly wines. German consumers perceived local wine as better for the environment (Greibitus *et al.*, 2013). Greibitus *et al.* (2013) also examined the influence of different beliefs regarding local wine on the WTP. Against expectation, the belief that buying local wine supports the local economy had no positive impact on the WTP. Perceiving local wines as tastier and safer did not affect consumers' WTP. The same held true for a pro-ecological worldview, measured by the New Ecological Paradigm (NEP), a 15-point scale to identify consumers' attitudes regarding the environment developed by Dunlap *et al.* (2000).

3.1.6.4 Context

Zepeda and Deal (2009) showed that organic food purchases are generally motivated by values, beliefs and norms. However, to explain consumers' real purchase behaviour rather than explaining general purchase intentions, one must account for Guagnano's ABC-Theory. This

model provides an explanation why attitudes do not completely transmit into behaviour and thereby contributes significantly towards an explanation of consumers' purchase behaviour. Contextual factors are external conditions which can be constraints or incentives for the purchase of wine with sustainability characteristics. For example, a slightly higher price for organic wine is not a purchase obstacle for people who are very committed to these products while for others it would be a financial barrier (Stern, 2000). The analysed articles evaluated the importance of sustainability characteristics among other wine features (context), e.g. price, origin and wine style. Soosay *et al.* (2012) revealed through focus group discussions that for many participants, the purchase of sustainable wine was motivated by sales promotion; sustainability was not highly valued when buying wine in the supermarket. In a constitutive survey, the most important wine attributes for consumers were price, followed by type of wine (e.g. sweet/dry), colour, grape variety and promotional activity; environmentally sustainable production process was much further back in the order. As to the importance of price compared to other product attributes, basically the same was revealed by the conjoint analysis studies of Bernabéu *et al.* (2008), Chiodo *et al.* (2011) and Mann *et al.* (2012). When it comes to the purchase of wine, price was found to be one of the most important characteristics; more important than the production method (conventional vs. organic). In the study of Bernabéu *et al.* (2008) and Mann *et al.* (2012) the highest preference was found for the lowest price followed by the mid-priced wines; the highest price was valued the least. Also Bazoche *et al.* (2015) revealed in a choice experiment on sustainable wine, that the high price level was significantly less chosen than the low priced wine and Brugarolas *et al.* (2010) showed that the higher the increase in price for organic wine, the lower the probability of purchase. However, in the study of Bazoche *et al.* (2015) medium priced wines were preferred over lower priced wines when certifications (organic and biodynamic) were posted and Chiodo *et al.* (2011) showed that the lower midfield price was preferred to the lowest price. Additionally, Bonn *et al.* (2016) revealed that even though price had a strong, negative effect on behavioural intentions, trust (beliefs) in either the producer or retailer may completely reverse the impact of price on the purchase of organic wine from negative to positive. This points to the importance of consumers' attitudes when looking at the influence of context on purchase behaviour.

The conjoint analysis studies on organic wine further revealed that the origin of wine had a bigger influence on consumers' preferences than the production method (conventional vs. organic) (Bernabéu *et al.*, 2008; Chiodo *et al.*, 2011; Mann *et al.*, 2012). However, organic production was more important than the colour of the wine (Mann *et al.*, 2012) and the presence of sulphites (Chiodo *et al.*, 2011). With regard to local wine, D'Amico *et al.* (2014) found that

Italian consumers who bought wine directly from a wine producer were not interested in Geographical Indications (PDO and PGI).

The results of Rahman *et al.* (2014) and Schmit *et al.* (2013) imply that taste is a further contextual variable moderating the transformation of attitudes into purchase behaviour. The authors concluded that environmentally friendly wine may lead to price premiums, but only if consumers' sensory expectations are met. Furthermore, Mueller Loose and Lockshin (2013) found that environmental sustainability is of much less importance than the taste of the wine, reputable region, quality control and brand name. However, in a latent class analysis, they determined consumer segments of 35–38 % across all countries valuing sustainability. In a cluster analysis on Italian consumers, Pomarici *et al.* (2016) basically revealed the same: a consumer segment of 32 % is highly interested in environmentally friendly wines. The results imply that if the commitment towards environmentally sustainable wine is very strong, attitudes may outperform contextual variables. Overall, these results show that there are several contextual variables (e.g. price, origin, taste, store type, promotion, type of wine) involved in wine purchasing decisions, interacting with each other and influencing consumers' attitudes as well.

3.1.6.5 *Habit*

Habits play a major role in food purchasing decisions. They are effected by contextual variables and the formation of attitudes and thus conciliate between behaviour and attitudes/context (Zepeda and Deal, 2009). Pomarici and Vecchio (2014) found that being responsible for food shopping, wine purchasing frequency and interest in sustainable food shopping significantly increased the purchase probability for social, environmental or ethical labelled wine. Vecchio (2013) found wine consumption frequency and caring about environmental sustainability in wine shopping to be significant factors influencing the WTP premiums for wines with an environmental and an ethical feature. Additionally, Pomarici *et al.* (2016) showed that the consumer segment which was highly interested in environmentally friendly wines was characterised by individuals who drink wine more frequently. These findings emphasize the influence of attitude of interest in sustainability issues on the formation of habits. For organic wine, the total amount of wine consumed had no influence on organic wine purchases (Mann *et al.*, 2012).

Important drivers of local wine consumption for consumers from the Northern Appalachian states were a weekly or monthly frequency of wine purchases, and high frequency of local food purchase (Woods *et al.*, 2013). Likewise, Italian consumers who bought wine directly from a

wine producer revealed a monthly shopping frequency (D'Amico *et al.*, 2014). Another study (Loureiro, 2003) on US consumers from Colorado revealed similar results. Consumers who bought wine at least once a week showed a higher WTP for local wines. This was attributed to the higher information level of frequent wine drinkers regarding the quality of local wine and their advanced ability to differentiate between good and bad Colorado wines. With regard to the Alphabet Theory, knowledge is important in the formation of attitudes towards the quality of local wine, which in turn may create the habit of buying local wine and possibly facilitate behaviour. In addition to the importance of habits in purchasing alternative food, Feldmann and Hamm (2015) point to spontaneous purchase situations in their review on consumers' perception and preferences for local food. For example, consumers might spontaneously buy a bottle of wine when they do grocery shopping at the supermarket, even though they usually purchase larger quantities from a local winery. Interestingly, behaviour may lead to the strengthening or the creation of new habits (Zepeda and Deal, 2009).

3.1.6.6 Behaviour

Eventually, all above described constructs will constitute aspects of consumers' purchasing behaviour regarding wine with sustainability characteristics. As none of the reviewed articles analysed purchase behaviour in real market scenarios (with real market transactions), most of the studies implemented one of the following experimental designs to get more realistic preferences and WTP values: choice experiment, conjoint analysis, best worst scaling, different methods of auctions and contingent valuation (see Table 2 in appendix: method). Two studies implied the hedonic price method to observe consumers' value for product characteristics indirectly through market supply data. Results of experimental and hedonic analysis are close antecedents of purchase behaviour, although they are still of a hypothetical nature. Studies applying incentive compatible scenarios with real wines sold and real money paid (Ay *et al.*, 2014; Bazoche *et al.*, 2008; Bazoche *et al.*, 2015; Grebitus *et al.*, 2013; Schmit *et al.*, 2013; Vecchio, 2013) deliver consumer preferences and/or a WTP which can be considered consumers' actual purchase behaviour (revealed preference). Because it is difficult to compare WTP values across studies from different countries applying different methods on wines with different sustainability characteristics, we did not report concrete WTP values.

Wiedmann *et al.* (2014) identified higher willingness to recommend organic wine as well as higher WTP for organic wine compared to conventional wine through an open-ended question. The studies by Pagliarini *et al.* (2013) and Brugarolas *et al.* (2010) basically confirmed this result. Most of the participants stated, when directly questioned, that they would be willing to

pay a premium for organic wine (Pagliarini *et al.*, 2013) and a large percentage of consumers would pay more for an organic wine in a study applying contingent valuation (Brugarolas *et al.*, 2010). Furthermore, the WTP for organic wine was significantly higher compared to conventional non-local wine in a French study applying the auction mechanism. For local wine, the organic premium was even higher (Ay *et al.*, 2014). Moreover Kwong *et al.* (2011) found that organic wines command significantly higher prices in a hedonic price analysis on all wines produced in Ontario (Canada) and released for sale. They concluded that Canadian consumers care about viticulture techniques used in the cultivation of the grapes. In addition, organic wine was preferred over conventional wine in a conjoint study on Italian (Chiodo *et al.*, 2011) and Spanish consumers (Bernabéu *et al.*, 2008). However, in a conjoint study on Swiss consumers, most consumers preferred conventional wine over organic wine (Mann *et al.*, 2012). Furthermore, Bazoche *et al.* (2008) found that the probability to buy and the WTP for Bordeaux wine was not significantly influenced by the organic label in a study applying an auction mechanism. For other environmental labels, no significant result or even a negative relation to purchase probability and willingness to buy was found. Bazoche *et al.* (2015) also found, in a choice experiment, no positive effect of the organic label on the purchase frequency, but a significant influence of the biodynamic label. Basically the same was revealed in a hedonic price analysis of Delmas and Grant (2008) on Californian wines. Eco-labels had a negative impact on prices, while a price premium for the eco-certification was detected. The result was attributed to consumers' negative connotation with organic wine. Regarding organic wines without added sulphites, the majority of Italian respondents stated that they would not pay a premium. Instead, they would pay higher prices for naturalness and designation of origin (D'Amico *et al.*, 2016). Conflicting results regarding WTP and preferences for organic wine may be explained to a certain extent by different study countries and varying research designs and methods.

Spanish consumers were willing to pay a price premium for sustainable wine in a study applying contingent valuation (Sellers, 2016) and for three different sustainable wines (environmental, social and ethical) in an Italian study employing an auction mechanism (Vecchio, 2013). Additionally, most of the respondents indicated an intention to pay more for an environmentally sustainable wine in a study on New Zealand consumers where respondents were asked directly if they were willing to pay a higher price for a sustainably produced wine (Forbes *et al.*, 2009). For environmentally friendly wine, US consumers' WTP was higher compared to regular Colorado wine, but fairly low in a study implementing contingent valuation (Loureiro, 2003). To compare consumers' WTP for different sustainability logos, Mueller Loose and Remaud

(2013) conducted a cross-national study applying a discrete choice experiment. The environmental corporate responsibility label showed a higher marginal WTP than the label related to social responsibility. The organic food logo received the highest implicit valuation by consumers on average, and in each analysed country; the highest WTP values were observed for France, followed by Germany.

Grebitus *et al.* (2013) found that German consumers were willing to pay more for local wine in a study adopting an auction mechanism: average WTP decreased when the distance of transportation, indicated through a food miles label, increased. Furthermore, Burgundian consumers' WTP for local wine (Marsannay, a GI from Burgundy) was higher compared to the non-local wine (Vacqueyras, a GI from the Rhône Valley) (Ay *et al.*, 2014). Castilla-La Mancha consumers showed the highest preference for wine from their local area followed by other wines from Castilla-La Mancha, and the lowest preference for national wine (Bernabéu *et al.*, 2008). In contrast, Swiss wine consumers preferred wines from France over wines from Switzerland. They ascribed this to France's longer tradition for high quality wine and concluded that wine purchasing decisions are made with a clear focus on quality (Mann *et al.*, 2012). Furthermore, Ay *et al.* (2014) showed that living closer to a vineyard (participants lived 3–11 km away from the nearest vineyard) decreased the WTP for local, organic or conventional wine. This result could be due to the short supply chain facing consumers, the available social networks, and the presence of least-cost alternatives if they buy their wines directly from the closely located producers. However, focusing on organic premiums, participants living far from vineyards showed a smaller premium for organic wine than those living close to a vineyard. Basically, the same result was found by Brugarolas *et al.* (2010). They found that WTP for organic wine was higher for Spanish consumers from regions where wine production shares a larger proportion of the regional economy. Hence, for local wine purchases the demographic characteristic 'place of residence' is an important parameter.

3.1.7 Discussion and conclusions

The Alphabet Theory was a suitable framework to categorise the results of the literature research and to reach a better understanding of the interrelationship of different variables influencing the purchase of wine with characteristics of sustainable production. Combining the formation of attitudes (VBN-Theory) with context (ABC-Theory) described how attitudes were transmitted into behaviour. In this way, the reason why purchase intentions do not always translate into purchase behaviour could be explained. Thus, Alphabet Theory offered an explanation of the attitude-behaviour gap, which is often referred to in studies on alternative

food purchase behaviour. Additionally, the variable knowledge helped to explain the reinforcement of attitudes and how they in turn affect the way consumers search for even more information. Insights on the constructs ‘information seeking’ and ‘knowledge’ are especially valuable for marketers aiming to justify higher prices for wine with sustainability characteristics. Furthermore, demographic data were useful in developing consumer profiles which are of high practical relevance for targeted marketing activities. The implementation of habits improved the explanation of consumers’ purchase behaviour even more. However, spontaneous purchase situations also need to be taken into consideration. Overall, the review confirmed the Alphabet Theory as a framework to analyse purchase behaviour of wine with sustainability characteristics and is recommended as a theoretical framework for further studies on purchase behaviour. Moreover, this framework enabled a systematic overview of the state of the art and research gaps could be identified (Figure 3).

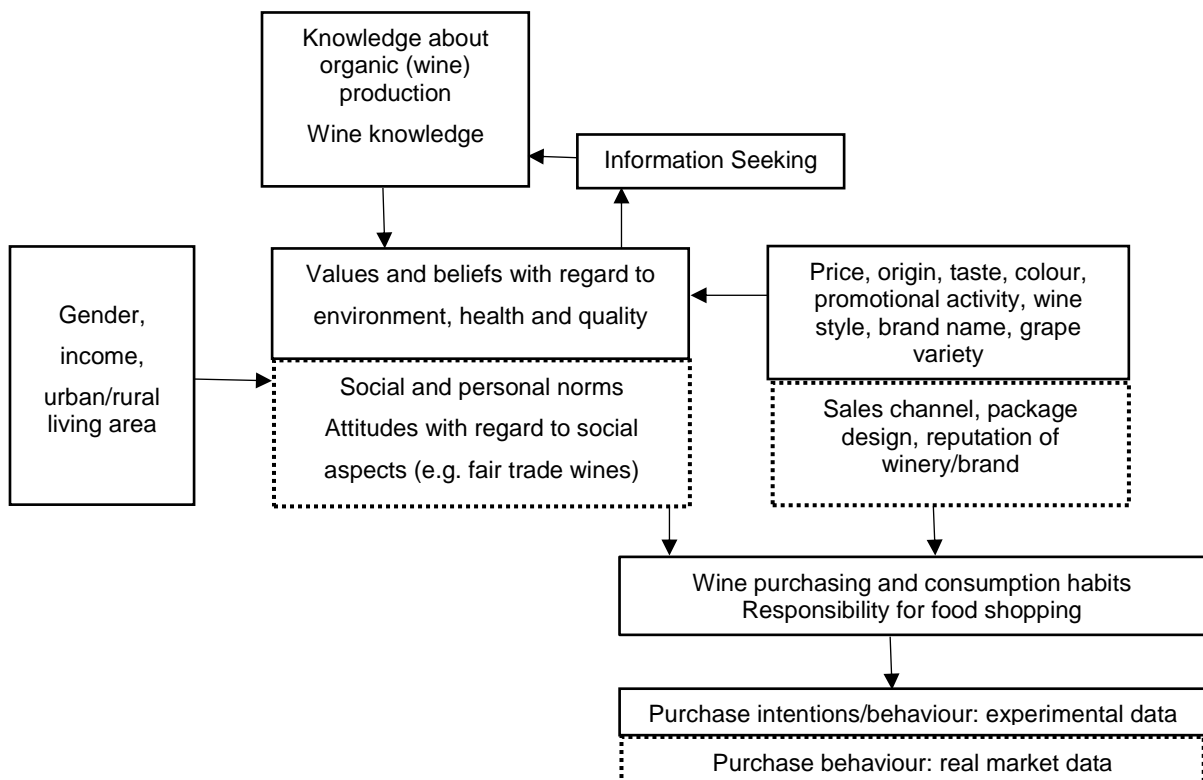


Figure 3: Consumers’ purchase behaviour for wine with sustainability characteristics: overview of the influencing factors and most relevant research gaps, based on the Alphabet Theory of Zepeda and Deal (2009)

(→ Impact of factors depends on the analysed sustainability characteristics; Research gaps)

Most of the studies reviewed focused on the environmental aspects of sustainability and examined organic wines. Future research should, therefore, additionally focus on social and economic aspects of sustainability. Large research gaps about the impact of context (e.g. price and availability) on consumers’ purchase behaviour exist, particularly in the field of local production. No studies were found regarding fair trade wine. The review also indicated that, due to the low awareness of the broad concept of ‘sustainability’, marketers, retailers and

producers should disseminate relevant information on environmental as well as on social and economic aspects of wine production to raise consumers' knowledge of sustainable wine production so as to create preferences and influence purchase behaviour. Regarding the studied countries, Europe and the US are generally well-examined, although there is need for further research on New World wine producing nations as well as on Asian consumers. Both Asia and North America are growing wine consumption markets while most of the traditional wine consumer countries in the EU recorded a reduction in their share of the global market (OIV International Organisation of Vine and Wine, 2015).

Depending on the strength of consumers' attitudes towards sustainability issues, various wine characteristics (context) like origin, taste and wine style influence the decision-making process. The contextual variable 'price' was found to be one of the most important product attributes that could prevent the purchase of organic and sustainable wine. Yet, the results underline that the effect of the contextual variable 'price' depends on consumers' values and beliefs regarding organic and sustainability labels. Hence, certain consumer groups were willing to pay price premiums for sustainable and organic wines. The review hints that the effect of price depends on the sales channel. In a study on the German wine market, Szolnoki and Hoffmann (2014) identified six consumer segments according to the utilisation of different sales channels and found a difference regarding their preference for either low or high priced wines. It should also be taken into consideration that price itself can influence the quality perception of sustainable wine, e.g. low price could imply low quality and vice versa. Future research should address consumers' price oriented quality perception in order to validate these conclusions and to give marketers recommendations for price-setting in different sales channels (discount, supermarket, wine-stores and cellar-door). Regarding further contextual variables, so far, little is known about variables like grape variety or wine style and no results were found on package design and the reputation of wineries or brands. Interesting insights on its interaction with attitudes and behaviour towards wine with sustainability characteristics could lead to an even deeper understanding of consumers' purchase behaviour.

Values and beliefs regarding environmentalism were given most often as motivators for the purchase of wine with sustainability characteristics. For organic wine, attitudes towards health and taste were presented as further determining factors. Overall, sustainable and organic wine was often believed to be of higher quality. However, social and personal norms were not involved in studies on the formation of attitudes. As social desirability is an important issue for purchasing wine, especially when hosting friends or buying wine as a gift (Orth, 2005), this

issue should be addressed in future studies on wine with sustainability characteristics. Gaining a deeper understanding of consumers' attitudes and their buying habits regarding different sustainability attributes will support wine marketers in their efforts to develop marketing strategies and to reach additional consumer segments.

A solid research body exists on consumers' preferences and WTP for wine with characteristics of sustainable production. However, none of the reviewed articles analysed purchase behaviour in a real market context and experimental methods provide evidence of an attitude-behaviour gap. Future research should therefore focus on consumers' purchase behaviour in a market context, for example, through the analysis of household panel data on organic wine. Analysing purchase data combined with survey data will result in a deeper understanding of the factors moderating the translation of attitudes into behaviour.

Given the review's findings, we assume that there is a considerable segment of consumers across different countries with positive perceptions pertaining to sustainable production methods of wine, who are willing to pay a premium for such a wine. These consumers are typically female with higher incomes, and people living in urban areas. However, the results indicate that local wine consumers differ in these characteristics. Further research is needed to validate these first findings. In conclusion, producing and marketing wine with characteristics of sustainable production is a promising strategy for quality differentiation. The results further indicate that consumers have even stronger preferences for organic wines when supplied in local markets. There seems to be a market opportunity for local, organic wine which needs to be further investigated.

3.1.8 Acknowledgements

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3.1.9 Appendix

Table 2: List of reviewed publications

Author(s), year	Title	Journal/ Conference proceedings	Study focus	Conceptualisation of the study focus	Element of Alphabet Theory	Method	Type of methodology	Sample size	Country
Ay et al., 2014	Does living close to a vineyard increase the willingness-to-pay for organic and local wine?	paper prepared for the EAAE Congress	organic and local	local wine: GI Marsannay (Burgundy); non-local wine: GI Vacqueyras (Rhône); EU regulation on organic production	information actual purchase behaviour	auction mechanism of Becker, DeGroot and Marshak	quantitative	111	France
Barber et al., 2010	Wine tourism, environmental concerns, and purchase intention	Journal of Travel & Tourism Marketing	environmentally friendly	ecological impacts of wine tourism linked to farming, harvesting, wine production, as well as the specific activities and travel patterns of wine tourists	demographics attitudes purchase intention	e-mail survey	quantitative	315	USA
Bazoche et al., 2008	An experimental study of wine consumers' willingness to pay for environmental characteristics	paper prepared for the EAAE International Congress	environmentally friendly	labels that indicate the use of few pesticides: Terra Vitis, Dulong, Filière Qualité Carrefour and French organic farming	information actual purchase behaviour	sensory evaluation in conjunction with an auction mechanism of Becker, DeGroot and Marshak	quantitative	139	France

Bazoche et al., 2015	Evaluating consumers' sustainable choice of wine: A virtual shop experiment	paper prepared for the EAAE-AAEA Joint Seminar	sustainable	labels with three pesticide levels: sustainable wine (integrated wine with reduced pesticide use), organic label (ban of chemical pesticides) and biodynamic label (ban of chemical pesticides and constraints linked to respect for nature's cycles)	information context actual purchase behaviour	choice experiment	quantitative	111	France
Bernabéu et al., 2008	Wine origin and organic elaboration, differentiating strategies in traditional producing countries	British Food Journal	organic and local	local wine: specific GI to which consumer's residence belongs within Castilla-La Mancha; non-local wine: other wines from Castilla-La Mancha; no definition on organic wine	demographics context purchase intention	conjoint analysis	quantitative	400	Spain
Bonn et al., 2016	Do environmental sustainable practices of organic wine suppliers affect consumers' behavioral intentions?	Cornell Hospitality Quarterly	organic and environmentally sustainable	environmental sustainable practices used by organic wine producers and retailers	attitudes context purchase intention	face-to-face survey	quantitative	471	USA (Florida)

Brugarolas et al., 2010	A contingent valuation analysis to determine profitability of establishing local organic wine markets in Spain	Renewable Agriculture and Food Systems	organic	no definition given	demographics knowledge context purchase intention	face-to-face survey including contingent valuation method	quantitative	800	Spain
Chiodo et al., 2011	Evaluation of the effects of changes in regulatory policies on consumers perception: The case of designations of origin in the wine common market organisation	paper prepared for the 122nd EAAE Seminar	organic	EU organic label	context purchase intention	conjoint analysis	quantitative	207	Italy
D'Amico et al., 2014	Short food supply chain and locally produced wines: Factors affecting consumer behaviour	Italian Journal of Food Science	local	direct sales from wine producer to final wine consumer	demographics context habits purchase intention	face-to-face survey	quantitative	953	Italy
D'Amico et al., 2016	Exploring environmental consciousness and consumer preferences for organic wines without sulfites	Journal of Cleaner Production	organic	organic wine without sulfites	demographics knowledge attitudes purchase intention	face-to-face survey	quantitative	201	Italy
Delmas and Grant, 2008	Eco-labeling strategies: The eco-premium puzzle in the wine industry	AAWE Working Paper No. 13	environmentally friendly	U.S.D.A National Organic Program standard and Demeter Certification	purchase intention	hedonic price analysis	quantitative	13,426 wines	USA (California)

Forbes et al., 2009	Consumer attitudes regarding environmentally sustainable wine: An exploratory study of the New Zealand marketplace	Journal of Cleaner Production	environmentally sustainable	many biological and ecological strategies that have been adopted by some New Zealand wine producers	information attitudes purchase intention	face-to-face survey	quantitative	109	New Zealand
Fotopoulos et al., 2003	Wine produced by organic grapes in Greece: Using means-end chains analysis to reveal organic buyers' purchasing motives in comparison to the non-buyers	Food Quality and Preference	organic	EU regulation on organic production	attitudes purchase intention	means-end-chains analysis	qualitative	49	Greece
Ginon, Ares, Laboissière et al., 2014	Logos indicating environmental sustainability in wine production: An exploratory study on how do Burgundy wine consumers perceive them	Food Research International	environmentally sustainable	14 logos indicating environmental sustainability including French organic farming and Demeter certification	knowledge	survey including an open-ended question	qualitative	127	France
Grebitus et al., 2013	Effect of distance of transportation on willingness to pay for food	Ecological Economics	local	different logos indicating the distance of transportation (20, 1000, 11,000, 18,000)	demographics attitudes actual purchase behaviour	non-hypothetical Vickrey auctions	quantitative	47	Germany

Kim and Bonn, 2015	The moderating effects of overall and organic wine knowledge on consumer behavioral intention	Scandinavian Journal of Hospitality and Tourism	organic	U.S.D.A National Organic Program standard	knowledge attitudes purchase intention	online survey	quantitative	1,362	
Kwong et al., 2011	A semi-parametric hedonic pricing model of Ontario wines	Canadian Journal of Agricultural Economics	environmentally sustainable	wines produced using environmentally sustainable viticulture practices: organic and biodynamic wines	purchase intention	hedonic price analysis	quantitative	373 wines	Canada
Loureiro, 2003	Rethinking new wines: Implications of local and environmentally friendly labels	Food Policy	environmentally friendly and local	environmentally friendly labels: standards are not as strict as in organic labelling, and vary from producer to producer; local: labels claiming local origin of the state Colorado	demographics attitudes habits purchase intention	face-to-face survey including contingent valuation method	quantitative	406	USA, (Colorado)
Mann et al., 2012	What matters to consumers of organic wine?	British Food Journal	organic and local	local wine: Swiss wine; non-local wines origin from France and Spain; no definition on organic wine	demographics knowledge attitudes context habits purchase intention	conjoint analysis	quantitative	404	Switzerland

Mueller Loose and Lockshin, 2013	Testing the robustness of best worst scaling for cross-national segmentation with different numbers of choice sets	Food Quality and Preference	environmentally sustainable	no definition given	context purchase intention	best-worst scaling	quantitative	2,500	UK, Ireland, US, Canada, Sweden
Mueller Loose and Rемаud, 2013	Impact of corporate social responsibility claims on consumer food choice: A cross-cultural comparison	British Food Journal	corporate social responsibility (CSR)	CSR claim, environmental responsibility claim, organic claim, resource specific environmental claims: carbon zero and less glass weight	knowledge attitudes purchase intention	choice experiment	quantitative	11,322	UK, France, Germany, US East Coast, US Midwest, and Anglo-phone and Franco-phone Canada
Pagliarini et al., 2013	Sensory descriptors, hedonic perception and consumer's attitudes to Sangiovese red wine deriving from organically and conventionally grown grapes	Frontiers in Psychology	organic	organic agriculture is a production management system that promotes and enhances bio-diversity, biological cycles and soil biological activity	attitudes purchase intention	sensory evaluation in conjunction with a survey	quantitative	100	

Pomarici et al., 2016	Environmental friendly wines: A consumer segmentation study	Agriculture and Agricultural Science Procedia	environmentally friendly	limited environmental impact and limited water consumption	demographics knowledge attitudes habits purchase intention	computer assisted telephone interview	quantitative	301	Italy
Pomarici and Vecchio, 2014	Millennial generation attitudes to sustainable wine: An exploratory study on Italian consumers	Journal of Cleaner Production	sustainable	carbon neutral label (environmental attribute); Libera Terra label (social attribute); Wine for Life label (social responsibility)	demographics knowledge habits purchase intention	online survey	quantitative	500	Italy
Rahman et al., 2014	A comparison of the influence of purchaser attitudes and product attributes on organic wine preferences	Cornell Hospitality Quarterly	organic	U.S.D.A National Organic Program standard	attitudes context purchase intention	sensory evaluation in conjunction with a survey	quantitative	224	USA
Schmit et al., 2013	Consumer valuation of environmentally friendly production practices in wines, considering asymmetric information and sensory effects	Journal of Agricultural Economics	environmentally friendly	environmentally friendly canopy management practices	context actual purchase behaviour	sensory evaluation in conjunction with a sealed-bid first-price English auction	quantitative	169	USA
Sellers 2016	Would you pay a price premium for a sustainable wine?	Agriculture and Agricultural Science Procedia	sustainable	environmental, economic and social aspects	demographics knowledge	online survey including contingent valuation	quantitative	553	Spain

					purchase intention				
Sogari et al., 2015	Consumer attitude towards sustainable-labelled wine: An exploratory approach	International Journal of Wine Business Research	sustainable	environmental, economic and social aspects	demographics attitudes purchase intention	online survey	quantitative	495	Italy
Sogari et al., 2016	Factors driving sustainable choice: The case of wine	British Food Journal	sustainable	environmental, economic and social aspects	attitudes purchase intention	online survey including contingent valuation	quantitative	495	Italy
Soosay et al., 2012	Sustainable value chain analysis – A case study of Oxford Landing from “vine to dine”	Supply Chain Management: An International Journal	sustainable	environmentally sustainable production process and packaging	Information knowledge context purchase intention	focus group discussion and online survey	mixed	6 focus groups, survey 1,100	UK
van Tonder and Mulder, 2015	Marketing communication for organic wine: Semiotic guidelines for wine bottle front labels	Communicatio: South African Journal for Communication Theory and Research	organic	no definition given	information	e-mail survey	qualitative	10	South Africa
Vecchio, 2013	Determinants of willingness-to-pay for sustainable wine: Evidence from experimental auctions	Wine Economics and Policy	sustainable	carbon neutral label (environmental attribute); Libera Terra label (social attribute); Wine for Life label (social responsibility)	demographics knowledge habits actual purchase behaviour	Vickrey fifth-price full bidding auctions	quantitative	80	Italy

Wiedmann et al., 2014	Tasting green: An experimental design for investigating consumer perception of organic wine	British Food Journal	organic	EU regulation on organic production	information attitudes purchase intention	sensory evaluation in conjunction with a survey	quantitative	66	Germany
Woods et al., 2013	Linking wine consumers to the consumption of local wines and winery visits in the Northern Appalachian States	International Food and Agribusiness Management Review	local	labels claiming local origin of the states Colorado, Pennsylvania, Ohio, Kentucky, and Tennessee	demographics knowledge habits purchase intention	online survey	quantitative	1,609	USA (Northern Appalachian States)

3.1.10 References

- Ay, J.-S., Chakir, R. and Marette, S. (2014), “Does living close to a vineyard increase the willingness-to-pay for organic and local wine?”, paper prepared for the EAAE 2014 Congress ‘Agri-Food and Rural Innovations for Healthier Societies’. Ljubljana, Slovenia, August 26–29, 2014, available at: <http://purl.umn.edu/183075> (accessed 18 February 2016).
- Barber, N., Taylor, D.C. and Deale, C.S. (2010), “Wine tourism, environmental concerns, and purchase intention”, *Journal of Travel & Tourism Marketing*, Vol. 27 No. 2, pp. 146–165.
- Bazoche, P., Deola, C. and Soler, L.G. (2008), “An experimental study of wine consumers’ willingness to pay for environmental characteristics”, paper prepared for the EAAE International Congress. Ghent, Belgium, August 26–29, 2008, available at: <http://purl.umn.edu/43651> (accessed 18 February 2016).
- Bazoche, P., Issanchou, S., Brouard, J., Maratray, J. and Ginon, E. (2015), “Evaluating consumers’ sustainable choice of wine: A virtual shop experiment. paper prepared for the EAAE-AAEA Joint Seminar ‘Consumer Behavior in a Changing World: Food, Culture, Society’. Naples, Italy, March 25–27, 2015”, available at: <http://purl.umn.edu/202735> (accessed 22 March 2016).
- Bernabéu, R., Brugarolas, M., Martínez-Carrasco, L. and Díaz, M. (2008), “Wine origin and organic elaboration, differentiating strategies in traditional producing countries”, *British Food Journal*, Vol. 110 No. 2, pp. 174–188.
- Bonn, M.A., Cronin, J.J. and Cho, M. (2016), “Do environmental sustainable practices of organic wine suppliers affect consumers behavioral intentions? The moderating role of trust”, *Cornell Hospitality Quarterly*, Vol. 57 No. 1, pp. 21–37.
- Brugarolas, M., Martinez-Carrasco Martinez, L., Bernabéu, R. and Martinez-Poveda, A. (2010), “A contingent valuation analysis to determine profitability of establishing local organic wine markets in Spain”, *Renewable Agriculture and Food Systems*, Vol. 25 No. 1, pp. 35–44.
- Chiodo, E., Casolani, N. and Fantini, A. (2011), “Evaluation of the effects of changes in regulatory policies on consumers perception: The case of designations of origin in the wine common market organisation”, paper prepared for the EAAE 122nd Seminar. Ancona, Italy, February 17–18, 2011, available at: <http://purl.umn.edu/99590> (accessed 18 February 2016).

- Christ, K.L. and Burritt, R.L. (2013), "Critical environmental concerns in wine production: An integrative review", *Journal of Cleaner Production*, Vol. 53, pp. 232–242.
- D'Amico, M., Di Vita, G., Chinnici, G., Pappalardo, G. and Pecorino, B. (2014), "Short food supply chain and locally produced wines: Factors affecting consumer behavior", *Italian Journal of Food Science*, Vol. 26 No. 3, pp. 329–334.
- D'Amico, M., Di Vita, G. and Monaco, L. (2016), "Exploring environmental consciousness and consumer preferences for organic wines without sulfites", *Journal of Cleaner Production*, Vol. 120, pp. 64–71.
- Defrancesco, E., Estrella Orrego, J. and Gennari, A. (2012), "Would 'New World' wines benefit from protected geographical indications in international markets? The case of Argentinean Malbec", *Wine Economics and Policy*, Vol. 1 No. 1, pp. 63–72.
- Delmas, M.A. and Grant, L.E. (2008), "Eco-labeling strategies: The eco-premium puzzle in the wine industry", *American Association of Wine Economists, Working Papers No. 13*, available at: <http://purl.umn.edu/37325> (accessed 30 January 2017).
- Drennan, J., Bianchi, C., Cacho-Elizondo, S., Louriero, S., Guibert, N. and Proud, W. (2015), "Examining the role of wine brand love on brand loyalty: A multi-country comparison", *International Journal of Hospitality Management*, Vol. 49, pp. 47–55.
- Dunlap, R.E. and Van Liere, K.D. (1978), "The 'New Environmental Paradigm'", *The Journal of Environmental Education*, Vol. 9 No. 4, pp. 10–19.
- Dunlap, R.E., Van Liere, K.D., Mertig, A.G. and Jones, R.E. (2000), "Measuring endorsement of the New Ecological Paradigm: A revised NEP Scale", *Journal of Social Issues*, Vol. 56 No. 3, pp. 425–442.
- EU (2012), "Regulation (EU) No 1151/2012 of the European Parliament and of the Council of 21 November 2012 on quality schemes for agricultural products and foodstuffs".
- EU Commission (2012), "Regulation (EU) No 203/2012 of 8 March 2012 Amending Regulation (EC) No 889/2008 Laying Down Detailed Rules for the Implementation of Council Regulation (EC) No 834/2007, as Regards Detailed Rules on Organic Wine".
- Fairtrade Foundation (2016), "Fairtrade wine", available at: <http://www.fairtrade.org.uk/en/buying-fairtrade/wine> (accessed 17 March 2016).
- Feldmann, C. and Hamm, U. (2015), "Consumers' perceptions and preferences for local food: A review", *Food Quality and Preference*, Vol. 40, pp. 152–164.
- Fernqvist, F. and Ekelund, L. (2014), "Credence and the effect on consumer liking of food – A review", *Food Quality and Preference*, Vol. 32, pp. 340–353.

- Forbes, S.L., Cohen, D.A., Cullen, R., Wratten, S.D. and Fountain, J. (2009), "Consumer attitudes regarding environmentally sustainable wine: An exploratory study of the New Zealand marketplace", *Journal of Cleaner Production*, Vol. 17 No. 13, pp. 1195–1199.
- Forbes, S.L. and DeSilva, T.-A. (2012), "Analysis of environmental management systems in New Zealand wineries", *International Journal of Wine Business Research*, Vol. 24 No. 2, pp. 98–114.
- Fotopoulos, C., Krystallis, A. and Ness, M. (2003), "Wine produced by organic grapes in Greece: using means-end chains analysis to reveal organic buyers' purchasing motives in comparison to the non-buyers", *Food Quality and Preference*, Vol. 14 No. 7, pp. 549–566.
- Ginon, E., Ares, G., Esteves dos Santos Laboissière, Lúcia Helena, Brouard, J., Issanchou, S. and Deliza, R. (2014), "Logos indicating environmental sustainability in wine production: An exploratory study on how do Burgundy wine consumers perceive them", *Food Research International*, Vol. 62, pp. 837–845.
- Grebitus, C., Lusk, J.L. and Nayga, R.M. (2013), "Effect of distance of transportation on willingness to pay for food", *Ecological Economics*, Vol. 88, pp. 67–75.
- Guagnano, G.A., Stern, P.C. and Dietz, T. (1995), "Influences on attitude-behavior relationships. A natural experiment with curbside recycling", *Environment and Behavior*, Vol. 27 No. 5, pp. 699–718.
- Gustafson, C.R., Lybbert, T.J. and Sumner, D.A. (2016), "Consumer sorting and hedonic valuation of wine attributes: Exploiting data from a field experiment", *Agricultural Economics*, Vol. 47 No. 1, pp. 91–103.
- Jaeger, S.R., Mielby, L.H., Heymann, H., Jia, Y. and Frøst, M.B. (2013), "Analysing conjoint data with OLS and PLS regression: A case study with wine", *Journal of the Science of Food and Agriculture*, Vol. 93 No. 15, pp. 3682–3690.
- Kim, H. and Bonn, M.A. (2015), "The moderating effects of overall and organic wine knowledge on consumer behavioral intention", *Scandinavian Journal of Hospitality and Tourism*, Vol. 15 No. 3, pp. 295–310.
- Klohr, B., Fleuchaus, R. and Theuvsen, L. (2013), "Sustainability: Implementation programs and communication in the leading wine producing countries", paper prepared for the 7th International Conference of the AWBR, June 12–15, 2013, Ontario, Canada., available at: <http://academyofwinebusiness.com/wp-content/uploads/2013/04/Klohr-Fleuchaus-Theuvsen.pdf> (accessed 23 May 2016).
- Kneafsey, M., Venn, L., Schmutz, U., Balázs, B., Trenchard, L., Eyden-Wood, T., Bos, E., Sutton, G. and Blackett, M. (2013), *Short food supply chains and local food systems in the*

- EU: A state of play of their socio-economic characteristics, Publications Office of the European Union, Luxemburg.
- Kwong, L.M.K., Cyr, D., Kushner, J. and Ogwang, T. (2011), "A semiparametric hedonic pricing model of Ontario wines", *Canadian Journal of Agricultural Economics*, Vol. 59 No. 3, pp. 361–381.
- Lockshin, L. and Corsi, A.M. (2012), "Consumer behaviour for wine 2.0: A review since 2003 and future directions", *Wine Economics and Policy*, Vol. 1 No. 1, pp. 2–23.
- Lockshin, L. and Hall, J. (2003), "Consumer purchasing behaviour for wine: What we know and where we are going", proceedings of the International Wine Marketing Colloquium. Adelaide, Australia, Juli 2013, available at: <http://academyofwinebusiness.com/wp-content/uploads/2010/05/File-030.pdf> (accessed 20 June 2016).
- Loureiro, M.L. (2003), "Rethinking new wines: Implications of local and environmentally friendly labels", *Food Policy*, Vol. 28 No. 5–6, pp. 547–560.
- Mann, S., Ferjani, A. and Reissig, L. (2012), "What matters to consumers of organic wine?", *British Food Journal*, Vol. 114 No. 2, pp. 272–284.
- Martínez-Carrasco, L., Brugarolas, M., Martínez-Poveda, A. and Ruiz-Martínez, J.J. (2015), "Comparing hypothetical versus non-hypothetical methods for measuring willingness to pay in a food context", *Spanish Journal of Agricultural Research*, Vol. 13 No. 4, pp. 1–12.
- Miller, K.M., Hofstetter, R., Krohmer, H. and Zhang, Z.J. (2011), "How should consumers' willingness to pay be measured? An empirical comparison of state-of-the-art approaches", *Journal of Marketing Research*, Vol. 48 No. 1, pp. 172–184.
- Mueller Loose, S. and Lockshin, L. (2013), "Testing the robustness of best worst scaling for cross-national segmentation with different numbers of choice sets", *Food Quality and Preference*, Vol. 27 No. 2, pp. 230–242.
- Mueller Loose, S. and Remaud, H. (2013), "Impact of corporate social responsibility claims on consumer food choice: A cross-cultural comparison", *British Food Journal*, Vol. 115 No. 1, pp. 142–166.
- OIV International Organisation of Vine and Wine (2015), "World Vitiviniculture situation", available at: <http://www.oiv.int/public/medias/2777/report-mainz-congress-2015-oiv-en-7.pdf> (accessed 18 April 2016).
- Orth, U.R. (2005), "Consumer personality and other factors in situational brand choice variation", *Journal of Brand Management*, Vol. 13 No. 2, pp. 115–133.

- Pagliarini, E., Laureati, M. and Gaeta, D. (2013), "Sensory descriptors, hedonic perception and consumer's attitudes to Sangiovese red wine deriving from organically and conventionally grown grapes", *Frontiers in Psychology*, Vol. 4, pp. 1–7.
- Panzone, L.A. (2014), "Why are discounted prices presented with full prices? The role of external price information on consumers' likelihood to purchase", *Food Quality and Preference*, Vol. 31, pp. 69–80.
- Pomarici, E., Amato, M. and Vecchio, R. (2016), "Environmental friendly wines: A consumer segmentation study", *Agriculture and Agricultural Science Procedia*, Vol. 8, pp. 534–541.
- Pomarici, E. and Vecchio, R. (2014), "Millennial generation attitudes to sustainable wine: An exploratory study on Italian consumers", *Journal of Cleaner Production*, Vol. 66, pp. 537–545.
- Rahman, I., Stumpf, T. and Reynolds, D. (2014), "A comparison of the influence of purchaser attitudes and product attributes on organic wine preferences", *Cornell Hospitality Quarterly*, Vol. 55 No. 1, pp. 127–134.
- Schmit, T.M., Rickard, B.J. and Taber, J. (2013), "Consumer valuation of environmentally friendly production practices in wines, considering asymmetric information and sensory effects", *Journal of Agricultural Economics*, Vol. 64 No. 2, pp. 483–504.
- Schwartz, S.H. (1977), "Normative influences on altruism", *Advances in Experimental Social Psychology*, Vol. 10, pp. 221–279.
- Schwartz, S.H. (1994), "Are there universal aspects in the structure and contents of human values?", *Journal of Social Issues*, Vol. 50 No. 4, pp. 19–45.
- Sellers, R. (2016), "Would you pay a price premium for a sustainable wine? The voice of the Spanish consumer", *Agriculture and Agricultural Science Procedia*, Vol. 8, pp. 10–16.
- Sogari, G., Corbo, C., Macconi, M., Menozzi, D. and Mora, C. (2015), "Consumer attitude towards sustainable-labelled wine: An exploratory approach", *International Journal of Wine Business Research*, Vol. 27 No. 4, pp. 312–328.
- Sogari, G., Mora, C. and Menozzi, D. (2016), "Factors driving sustainable choice: The case of wine", *British Food Journal*, Vol. 118 No. 3, pp. 632–646.
- Soosay, C., Fearne, A. and Dent, B. (2012), "Sustainable value chain analysis – A case study of Oxford Landing from 'vine to dine'", *Supply Chain Management: An International Journal*, Vol. 17 No. 1, pp. 68–77.
- Stern, P.C. (2000), "New environmental theories: Toward a coherent theory of environmentally significant behavior", *Journal of Social Issues*, Vol. 56 No. 3, pp. 407–424.

- Stern, P.C., Dietz, T., Abel, T.D., Guagnano, G.A. and Kalof, L. (1999), "A value-belief-norm theory of support for social movements: The case of environmentalism", *Human Ecology Review*, Vol. 6 No. 2, pp. 81–97.
- Stern, P.C., Kalof, L., Dietz, T. and Guagnano, G.A. (1995), "Values, beliefs, and proenvironmental action: Attitude formation toward emergent attitude objects", *Journal of Applied Social Psychology*, Vol. 25 No. 18, pp. 1611–1636.
- Strange, T. and Bayley, A. (2008), *OECD Insights: Sustainable development: Linking economy, society, environment*, OECD Publishing, Paris.
- Szolnoki, G. (2013), "A cross-national comparison of sustainability in the wine industry", *Journal of Cleaner Production*, Vol. 53, pp. 243–251.
- Szolnoki, G. and Hoffmann, D. (2014), "Consumer segmentation based on usage of sales channels in the German wine market", *International Journal of Wine Business Research*, Vol. 26 No. 1, pp. 27–44.
- United States Department of Agriculture (2000), "National Organic Program", Title 7. Part 205. 65 FR 80637, Dec 21, 2000.
- Van Tonder, E.M. and Mulder, D. (2015), "Marketing communication for organic wine: Semiotic guidelines for wine bottle front labels", *Communicatio: South African Journal for Communication Theory and Research*, Vol. 41 No. 1, pp. 131–151.
- Vecchio, R. (2013), "Determinants of willingness-to-pay for sustainable wine: Evidence from experimental auctions", *Wine Economics and Policy*, Vol. 2 No. 2, pp. 85–92.
- Wiedmann, K.-P., Hennigs, N., Behrens, S.H. and Klarmann, C. (2014), "Tasting green: An experimental design for investigating consumer perception of organic wine", *British Food Journal*, Vol. 116 No. 2, pp. 197–211.
- Willer, H., Schaack, D. and Lernoud, J. (2017), "Organic farming and market development in Europe and the European Union", in Willer, H. and Lernoud, J. (Eds.), *The World of organic agriculture: Statistics and emerging trends 2017*, Research Institute of Organic Agriculture (FiBL), Frick, and IFOAM - Organics International, Frick and Bonn.
- Woods, T.A., Nogueira, L. and Yang, S.-H. (2013), "Linking wine consumers to the consumption of local wines and winery visits in the Northern Appalachian States", *International Food and Agribusiness Management Review*, Vol. 16 No. 4, pp. 181–205.
- Yang, Y. and Paladino, A. (2015), "The case of wine: Understanding Chinese gift-giving behavior", *Marketing Letters*, Vol. 26 No. 3, pp. 335–361.
- Zepeda, L. and Deal, D. (2009), "Organic and local food consumer behaviour: Alphabet Theory", *International Journal of Consumer Studies*, Vol. 33 No. 6, pp. 697–705.

3.2 Which consumers opt for organic wine and why? An analysis of the attitude-behaviour link

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3.2.1 Abstract

Purpose: The paper aims to analyse the effect of attitudes and socio-demographics on wine consumers’ real purchase behaviour for organic wine.

Design/methodology/approach: This study is based on GfK household panel data, a real market data source of high population coverage. A two-part fractional model was applied as two distinct categories of wine buyers were observed. The first part of the two-part fractional model consisted of a standard binary choice model and defined the likelihood of belonging to the group of organic wine buyers. The second part of the model only took organic wine buyers into account and described their purchase intensity.

Findings: Preferences for organic products and sustainability concerns (e.g. environmental and social concerns) drive organic wine purchases. Proving a causal relation between attitudes and purchase behaviour gives evidence that stated preferences are a reliable indicator to predict consumer behaviour. However, the weak relation between attitudes and behaviour confirms the existence of an attitude-behaviour gap.

Practical implications: Quality benefits of organic wine production need to be communicated to attract new customers. Stronger focus should be put on sustainability issues with the aim of encouraging organic customers to also increase their expenditures for organic wine.

Originality/value: The influence of sustainability concerns on purchase behaviour is still controversial and no study, so far, has analysed real purchase data for organic wine. The results provide new insights on why attitudes do not fully transform into purchase behaviour.

Keywords: attitude-behaviour gap, purchase barrier, household panel data, organic products, wine choice

3.2.2 Introduction

Organic wine is a product made from grapes that are grown according to the principles of organic production (EU Commission, 2012). Principles of organic production ensure implementation of environmentally friendly practices through the ban of pesticides and chemical fertilizers (EU Commission, 2008). Hence, organic wine certification is one of the approaches which contributes to environmental sustainability in wine production (Mariani and Vastola, 2015). The number of farmers cultivating organic grapes globally has increased considerably in the last years. In 2004, 87,655 hectares of organic grapes were grown worldwide, whereas nearly 330,000 hectares of organic grapes were cultivated around the globe in 2015 (Lernoud and Willer, 2017b).

The growth in organic wine production has led to growing interest in the investigation of how consumers respond to this new wine attribute. Exploring consumers' attitudes and their influence on the purchase of organic wine was the main subject of previous studies. These studies based on survey data and revealed a close relation between attitudes and purchase behaviour (Schäufele and Hamm, 2017). For organic food, however, attitudes do not consistently convert into behaviour (Janssen, 2018), meaning that consumers do not always act how they talk. One reason is that stated attitudes are overestimated due to social desirability. Another reason which has been given in several studies is that consumers have positive attitudes, but are impeded to act (e.g. availability, price) (Carrington *et al.*, 2010). Therefore, it is of great value to analyse real purchase data to examine this inconsistency, which is referred to as attitude-behaviour gap.

Up to now it has not been clear whether a causal relation between ethical attitudes (environmental and social concerns) and real purchase behaviour towards organic wine exists and how strong this effect is compared to socio-demographic data. To answer these questions, the present study uses GfK household panel data, which captures the real purchase behaviour of German households, as well as attitudinal and socio-demographic data. Based on household panel data, this study is one of the first to define the socio-demographic profile of organic wine consumers as well as drivers and barriers of organic wine purchases in real market contexts. The study has two research questions: 1) which attitudes and socio-demographic characteristics affect the likelihood of purchasing organic wine, and 2) what influences the likelihood of increasing expenditure on organic wine among those who already belong to the group of organic wine buyers.

3.2.3 The role of socio-demographics for organic wine purchases

Since price was found to be an essential barrier to the purchase of organic products, the question if income level explains the purchase of organic products has been investigated in previous research (Aschemann-Witzel and Zielke, 2017). Several studies based on actual purchase data found that consumers with higher incomes were more likely to purchase organic products (Lopez and Lopez, 2009; Ngobo, 2011; Smith *et al.*, 2009a) while others found no relationship between income and actual organic purchase (Monier *et al.*, 2009; Sridhar *et al.*, 2012; Van Doorn and Verhoef, 2015). To shed light on the mixed results of previous research, the review of Aschemann-Witzel and Zielke (2017) concluded that higher income removes the barrier of price, allowing attitudes to become more important determinants at higher income levels.

With respect to organic wine, D'Amico *et al.* (2016) did not find any correlation between the level of income and the purchase of organic wine. However, an increase in income positively affected the purchase of sustainable (Sellers, 2016) and environmentally friendly wine (Loureiro, 2003; Pomarici *et al.*, 2016).

For education, no study so far has analysed real purchase data for its eventual effect on organic wine choices. However, household panel studies for other organic products have shown that consumers with a higher level of education were more likely to buy organic eggs and milk (Monier *et al.*, 2009) and organic food in general (Ngobo, 2011; Van Doorn and Verhoef, 2015). Dettmann and Dimitri (2009) revealed that an increase in the education level did not only lead to a higher probability of purchasing organic vegetables, but also positively affected the likelihood of increasing the expenditures. Only Zhang *et al.* (2009) did not find any correlation between education and the purchase of organic tomatoes and apples. Zepeda and Deal (2009) stated that education level may reflect consumers' willingness to seek information leading to an increased level of knowledge about organic production. Education is presented as one of the few socio-demographics that consistently affect organic purchase. These results show that, compared to income, level of education may be an even stronger discriminating factor in organic purchase decisions.

Another socio-demographic characteristic that might influence the purchase of organic wine is consumers' age. Thach and Olsen (2006) argued that since young adults have grown up during the time when environmental and social issues have been highlighted in the media, the internet and on social networks, they are highly informed about sustainability challenges. Gassler (2015) and Bernabéu *et al.* (2008) concluded that young adults (18–35 years old) appreciated organic wine. Moreover, those young people who already tried organic wine were willing to repeat the

purchase and paid higher prices (Gassler, 2015). In contrast, Mann *et al.* (2012) and D'Amico *et al.* (2016) did not find any relation between age and consumption of organic wine.

3.2.4 The role of attitudes for organic wine purchases

Consumers' attitudes, preferences and concerns offer higher explanatory value for organic purchase decisions compared to socio-demographics of consumers (Aschemann-Witzel and Zielke, 2017). With regard to wine, controversial study results exist if organic products' positive health and taste perceptions transfer to organic wine.

Health concerns were most often found to be influencing factors for organic wine purchases (Bonn *et al.*, 2016; Brugarolas *et al.*, 2010; D'Amico *et al.*, 2016; Mann *et al.*, 2012; Tsourgiannis *et al.*, 2013). However, Rojas-Méndez *et al.* (2014) stated that health conscious people do not drink alcoholic beverages often and organic wine would not be an alternative for these people. In addition, organic consumers may doubt health benefits of organic wine due to the fact that at least in Europe organic wine is produced with the addition of sulphites. Although, organic wine contains smaller quantities of sulphites compared to conventional wine, they are considered as additives and known as allergen. Some organic food consumers wish to avoid these two properties (Jones and Grandjean, 2017)

Similarly as for organic products in general, sensory expectations were important in consumers' wine choice. Hence, the belief in the superior taste of organic wine and the perception of an organic label as a quality cue were important motivational factors in its purchase (Kim and Bonn, 2015; Wiedmann *et al.*, 2014). Therefore, a negative quality image associated with organic wine (Mann *et al.*, 2012) particularly with regard to taste (Stolz and Schmid, 2008) could influence consumers' purchase intentions. Rahman *et al.* (2014) and Schmit *et al.* (2013) concluded that repeated purchase of environmentally friendly wine would not happen when consumers' sensory expectations are not met while a higher level of concern about the environment might lead to the purchase of organic wine despite bad taste/quality perceptions (Kim and Bonn, 2015; Rahman and Reynolds, 2017).

Regarding the effect of sustainability concerns on the purchase of organic wine, results of previous studies were not consistent. Several studies suggested that environmental concerns (Barber *et al.*, 2014; Brugarolas Mollá-Bauzá *et al.*, 2005; D'Amico *et al.*, 2016; Rahman and Reynolds, 2017) and beliefs in the environmental benefits of organic production (Bonn *et al.*, 2016; Olsen *et al.*, 2012; Tsourgiannis *et al.*, 2015) positively affected purchase intentions towards organic wine. Moreover, consumers' willingness-to-pay a price premium for organic

wine was affected by environmental concerns (Barber *et al.*, 2014; Brugarolas Mollá-Bauzá *et al.*, 2005; D'Amico *et al.*, 2016). In contrast, some studies found no relation between the perception of environmental benefits and purchase intentions (Kim and Bonn, 2015; Mann *et al.*, 2012; Rahman *et al.*, 2014).

With the development of new sustainability notions in agricultural food production in association with the concept of self-sustaining local economy, local food movements have gained popularity in the last years (Thilmany *et al.*, 2008). Local food movement activists argue that sustainability is best guaranteed by the formation of local small-scale community economies and by consuming food produced within the local area of their residence (Curtis, 2003). Since there are some common sustainability and egoistic characteristics in organic and local food related to better taste perception, health, and environmental benefits, consumers' intentions to purchase organic and local food frequently overlap (Hempel and Hamm, 2016; Janssen, 2018). With respect to wine, Grebitus *et al.* (2013) concluded, however, that consumers' environmental concerns and positive taste perceptions with regard to local wine had no significant impact on willingness-to-pay, but the support of local production was an influencing factor to pay more for local wine. Local origin was a motivation for French (Ay *et al.*, 2014) and Spanish consumers (Brugarolas *et al.*, 2010) to pay higher prices for organic wine.

These results raise the question if a relationship between appreciation of local and domestic production and purchase of organic wine in Germany exists.

3.2.5 Data and Methods

3.2.5.1 Data description

This study makes use of household panel data provided by the GfK Group (Nuremberg, Germany) which is unique due to its inclusion of data on the grocery purchases of 30,000 households in combination with results of a panel survey. The survey provides information on the socio-demographic characteristics and attitudes of each household towards sustainable, organic, environmentally friendly, and local food production. For the analysis, a subset of the full panel sample was used that includes only households that bought wine at least once during the one-year period (December 2014 – November 2015). The total sample consists of 11,367 households. A comparison of the sample's socio-demographic characteristics and the average German population (German Federal Statistical Office, 2016) is made in Table 3.

Table 3: Socio-demographic characteristics of the sample and the German population

Socio-demographics (N=11,367)	Sample %*	Population %**	
	Age of the head of household	Age of German residents older than 18 years	
Up to 29 years	2.3	17.0	
30–39 years	10.5	14.7	
40–49 years	18.2	16.7	
50–59 years	26.6	18.9	
60–69 years	24.5	13.8	
70 years and older	17.9	18.8	
	Formal education of the head of calendar (including vocational school and university)	School-leaving qualification of German residents older than 15 years	Vocational qualification of German residents older than 15 years
Secondary general school	18.7	35.8	-
Intermediate secondary school	32.6	24.7	-
Qualified dual vocational training programme	-	-	48.8
Special upper secondary school (vocational school)	14.5	-	8.6
Grammar school	9.1	32.0	
University	25.2	-	16.4
Others	-	7.5	26.2
	Household net income	Net income of private households in Germany	
≤ 749	3.1	30.9	
750–999 €	3.9		
1000–1249 €	6.5		
1250–1499 €	7.5		
1500–1999 €	16.3	16.0	
2000 € and more	62.6	53.2	

Sources: *GfK household panel data (only wine buyers). **German Federal Statistical Office (2016)

As can be seen from the table, young people up to 39 years were highly underrepresented while persons aged 50–69 years were overrepresented in the sample. The age groups 40–49 and 70 years and older were represented quite well. A direct comparison of education and income was not possible since the federal statistical office applies different age and income categories. With regard to education, the categorisation of the GfK institute consists of a mix of school leaving and vocational qualifications while the German federal office provides two separate statistics on those two aspects (see Table 3).

One quarter of the sample had a university diploma which is a higher share compared to the federal statistic on vocational qualifications of German residents older than 15 years (16.4 %). Moreover, data on German residents' school leaving qualification lead to the conclusions that people of the lowest (secondary general school) formal education level were underrepresented in the sample. With regard to household net income, higher income households were slightly overrepresented. Overall, households of the sample were older and of higher social class. However, it needs to be considered that the sample comprises only wine purchasing households. Since it is known that wine consumers are older, of higher formal education and income compared to the average population (Szolnoki and Hoffmann, 2014), it can be concluded that the sample represents wine consumers quite well.

3.2.5.2 Measures and Model

Organic wine budget share is the dependent variable which is defined as the ratio of expenditures on organic wine (in Euro) to the total expenditures for wine (Moser, 2016; Van Doorn and Verhoef, 2015; Wier *et al.*, 2008) during the one-year period:

$$organic\ wine\ budget\ share_i = \frac{\sum purchase_{organic\ wine,i}}{\sum purchase_{wine,i}},$$

where i is the household;

$purchase_{organic\ wine,i}$ is the amount of money spent on organic wine by household i

$purchase_{wine,i}$ is the total amount of money spent on wine by household i .

Hence, the dependent variable takes values on the interval bounded from zero for households that buy no organic wine, to one, for households buying only organic wine.

In accordance with the literature review of this study, the following model was specified:

$$\frac{\sum purchase_{organic\ wine,i}}{\sum purchase_{wine,i}} = \beta_0 + \sum_{k=1}^5 \beta_k Age_{ki} + \sum_{l=1}^4 \beta_l Education_{li} + \sum_{m=1}^5 \beta_m Income_{mi} \\ + \beta_1 Factor\ 1_i + \beta_2 Factor\ 2_i + \beta_3 Factor\ 3_i + \alpha_i$$

With respect to the independent variables, principal component factor analysis (PCA) was conducted. The Kaiser-Meyer-Olkin (KMO) measure (0.94) and Bartlett's test of sphericity ($p=0.001$) verified the sample adequacy for the analysis. Table 4 presents the factor scores after varimax rotation.

Table 4: Rotated component matrix

	Factor 1: Preference for organic products	Factor 2: Responsibility for the environment and society	Factor 3: Appreciation of local and domestic products
I would like to have a greater supply of organic products in stores	0.844	0.288	0.119
I am willing to spend more for organic products	0.830	0.290	0.192
I prefer organic products when I buy groceries	0.808	0.319	0.145
Organic products are healthier than non-organic-products	0.795	0.158	0.155
When it comes to organic products, I trust specialised organic stores more than conventional supermarkets	0.784	0.185	0.111
With the purchase of organic products, I can make a small contribution against climate change	0.775	0.271	0.135
Organic products taste better than non-organic-products	0.769	0.114	0.146
I would like to have more information about organic products	0.765	0.290	0.116
I consciously buy more often products which are less harmful to the environment	0.187	0.752	0.160
Actually, I care little about the environmental harmfulness of products (reversed)	-0.114	-0.720	-0.018
I obtain information about which food is environmentally polluted and stop buying it.	0.249	0.620	0.182
I consider sustainability labels when I go shopping (e.g. UTZ-label, FairChoice, Rainforest Alliance Certified)	0.342	0.551	0.181
I am willing to spend more for environmentally- friendly packaging	0.309	0.521	0.257
A fair treatment of producers in the country of origin, to me, is also a part of sustainability	0.326	0.514	0.273
German food is of the highest quality	0.093	0.046	0.777
I have a high degree of trust in local products	0.080	0.122	0.763
I am willing to spend more for local food	0.322	0.317	0.635
I do not care if my foods originate from Germany or another country (reversed)	-0.134	-0.245	-0.584
Eigenvalue	5.65	2.99	2.32
% of Variance	31.36	16.58	12.91
Cronbach's α	0.94	0.78	0.72

Source: Own calculation based on GfK panel data (N=10,588)

PCA reduced the number of statements on sustainable food consumption from the survey questionnaire to three factors. *Factor 1*, named “preference for organic products”, includes statements related to positive attitudes towards organic products. This factor reflects mostly

motivations to purchase organic products including, for instance, beliefs in the health benefits and superior taste of organic food. The willingness-to-pay price premium for organic products and trust in specialised organic stores are likewise included in the first factor. *Factor 2*, named “responsibility for the environment and society”, consists of statements related to sustainability concerns about the environment and society including, for example, appreciation of environmentally friendly packaging and sustainability labels. This factor primarily represents ethical attitudes in food choices. *Factor 3*, named “appreciation of local and domestic products”, integrates all statements related to attitudes towards local and domestic food products. This factor mainly comprises statements reflecting trust and beliefs in the higher quality of domestic and local food products compared to foreign ones. In total, all three factors explain 60 percent of variance within the data representing the smallest number of uncorrelated factors.

In addition to attitudes, *Age*, *Education*, and *Income* represent independent variables. Age of the head of household includes six groups. The education level of the head of calendar, i.e. the person who manages the documentation of purchases, consists of five categories. Weighted per capita net income has six categories. The baseline consumer (for whom the dummy variable is omitted) is 70 or older, earning € 2,000 and more, with a university degree.

3.2.5.3 *Methods*

Since the distribution of “organic wine budget share” is bounded on the interval $[0,1]$, the effect of independent variables is nonlinear. Moreover, the variance alters because the mean value is located near one of the boundaries and heteroscedasticity becomes a concern (Cook *et al.*, 2008). Therefore, the application of standard linear regression would lead to biased results (Berry, 1993; Cook *et al.*, 2008).

To overcome the outlined problems, Generalized Linear Models (GLMs) are used for nonlinear relations. This kind of regression analysis allows for the specification of models whose dependent variable follows different distributions from the exponential family (Smithson and Merkle, 2014).

One of the types of GLMs which is often applied to cases with bounded dependent variables is logistic regression. However, for logistic regression, one needs to create artificial differences between zero- and one-observation outcomes by arbitrarily choosing cut-off points for these observations (Zikmund *et al.*, 2009). Thus, when applying logistic regression, the original data

of the “organic wine budget share” must be modified and thereby, information would get lost, which is not in line with the aim of this study.

Another type of GLMs is the censored normal Tobit model. Censored observations are those that are only partially observed and, in addition to those already known, can assign some meaningful values outside of values zero and one of the double bounded dependent variables (Smithson and Merkle, 2014). Yet, it is not clear if it is reasonable to assume censoring because the variable “organic wine budget share” is defined on the interval $[0,1]$ and the outcomes zero and one are more the result of deliberate choices of the households than any type of censoring (Maddala, 1991). In addition, the Tobit estimator becomes inconsistent when the assumption of normal distribution is rejected. To statistically verify the normality assumption of the censored Tobit model, the Lagrange multiplier (LM) test was performed (Drukker, 2002). According to the LM statistic, the null hypothesis of normality and the use of the Tobit estimator to model the data is rejected because the critical values are lower than the LM computed value. Papke and Wooldridge (1996) introduced the fractional logit (or respectively probit) model to overcome the drawbacks of the previously explained GLMs. However, the presence of a large number of observations having zero outcome (87.6 percent) in the “organic wine budget share” makes use of the fractional logit model inappropriate because this model does not predict zeros (Schwiebert and Wagner, 2015). Moreover, a large number of zero observations in the dependent variable raises the question whether zero values were generated by the same process as the other values (Cook *et al.*, 2008). As a solution, Ramalho *et al.* (2011) introduced the two-part fractional model. The two-part fractional model predicts zeros as a separate sub model and assumes that zero outcomes and positive outcomes are best described by two distinct mechanisms (participation and expenditure decision). In the case of the present study, consumers’ attitudes towards sustainable food and socio-demographics might have different effects on the decision to purchase organic wine (participation decision) and how much to spend on organic wine (expenditure decision). Thus, the two-part fractional model was chosen for the analysis.

The first part of the two-part fractional model consists of a standard binary choice model and defines the likelihood of observing a positive outcome. This part is defined as (Ramalho *et al.*, 2011):

$$y = \begin{cases} 0 & \text{if } y = 0 \\ 1 & \text{if } y \in (0,1) \end{cases}$$

The probability function y is:

$$\Pr(y = 1|x) = F(x\beta_{1P}),$$

where β_{1P} is a vector of variable coefficients in the first part,

$F(\cdot)$ is a distributional function for the first part.

The second part of the model describes the magnitude of positive outcomes. The probability function of the second part is:

$$\Pr[y|x, y \in (0, 1)] = M(x\beta_{2P}),$$

where β_{2P} is a vector of variable coefficients in the second part,

$M(\cdot)$ is a distributional function for the second part.

Based on the outlined equations, the two-part model can be analysed as:

$$\Pr(y|x) = \Pr(y | x, y = 0) \cdot \Pr(y = 0 | x) + \Pr[y | x, y \in (0, 1)] \cdot \Pr[y \in (0, 1)|x].$$

Since the first term on the right-hand side of the previous equation equals zero, the two-part model can be described as:

$$\Pr(y|x) = \Pr[y|x, y \in (0, 1)] \cdot \Pr[y \in (0, 1)|x] = M(x\beta_{2P}) \cdot F(x\beta_{1P})$$

where the two components of the two-part model are to be estimated separately.

Based on the results of Generalized Goodness-of-functional Form (GGOFF) test, Cauchy distributional functions were chosen for the binary and fractional part of the two part fractional model (Ramalho *et al.*, 2014). The coefficients of the two-part fractional regression model are difficult to interpret. Generally, in any non-linear model, marginal effects are used because they are more informative compared to regression coefficients (Cameron and Trivedi, 2009). Thus, based on the two-part model equation, the effect on y of a unitary change in x_j is determined as:

$$\frac{\partial \Pr(y|x)}{\partial x_j} = \frac{\partial M(x\beta_{2P})}{\partial x_j} F(x\beta_{1P}) + M(x\beta_{2P}) \frac{\partial F(x\beta_{1P})}{\partial x_j}$$

The change in y is separated into two parts. The first one shows the change in y of the households that have positive outcomes, weighted by the probability of having positive outcomes. This part explains the effects on the probability of whether organic wine is purchased at all (effects on the probability of being above zero). The second shows the change in probability of having positive outcomes, weighted by the expected value of y for the households that have positive outcomes. The second part explains the effects on change in probability of organic wine purchase for those who spent on organic wine (effects conditional upon being

above zero) (Ramalho *et al.*, 2011). Thus, the marginal effect estimates are divided into the effects on the decision to purchase organic wine for the first time and the effects on the subsample of those who have purchased organic wine.

3.2.6 Results and discussion

The results of the two-part fractional regression model are presented in Table 5. The Wald test specifies whether the coefficients of the independent variables are simultaneously equal to zero. Pseudo R^2 is calculated as the square of the correlation between the predicted and actual values of the organic wine budget share (Ramalho *et al.*, 2011). The Wald test for both parts of the specified model is highly significant and indicates that including consumers' attitudes and socio-demographics creates a statistically significant improvement in the fit of the model. The overall goodness of fit as measured by Pseudo R^2 is equal to 5.7 percent and 9.1 percent for the models explaining participation and expenditure decisions respectively. Relatively low values of R^2 are expected for models based on cross-sectional data with large number of observations (Gujarati, 2004), as it is the case for household panel data.

The estimation proves the rather low predictive power of attitudes and socio-demographic variables with respect to the demand for organic wine. However, compared to the results of the analyses of Moser (2016) and Wier *et al.* (2008), who also investigated purchase behaviour towards organic food based on household panel data, a significant portion of the variation in organic wine budget share can be explained by consumers' attitudes and socio-demographic characteristics.

The findings presented in Table 5 show that the likelihood of purchasing organic wine increases with preferences for organic products by 5.1 percentage points. Similarly, preferences for organic products increase the probability that households will spend a higher budget share on organic wine by 5.5 percentage points. Moreover, confirming the results of Bonn *et al.* (2016) and Rahman and Reynolds (2017), the probability of purchasing organic wine and spending a higher budget share on organic wine increases with a sense of responsibility for the environment and society by 3.2 and 4.1 percentage points respectively. These results document the existence of a positive relationship between ethical attitudes and the purchase of organic wine. However, compared to organic food in general (Janssen, 2018), no significant relationship between the appreciation of local and domestic products and the purchase of organic wine was found. The overwhelming importance of the country or region of origin for the purchase of wine could be an explanation for this result (Defrancesco *et al.*, 2012; Jaeger *et al.*, 2013; Yang and Paladino, 2015). For example, Swiss consumers preferred French wine due to higher trust in the quality

of French wines compared to Swiss ones (Mann *et al.*, 2012). Similarly, Japanese consumers were willing to pay more for organic wine of foreign origin due to a lack of trust in domestic wine production (Hoang *et al.*, 2016).

Table 5: Factors explaining organic wine budget share

	First part (participation decision)		Second part (expenditure decision)	
	Marginal effects	Standard error	Marginal effects	Standard error
Age of the head of household (in %) (≥ 70 years and up is baseline):				
≤ 29 years	-0.036	0.030	0.265***	0.056
30–39 years	-0.007	0.012	0.096***	0.033
40–49 years	0.010	0.010	0.080***	0.029
50–59 years	0.003	0.009	-0.004	0.029
60–69 years	0.014	0.009	0.033	0.027
Formal education of the head of calendar (in %) (University is baseline):				
Secondary general school	-0.034***	0.010	0.067**	0.028
Intermediate secondary school	-0.034***	0.007	0.039	0.022
Special upper secondary school (vocational school)	-0.030***	0.009	0.024	0.028
Grammar school	-0.002	0.009	0.010	0.029
Weighted per capita net income (in %) (≥ 2000 € is baseline):				
≤ 749	-0.032***	0.015	0.034	0.034
750–999 €	-0.032***	0.013	0.045	0.031
1000–1249 €	-0.010	0.009	0.057**	0.024
1250–1499 €	-0.008	0.008	0.001	0.026
1500–1999 €	-0.000	0.007	-0.030	0.025
Preferences for organic products	0.051***	0.003	0.055***	0.010
Responsibility for the environment and society	0.032***	0.003	0.041***	0.009
Appreciation of local and domestic products	-0.001	0.003	0.009	0.010
Number of observations	10,588		1,322	
Wald test, Chi ²	450.87		96.07	
Pseudo-R ²	0.057		0.091	

***, ** shows significance at $p < 0.01$, $p < 0.05$

Source: author's own calculation based on GfK household panel data

The marginal effects indicate that households with lower income (up to € 749 and € 750–999) are less likely to purchase organic wine compared to wealthy ones. At the same time, households with relatively low income (€ 1000–1249) are more likely to spend a higher budget

share on organic wine compared to wealthy ones. An explanation for this result may relate to the fact that a limited budget prevents access to organic wine due to its higher price. However, higher income does not consistently drive the purchase of organic wine. These results are line with the review of (Aschemann-Witzel and Zielke, 2017) on organic food consumption, who concluded that higher income may remove the barrier to try organic products, but other factors determine whether consumers continue to purchase them.

According to the analysis presented in Table 5, less educated households are less likely to purchase organic wine compared to those with a university degree. A plausible explanation could be that a lower education level may lead to a lack of knowledge about the benefits of organic wine production that preclude the decision to purchase organic wine at all. However, households that finished secondary general school are more likely to increase their expenditure on organic wine compared to those with a university degree. This result is in contrast with the study of Dettmann and Dimitri (2009) on organic food consumption and indicates that a higher education level does not drive those who already buy organic wine to increase their expenditure on organic wine.

Thus, the findings suggest that low income and education levels preclude the decision to purchase organic wine at all. Yet, for organic wine buyers, low income and education levels do not appear to be discriminating factors to increase the expenditure on organic wine. However, attitudes drive consumers to repeat the purchase of organic wine.

The marginal effects associated with a change in age indicate that young adults (up to 29 years old), older millennials (30–39 years old) and the middle age group (40–49 years old) compared to elderly (≥ 70 years old) are more likely to spend a higher budget share on organic wine by 26.5, 9.6 and 8.0 percentage points respectively. Notably, the younger the age of the head of household, the higher the probability of spending a greater wine budget share on organic wine. These findings confirm the results of prior studies concluding that consumers of wine with sustainability characteristics are of a younger age (Bernabéu *et al.*, 2008; Gassler, 2015) as well as older millennials (Pomarici and Vecchio, 2014). This result is not surprising considering the fact that relatively younger consumers grew up during the period of increased attention to sustainability issues in the media, the Internet and on social networks (Thach and Olsen, 2006). Thus, younger adults and older millennials may be more open-minded towards new, sustainable, production methods and consumption. However, age does not play a significant role in the decision whether to purchase organic wine or not.

3.2.7 Conclusions

The results of the analysis support prior research based on stated preferences affirming that preferences for organic products and sustainability concerns drive organic wine purchases. Hence, studies based on consumer surveys, experimental auctions and choice experiments were a reliable source to reveal real purchase considerations in organic wine choice. Consumers with more positive attitudes towards organic products and sustainability in general are more likely to purchase organic wine. However, attitudes only explain a small part of consumers' behaviour. Attitudes and behaviour are only moderately related providing evidence that other contextual factors (e.g. price, availability, grape variety, promotion, etc.) may have a greater explanatory value for organic wine purchase decisions and an attitude-behaviour gap exists. Moreover, organic consumers' health and taste attitudes may not completely transform into the purchase of organic wine due to the fact that wine is an alcoholic beverage mainly used for pleasure.

The result of the analysis allows for the assumption that lower income and education levels are barriers to the purchase of organic wine in the first place. Yet, for organic wine buyers, low income and education are no longer influencing factors for a higher share of organic wine expenditures. Hence, from the point when the decision to purchase organic wine is made, other factors seem to play a more important role. These results lead to the conclusion that the roles of income and education are not as important as consumers' attitudes in organic wine choice. Thus, communication of environmental, social and health benefits of organic production may be most persuasive in shaping consumers' attitudes in order to induce the purchase of organic wine.

The results of the study contribute to the existing research through its understanding of the effects and relevance of attitudes and socio-demographics on the probability to purchase organic wine at all and of spending a greater share on organic wine expenditures in real market conditions. For the first time, to our knowledge, the comparison of the effects of these factors was conducted. However, despite the valuable results, this study could not avoid limitations. The research was focused only on the effect of attitudes and socio-demographics on purchase behaviour. Yet, the consumer's purchase decision is a complex process that is affected by various factors. Especially with respect to wine, context variables (e.g. origin, store type, packaging, promotion, and type of wine) affect consumers' attitudes and may influence purchase choices. Within the frame and the aims of the study, it was not possible to investigate the influence of all the multiple factors on wine purchase behaviour that might increase the

explanatory power of the regression models. Further studies should therefore integrate other factors and barriers (e.g. price, lack of knowledge, and perception of low quality of organic and domestic wine) to test their respective influences and deeper understand consumers' purchase behaviour.

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3.2.9 References

- Aschemann-Witzel, J. and Zielke, S. (2017), “Can't buy me green? A review of consumer perceptions of and behavior toward the price of organic food”, *Journal of Consumer Affairs*, Vol. 51 No. 1, pp. 211–251.
- Ay, J.-S., Chakir, R. and Marette, S. (2014), “Does living close to a vineyard increase the willingness-to-pay for organic and local wine?”, paper prepared for the EAAE 2014 Congress ‘Agri-Food and Rural Innovations for Healthier Societies’. Ljubljana, Slovenia, August 26–29, 2014, available at: <http://purl.umn.edu/183075> (accessed 18 February 2016).
- Barber, N., Bishop, M. and Gruen, T. (2014), “Who pays more (or less) for pro-environmental consumer goods? Using the auction method to assess actual willingness-to-pay”, *Journal of Environmental Psychology*, Vol. 40, pp. 218–227.
- Bernabéu, R., Brugarolas, M., Martínez-Carrasco, L. and Díaz, M. (2008), “Wine origin and organic elaboration, differentiating strategies in traditional producing countries”, *British Food Journal*, Vol. 110 No. 2, pp. 174–188.
- Berry, W.D. (1993), *Understanding regression assumptions: Quantitative applications in the social sciences*, Vol. 92, Sage Publications, Newbury Park, California.
- Bonn, M.A., Cronin, J.J. and Cho, M. (2016), “Do environmental sustainable practices of organic wine suppliers affect consumers behavioral intentions? The moderating role of trust”, *Cornell Hospitality Quarterly*, Vol. 57 No. 1, pp. 21–37.
- Brugarolas, M., Martinez-Carrasco Martinez, L., Bernabéu, R. and Martinez-Poveda, A. (2010), “A contingent valuation analysis to determine profitability of establishing local organic wine markets in Spain”, *Renewable Agriculture and Food Systems*, Vol. 25 No. 1, pp. 35–44.
- Brugarolas Mollá-Bauzá, M., Martínez-Carrasco Martínez, L., Martínez Poveda, A. and Rico Pérez, M. (2005), “Determination of the surplus that consumers are willing to pay for an organic wine”, *Spanish Journal of Agricultural Research*, Vol. 3 No. 1, pp. 43–51.
- Cameron, A.C. and Trivedi, P.K. (2009), *Microeconometrics using stata*, Stata Press, College Station, Texas.
- Carrington, M.J., Neville, B.A. and Whitwell, G.J. (2010), “Why ethical consumers don't walk their talk: Towards a framework for understanding the gap between the ethical purchase intentions and actual buying behaviour of ethically minded consumers”, *Journal of Business Ethics*, Vol. 97 No. 1, pp. 139–158.

- Cook, D.O., Kieschnick, R. and McCullough, B.D. (2008), "Regression analysis of proportions in finance with self selection", *Journal of Empirical Finance*, Vol. 15 No. 5, pp. 860–867.
- Curtis, F. (2003), "Eco-localism and sustainability", *Ecological Economics*, Vol. 46 No. 1, pp. 83–102.
- D'Amico, M., Di Vita, G. and Monaco, L. (2016), "Exploring environmental consciousness and consumer preferences for organic wines without sulfites", *Journal of Cleaner Production*, Vol. 120, pp. 64–71.
- Defrancesco, E., Estrella Orrego, J. and Gennari, A. (2012), "Would 'New World' wines benefit from protected geographical indications in international markets? The case of Argentinean Malbec", *Wine Economics and Policy*, Vol. 1 No. 1, pp. 63–72.
- Dettmann, R.L. and Dimitri, C. (2009), "Who's buying organic vegetables? Demographic characteristics of U.S. consumers", *Journal of Food Products Marketing*, Vol. 16 No. 1, pp. 79–91.
- Drukker, D.M. (2002), "Bootstrapping a conditional moments test for normality after tobit estimation", *The Stata Journal*, Vol. 2 No. 2, pp. 125–139.
- EU Commission (2008), "Regulation (EU) No 889/2008 of 5 September 2008 laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007 on organic production and labelling of organic products with regard to organic production, labelling and control".
- EU Commission (2012), "Regulation (EU) No 203/2012 of 8 March 2012 Amending Regulation (EC) No 889/2008 Laying Down Detailed Rules for the Implementation of Council Regulation (EC) No 834/2007, as Regards Detailed Rules on Organic Wine".
- Gassler, B. (2015), "How green is your 'Grüner'? Millennial wine consumers' preferences and willingness-to-pay for eco-labeled wine", *Jahrbuch der Österreichischen Gesellschaft für Agrarökonomie*, Vol. 24, pp. 131–140.
- German Federal Statistical Office (2016), *Statistical Yearbook 2016*, Federal Statistical Office, Wiesbaden.
- Grebitus, C., Lusk, J.L. and Nayga, R.M. (2013), "Effect of distance of transportation on willingness to pay for food", *Ecological Economics*, Vol. 88, pp. 67–75.
- Gujarati, D.N. (2004), *Basic econometrics*, 4th ed., Tata McGraw-Hill, New York.
- Hempel, C. and Hamm, U. (2016), "How important is local food to organic-minded consumers?", *Appetite*, Vol. 96, pp. 309–318.

- Hoang, V., Iida, T., Matsumoto, S., Watanabe, N. and Wilson, C. (2016), "Consumer's comparison between local and imported organic products: A hedonic analysis of the Japanese table wine market", *Eurasian Business Review*, Vol. 6 No. 3, pp. 405–415.
- Jaeger, S.R., Mielby, L.H., Heymann, H., Jia, Y. and Frøst, M.B. (2013), "Analysing conjoint data with OLS and PLS regression: A case study with wine", *Journal of the Science of Food and Agriculture*, Vol. 93 No. 15, pp. 3682–3690.
- Janssen, M. (2018), "Determinants of organic food purchases: Evidence from household panel data", *Food Quality and Preference*, Vol. 68, pp. 19–28.
- Jones, G. and Grandjean, E. (2017), "Creating the market for organic wine: Sulfites, certification, and green values", Harvard Business School General Management Unit, Working Paper No. 18-048, pp. 1–59.
- Kim, H. and Bonn, M.A. (2015), "The moderating effects of overall and organic wine knowledge on consumer behavioral intention", *Scandinavian Journal of Hospitality and Tourism*, Vol. 15 No. 3, pp. 295–310.
- Lernoud, J. and Willer, H. (2017), "Land use and commodities in organic agriculture", in Willer, H. and Lernoud, J. (Eds.), *The World of organic agriculture: Statistics and emerging trends 2017*, Research Institute of Organic Agriculture (FiBL), Frick, and IFOAM - Organics International, Frick and Bonn, pp. 77–135.
- Lopez, E. and Lopez, R.A. (2009), "Demand for differentiated milk products: Implications for price competition", *Agribusiness*, Vol. 25 No. 4, pp. 453–465.
- Loureiro, M.L. (2003), "Rethinking new wines: Implications of local and environmentally friendly labels", *Food Policy*, Vol. 28 No. 5–6, pp. 547–560.
- Maddala, G.S. (1991), "A perspective on the use of limited-dependent and qualitative variables models in accounting research", *The Accounting Review*, Vol. 66 No. 4, pp. 788–807.
- Mann, S., Ferjani, A. and Reissig, L. (2012), "What matters to consumers of organic wine?", *British Food Journal*, Vol. 114 No. 2, pp. 272–284.
- Mariani, A. and Vastola, A. (2015), "Sustainable winegrowing: Current perspectives", *International Journal of Wine Research*, Vol. 7, pp. 37–48.
- Monier, S., Hassan, D., Nichèle, V. and Simion, M. (2009), "Organic food consumption patterns", *Journal of Agricultural and Food Industrial Organization*, Vol. 7 No. 2, pp. 1–25.

- Moser, A.K. (2016), "Consumers' purchasing decisions regarding environmentally friendly products. An empirical analysis of German consumers", *Journal of Retailing and Consumer Services*, Vol. 31, pp. 389–397.
- Ngobo, P.V. (2011), "What drives household choice of organic products in grocery stores?", *Journal of Retailing*, Vol. 87 No. 1, pp. 90–100.
- Olsen, J., Thach, L. and Hemphill, L. (2012), "The impact of environmental protection and hedonistic values on organic wine purchases in the US", *International Journal of Wine Business Research*, Vol. 24 No. 1, pp. 47–67.
- Papke, L.E. and Wooldridge, J.M. (1996), "Econometric methods for fractional response variables with an application to 401 (K) plan participation rates", *Journal of Applied Econometrics*, Vol. 11, pp. 619–632.
- Pomarici, E., Amato, M. and Vecchio, R. (2016), "Environmental friendly wines: A consumer segmentation study", *Agriculture and Agricultural Science Procedia*, Vol. 8, pp. 534–541.
- Pomarici, E. and Vecchio, R. (2014), "Millennial generation attitudes to sustainable wine: An exploratory study on Italian consumers", *Journal of Cleaner Production*, Vol. 66, pp. 537–545.
- Rahman, I. and Reynolds, D. (2017), "Organic wine: The influence of biospheric, altruistic, and egoistic values on purchase intention, willingness to pay more, and willingness to sacrifice", *International Journal of Hospitality Beverage Management*, Vol. 1 No. 1, pp. 1–47.
- Rahman, I., Stumpf, T. and Reynolds, D. (2014), "A comparison of the influence of purchaser attitudes and product attributes on organic wine preferences", *Cornell Hospitality Quarterly*, Vol. 55 No. 1, pp. 127–134.
- Ramalho, E.A., Ramalho, J.J.S. and Murteira, J.M.R. (2011), "Alternative estimating and testing empirical strategies for fractional regression models", *Journal of Economic Surveys*, Vol. 25 No. 1, pp. 19–68.
- Ramalho, E.A., Ramalho, J.J.S. and Murteira, J.M.R. (2014), "A generalized goodness-of-functional form test for binary and fractional regression models", *The Manchester School*, Vol. 82 No. 4, pp. 488–507.
- Rojas-Méndez, J.I., Le Nestour, M. and Rod, M. (2014), "Understanding Attitude and Behavior of Canadian Consumers Toward Organic Wine", *Journal of Food Products Marketing*, Vol. 21 No. 4, pp. 375–396.

- Schäufele, I. and Hamm, U. (2017), “Consumers’ perceptions, preferences and willingness-to-pay for wine with sustainability characteristics: A review”, *Journal of Cleaner Production*, Vol. 147, pp. 379–394.
- Schmit, T.M., Rickard, B.J. and Taber, J. (2013), “Consumer valuation of environmentally friendly production practices in wines, considering asymmetric information and sensory effects”, *Journal of Agricultural Economics*, Vol. 64 No. 2, pp. 483–504.
- Schwiebert, J. and Wagner, J. (2015), “A generalized two-part model for fractional response variables with excess zeros”, *Beiträge zur Jahrestagung des Vereins für Socialpolitik 2015: Ökonomische Entwicklung - Theorie und Politik - Session: Microeconometrics*, No. B04-V2.
- Sellers, R. (2016), “Would you pay a price premium for a sustainable wine? The voice of the Spanish consumer”, *Agriculture and Agricultural Science Procedia*, Vol. 8, pp. 10–16.
- Smith, T.A., Huang, C.L. and Lin, B.-H. (2009), “Does price or income affect organic choice? Analysis of U.S. fresh produce users”, *Journal of Agricultural and Applied Economics*, Vol. 41 No. 3, pp. 731–744.
- Smithson, M. and Merkle, E.C. (2014), *Generalized linear models for categorical and continuous limited dependent variables: Statistics in the social and behavioral sciences series*, CRC Press, Boca Raton, Florida, USA.
- Sridhar, K., Bezawada, R. and Trivedi, M. (2012), “Investigating the drivers of consumer cross-category learning for new products using multiple data sets”, *Marketing Science*, Vol. 31 No. 4, pp. 668–688.
- Stolz, H. and Schmid, O. (2008), “Consumer attitudes and expectations of organic wine”, paper prepared for the 16th IFOAM Organic World Congress. Modena, Italy, June 16–20, 2008, available at: <http://orgprints.org/13974/> (accessed 24 August 2016).
- Szolnoki, G. and Hoffmann, D. (2014), “Consumer segmentation based on usage of sales channels in the German wine market”, *International Journal of Wine Business Research*, Vol. 26 No. 1, pp. 27–44.
- Thach, E.C. and Olsen, J. (2006), “Market segment analysis to target young adult wine drinkers”, *Agribusiness*, Vol. 22 No. 3, pp. 307–322.
- Thilmany, D., Bond, C.A. and Bond, J.K. (2008), “Going local: Exploring consumer behavior and motivations for direct food purchases”, *American Journal of Agricultural Economics*, Vol. 90 No. 5, 1303–1309.
- Tsourgiannis, L., Karasavvoglou, A. and Nikolaidis, M. (2013), “Exploring consumers’ purchasing behaviour regarding organic wine in a convergence E.U. region: The case of

- east Macedonia and Thrace, Greece”, in Karasavvoglou, A. and Polychronidou, P. (Eds.), *Balkan and eastern European countries in the midst of the global economic crisis: Contributions to economics*, Physica-Verlag HD, Heidelberg, pp. 133–155.
- Tsourgiannis, L., Loizou, E., Karasavvoglou, A., Tsourgiannis, C.A. and Florou, G. (2015), “Consumers’ purchasing behaviour patterns regarding organic wine in a southern E.U. country”, proceedings of the 7th International Conference on Information and Communication Technologies in Agriculture, Food and Environment (HAICTA).
- Van Doorn, J. and Verhoef, P.C. (2015), “Drivers of and barriers to organic purchase behavior”, *Journal of Retailing*, Vol. 91 No. 3, pp. 436–450.
- Wiedmann, K.-P., Hennigs, N., Behrens, S.H. and Klarmann, C. (2014), “Tasting green: An experimental design for investigating consumer perception of organic wine”, *British Food Journal*, Vol. 116 No. 2, pp. 197–211.
- Wier, M., O’Doherty Jensen, K., Andersen, L.M. and Millock, K. (2008), “The character of demand in mature organic food markets: Great Britain and Denmark compared”, *Food Policy*, Vol. 33 No. 5, pp. 406–421.
- Yang, Y. and Paladino, A. (2015), “The case of wine: Understanding Chinese gift-giving behavior”, *Marketing Letters*, Vol. 26 No. 3, pp. 335–361.
- Zepeda, L. and Deal, D. (2009), “Organic and local food consumer behaviour: Alphabet Theory”, *International Journal of Consumer Studies*, Vol. 33 No. 6, pp. 697–705.
- Zhang, F., Epperson, J.E., Huang, C.L. and Houston, J.E. (2009), “Organic price premiums paid for fresh tomatoes and apples by US households: Evidence from Nielsen Homescan Data”, *Journal of Food Distribution Research*, Vol. 40 No. 3, pp. 105–114.
- Zikmund, W.G., Babin, B.J., Carr, J.C. and Griffin, M. (2009), *Business research methods*, 8th ed., Cengage Learning, USA.

3.3 Organic wine purchase behaviour in Germany: Exploring the attitude-behaviour-gap with data from a household panel

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3.3.1 Abstract

Consumer surveys revealed positive attitudes towards organic wine in large consumer segments. Health, environmental and quality benefits were stated most often as drivers for purchase decisions. However, sales data show that the market share for organic wine is still far below 10 % compared to the total wine market in all countries. Obviously, there is a gap between consumers’ attitudes and real purchase behaviour in daily decisions. So far, it is not clear whether there is congruence between consumers’ attitudes and their purchase behaviour and if the attitude-behaviour-gap differs among consumer segments. Consequently, the paper at hand explores the attitude-behaviour-gap with household panel data from the GfK Group by means of a cluster analysis. The results show that even though expenditure shares for organic wine were at a low level, attitudes were in line with purchase behaviour for five out of six clusters. For example, consumers who had the highest expenditure share for organic wine showed strong pro-environmental attitudes and a preference for sustainable products. Therefore, comprehensive communication about sustainability issues, which also includes social aspects, could help to further develop the organic wine market and lead to higher market shares. However, for the low-income consumer cluster, the price of organic wine seemed to be an effective barrier despite their positive attitudes towards environmentalism. Future studies need to consider that the extent of the attitude-behaviour-gap is segment specific.

Keywords: attitude-behaviour-gap, ethical consumption, wine choice, organic wine, consumer behaviour, household panel data

3.3.2 Introduction

Although Germany is a rather small wine-producing country, it holds a leading position in international wine trade and is the fourth largest wine-consuming country in the world. The traditional European wine-producing countries France, Italy and Spain are the leading foreign suppliers for the German market followed by various overseas countries (USA, South Africa

and Chile). However, domestic wines are still most important both in purchase volume and value. The German wine market is characterised by high market shares of discount outlets and supermarkets and a relatively low relevance of direct sales and wine speciality shops (German Wine Institute, 2016). German wine producers are therefore acting in a highly competitive market, especially regarding price.

Within this market, producers adopt various differentiation strategies such as regions of origin, varieties, wine styles and vintages. This makes wine one of the most differentiated products on the food market and consumers face many different cues on wine labels and a wide range of prices. Studies found that country of origin and the region of production were among the most important wine choice criteria (Defrancesco *et al.*, 2012; Jaeger *et al.*, 2013; Yang and Paladino, 2015). Whether consumers prefer domestic wines for ethnocentrism or imported wines from reputable origins is a matter of discussion (Kolyesnikova *et al.*, 2008; Mann *et al.*, 2012; Yang and Paladino, 2015). It seems that the reasons for the diverging results may be found in differences in countries' wine cultural backgrounds and consumers' preferences.

Moreover, variety (Gustafson *et al.*, 2016), price (Panzone, 2014) brand (Drennan *et al.*, 2015), packaging/labelling (Mueller Loose and Szolnoki, 2012) and quality awards (Orth and Krška, 2001) were found to be relevant wine attributes for consumers' purchase decisions. Consumers usually cannot taste the wine before the shopping act, therefore, the quality of wine is assessed based on the previously named extrinsic attributes (Orth and Krška, 2001, 2001; Sáenz-Navajas *et al.*, 2013; Veale, 2008). Particularly, price-related quality assessment, i.e. that higher prices indicate higher quality, is an important heuristic for wine purchase decisions (Palma *et al.*, 2016).

In accordance with the wine market's high product differentiation, consumers vary widely in their preferences towards wine attributes. Dividing the market into several segments, while considering consumers' varying desires, allows for the development of targeted marketing strategies. Not accounting for consumer heterogeneity could generate misleading conclusions, as differences between consumer characteristics can cancel each other out on an aggregated level (Mueller and Szolnoki, 2010). Several authors carried out segmentation studies and found homogeneous consumer segments in the heterogeneous wine market. Different characteristics were used to allocate consumers to segments such as demographics (Olsen *et al.*, 2007), wine consumption behaviour (Lesschaeve *et al.*, 2012; Thomas and Pickering, 2003), lifestyle (Johnson and Bruwer, 2003; Thach and Olsen, 2004) and involvement (Hollebeek *et al.*, 2007; Johnson and Bastian, 2015; Lockshin *et al.*, 2001). Moreover, consumers' purchase decisions

varied according to whether wine was chosen for self-consumption, hosting friends, or as a gift. The benefits consumers gained in the respective choice situation were quality, value for money, social acceptance and a sense of well-being. Environmental and health benefits were relevant for consumers' wine choice, particularly in the "self" situation (Orth, 2005). People with high purchase frequencies and high wine involvement especially paid attention to environmental issues. Pomarici *et al.* (2016) found that the segment of wine consumers highly interested in environmentally-friendly wine made up 32 % of consumers. In a cross-national study, a consumer segment of about 35–38 % across all countries valued environmentally sustainable wine (Mueller Loose and Lockshin, 2013).

In line with this development, wine with sustainability characteristics has become more relevant to consumers (Schäufele and Hamm, 2017). Numerous studies in different countries revealed that consumers preferred organic over conventional wine (Bernabéu *et al.*, 2008; Chiodo *et al.*, 2011; Mann *et al.*, 2012) and elicited a higher willingness to pay for organic wine (Ay *et al.*, 2014; Brugarolas *et al.*, 2010; Pagliarini *et al.*, 2013; Wiedmann *et al.*, 2014), sustainable wine (Forbes and DeSilva, 2012; Sellers, 2016; Vecchio, 2013) and local wine (Ay *et al.*, 2014; Bernabéu *et al.*, 2008; Grebitus *et al.*, 2013). Several authors gave evidence profiling consumers of wine with sustainability characteristics as females (Barber *et al.*, 2010; Loureiro, 2003; Mann *et al.*, 2012; Pomarici and Vecchio, 2014; Sellers, 2016; Vecchio, 2013), with higher incomes (Loureiro, 2003; Pomarici *et al.*, 2016; Sellers, 2016; Woods *et al.*, 2013), living in urban areas (Mann *et al.*, 2012; Pomarici and Vecchio, 2014; Sellers, 2016). However, for local wine, the opposite seems to hold true. The typical local wine consumer was characterized as male (D'Amico *et al.*, 2014; Grebitus *et al.*, 2013) with a low to medium income (D'Amico *et al.*, 2014) living in a rural area (Woods *et al.*, 2013).

The prominent motivation for the purchase of wines with sustainability cues was environmental benefits (Schäufele and Hamm, 2017). This was found for wine labelled as sustainable (Sogari *et al.*, 2015; Sogari *et al.*, 2016), environmentally-friendly (Barber *et al.*, 2010) and local (Grebitus *et al.*, 2013). As for organic wine, contrasting views were revealed. On one hand, consumers' perceptions of environmental benefits (Bonn *et al.*, 2016; Mueller Loose and Remaud, 2013) and environmental consciousness and curiosity (D'Amico *et al.*, 2016) were positively related to the purchase of organic wine. However, several authors revealed the opposite (Kim and Bonn, 2015; Mann *et al.*, 2012; Rahman *et al.*, 2014). Moreover, it seems that sustainable practices of organic wine producers (Bonn *et al.*, 2016) and social fairness (Mueller Loose and Remaud, 2013) were important aspects.

Setting aside those largely ethical motivations and looking at self-driven motivations for the purchase of organic wine, positive health effects (Bonn *et al.*, 2016; Fotopoulos *et al.*, 2003; Mann *et al.*, 2012) and taste (Kim and Bonn, 2015) were found to be determining factors. In addition, the organic cue had a positive effect on consumers' sensory evaluation (Pagliarini *et al.*, 2013; Wiedmann *et al.*, 2014), indicating that organic wine is believed to be of higher quality. Moreover, organic wine of local origin was found to be an additional purchase motivation (Ay *et al.*, 2014; Brugarolas *et al.*, 2010).

Even though consumers' perceptions and attitudes towards wine with sustainability characteristics were mainly positive and a higher willingness to pay for wine with sustainability cues was revealed, no study has examined consumers' real marketplace behaviour to provide answers as to whether or not an attitude-behaviour-gap exists (Schäufele and Hamm, 2017). The paper at hand aims to contribute to this understanding in the context of households' real purchase behaviour pertaining to organic wine in Germany. Special emphasis is put on consumers' motivation for the purchase of organic and domestic wine to shed light on the hitherto diverging literature. A segmentation approach was chosen to account for consumers' heterogeneity. Special focus is placed on the segments' wine choice concerning the country of origin, wine colour and shopping location. The objective of this study is twofold: firstly, to identify consumer segments according to attitudes and purchase intentions towards the consumption of food with sustainability characteristics and secondly, to find out whether these segments differ in their wine purchase behaviour. Thus, this paper herein explores the attitude-behaviour-gap. In addition, socio-demographic characteristics for each cluster are described.

The paper is structured as follows: in Section 3.3.3, reasons for the attitude-behaviour-gap are discussed in connection to survey limitations and consumer behaviour theory. In this context, a special focus is placed on purchase barriers and household panel studies pertaining to organic food. In section 3.3.4, the data set is presented and factor and cluster analyses are outlined. In section 3.3.5, the results of the cluster analysis are presented and differences in the segments' purchase behaviour are described. We conclude with a discussion on the existence of an attitude-behaviour-gap (section 3.3.6) and recommendations for marketing organic wine.

3.3.3 Attitude-behaviour-gap

The discrepancy between consumers' positive attitudes or purchase intentions towards a product and the relatively low level of action when it comes to purchase decisions is referred to in the literature as the "attitude-behaviour-gap" (Bray *et al.*, 2011; Carrington *et al.*, 2010). In general, it is the difference between what people state and how they act. Several researchers in

the field of ethical consumerism examined this gap and found that ethically minded consumers were not consistently affected by their values and beliefs regarding environmental and social issues when it comes to real purchase decisions (Auger and Devinney, 2007; Bray *et al.*, 2011; Carrigan and Attalla, 2001; De Pelsmacker *et al.*, 2005). With regard to organic food, several authors explored the attitude-behaviour-gap in a broader view and considered attitudes surrounding organics in general such as positive health and taste issues, while focusing on more than just ethical aspects (Aschemann-Witzel and Niebuhr Aagaard, 2014; Padel and Foster, 2005). It was established that even if positive attitudes towards organic products built the intention to purchase, they did not necessarily translate into an actual purchase (Frostling-Henningsson *et al.*, 2014; Moser, 2016). This becomes evident when we look at the great majority of people who believed that the product's environmental impact is important to them when purchasing products (84 %) and the high proportion of consumers who stated they often buy environmentally-friendly products (26 %) (Eurobarometer, 2013) compared to the relatively small market shares of organic food in Europe (e.g. 4.8 % in Germany) (Willer *et al.*, 2017).

What are the reasons for these inconsistencies? Two research streams are exploring different, yet complementary causes (Carrington *et al.*, 2010). One is addressing weaknesses in survey instruments which overestimate attitudes and preferences mainly due to socially desirable consumer responses. The outcome is a hypothetical bias responsible for the attitude-behaviour-gap. That is, consumers have much less favourable attitudes towards organics than many surveys showed and therefore real market data needs to be analysed. The other argumentation, based on consumer behaviour theory, explains purchase behaviour by various influencing factors which mediate or moderate attitude and behaviour to account for the attitude-behaviour-gap. That means that consumers do have positive attitudes towards organic food, but are impeded by various causes. We will consider both these approaches in the next two subsections.

3.3.3.1 Purchase barriers

A wide range of theoretical frameworks and models exist, all seeking to understand consumer's decision-making processes to explain consumers' purchase behaviour. These models address the correlation of person-specific internal elements like attitudes, along with behavioural aspects and are looking for mediating and moderating variables between the constructs. An overview of the development of different models analysing the translation of attitudes into purchase intentions and actual behaviour in the context of ethical consumption is given in Carrington *et al.* (2010). Regarding organic food, a huge number of empirical investigations

and review studies exist analysing consumers' attitudes, intentions and purchase behaviour as well as the causal links. In this context, the theory of planned behaviour is a widely-used background to explain consumers' behaviour (Ajzen, 1991). A current meta-analysis on the prediction of organic food consumption gives evidence of the major role of attitudes in influencing purchase intentions and the strong intention-behaviour relation (Scalco *et al.*, 2017). However, most often surveys and experiments are carried out. Real market data is only scarcely examined.

When analysing purchase behaviour regarding organic food, the focus is often on the reasons why attitudes do not completely transmit into behaviour in order to explain the discrepancy between attitudes and behaviour. Several authors found that high price premiums (Aschemann-Witzel and Niebuhr Aagaard, 2014), lack of availability (O'Donovan and McCarthy, 2002), knowledge (Aertsens *et al.*, 2011), and trust (Nuttavuthisit and Thøgersen, 2017) act as purchase barriers [for a review, see Aertsens *et al.* (2009)]. Moreover, some studies name inferior taste and appearance as further purchase barriers (Buder *et al.*, 2014). With wine, one reason might be that positive attitudes towards organic food, e.g. a positive taste image, do not completely apply for wine. Mann *et al.* (2012) attributed the low market share of organic wine compared to other food products to its poor quality-image; Stolz and Schmid (2008) found that organic wine faces image problems regarding taste. Moreover, the origin of wine was found to be of higher relevance than the production method (Bernabéu *et al.*, 2008; Chiodo *et al.*, 2011; Mann *et al.*, 2012).

However, most often, economic variables were described as the key factors influencing the actual purchase of organic products (Aschemann-Witzel and Zielke, 2017). Relatively high price premiums of organic food were identified as major barriers to buying organic food in general (Gottschalk and Leistner, 2013; Padilla Bravo *et al.*, 2013) and especially organic wine (Bernabéu *et al.*, 2008; Mann *et al.*, 2012). Accordingly, lower incomes affect the purchase of organic food negatively and vice versa (Schröck, 2012; Smith *et al.*, 2009a; Zhang *et al.*, 2009). However, in higher income classes, the price barrier appears not to be an issue and economic variables become less important in explaining purchase behaviour. In such a developmental context, attitudes become more important as explanatory variables (Aschemann-Witzel and Zielke, 2017). It should also be noticed that price premiums of organic food could signal high product quality to consumers and therefore motivate them to buy organic products (Marian *et al.*, 2014).

The study at hand aims to identify barriers for the purchase of organic wine through the analysis of disparities between organic and conventional wine purchases. Analysing which kind of wines different consumer segments regularly buy in conventional or organic quality could provide relevant insights for the development of the organic wine market in Germany. Moreover, the study allows for the investigation of the relationship between attitudes and real purchase behaviour based on real market data, to conclude on the existence of an attitude-behaviour-gap. Deeper insights on this topic will be explored in the next sub-chapter.

3.3.3.2 *Survey constraints*

Methodological restrictions of consumer surveys are a subject of the investigation within the field of ethical consumerism. According to Auger and Devinney (2007), the most relevant problem is the social desirability bias which occurs when people feel pressured to give answers which they consider socially acceptable. Surveys are prone to this issue because people do not have an incentive to reveal their true attitudes and purchase intentions. Interviewees are not forced to make a monetary commitment or to make a trade-off between price and other attributes and this is what distinguishes them from real purchase situations. To lessen this problem, which is also considered as a “hypothetical bias”, consumer surveys use incentive aligned or indirect measurement methods like experimental auctions and choice experiments (Martínez-Carrasco *et al.*, 2015; Miller *et al.*, 2011). Results of such studies are close antecedents of purchase behaviour, often termed ‘revealed preferences’. However, these studies are still of an experimental nature, different from real market scenarios with real market transactions.

By means of household panel data, it is possible to analyse the relation between attitudes and real purchase behaviour as attitudinal survey data is linked to data on consumers’ shopping baskets. To our knowledge, only very few studies made use of this data source to analyse the relation between attitudes and behaviour. Moser (2016) focused on the influence of environmental concerns and found that even though attitudes had an influence on self-reported purchase behaviour, an effect on real purchase behaviour could not be detected. Environmental motives were explained as additional value, although they were not decisive for the actual purchase. Similarly, the study of Andersen (2011) did not find a link between concerns about animal welfare in egg production and the actual purchase behaviour, even though a large part of the population was willing to pay more for organic eggs to increase animal welfare. Two further studies included ethical motivations (environment/animal welfare) and self-driven motivations (taste/health). Wier *et al.* (2008) showed that motives like health and taste were

decisive factors for real purchase decisions, whereas concerns for animal welfare and the environment seemed to be a necessary (but not sufficient) condition. In contrast, the study of Van Doorn and Verhoef (2015) showed that taste and health motives were less important in explaining purchase behaviour for organic food, whereas concern for environment and animal welfare were significant. Thus, varying results for different product categories were found. For vice products, which offer direct enjoyment but contribute to negative long-term effects such as, for example, chocolate or wine, it could be advantageous to focus on quality benefits, as quality conscious consumers were more likely to purchase organic products in this category.

These results point to the drawbacks of consumer self-reporting methods and the necessity to measure consumers real purchase behaviour based on real market data, as not all attitudes and intentions translate into the act of shopping. Moreover, study results appear to differ according to product categories and an investigation of organic wine purchases seems necessary. These inferences are backed up by a recent meta-study on organic food consumption which revealed the need for more investigations of actual marketplace behaviour within specific organic product groups (Scalco *et al.*, 2017).

3.3.4 Material and Methods

The study is based on a household panel dataset provided by the GfK Group (Nuremberg, Germany), comprising regular grocery purchases of 30,000 households in Germany, which is quite unique in size. The population consists of all private German households with primary residence in Germany. Proportional quota sampling was used according to region, household size, number of children under the age of 15, age of the head of household and occupational group of the main earner. In actual fact, it is not possible to reach a constant sample due to panel mortality. To ensure that the sample is representative of the German population, the data is weighted with a constant factor which was calculated through iterative weighting and delivered by the GfK.

We focused on households who bought wine at least once in the period between December 2014 and November 2015 (N=17,673) which were the latest data at the time of data delivery. For each shopping act, information on shopping location, wine price, quantity (liters) and specific wine characteristics were given. Overall, 219,672 wine purchases were registered (see Table 10). This purchase information was matched to household-level information on socio-demographics and statements on attitudes and purchase intentions regarding sustainable, environmentally-friendly, organic and local food.

Attitudinal statements were given on a five-point rating scale from “I do not agree at all (1)” to “I totally agree (5)”. Overall, 20 variables were included. By means of factor analysis (principle components analysis), the variables were condensed to a lower number of latent variables (factors). The aim was to display the high quantity of variables through factors while simultaneously obtaining a low loss of variance. The number of factors was determined by the Kaiser-criterion (Eigenvalue > 1). Variables with high factor loadings on more than one factor (> 0.4) were excluded. For an easier interpretation of the factors, varimax rotation was applied. Finally, Cronbach’s alpha scores were used as a measure for internal scale reliability.

After that, k-means clustering was performed on the factors because this method is most suited for high case numbers. The target criterion was the minimization of variance within the clusters and clearance was the squared Euclidean distance. As it is not possible to determine the number of clusters within k-means analysis, this step was performed through the Ward method beforehand. Initially, the dendrogram and the elbow-criterion were observed to determine the number of clusters. For final clarification of cluster homogeneity, the F-Values of different cluster solutions were calculated. This value gives the ratio of the variance within the cluster to the variance in the whole sample and must therefore be below one to achieve completely homogeneous clusters. Another step in the analysis which needed to be conducted in advance, was the elimination of outliers. For that, hierarchical cluster analysis (method: single linkage) was applied. Finally, the clusters were tested for statistically significant differences in wine consumption behaviour and socio-demographics. For metric variables, the method of one-way analysis of variance (ANOVA) was used and for nominal variables, pairwise comparisons of column proportions (z-test) was performed.

3.3.5 Results

3.3.5.1 Factor analysis

The Kaiser-Meyer-Olkin (KMO) measure of 0.94 and the measure of sampling adequacy (MSA) of minimum 0.8 for each variable proofed the sampling adequacy to conduct a principal component analysis. Two variables were excluded because of high factor loadings on two factors. Table 6 shows the factor scores after varimax rotation. The analysis resulted in a three-factor solution: preference for organic products (F1), responsibility for the environment and society (F2) and appreciation of local and domestic products (F3). Overall, 60.6 % of the total variance was explained through the factors and Cronbach’s alpha scores were above 0.7 for all factors, which is considered “good” regarding internal scale reliability.

Table 6: Rotated component matrix: Factors identified

	Factor 1: Preference for organic products	Factor 2: Responsibility for the environment and society	Factor 3: Appreciation of local and domestic products
I would like to have a greater supply of organic products in stores	.843	.283	.121
I am willing to spend more for organic products	.829	.286	.190
I prefer organic products when I buy groceries	.804	.313	.155
Organic products are healthier than non-organic-products	.790	.150	.154
When it comes to organic products, I trust specialised organic stores more than conventional supermarkets	.776	.181	.106
With the purchase of organic products, I can make a small contribution against climate change	.768	.268	.139
Organic products taste better than non-organic-products	.762	.118	.143
I would like to have more information about organic products	.758	.289	.117
I consciously buy more often products which are less harmful to the environment	.183	.758	.177
Actually, I care little about the environmental harmfulness of products (reversed)	-.116	-.727	-.018
I obtain information about which food is environmentally polluted and stop buying it.	.239	.625	.194
I consider sustainability labels when I go shopping (e.g. UTZ-label, FairChoice, Rainforest Alliance Certified)	.358	.546	.170
A fair treatment of producers in the country of origin, to me, is also a part of sustainability	.332	.520	.251
I am willing to spend more for environmentally-friendly packaging	.324	.505	.257
German food is of the highest quality	.088	.058	.782
I have a high degree of trust in local products	.098	.114	.755
I am willing to spend more for local food	.334	.295	.636
I do not care if my foods originate from Germany or another country (reversed)	-.125	-.259	-.595
Eigenvalue	5.61	2.97	2.33
% of Variance	31.16	16.51	12.94
Cronbach's α	0.94	0.79	0.72

Source: Own calculation based on GfK panel data (N=16,474)

Factor 1 combines positive attitudes and purchase intentions towards organic products. The variables reflecting these factors mainly give self-driven motives for the preference of organic products, that is the belief that organic products are healthier and better tasting than non-organic products. Further variables of this factor are directly related to the purchase of organic products, e.g. a higher willingness to pay for organic products and the preference to purchase in specialised organic stores. The second factor identifies mainly ethical motivations for food

choices pertaining to the protection of the environment and fair treatment of producers. The importance of sustainability labels is also reflected in Factor 2. F3 pools items which reveal the belief that local and domestic products are superior to products from further away, for example “I have a high level of trust in local products” or “German food is of the highest quality”.

3.3.5.2 Cluster analysis

Based on the three factors, six clusters were identified after eliminating 87 outliers (see Figure 4). The results confirm the existence of different consumer segments regarding attitudes and purchase intentions. The first, and largest cluster, “The Holistics” represents 21 % of all wine-purchasing households. People in this cluster exhibit a relatively high sense of responsibility for environmental and social issues. At the same time, they show preferences for organic products. Regarding local food, they have only slightly positive attitudes. The second cluster, “The Local-Organics”, is characterised by high scores for the factors “Appreciation of local and domestic products” and “Preference for organic products”. However, these people pay rather little attention to social and environmental issues. This points to the importance of self-driven purchase motivation, like taste and health.

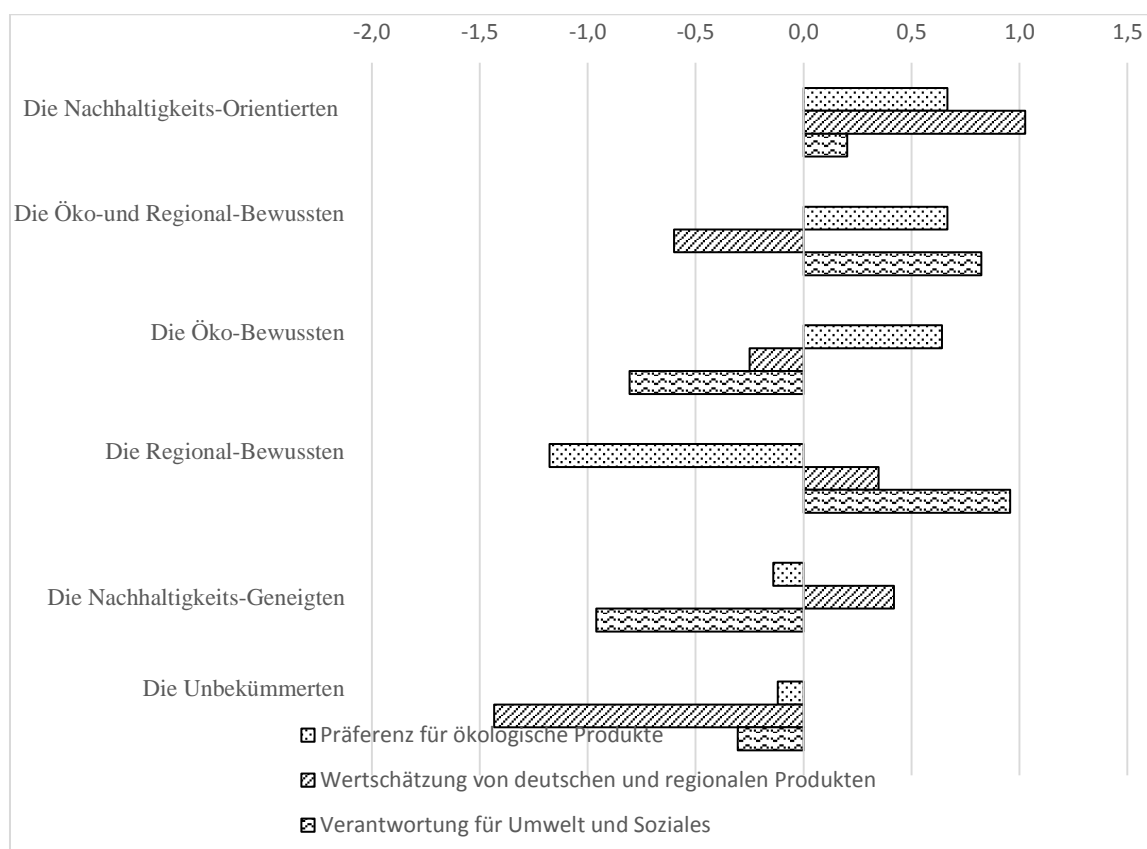


Figure 4: Cluster centers of the k-means cluster analysis (N=16,387)

“The Organics” (cluster 3) only score high on the factor “Preference for organic products”; local and domestic products are relatively unpopular among this group of people. Moreover, environmental and social aspects of food production are of minor relevance. The fourth cluster “The Locals” is opposite to “The Organics”: it has a very high preference for local and domestic products and a very low preference for organic products. Cluster 5 “The Sustainably Inclined” shows curiosity towards social responsibility topics and environmental issues and at the same time minor interest in local and domestic products. The sixth cluster “The Unconcerned” is the smallest cluster and people in this segment show the least sense of responsibility for the environment and society. This goes along with negative scores for organic and local/domestic production.

3.3.5.3 Purchase behaviour and socio-demographics

In the following, each cluster is described more specifically regarding purchase behaviour and socio-demographics.

3.3.5.3.1 The Holistics

The cluster was responsible for 24 % of all wine expenditures in 2015 (see appendices: Table 11:) and at the same time revealed the highest expenditure share for organic wine (7 %) (see Table 7). Households in this cluster had a relatively high price acceptance¹ of 3.89 € for conventional wine. However, for organic wine, price acceptance was positioned in the midfield at 4.71 € and did not exceed the price barrier of 5 € where the premium segment starts. People in this segment showed high expenditure shares for direct purchases of organic wine at wineries, cooperatives or wine cellars (40.5 %); (see Table 8). An examination of conventional wines shows that wine specialty stores were found to be very important compared to the other clusters (see appendices: Table 12). Regarding origin, German wine was most preferred among organic red wines (see Table 9), whereas French red wine played only a minor role. However, French wines had relatively high expenditure shares for conventional red wine (see appendices: Table 13). Most people in this cluster were over the age of 70 (30 %), had a university degree (32 %) and belonged to the highest income group (26 %) (see appendices: Table 14).

¹ Average price paid in real purchase situations over one year

Table 7: Expenditure share and price acceptance of consumer segments

	<u>Cluster 1</u>	<u>Cluster 2</u>	<u>Cluster 3</u>	<u>Cluster 4</u>	<u>Cluster 5</u>	<u>Cluster 6</u>
	The Holistics (21 %)	The Local- Organics (19 %)	The Organics (19 %)	The Locals (15 %)	The Sustainably Inclined (14 %)	The Unconcerned (12 %)
Expenditure share in %						
organic wine	7.06 ^a	3.96 ^b	3.92 ^b	2.05 ^c	2.04 ^c	1.06 ^d
domestic wine	44.28 ^a	50.54 ^b	41.92 ^a	50.36 ^b	41.79 ^a	45.10 ^a
Price acceptance in €/L per Liter						
organic wine	4.71 ^a	5.65 ^b	5.22 ^c	5.50 ^{b,c}	4.82 ^a	3.49 ^d
conventional wine	3.89 ^a	3.93 ^a	3.58 ^b	3.48 ^c	2.96 ^d	2.83 ^e

Shares and mean values of clusters with different letters differ significantly ($p < 0.05$).

3.3.5.3.2 The Local-Organics

The cluster had relatively high expenditure shares for organic and domestic wine. It showed the highest price acceptance, both for organic (5.65 €) and conventional wine (3.93 €). Compared to other clusters, relatively high expenditure shares for organic wine purchases at supermarkets and organic stores were revealed. However, direct wine sellers were the most important shopping channel for organic wine. Regarding organic white wine, special preference was given to German wine. Most people could be found in the highest income class.

Table 8: Expenditure share (in %) by shopping venue and consumer segment for organic wine

	<u>Cluster 1</u>	<u>Cluster 2</u>	<u>Cluster 3</u>	<u>Cluster 4</u>	<u>Cluster 5</u>	<u>Cluster 6</u>
	The Holistics (21 %)	The Local- Organics (19 %)	The Organics (19 %)	The Locals (15 %)	The Sustainably Inclined (14 %)	The Unconcerned (12 %)
Discount outlet	24.6 ^a	21.9 ^b	42.6 ^c	24.6 ^a	24.1 ^a	53.1 ^d
Supermarket	9.0 ^a	12.0 ^b	8.4 ^c	8.8 ^{a,c}	8.5 ^{a,c}	9.9 ^a
Wine specialty store	11.3 ^a	14.1 ^b	26.9 ^c	31.4 ^d	6.3 ^e	12.2 ^a
Direct wine seller	40.5 ^a	39.6 ^a	16.3 ^b	27.6 ^c	59.5 ^d	15.7 ^b
Organic store	6.0 ^a	10.7 ^b	2.9 ^c	0.7 ^d	0.2 ^e	1.8 ^f
Others	8.6 ^a	1.7 ^b	3.0 ^c	6.9 ^d	1.3 ^e	7.3 ^f

a,b,c,d shares of clusters with different letters differ significantly ($p < 0.05$).

3.3.5.3.3 The Organics

The cluster was characterized by a relative high expenditure share for organic wine and relatively low expenditure shares for local wine. Most of the expenditures for organic wine were made in discount outlets. Moreover, wine specialty stores had a relatively high share as well. Regarding organic red wine, the origins France and Italy exhibited high expenditure shares. For organic white wine, Italy was the most preferred country. Wine shoppers of this group are remarkably younger compared to the other clusters. Most of them had a university degree.

3.3.5.3.4 The Locals

The cluster was characterized by a high expenditure share for domestic wine (50 %) and low expenditure shares for organic wine (2 %). This consumer group showed the highest expenditure share for organic red wines from Germany. As for conventional wine, direct wine purchases and white wines originating in Germany were of comparably high importance. Wine shoppers of this cluster were more likely to be older, with less formal education and lower incomes.

3.3.5.3.5 The Sustainably Inclined

Along with the “Local-Organics”, this cluster had the highest preference for organic white wines from Germany. Moreover, they exhibited the highest expenditure share for direct purchases of organic wine. For organic red wines, the origin Italy was favored. In contrast, they spent a relatively high amount for wines from Germany and France when looking at conventional red wine. This group had the highest share in the lowest income groups.

3.3.5.3.6 The Unconcerned

The cluster conducted only 10 % of all wine purchases measured in Euros and exhibited the lowest expenditure share for organic wine (1 %). This cluster showed high expenditure shares for organic wine purchases in discount outlets. They had the lowest price acceptance for conventional (2.83 €) and organic wine (3.49 €). Specifically, Italian wines exposed high expenditure shares when analysing purchases of organic red wine. People up to the age of 29 had an above average share in this cluster.

Table 9: Expenditure share (in %) by country of origin and consumer segment differentiated in organic red and white wine

		<u>Cluster 1</u>	<u>Cluster 2</u>	<u>Cluster 3</u>	<u>Cluster 4</u>	<u>Cluster 5</u>	<u>Cluster 6</u>
		The Holistics (21 %)	The Local- Organics (19 %)	The Organics (19 %)	The Locals (15 %)	The Sustainably Inclined (14 %)	The Unconcerned (12 %)
Red	Germany	38.9 ^a	37.4 ^b	17.3 ^c	41.7 ^d	5.7 ^e	9.4 ^f
	France	9.5 ^a	14.1 ^b	34.1 ^c	11.3 ^d	2.6 ^e	11.7 ^d
	Italy	24.3 ^a	11.1 ^b	31.6 ^c	22.9 ^a	62.9 ^d	51.0 ^e
	Spain	25.5 ^a	29.5 ^b	10.4 ^c	18.6 ^d	28.5 ^b	26.7 ^{a,b}
	Others	1.8 ^a	7.9 ^b	6.6 ^c	5.6 ^c	0.2 ^d	1.3 ^a
White	Germany	69.8 ^a	85.0 ^b	44.1 ^c	60.3 ^d	76.0 ^e	70.6 ^a
	France	2.1 ^a	0.6 ^b	4.2 ^c	0.3 ^b	2.3 ^a	1.6 ^a
	Italy	17.2 ^a	10.1 ^b	44.3 ^c	34.1 ^d	18.8 ^a	26.9 ^e
	Spain	10.3 ^a	3.7 ^b	7.4 ^c	3.7 ^b	2.8 ^b	0.9 ^d
	Others	0.6 ^a	0.6 ^a	-. ^b	1.6 ^c	-. ^b	-. ^b

a,b,c,d shares of clusters with different letters differ significantly ($p < 0.05$).

3.3.6 Discussion and conclusions

The analysis confirmed that attitudes were in line with purchase behaviour. Consumers with positive attitudes towards organic products showed higher organic budget shares; the same held true for domestic wine. In contrast, the cluster of the “Unconcerned” indicated relatively negative attitudes and showed a low level of action. The cluster with the highest expenditure share for organic wine indicated strong pro-environmental attitudes and a preference for sustainable products. Therefore, we conclude that communication strategies with a focus on environmental and social issues could help to further develop the organic wine market.

However, the clusters’ expenditure shares for organic wine were generally at a low level. One major reason could be the low supply level of organic wine. In 2015, only 4.7 % of the world’s grape-growing area was cultivated according to organic standards (Lernoud and Willer, 2017a). Therefore, we assume that the low expenditure share is mainly attributed to the still low availability and product assortment of organic wine. Especially with regard to the highly-differentiated wine market and varying consumer preferences, this issue is thought to be the major purchase barrier for consumers. As the organic wine growing area is increasing in most European countries, this barrier should disappear in the future.

The results of this study have indicated that ethically concerned wine consumers (Clusters: Holistics & Sustainably Inclined) accounted for 35 % of all German wine purchasing

households. Previous research determined that the proportion was in the same range (32–38 %) (Mueller Loose and Lockshin, 2013; Pomarici *et al.*, 2016). However, only 21 % (Holistics) showed a relatively high level of action when it came to environmentally conscious wine purchase behaviour. The other part of the ethically concerned wine consumers (Sustainably Inclined) was indeed sustainably oriented, but did not convert these attitudes into actual purchase behaviour. This could be attributed to the so called “price barrier” (Bernabéu *et al.*, 2008; Mann *et al.*, 2012) as consumers of the cluster had lower average incomes and a lower price acceptance in accordance with previous studies. We conclude that studies not taking real purchase data into account are prone to overestimate the segment of ethically motivated consumers by about one half.

Different clusters for the application of marketing strategies were identified. Consumers who had the highest expenditure share for organic wine (Holistics) showed strong pro-environmental attitudes and a preference for sustainable products. In line with prior studies, this consumer segment had a higher wine purchasing frequency (Orth, 2005; Pomarici *et al.*, 2016) and higher incomes (Loureiro, 2003; Pomarici *et al.*, 2016; Sellers, 2016; Woods *et al.*, 2013). Interestingly, this consumer group had a specific preference for conventional French wines and purchased conventional wine at wine specialty shops. This suggests that for French wine the organic attribute is less relevant as the country effect is overwhelmingly high (Bernabéu *et al.*, 2008; Mann *et al.*, 2012). Similarly, the organic attribute could be less important for purchases at wine specialty stores.

The cluster “Organics” had a relatively high preference for organic products and relatively negative attitudes towards the quality of local products. Accordingly, Italian and French organic wines were strongly preferred. Likewise, in the study of Mann *et al.* (2012) Swiss wine consumers preferred wines from France over wines from Switzerland. The authors ascribed this to France’s longer tradition for high quality wine.

In line with the findings of Long and Murray (2013), we detected two different groups of consumers with a preference for local products. Those who are at the same time strongly committed to organic production (Local-Organics), and those who are exclusively supporting local production (Locals). The consumer group, who is interested in organic and local food (Local-Organics) is thought to be the most promising consumer segment for organic wine producers from Germany and offers high market potential for direct selling wineries. This segment has great potential, especially regarding the future wine market, as young people are slightly overrepresented. The considerably higher price acceptance for wine indicates that this

segment consisted of more involved wine drinkers (see e.g. Barber *et al.* (2007)). The promising combination of organic production and local origin is in line with the studies of Ay *et al.* (2014) and Brugarolas *et al.* (2010). On the other hand, the consumer group interested in local food (Locals) only supports local products while preferences for organic products were low. This segment is highly committed to German red wine. According to the study of D'Amico *et al.* (2014), local consumers had lower income. Communication for this consumer segment should focus on the local/domestic origin.

Although the applied segmentation approach was relevant to determining consumer segments in the German wine market, the study did not prove a causal relation between attitudes and behaviour. Future studies should therefore use real purchase data to estimate this link with a special focus on a diverging effect of self-driven and ethical motivations. In this context it must be noted that other psychological barriers could also contribute to the attitude-behaviour gap, e.g. a lack of trust in the organic label, missing knowledge about organic wine production practices or the belief that organic wine is of minor quality. The effect of these factors is suggested to be analysed in upcoming studies.

Moreover, the difference between the accepted organic and conventional wine price gave no information about the price premium consumers were willing to pay for the organic attribute alone. For this purpose, the price effect needs to be separated from all other attributes in future research through a hedonic price analysis. A further restriction of the study was the limited number of wine attributes due to the nature of the data provided. It must be mentioned that many other intrinsic and extrinsic characteristics could be important to the consumers' wine choice such as packaging, brand and variety.

The particular value of this study was the single data source for attitudes and real buying behaviour that allowed the exploration of the attitude-behaviour-gap. The most important outcome for following consumer studies was the considerable link between the clusters' attitudes and the actual buying behaviour with regard to expenditure share, price acceptance, shopping venue and country of origin. The attitude-behaviour gap was rather low for all of these purchase properties except expenditure share. Future studies should consider that survey attitudes can be a reliable source to draw conclusions on specific aspects of consumers' behaviour.

3.3.7 Acknowledgements

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3.3.8 Appendices

Table 10: Sample description

	Number of purchases (N=219,672)	Purchases in Liter (N= 405,443.58)	Purchases in Euro (N= 1,438,765.17)
organic wine	3.1 %	3.4 %	4.8 %
conventional wine	96.9 %	96.6 %	95.2 %

Table 11: Distribution of wine purchases among the different clusters

	<u>Cluster 1</u>	<u>Cluster 2</u>	<u>Cluster 3</u>	<u>Cluster 4</u>	<u>Cluster 5</u>	<u>Cluster 6</u>
	The Holistics (21 %)	The Local- Organics (19 %)	The Organics (19 %)	The Locals (15 %)	The Sustainably Inclined (14 %)	The Unconcerned (12 %)
Number of purchases (N=219,672)	23.30 %	16.99 %	18.14 %	14.92 %	14.59 %	12.06 %
Purchases in Liter (N= 405,443.58)	22.05 %	16.85 %	16.57 %	16.50 %	14.99 %	13.04 %
Purchases in Euro (N= 1,438,765.17)	24.47 %	19.01 %	17.03 %	16.38 %	12.68 %	10.44 %

Table 12: Expenditure share (in %) by shopping venue and consumer segment for conventional wine

	<u>Cluster 1</u>	<u>Cluster 2</u>	<u>Cluster 3</u>	<u>Cluster 4</u>	<u>Cluster 5</u>	<u>Cluster 6</u>
	The Holistics (21 %)	The Local- Organics (19 %)	The Organics (19 %)	The Locals (15 %)	The Sustainably Inclined (14 %)	The Unconcerned (12 %)
Discount outlet	38.2 ^a	34.3 ^b	43.4 ^c	37.6 ^d	47.2 ^e	50.5 ^f
Supermarket	25.6 ^a	26.7 ^b	26.8 ^b	26.8 ^b	33.9 ^c	33.7 ^c
Wine specialty store	14.3 ^a	11.1 ^b	13.4 ^c	9.0 ^d	9.0 ^d	5.6 ^e
Direct wine seller	16.0 ^a	21.9 ^b	11.4 ^c	21.7 ^d	6.0 ^d	8.2 ^e
Organic store	0.1 ^a	0.0 ^b	0.0 ^c	0.0 ^b	0.0 ^d	0.0 ^{b,c}
Others	5.9 ^a	6.0 ^a	5.1 ^b	4.9 ^c	3.8 ^d	1.9 ^e

a,b,c,d shares of clusters with different letters differ significantly (p<0.05).

Table 13 Expenditure share (in %) by country of origin and consumer segment differentiated in conventional red and white wine

		<u>Cluster 1</u>	<u>Cluster 2</u>	<u>Cluster 3</u>	<u>Cluster 4</u>	<u>Cluster 5</u>	<u>Cluster 6</u>
		The Holistics (21 %)	The Local- Organics (19 %)	The Organics (19 %)	The Locals (15 %)	The Sustainably Inclined (14 %)	The Unconcerned (12 %)
Red	Germany	34.3 ^a	37.1 ^b	31.5 ^c	41.6 ^d	27.3 ^e	32.3 ^f
	France	20.7 ^a	20.1 ^b	18.7 ^c	17.7 ^d	21.5 ^e	20.5 ^{a,b}
	Italy	19.0 ^a	16.9 ^b	16.7 ^b	19.5 ^c	17.3 ^d	17.7 ^e
	Spain	12.6 ^a	13.4 ^b	12.4 ^{a,c}	8.5 ^d	12.9 ^e	12.1 ^c
	Others	13.4 ^a	12.5 ^b	20.7 ^c	12.6 ^b	21.0 ^c	17.3 ^d
White	Germany	63.9 ^a	72.0 ^b	63.8 ^a	69.3 ^c	60.3 ^d	55.7 ^e
	France	11.6 ^a	6.2 ^b	8.3 ^c	6.7 ^d	13.0 ^e	8.9 ^f
	Italy	9.9 ^a	8.1 ^b	13.0 ^c	10.2 ^d	11.7 ^e	15.1 ^f
	Spain	2.3 ^a	1.2 ^b	1.8 ^c	2.0 ^d	1.8 ^c	2.5 ^e
	Others	12.3 ^a	12.5 ^a	13.1 ^b	11.8 ^c	13.2 ^b	17.8 ^d

a,b,c,d shares of clusters with different letters differ significantly ($p < 0.05$).

Table 14: Demographic data of consumer segments

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
	The Holistics (21 %)	The Local-Organics (19 %)	The Organics (19 %)	The Locals (15 %)	The Sustainably Inclined (14 %)	The Unconcerned (12 %)
Age of the head of household (in %)						
up to 29 years	3.3 ^a	7.0 ^b	7.6 ^{b,c}	2.0 ^d	4.0 ^a	9.0 ^c
30–39 years	10.3 ^a	13.1 ^b	16.5 ^c	8.8 ^d	11.3 ^a	14.3 ^b
40–49 years	14.9 ^a	19.2 ^b	22.0 ^c	14.0 ^a	19.7 ^b	21.5 ^{b,c}
50–59 years	19.4 ^a	18.9 ^a	21.7 ^b	18.2 ^a	22.2 ^b	21.7 ^b
60–69 years	22.0 ^a	19.4 ^b	15.4 ^c	26.0 ^d	21.6 ^a	17.4 ^{b,c}
70 years and more	30.0 ^a	22.3 ^b	16.8 ^c	31.0 ^a	21.2 ^b	16.1 ^c
Education of the head of calendar (in %)						
Secondary general school	16.1 ^a	16.0 ^a	13.9 ^b	28.0 ^c	22.3 ^d	15.3 ^{a,b}
Intermediate Secondary School	26.7 ^a	35.2 ^b	28.9 ^c	28.7 ^{a,c}	34.0 ^b	33.6 ^b
Special upper secondary school	15.4 ^a	14.8 ^{a,b,c}	13.3 ^c	15.9 ^a	13.9 ^{a,b,c}	13.0 ^{b,c}
Grammar school	10.1 ^a	7.5 ^b	14.4 ^c	8.7 ^{a,b}	9.4 ^a	12.4 ^c
University	31.8 ^a	26.6 ^b	29.5 ^a	18.8 ^c	20.4 ^c	25.7 ^b
Weighted per capita net income (in %)¹⁾						
up to 749 €	6.3 ^a	7.9 ^b	9.8 ^c	10.0 ^c	12.4 ^d	9.1 ^{b,c}
750–999 €	9.4 ^a	10.4 ^{a,b}	12.4 ^c	10.9 ^{b,c}	15.0 ^d	10.3 ^{a,b}
1000–1249 €	17.1 ^a	16.2 ^a	16.4 ^a	19.2 ^b	17.9 ^{a,b}	16.9 ^a
1250–1499 €	17.3 ^a	18.8 ^{a,b}	17.7 ^{a,b}	22.5 ^c	17.6 ^{a,b}	19.8 ^b
1500–1999 €	23.7 ^a	21.6 ^b	21.2 ^b	20.4 ^b	20.2 ^b	22.1 ^{a,b}
2000 € and more	26.3 ^a	25.1 ^a	22.5 ^b	17.1 ^c	17.0 ^c	21.8 ^b

a,b,c,d shares of clusters with different letters differ significantly ($p < 0.05$). ¹⁾1*First Adult + 0.7*following adult + 0.5*children

3.3.9 References

- Aertsens, J., Mondelaers, K., Verbeke, W., Buysse, J. and Van Huylenbroeck, G. (2011), "The influence of subjective and objective knowledge on attitude, motivations and consumption of organic food", *British Food Journal*, Vol. 113 No. 11, pp. 1353–1378.
- Aertsens, J., Verbeke, W., Mondelaers, K., Van Huylenbroeck, G. and Van Huylenbroeck, G. (2009), "Personal determinants of organic food consumption: A review", *British Food Journal*, Vol. 111 No. 10, pp. 1140–1167.
- Ajzen, I. (1991), "The theory of planned behavior", *Theories of Cognitive Self-Regulation*, Vol. 50 No. 2, pp. 179–211.
- Andersen, L.M. (2011), "Animal welfare and eggs – Cheap talk or money on the counter?", *Journal of Agricultural Economics*, Vol. 62 No. 3, pp. 565–584.
- Aschemann-Witzel, J. and Niebuhr Aagaard, E.M. (2014), "Elaborating on the attitude-behaviour gap regarding organic products: Young Danish consumers and in-store food choice", *International Journal of Consumer Studies*, Vol. 38 No. 5, pp. 550–558.
- Aschemann-Witzel, J. and Zielke, S. (2017), "Can't buy me green? A review of consumer perceptions of and behavior toward the price of organic food", *Journal of Consumer Affairs*, Vol. 51 No. 1, pp. 211–251.
- Auger, P. and Devinney, T.M. (2007), "Do what consumers say matter? The misalignment of preferences with unconstrained ethical intentions", *Journal of Business Ethics*, Vol. 76 No. 4, pp. 361–383.
- Ay, J.-S., Chakir, R. and Marette, S. (2014), "Does living close to a vineyard increase the willingness-to-pay for organic and local wine?", paper prepared for the EAAE 2014 Congress 'Agri-Food and Rural Innovations for Healthier Societies'. Ljubljana, Slovenia, August 26–29, 2014, available at: <http://purl.umn.edu/183075> (accessed 18 February 2016).
- Barber, N., Ismail, J. and Dodd, T. (2007), "Purchase attributes of wine consumers with low involvement", *Journal of Food Products Marketing*, Vol. 14 No. 1, pp. 69–86.
- Barber, N., Taylor, D.C. and Deale, C.S. (2010), "Wine tourism, environmental concerns, and purchase intention", *Journal of Travel & Tourism Marketing*, Vol. 27 No. 2, pp. 146–165.
- Bernabéu, R., Brugarolas, M., Martínez-Carrasco, L. and Díaz, M. (2008), "Wine origin and organic elaboration, differentiating strategies in traditional producing countries", *British Food Journal*, Vol. 110 No. 2, pp. 174–188.

- Bonn, M.A., Cronin, J.J. and Cho, M. (2016), “Do environmental sustainable practices of organic wine suppliers affect consumers behavioral intentions? The moderating role of trust”, *Cornell Hospitality Quarterly*, Vol. 57 No. 1, pp. 21–37.
- Bray, J., Johns, N. and Kilburn, D. (2011), “An exploratory study into the factors impeding ethical consumption”, *Journal of Business Ethics*, Vol. 98 No. 4, pp. 597–608.
- Brugarolas, M., Martinez-Carrasco Martinez, L., Bernabéu, R. and Martinez-Poveda, A. (2010), “A contingent valuation analysis to determine profitability of establishing local organic wine markets in Spain”, *Renewable Agriculture and Food Systems*, Vol. 25 No. 1, pp. 35–44.
- Buder, F., Feldmann, C. and Hamm, U. (2014), “Why regular buyers of organic food still buy many conventional products”, *British Food Journal*, Vol. 116 No. 3, pp. 390–404.
- Carrigan, M. and Attalla, A. (2001), “The myth of the ethical consumer – Do ethics matter in purchase behaviour?”, *Journal of Consumer Marketing*, Vol. 18 No. 7, pp. 560–578.
- Carrington, M.J., Neville, B.A. and Whitwell, G.J. (2010), “Why ethical consumers don’t walk their talk: Towards a framework for understanding the gap between the ethical purchase intentions and actual buying behaviour of ethically minded consumers”, *Journal of Business Ethics*, Vol. 97 No. 1, pp. 139–158.
- Chiodo, E., Casolani, N. and Fantini, A. (2011), “Evaluation of the effects of changes in regulatory policies on consumers perception: The case of designations of origin in the wine common market organisation”, paper prepared for the EAAE 122nd Seminar. Ancona, Italy, February 17–18, 2011, available at: <http://purl.umn.edu/99590> (accessed 18 February 2016).
- D'Amico, M., Di Vita, G., Chinnici, G., Pappalardo, G. and Pecorino, B. (2014), “Short food supply chain and locally produced wines: Factors affecting consumer behavior”, *Italian Journal of Food Science*, Vol. 26 No. 3, pp. 329–334.
- D'Amico, M., Di Vita, G. and Monaco, L. (2016), “Exploring environmental consciousness and consumer preferences for organic wines without sulfites”, *Journal of Cleaner Production*, Vol. 120, pp. 64–71.
- De Pelsmacker, P., Driesen, L. and Rayp, G. (2005), “Do consumers care about ethics? Willingness to pay for fair-trade coffee”, *Journal of consumer affairs*, Vol. 39 No. 2, pp. 363–385.
- Defrancesco, E., Estrella Orrego, J. and Gennari, A. (2012), “Would ‘New World’ wines benefit from protected geographical indications in international markets? The case of Argentinean Malbec”, *Wine Economics and Policy*, Vol. 1 No. 1, pp. 63–72.

- Drennan, J., Bianchi, C., Cacho-Elizondo, S., Louriero, S., Guibert, N. and Proud, W. (2015), "Examining the role of wine brand love on brand loyalty: A multi-country comparison", *International Journal of Hospitality Management*, Vol. 49, pp. 47–55.
- Eurobarometer (2013), "Attitudes of Europeans towards building the single market for green products: Flash Eurobarometer 367", available at: <http://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/ResultDoc/download/DocumentKy/60379/> (accessed 11 May 2017).
- Forbes, S.L. and DeSilva, T.-A. (2012), "Analysis of environmental management systems in New Zealand wineries", *International Journal of Wine Business Research*, Vol. 24 No. 2, pp. 98–114.
- Fotopoulos, C., Krystallis, A. and Ness, M. (2003), "Wine produced by organic grapes in Greece: using means-end chains analysis to reveal organic buyers' purchasing motives in comparison to the non-buyers", *Food Quality and Preference*, Vol. 14 No. 7, pp. 549–566.
- Frostling-Henningsson, M., Hedbom, M. and Wilandh, L. (2014), "Intentions to buy 'organic' not manifested in practice", *British Food Journal*, Vol. 116 No. 5, pp. 872–887.
- German Wine Institute (DWI) (2016), "German Wine Statistics (Deutscher Wein Statistik). The Wine Market in 2015", available at: http://www.deutscheweine.de/fileadmin/user_upload/Website/Service/Downloads/Statistik_2016-2017-neu.pdf (accessed 12 January 2018).
- Gottschalk, I. and Leistner, T. (2013), "Consumer reactions to the availability of organic food in discount supermarkets", *International Journal of Consumer Studies*, Vol. 37 No. 2, pp. 136–142.
- Grebitus, C., Lusk, J.L. and Nayga, R.M. (2013), "Effect of distance of transportation on willingness to pay for food", *Ecological Economics*, Vol. 88, pp. 67–75.
- Gustafson, C.R., Lybbert, T.J. and Sumner, D.A. (2016), "Consumer sorting and hedonic valuation of wine attributes: Exploiting data from a field experiment", *Agricultural Economics*, Vol. 47 No. 1, pp. 91–103.
- Hollebeek, L.D., Jaeger, S.R., Brodie, R.J. and Balemi, A. (2007), "The influence of involvement on purchase intention for new world wine", *Food Quality and Preference*, Vol. 18 No. 8, pp. 1033–1049.
- Jaeger, S.R., Mielby, L.H., Heymann, H., Jia, Y. and Frøst, M.B. (2013), "Analysing conjoint data with OLS and PLS regression: A case study with wine", *Journal of the Science of Food and Agriculture*, Vol. 93 No. 15, pp. 3682–3690.

- Johnson, T. and Bastian, S.E.P. (2015), "A fine wine instrument – An alternative for segmenting the Australian wine market", *International Journal of Wine Business Research*, Vol. 27 No. 3, pp. 182–202.
- Johnson, T. and Bruwer, J. (2003), "An empirical confirmation of wine-related lifestyle segments in the Australian wine market", *International Journal of Wine Marketing*, Vol. 15 No. 1, pp. 5–33.
- Kim, H. and Bonn, M.A. (2015), "The moderating effects of overall and organic wine knowledge on consumer behavioral intention", *Scandinavian Journal of Hospitality and Tourism*, Vol. 15 No. 3, pp. 295–310.
- Kolyesnikova, N., Dodd, T.H. and Duhan, D.F. (2008), "Consumer attitudes towards local wines in an emerging region: A segmentation approach", *International Journal of Wine Business Research*, Vol. 20 No. 4, pp. 321–334.
- Lernoud, J. and Willer, H. (2017), "Current statistics on organic agriculture worldwide: Area, producers, markets, and selected crops", in Willer, H. and Lernoud, J. (Eds.), *The World of organic agriculture: Statistics and emerging trends 2017*, Research Institute of Organic Agriculture (FiBL), Frick, and IFOAM - Organics International, Frick and Bonn.
- Lesschaeve, I., Bowen, A. and Bruwer, J. (2012), "Determining the impact of consumer characteristics to project sensory preferences in commercial white wines", *American Journal of Enology and Viticulture*, Vol. 63 No. 4, pp. 487–493.
- Lockshin, L., Quester, P. and Spawton, T. (2001), "Segmentation by involvement or nationality for global retailing: a cross-national comparative study of wine shopping behaviours", *Journal of Wine Research*, Vol. 12 No. 3, pp. 223–236.
- Long, M.A. and Murray, D.L. (2013), "Ethical consumption, values convergence/divergence and community development", *Journal of Agricultural and Environmental Ethics*, Vol. 26 No. 2, pp. 351–375.
- Loureiro, M.L. (2003), "Rethinking new wines: Implications of local and environmentally friendly labels", *Food Policy*, Vol. 28 No. 5–6, pp. 547–560.
- Mann, S., Ferjani, A. and Reissig, L. (2012), "What matters to consumers of organic wine?", *British Food Journal*, Vol. 114 No. 2, pp. 272–284.
- Marian, L., Chrysochou, P., Krystallis, A. and Thøgersen, J. (2014), "The role of price as a product attribute in the organic food context: An exploration based on actual purchase data", *Food Quality and Preference*, Vol. 37, pp. 52–60.

- Martínez-Carrasco, L., Brugarolas, M., Martínez-Poveda, A. and Ruiz-Martínez, J.J. (2015), “Comparing hypothetical versus non-hypothetical methods for measuring willingness to pay in a food context”, *Spanish Journal of Agricultural Research*, Vol. 13 No. 4, pp. 1–12.
- Miller, K.M., Hofstetter, R., Krohmer, H. and Zhang, Z.J. (2011), “How should consumers’ willingness to pay be measured? An empirical comparison of state-of-the-art approaches”, *Journal of Marketing Research*, Vol. 48 No. 1, pp. 172–184.
- Moser, A.K. (2016), “Consumers’ purchasing decisions regarding environmentally friendly products. An empirical analysis of German consumers”, *Journal of Retailing and Consumer Services*, Vol. 31, pp. 389–397.
- Mueller, S. and Szolnoki, G. (2010), “The relative influence of packaging, labelling, branding and sensory attributes on liking and purchase intent: Consumers differ in their responsiveness”, *Food Quality and Preference*, Vol. 21 No. 7, pp. 774–783.
- Mueller Loose, S. and Lockshin, L. (2013), “Testing the robustness of best worst scaling for cross-national segmentation with different numbers of choice sets”, *Food Quality and Preference*, Vol. 27 No. 2, pp. 230–242.
- Mueller Loose, S. and Remaud, H. (2013), “Impact of corporate social responsibility claims on consumer food choice: A cross-cultural comparison”, *British Food Journal*, Vol. 115 No. 1, pp. 142–166.
- Mueller Loose, S. and Szolnoki, G. (2012), “Market price differentials for food packaging characteristics”, *Food Quality and Preference*, Vol. 25 No. 2, pp. 171–182.
- Nuttavuthisit, K. and Thøgersen, J. (2017), “The importance of consumer trust for the emergence of a market for green products: The case of organic food”, *Journal of Business Ethics*, Vol. 140 No. 2, pp. 323–337.
- O’Donovan, P. and McCarthy, M. (2002), “Irish consumer preference for organic meat”, *British Food Journal*, Vol. 104 No. 3/4/5, pp. 353–370.
- Olsen, J., Thach, L. and Nowak, L. (2007), “Wine for my generation: Exploring how US wine consumers are socialized to wine”, *Journal of Wine Research*, Vol. 18 No. 1, pp. 1–18.
- Orth, U.R. (2005), “Consumer personality and other factors in situational brand choice variation”, *Journal of Brand Management*, Vol. 13 No. 2, pp. 115–133.
- Orth, U.R. and Krška, P. (2001), “Quality signals in wine marketing: The role of exhibition awards”, *The International Food and Agribusiness Management Review*, Vol. 4 No. 4, pp. 385–397.

- Padel, S. and Foster, C. (2005), "Exploring the gap between attitudes and behaviour: Understanding why consumers buy or do not buy organic food", *British Food Journal*, Vol. 107 No. 8, pp. 606–625.
- Padilla Bravo, C., Cordts, A., Schulze, B. and Spiller, A. (2013), "Assessing determinants of organic food consumption using data from the German National Nutrition Survey II", *Food Quality and Preference*, Vol. 28 No. 1, pp. 60–70.
- Pagliarini, E., Laureati, M. and Gaeta, D. (2013), "Sensory descriptors, hedonic perception and consumer's attitudes to Sangiovese red wine deriving from organically and conventionally grown grapes", *Frontiers in Psychology*, Vol. 4, pp. 1–7.
- Palma, D., Ortúzar, J.d.D., Rizzi, L.I., Guevara, C.A., Casaubon, G. and Ma, H. (2016), "Modelling choice when price is a cue for quality: A case study with Chinese consumers", *Journal of Choice Modelling*, Vol. 19, pp. 24–39.
- Panzone, L.A. (2014), "Why are discounted prices presented with full prices? The role of external price information on consumers' likelihood to purchase", *Food Quality and Preference*, Vol. 31, pp. 69–80.
- Pomarici, E., Amato, M. and Vecchio, R. (2016), "Environmental friendly wines: A consumer segmentation study", *Agriculture and Agricultural Science Procedia*, Vol. 8, pp. 534–541.
- Pomarici, E. and Vecchio, R. (2014), "Millennial generation attitudes to sustainable wine: An exploratory study on Italian consumers", *Journal of Cleaner Production*, Vol. 66, pp. 537–545.
- Rahman, I., Stumpf, T. and Reynolds, D. (2014), "A comparison of the influence of purchaser attitudes and product attributes on organic wine preferences", *Cornell Hospitality Quarterly*, Vol. 55 No. 1, pp. 127–134.
- Sáenz-Navajas, M.-P., Campo, E., Sutan, A., Ballester, J. and Valentin, D. (2013), "Perception of wine quality according to extrinsic cues: The case of Burgundy wine consumers", *Food Quality and Preference*, Vol. 27 No. 1, pp. 44–53.
- Scalco, A., Noventa, S., Sartori, R. and Ceschi, A. (2017), "Predicting organic food consumption: A meta-analytic structural equation model based on the theory of planned behavior", *Appetite*, Vol. 112, pp. 235–248.
- Schäufele, I. and Hamm, U. (2017), "Consumers' perceptions, preferences and willingness-to-pay for wine with sustainability characteristics: A review", *Journal of Cleaner Production*, Vol. 147, pp. 379–394.

- Schröck, R. (2012), "The organic milk market in Germany is maturing: A demand system analysis of organic and conventional fresh milk segmented by consumer groups", *Agribusiness*, Vol. 28 No. 3, pp. 274–292.
- Sellers, R. (2016), "Would you pay a price premium for a sustainable wine? The voice of the Spanish consumer", *Agriculture and Agricultural Science Procedia*, Vol. 8, pp. 10–16.
- Smith, T.A., Huang, C.L. and Lin, B.-H. (2009), "Does price or income affect organic choice? Analysis of U.S. fresh produce users", *Journal of Agricultural and Applied Economics*, Vol. 41 No. 3, pp. 731–744.
- Sogari, G., Corbo, C., Macconi, M., Menozzi, D. and Mora, C. (2015), "Consumer attitude towards sustainable-labelled wine: An exploratory approach", *International Journal of Wine Business Research*, Vol. 27 No. 4, pp. 312–328.
- Sogari, G., Mora, C. and Menozzi, D. (2016), "Factors driving sustainable choice: The case of wine", *British Food Journal*, Vol. 118 No. 3, pp. 632–646.
- Stolz, H. and Schmid, O. (2008), "Consumer attitudes and expectations of organic wine", paper prepared for the 16th IFOAM Organic World Congress. Modena, Italy, June 16–20, 2008, available at: <http://orgprints.org/13974/> (accessed 24 August 2016).
- Thach, E.C. and Olsen, J. (2004), "The search for new wine consumers: Marketing focus on consumer lifestyle or lifecycle", *International Journal of Wine Marketing*, Vol. 16 No. 3, pp. 44–57.
- Thomas, A. and Pickering, G. (2003), "Behavioural segmentation: A New Zealand wine market application", *Journal of Wine Research*, Vol. 14 No. 2-3, pp. 127–138.
- Van Doorn, J. and Verhoef, P.C. (2015), "Drivers of and barriers to organic purchase behavior", *Journal of Retailing*, Vol. 91 No. 3, pp. 436–450.
- Veale, R. (2008), "Sensing or knowing?", *International Journal of Wine Business Research*, Vol. 20 No. 4, pp. 352–366.
- Vecchio, R. (2013), "Determinants of willingness-to-pay for sustainable wine: Evidence from experimental auctions", *Wine Economics and Policy*, Vol. 2 No. 2, pp. 85–92.
- Wiedmann, K.-P., Hennigs, N., Behrens, S.H. and Klarmann, C. (2014), "Tasting green: An experimental design for investigating consumer perception of organic wine", *British Food Journal*, Vol. 116 No. 2, pp. 197–211.
- Wier, M., O'Doherty Jensen, K., Andersen, L.M. and Millock, K. (2008), "The character of demand in mature organic food markets: Great Britain and Denmark compared", *Food Policy*, Vol. 33 No. 5, pp. 406–421.

- Willer, H., Schaack, D. and Lernoud, J. (2017), “Organic farming and market development in Europe and the European Union”, in Willer, H. and Lernoud, J. (Eds.), *The World of organic agriculture: Statistics and emerging trends 2017*, Research Institute of Organic Agriculture (FiBL), Frick, and IFOAM - Organics International, Frick and Bonn.
- Woods, T.A., Nogueira, L. and Yang, S.-H. (2013), “Linking wine consumers to the consumption of local wines and winery visits in the Northern Appalachian States”, *International Food and Agribusiness Management Review*, Vol. 16 No. 4, pp. 181–205.
- Yang, Y. and Paladino, A. (2015), “The case of wine: Understanding Chinese gift-giving behavior”, *Marketing Letters*, Vol. 26 No. 3, pp. 335–361.
- Zhang, F., Epperson, J.E., Huang, C.L. and Houston, J.E. (2009), “Organic price premiums paid for fresh tomatoes and apples by US households: Evidence from Nielsen Homescan Data”, *Journal of Food Distribution Research*, Vol. 40 No. 3, pp. 105–114.

3.4 Wine consumers' reaction to prices and organic labels at the point of sale. An analysis of household panel data

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3.4.1 Abstract

Price premiums are considered as major purchase barriers for organic products and therefore may prevent organic market growth. For wine, however, prices take a double and conflicting effect: they also serve as quality signal for consumers. Therefore, it is of high relevance to examine if price is a major barrier for organic wine as well.

Even though many studies already examined price behaviour for organic wine through surveys and experiments it is still to be clarified how consumers' react to price changes in a real market context. So far, no study analyzed consumer preferences for organic labelled wine in daily shopping situations. Through the analysis of the GfK household panel – a high frequency data set of extensive population coverage – implications for price setting and price promotions in different market segments can be given.

In contrast to previous studies, consumers' overall price sensitivity was found to be low for organic wine and consumers' preferred organic over conventional wine. The effect of price as quality cue or purchase barrier and the effect of an organic label on consumers' behaviour varied between price categories. Organic wine was valued highest in the low price category whereas no price premium for the organic label was examined in the high price segment. Price sensitivity was extremely high for organic wine in the low price segment while price functioned as quality signal in the premium segment for organic and conventional wine similarly.

This study verified previous stated preference studies on organic wine through the analysis of actual purchase data. Moreover, new insights for price setting in different price categories were generated through the examination of a large amount of disaggregated data on single consumer purchases.

Keywords: price elasticity; hedonic price analysis; organic food; wine choice; consumer behaviour; household panel data

3.4.2 Introduction

As organic farming usually coincides with an increase in production costs, consumers' evaluation of the price-value ratio is of special interest. Consumers must be willing to pay a price premium for organic wine over conventional wine to make organic wine production worthwhile. In a highly competitive market, knowledge of the degree to which price effects consumers' purchase behaviour, i.e. price sensitivity, is essential in establishing targeted marketing strategies, especially in areas like price setting and price promotions. Most research on consumers' price sensitivity is based on purchase experiments and consumer surveys which are prone to socially desirable answers. Therefore, the potential to overestimate consumers' willingness-to-pay for socially accepted products like organic wine and to underestimate the role of price is high. Analyzing real purchase data is consequently of great advantage when it comes to the analysis of organic markets (Pearson *et al.*, 2011).

This paper is based on a German household panel provided by the market research company GfK – a data source of large sample size and high population coverage – which allows for the exploration of consumers' daily purchase decisions from real market transactions. Emphasis is placed on the households' purchase behaviour regarding organic wine prices. The first objective of this study is to clarify if consumers react differently to price changes in organic and conventional wine. The extent to which prices influence consumers' purchase behaviour is often indicated in the literature as “price sensitivity” (Guerrero-López *et al.*, 2017; Malasevska and Haugom, 2018; Mizdrak *et al.*, 2015; Natarajan *et al.*, 2017) or “price responsiveness” (Ludbrook *et al.*, 2014; Sharma *et al.*, 2017) and is typically operationalised through the price elasticity of demand which is defined as the reaction of demand on price changes (Cornelsen *et al.*, 2016). In this study, the term “price sensitivity” is used and is measured through consumers' price elasticity. Here it should be noted that price elasticity is only one part of consumers' price behaviour which also consists of internal processes such as price knowledge and attitudes towards prices (Rödiger and Hamm, 2015).

The second objective focuses on whether there is a difference in the willingness-to-pay for organic wine of domestic (German) origin compared to organic wine of foreign origin. Consumers' willingness-to-pay for organic wine is defined as the price premium consumers actually paid for organic wine compared to conventional wine. Drawing on the studies of Ankamah-Yeboah *et al.* (2016), Lin *et al.* (2008) and Smith *et al.* (2009b), this paper is the first to estimate revealed organic price premiums for organic wine in contrast to hypothetical willingness-to-pay estimates of stated preference studies.

For this purpose, the next three subsections give an overview on the current state of the art with respect to consumers' price behaviour for (organic) wine with a special focus on price sensitivity and willingness-to-pay. In section 3.4.4, the household panel data set is presented, the method of panel analysis is described, and the applied regression models to measure consumers' price sensitivity and willingness-to-pay are outlined. Results are given in section 3.4.5 and followed by the discussion in section 0. In section 3.4.7, conclusions for price setting, marketing, and implications for further research are outlined.

3.4.3 Literature review

3.4.3.1 Price sensitivity

Various studies have shown that the demand for wine is negatively correlated to price changes and have given evidence of a negative price-demand function. Overall, the economic demand for wine was proved to be inelastic on an aggregated level [for a meta-analysis see: Gallet (2007), Fogarty (2009), Wagenaar *et al.* (2009)], which means that the demand will decrease slightly when prices increase. However, previous research has shown that price elasticities for wine vary over income groups, societies and individual drinking behaviours (Wagenaar *et al.*, 2009). As an example, the impact of price was lower for premium wine (Cembalo *et al.*, 2014), red wine (Lynn, 2004) and for wine that was consumed outside the home, e.g. in bars or restaurants (Jiang *et al.*, 2016).

The studies reviewed in the meta-analysis predominantly analysed national aggregated time series data or cross-sectional data. Meng *et al.* (2014) advise analysing repeated observations on purchases and prices of households or individuals as these data would be methodologically advantageous regarding unobserved heterogeneity and causal inference. Individual-level panel data would be helpful, especially considering the differentiated results regarding specific markets and consumer groups. Such high-frequency data would allow for the analysis of consumers' responses to price changes including their reactions to products on sale which would otherwise be cancelled out. For wine, with its high degree of heterogeneity, a more disaggregated approach is essential.

As for organic products, comparatively little research has been conducted about price elasticities and existing studies have focused mainly on milk, fresh produce, and meat. No study on organic wine was found. Up to now, there is a general consensus that prices are relevant factors for consumers' purchases of organic products and that price and purchase quantities are negatively correlated (Aschemann-Witzel and Zielke, 2017; Schröck, 2012). However, the

degree to which prices of organic products influence purchase behaviour is controversial, i.e. if consumers' reaction is elastic or inelastic. The majority of studies have found that the demand for organic food is somewhat price elastic (Anders and Moeser, 2008) and in general, more price sensitive than for conventional food (Alviola and Capps, 2010; Fourmouzi *et al.*, 2012; Glaser and Thompson, 2000; Kasteridis and Yen, 2012; Lin *et al.*, 2009; Schröck, 2013) which is often attributed to the high price premiums of organic products and their still minor market share. According to these findings, price reductions of organic food would lead to a revenue increase, as the change in price could be compensated by higher purchase quantities. However, some studies have found the demand for organic food to be inelastic (Akaichi and Revoredo-Giha, 2016; Schröck, 2012; Zhang *et al.*, 2011) which indicates that lower prices would not be helpful in increasing revenues. Decreasing price elasticities were in line with the growth of the organic market, i.e. higher availability in different stores (Schröck, 2012) and growing market shares (Glaser and Thompson, 2000).

In a recent review of Aschemann-Witzel and Zielke (2017) on consumer reactions towards price changes of organic food, the diverging results of the above mentioned studies were acknowledged. The variance in the results was ascribed to differences in product categories and consumer segments. For less processed, highly price promoted products, and product categories with high purchase frequency and strong conventional brands, consumers' price sensitivity was expected to be higher. Moreover, regular consumers were described as less price sensitive than occasional or non-buyers. However, even the typical organic consumer was defined as somehow reactive to organic food price changes. In light of these results, Schröck (2012) concluded that new organic buyers could be attracted through price reductions.

3.4.3.2 Price as purchase barrier

From a consumer research perspective, price is among the most important wine attributes (Lockshin and Corsi, 2012) and could act as a purchase barrier due to consumers' budget constraints (Brugarolas *et al.*, 2010). However, contrary to economic theory, consumers did not always favour the cheapest wine. Not a lot of evidence for a negative linear effect of price was found in the area of wine consumer research (Bernabéu *et al.*, 2008; Corsi *et al.*, 2012; Hollebeek *et al.*, 2007; Mann *et al.*, 2012). Strong evidence was found, however, for an inverse quadratic relationship implying that mid-priced wines were preferred over lower-priced and more expensive wines (Bazoche *et al.*, 2015; Chiodo *et al.*, 2011; Lockshin *et al.*, 2006; Mueller *et al.*, 2010b).

Most studies showed that the effect of price was segment specific (Mueller *et al.*, 2010a). In literature, the level of involvement was mentioned most often as a determining factor for the degree of price sensitivity. Purchase experiments showed that less involved consumers simply relied on price information. Highly involved consumers used more cues for choosing wine and other characteristics like the region of origin became more important (Hollebeek *et al.*, 2007; Lockshin *et al.*, 2006). Moreover, the study of Durham *et al.* (2004) found evidence for a lower price sensitivity among red wine consumers. This result was attributed to red wine drinkers' higher involvement level. However, Hollebeek *et al.* (2007) emphasised that even involved consumers were price-conscious and paid attention to price promotions.

Thus price promotions were, for example, a commonly used tool to increase wine sales in supermarkets in the UK (Ritchie *et al.*, 2010) and Australia (Johnston *et al.*, 2017). Accordingly, sales promotions were found to be an important motivator to purchase sustainable wine (Soosay *et al.*, 2012) and organic products (Bezawada and Pauwels, 2013) in supermarkets. In particular, promotions were more effective in increasing sales for storable products than price reductions as they induce stockpiling (Bezawada and Pauwels, 2013).

However, the downside was that price promotions direct consumers' focus on the price of wine while attracting mainly low involved consumers (Hollebeek *et al.*, 2007) for whom wine prices are very important (Lockshin *et al.*, 2006). Therefore, price promotions prevent a trading-up in supermarkets as these measures reduce the value of a brand and lower its image (Ritchie *et al.*, 2010). In a review on the future of consumer behaviour research for wine, the negative long-term effects of promotions were emphasised. Moreover, it was outlined that this strategy is not effective in gaining many new customers, may not always increase demand, erodes reference prices and hurt profits (Lockshin and Corsi, 2012). Therefore, it is suggested that retailers find new ways to stimulate wine sales.

3.4.3.3 *Price as quality cue*

A meta-regression analysis on wine prices and quality ratings found strong empirical evidence for a moderate relation between price and sensory quality, and proved a strong price-reputation link (Oczkowski and Doucouliagos, 2014). Hence, it is not surprising that several consumer studies disclosed that wine prices were used as information tools and served as quality indicators in purchase decisions (Palma *et al.*, 2016). Wine prices were particularly used as a proxy for quality when there were few other product characteristics to evaluate and the product could not be tasted before purchase (Lockshin *et al.*, 2006). Moreover, price cues caused expectations about taste quality and thereby modified the sensory experience, meaning that

higher prices increased experienced pleasantness (Plassmann *et al.*, 2008; Schmidt *et al.*, 2017). The price cue did not only stress consumers' budget constraints, but also functioned as a quality cue. The study of Palma *et al.* (2016) evidenced this “double – and conflicting – global effect” of price on purchase probability.

The effect of price as a quality cue was also found for organic products (Marian *et al.*, 2014; Ngobo, 2011). A mid-price strategy was supported due to an inverted U-shaped price function. Moreover, it was concluded that the price premium of organic products should not exceed a certain threshold as the price premium could eventually act as a barrier. Aschemann-Witzel and Niebuhr Aagaard (2014) showed that the price premium consumers are willing to pay for organic, compared to conventional products, was, on average, 30 % and the willingness-to-pay depended on the information about organic benefits and the competition with food from local origin or speciality foods.

So far, consumers' willingness-to-pay for organic wine has frequently been analysed through surveys and experiments (Ay *et al.*, 2014; Bazoche *et al.*, 2008; Bazoche *et al.*, 2015; Brugarolas *et al.*, 2010; D'Amico *et al.*, 2016; Delmas and Lessem, 2017; Pagliarini *et al.*, 2013; Schmit *et al.*, 2013; Wiedmann *et al.*, 2014). Most of these studies reported consumers stated or revealed preferences and showed that consumers were willing to pay a price premium for organic wine when compared with a conventional one (Schäufele and Hamm, 2017). Interestingly, a recent study of Delmas and Lessem (2017) showed that organic wines of higher price levels or from a high quality region did not receive a price premium for the organic production.

Few studies analysed released wine prices. These studies accessed price data mostly through wine rating guides and analysed data by means of the hedonic price method (Abraben *et al.*, 2017; Delmas and Grant, 2008; Kwong *et al.*, 2011; Waldrop *et al.*, 2017). Relative price premiums for certified organic wine ranged, on average, between 12–22 %. Similar to Delmas and Lessem (2017), a diminishing price premium was proved for increasing price and quality levels by Abraben *et al.* (2017). Moreover, the authors found that the importance of the organic label decreased when other quality attributes were present.

3.4.4 Material and Methods

3.4.4.1 Data

The GfK Group (Nuremberg, Germany) runs a panel of 30,000 households, representative of the population in Germany. The data set made available for the analysis at hand covered the 12-

month period from the 1st December 2014 to the 30th November 2015. These were the latest data at the time of data delivery. In the following, this 12-months period is called 2015. We have focused our analysis on households that bought wine at least once in the year 2015 (N=17,440). The GfK replaces households that did not report throughout whole periods and thus do not belong to the constant data pool. These households were excluded from our analysis due to low reliability. Finally, we came up with 11,367 households which conducted 146,698 wine purchases in 2015. For each purchase act, the data provided information on price, purchase quantity, shopping location, product characteristics (e.g. organic production, origin, wine colour) and promotion activities. The observations revealed purchase behaviour over one year in unequal time intervals and were therefore different from traditional panel data with observations for certain points in time, e.g. years. Due to the high heterogeneity of wine quality and wine prices, a disaggregated approach was used. Through this method, it was possible to, firstly, analyse the effect of wine quality characteristics on price, and secondly, to decipher if the price of wine influences the volume purchased within the specific purchase situation. The data was prepared much like that of Ankamah-Yeboah *et al.* (2016) who also analysed household panel data.

3.4.4.2 Panel data analysis

Due to the clustered structure of the data at hand, i.e. purchases of wine were nested within households, a panel model was applied (Wooldridge, 2013). Ignoring this structure would signify the assumption that observations (purchases) related to the same household are independent, which is not realistic. For example, households' income or attitudes will typically influence their purchase behaviour. Applying a pooled regression would therefore lead to biased and inefficient parameter estimates and standard errors because error terms of different observations within one household are correlated. To overcome this problem, panel models account for households' individual unobserved heterogeneity (Verbeek, 2012).

The two models of choice are the fixed and the random-effects model. In the fixed effects model, conclusions conditional on the effects are based on the sample, whereas the random-effects model allows for conclusions with respect to the population (Hsiao, 2007). This indicates using the random model because we want to make inferences for the population in Germany. Moreover, the random-effects panel model has already been applied to estimate implicit prices for the organic attribute using household panel data (Ankamah-Yeboah *et al.*, 2016; Huang and Lin, 2007). The random-effects model holds a composite error term ε which consists of an unobserved random household specific effect α_i and a remainder component u_{ij} :

$$\varepsilon = \alpha_i + u_{ij} \quad i = 1 \dots n \quad \text{households}, \quad j = 1 \dots m \quad \text{purchase acts}$$

To account for the non-linear relation of both models, a logarithmic transformation of the variables price and quantity was implied. Regarding the hedonic price analysis, this is a widely common procedure (Costanigro and McCluskey, 2012). To deal with the problem of heteroscedasticity and serial correlation, White's heteroscedasticity-consistent covariance matrix was estimated using the version of Arellano (Arellano, 1987; White, 1980).

3.4.4.3 Hedonic price analysis

Hedonic price analysis was applied to identify consumers' willingness-to-pay for organic wine. Previous studies already used this approach to analyse the willingness-to-pay for organic salmon (Ankamah-Yeboah *et al.*, 2016) and organic tomatoes (Huang and Lin, 2007) with household panel data. The theoretical foundation of the hedonic price analysis is built on so-called characteristic models. The focus of interest is not on the product itself, but on its quality attributes. The hedonic model applied in this study follows the Consumer Goods Characteristics Model of Ladd and Suvannunt (1976) which is based on the consumer theory of Lancaster (1966). The model for the present study is specified as follows:

$$\ln p_{ij} = \beta_0 + \beta_1 \text{Organic}_{ij} + \beta_2 \text{Organic}_{ij} * \text{Germany}_{ij} + \beta_3 \text{NovDec}_{ij} \\ + \sum_{k=1}^{10} \beta_k \text{Origin}_{kij} + \sum_{l=1}^5 \beta_l \text{Store}_{lij} + \sum_{m=1}^2 \beta_m \text{Colour}_{mij} + \alpha_i + u_{ij}$$

where p_{ij} is the price for wine paid by the i th household in the j th purchase situation. The main focus of the price analysis was on the effect of the organic production method. An interaction term for organic production in Germany was introduced to differentiate the effect of domestic production on the price. The model controls for country of origin, store, wine colour and the increased demand before Christmas (*NovDec*).

The reason for differences in product prices is attributed to a variance in the valuation of relevant product characteristics. Thus, decision-relevant and purchase-relevant product attributes can be identified. As market prices are simultaneously determined by demand and supply, implicit prices are also reflecting marginal costs of producers (Rosen, 1974). A detailed explanation of the influence of consumer preferences and producer costs on wine prices with regard to certain wine characteristics is given in Schäufele *et al.* (2016).

3.4.4.4 Price elasticity

To analyse consumers' reaction to prices within specific purchase situations (price elasticity), a single panel equation model was estimated with the purchase volume of wine (in liters) as the outcome variable. The price variable was interacted with organic production to understand if the effect differs according to the production method. Moreover, the purchase of wine in promotion offers was treated separately. The model controlled for the households' individual characteristics of age, income, and education, as well. The model was specified as follows:

$$\ln q_{ij} = \beta_0 + \beta_1 \ln p_{ij} + \beta_2 \ln p_{ij} * Organic_{ij} + \beta_3 Organic_{ij} + \beta_4 Promotion_{ij} + \beta_5 HouseholdSize_{ij} \\ + \sum_{k=1}^5 \beta_k Age_{kij} + \sum_{l=1}^4 \beta_l Education_{lij} + \sum_{m=1}^5 \beta_m Income_{mij} + \alpha_i + u_{ij}$$

where q_{ij} is volume (in litres) bought by the i th household in the j th purchase situation. Coefficients of the price variables can be directly interpreted as price elasticities because both independent and dependent variables are logarithmised. All other relations are semi-logarithmic and coefficients therefore represent the percentage change in the dependent variable. In the case of dummy variables, the formula given by Halvorsen and Palmquist (1980) must be applied. The relative effect of dummy variables is calculated as follows:

$$relative\ change\ in\ Y = 100 * (e^{\beta} - 1)$$

At this point, it is important to notice that non-purchase information, which was most often considered in discrete choice models, was not given. Therefore, the conclusions of this analysis only refer to wine-buying households and their specific wine choices, and not to all German households. Moreover, we did not control for substitutional relationships as this would require aggregation of the single purchase decisions to a lower number of products. This is a common procedure in the case of homogeneous products like milk (Schröck, 2012), but is not appropriate for heterogeneous products like wine. Most often, demand analyses control for quality differences to estimate the pure effect of price changes on demand (Schröck, 2013). This study, however, was particularly dedicated to the question of how different prices and associated quality variations affect consumers' purchase behaviour.

3.4.4.5 Price categories

To account for the wine market's high heterogeneity and market segmentation (Costanigro *et al.*, 2007), price categories were established and price elasticity and willingness-to-pay models were re-estimated for each category. Due to the correlation of wine price and wine quality, this is a plausible way to segment the wine market to gain deeper insights for targeted marketing

strategies. The development of demand as a function of the price was considered in the definition of price categories: the low-price category was defined as less than 3 € per bottle due to the strong decline of purchase acts for higher-priced conventional and organic wines. For organic wine, an increase in demand was found for wine prices starting at a price of 5 € and therefore the mid-price category (≥ 3 € to < 5 €) and the premium-price category (≥ 5 €) were established.

Most purchases were conducted for wine bottles of 0.75 l (59 %), followed by 1.00 l (31 %). Item prices, i.e. prices per bottle rather than unit prices, were used because consumers' perceived value of a product is not necessarily defined by the product's actual monetary value. Studies on the usage and awareness of unit prices showed that a significant share of consumers did not use unit prices due to a lack of cognitive ability (Manning, Sprott, & Miyazaki, 2003), motivation, or time; consumers instead used heuristics like special offers to save money or quality proxies like brands to get the best value (Manning *et al.*, 2003; Mitchell *et al.*, 2003). For the regression analysis, however, prices were converted into prices per litre.

3.4.5 Results

3.4.5.1 Price sensitivity

To measure consumer's price reaction within unique purchase situations, a quantity-dependent demand model was estimated controlling for the demographic variables of household size, age, education, and income (see Table 15). The interaction term *price*organic* was introduced to differentiate the effect of price for organic and conventional wine. Significant interaction terms show that the impact of an independent variable (price) on a dependent variable is different regarding another independent variable (organic/conventional). Therefore, the overall effect for a variable with an interaction term consists of the main effect (price) and the interaction effect (*price*organic*). The main effect of price can only be interpreted as the unique effect if organic is 0, i.e. for conventional wines. To obtain the price sensitivity for organic wine, both coefficients need to be added (*price+price*organic*).

The explanatory power of the model was rather low. That is, however, typical for household panel studies using an elevated level of disaggregation which results in high noise. For wine, external sources which are not controlled for are, for example, wines bought as a gift. In aggregated data, this unexplained variance is often averaged out which leads to higher R^2 (Wier *et al.*, 2008). This clearly illustrates that low R^2 is not necessarily an indicator for weak effect

sizes and that it is very likely that the low scores in this study depend on the variance of independent and dependent variables.

For conventional wine, consumers' price sensitivity was negative, meaning that higher priced conventional wines led to a reduced amount of purchase volume (in litres). The reaction was inelastic and amounted to -0.31. Due to the double-log specification of the relationship, the variables could be directly interpreted as elasticities: a 1.0 % increase in price was associated with a -0.31 % decrease in purchase quantity. For the effect of price in the case of organic wine, the coefficient of the interaction term *price*organic* of 0.36 % had to be added to the price coefficient which resulted in a price elasticity of 0.05 %. That means the price-quantity relation was positive and highly inelastic compared to conventional wine. The dummy variable *organic* shows that even though the influence of price on quantity was low, the purchase quantity was on average 36.6 % lower compared to conventional wine. Price promotion, however, was associated with a 22.8 % increase in purchase quantity.

Household size, age and income were positively related to purchase quantity. With every additional person in a household, purchase quantity increased by 7.44 %. From the age of 40 and up, an increasing effect of age groups was found compared to persons under the age of 29. Income groups had a significant effect from an income of € 1,250 and up, with an increasing effect as well. For education, no clear relationship could be deducted.

Table 15: Price sensitivity model

	Coefficient (robust standard error)	Percentage change (%)
Constant term	0.00 (0.04)	
Price elasticity		
Price ^a	-0.31*** (0.01)	-0.31
Price*Organic ^a	0.36*** (0.05)	0.36
Price promotion^b		
	0.21*** (0.01)	22.82
Organic wine^b		
	-0.46*** (0.07)	-36.62
Household size (in persons)^c		
	0.07*** (0.01)	7,44
Age of the head of household (Reference category: up to 29 years old)^b		
30–39 years old	0,06 (0.03)	6,37
40–49 years old	0.18*** (0.03)	20.22
50–59 years old	0.27*** (0.03)	30.88
60–69 years old	0.39*** (0.03)	47.43
70 years old and up	0.39*** (0.03)	48.30
Education of the head of calendar (Reference category: Secondary general school)^b		
Intermediate secondary school	-0.05** (0.02)	-4.98
Special upper secondary school	-0.01 (0.02)	-0.72
Grammar school	-0.04 (0.02)	-4.09
University	-0.03 (0.02)	-2.87
Weighted¹⁾ per capita net income (Reference category: up to 749 €)^b		
750–999 €	0.00 (0.02)	0.08
1000–1249 €	0.02 (0.02)	2.44
1250–1499 €	0.11*** (0.02)	12.01
1500–1999 €	0.17*** (0.02)	18.24
2000 € and up	0.30*** (0.02)	34.58
Number of households	11,367	
Observations	146,632	
R ²	0.043	

*** and ** indicate the 0.1% and 1% significance levels.

^a Coefficients can be directly taken as price elasticity when the independent and the dependent variables are logarithmised.

^b When interpreting the coefficients of dummy variables in semi-logarithmic regression equations, the formula given by Halvorsen and Palmquist (1980) must be applied. The relative effect of dummy variables is calculated as follows:

relative change in $Y=100 \cdot (e^{\beta} - 1)$.

^c Coefficients represent the percentage change in the dependent variable when the independent variable is logarithmised.

¹⁾ 1*first adult + 0.7*every subsequent adult + 0.5*children.

Considering the heterogeneity of wine quality and its correlation with price, different models for three price categories (low, mid-price, and premium) were estimated (see Table 16) and considerable differences from the aggregated model on Table 15 were found.

Consumers' reaction to price changes varied strongly within different price categories. The price-quantity relation was negative for the low-price category and positive for the mid-price and premium-price segment. For organic wines of the low-price segment, price sensitivity was high: the price coefficient was found to be elastic (-1.15 %) whereas an inelastic reaction was detected for conventional wine (-0.55 %). In the mid-price segment, no statistically significant relation was found for prices and quantities. Moreover, coefficients were rather low. For conventional wines of the premium-price segment, a positive inelastic relation of 0.12 % was found, i.e. a 1 % increase in price resulted in a 0.12 % increase in purchase volume. For organic wine, this reaction was even higher, but statistically not significant. Price promotions played a significant role for purchase volume in all price categories, whereby they were most relevant for the mid-price segment (28.97 %).

Household size was most relevant for mid-priced wines (9.15 %). For low-priced wine, the importance was relatively lower (6.38 %). The sociodemographic household characteristics age and income were found to be important influencing factors for wine purchases in all price categories. Being over 60 years old was associated with a consumption increase for higher price categories, meaning that older people had a higher preference for more expensive wines. Likewise, the influence of a per head income of more than € 1,249 had a greater impact with each increasing price category.

Table 16: Price sensitivity model for wine in different price categories

Price category	Coefficient (robust standard error)			Percentage change (%)		
	Low (< 3 €)	Mid (≥ 3 € to < 5 €)	Premium (≥ 5 €)	Low (< 3 €)	Mid (≥ 3 € to < 5 €)	Premium (≥ 5 €)
Constant term	0.30*** (0.04)	-0.66*** (0.08)	-0.82*** (0.10)			
Price coefficients						
Price ^a	-0.55*** (0.02)	0.06 (0.04)	0.12*** (0.04)	-0.55	0.06	0.12
Price*Organic ^a	-0.60** (0.22)	0.02 (0.18)	0.12 (0.13)	-0.60	0.02	0.12
Price promotion^b						
	0.19*** (0.01)	0.25*** (0.01)	0.19*** (0.02)	20.46	28.97	21.42
Organic wine^b						
	0.59** (0.22)	0.03 (0.24)	-0.06 (0.24)	80.42	3.30	-6.03
Household size (in persons)^c						
	0.06*** (0.01)	0.09*** (0.01)	0.08*** (0.01)	6.38	9.15	8.47
Age of the head of household (Reference category: up to 29 years old)^b						
30–39 years old	0.07 (0.04)	0.04 (0.05)	-0.00 (0.06)	6.99	3.88	-0.23
40–49 years old	0.19*** (0.03)	0.13** (0.04)	0.17** (0.06)	20.58	13.40	18.34
50–59 years old	0.25*** (0.03)	0.22*** (0.04)	0.20** (0.06)	28.10	24.61	22.16
60–69 years old	0.31*** (0.03)	0.33*** (0.04)	0.43*** (0.06)	36.50	39.11	53.95
70 years old and up	0.29*** (0.03)	0.35*** (0.05)	0.43*** (0.06)	33.88	41.41	53.00
Education of the head of calendar (Reference category: Secondary general school)^b						
Intermediate secondary school	-0.06** (0.02)	-0.02 (0.02)	-0.06 (0.03)	-5.49	-2.36	-5.48
Special upper secondary school	-0.05* (0.02)	0.02 (0.03)	-0.02 (0.04)	-5.06	2.23	-2.04
Grammar school	-0.04 (0.03)	-0.06* (0.03)	-0.06 (0.04)	-3.64	-6.10	-6.09
University	-0.06** (0.02)	-0.05 (0.03)	-0.02 (0.03)	-6.27	-4.54	-2.15
Weighted¹⁾ per capita net income (Reference category: under 749 €)^b						
750–999 €	0.01 (0.02)	0.00 (0.03)	0.04 (0.05)	0.78	0.39	4.33
1000–1249 €	0.04 (0.02)	0.05 (0.03)	0.10* (0.04)	3.83	4.96	10.34
1250–1499 €	0.08*** (0.02)	0.15*** (0.03)	0.21*** (0.04)	8.83	16.36	23.89
1500–1999 €	0.14*** (0.02)	0.20*** (0.03)	0.27*** (0.04)	14.91	22.27	30.83
2000 € and up	0.26*** (0.03)	0.34*** (0.03)	0.40*** (0.04)	29.76	40.03	49.89
Number of households	7,437	7,641	5,791			
Observations	78,027	45,016	23,589			
R ²	0.058	0.028	0.026			

***, **, and * indicate the 0.1%, 1% and 5% significance levels.

^a Coefficients can be directly taken as price elasticity when the independent and the dependent variables are logarithmised.

^b When interpreting the coefficients of dummy variables in semi-logarithmic regression equations, the formula given by Halvorsen and Palmquist (1980) must be applied. The relative effect of dummy variables is calculated as follows: relative change in $Y=100 \cdot (e^{\beta} - 1)$.

^c Coefficients represent the percentage change in the dependent variable when the dependent variable is logarithmised.

¹⁾ 1*first adult + 0.7*every subsequent adult + 0.5*children.

3.4.5.2 Willingness-to-pay

In Table 17, the results of the hedonic price analysis on the aggregated level (not price category specific) are presented. The resulting effects of the coefficients needed to be interpreted as willingness-to-pay estimates and *ceteris paribus* in relation to the reference: a conventional Italian red wine bought between January and October in a supermarket. The determination coefficient (R^2) indicated that the model explained 35 % of the variation in price. High coefficients for the store variables showed that where wine consumers made their purchase had a strong impact on wine prices.

The significant interaction term (organic*German) showed that the willingness-to-pay for organic wine was different with regard to the origin, i.e. domestic (German) or foreign (all other countries). The main effect (organic) needed to be interpreted as the only effect if domestic is 0, i.e. for foreign wines. For organic wine from Germany, both coefficients must be added (organic+organic*Germany). This means that, for organic wine not originating from Germany, a price premium of 5.7 % (absolute price effect: 0.20 €) was estimated compared to conventional wine. Organic wines of German origin (variable: organic*German) received an additional organic price premium of 8.4 %. In total, a price premium of 14.1 % was paid for German organic wine compared to the conventional wine of foreign origin. In absolute terms, the premium for German wine was 0.49 € based on an average price of 3.43 €.

Table 17: Willingness-to-pay model

	Coefficient (robust standard error)	Relative price effect (%) ^a	Absolute price effect (€) ^b
Constant term	1.28*** (0.01)	-	
Organic	0.06*** (0.01)	5.69	0.20
Organic*Germany	0.08*** (0.02)	8.36	0.29
Season (November and December)	0.03*** (0.00)	3.45	0.12
Country of origin (Reference category: Italy)			
Germany	0.07*** (0.01)	7.10	0.24
France	0.03** (0.01)	3.23	0.11
Spain	0.02 (0.01)	2.06	0.07
Southeast Europe	-0.17*** (0.02)	-15.64	-0.54
Austria	0.01 (0.01)	0.68	0.02
South Africa	0.06*** (0.01)	5.75	0.20
USA (California)	0.15*** (0.01)	15.68	0.54
Chile	-0.08*** (0.02)	-7.80	-0.27
Australia	0.10*** (0.01)	10.25	0.35
Others	-0.29*** (0.02)	-25.00	-0.86
Store (Reference category: Food retailer)			
Discount store	-0.14*** (0.01)	-12.64	-0.43
Wine specialty store	0.62*** (0.03)	85.38	2.93
Direct wine seller	0.41*** (0.02)	50.18	1.72
Organic store	0.10* (0.04)	10.27	0.35
Others	0.17*** (0.02)	18.59	0.64
Colour (Reference category: Red)			
White	-0.09 (0.01)	-8.89	-0.30
Rosé	-0.16 (0.01)	-14.49	-0.50
Number of households	11,367		
Observations	146,698		
R ²	0.349		

***, **, and * indicate the 0.1%, 1% and 5% significance levels.

^a When interpreting the coefficients of dummy variables in semi-logarithmic regression equations, the formula given by Halvorsen and Palmquist (1980) must be applied. The relative effect of dummy variables is calculated as follows:

relative change in $Y = 100 \cdot (e^{\beta} - 1)$.

^b Given the average prices of 3.43 € per litre.

Regarding country of origin, New World wine producing countries generally received higher price premiums compared to European countries. The highest coefficients were estimated for California and Australia with price premiums of 15.7 % and 10.3 % compared to Italian wine. The lowest premium existed for Spain (2.1 %). A price deduction was given for Southeast Europe (-15.6 %). An expectation was the price premium for German wine with an overall relative price effect of 15.5 %.

Other variables which were controlled for showed the expected signs. For example, consumers were willing to pay slightly higher prices (about 3.5 %) around Christmastime (November and December). Moreover, a price premium for red wine was estimated. White wine received a price deduction which was even higher for rosé wine. Moreover, price premiums were highest for wine bought in specialty stores (85.4 %) and directly at wine sellers (50.2 %). Organic stores commanded a premium of 10.3 %. The average price deduction for a wine sold at discount stores was 12.6 % compared to supermarkets.

To account for differences in the effects of the coefficients in price categories, the equation of the price model presented above was re-estimated. The regression output is shown in Table 18. The explanatory power of the low-price segment (36 %) was close to the average effect over all wines, whereas the mid-price (89 %) and premium-price model (76 %) explained a remarkably higher share of variance. The organic price premium for foreign wine was highest in the low-price model; the relative price effect of 32.6 % and the absolute premium of 0.70 € per litre were far higher compared to the aggregated model. The interaction variable *organic*German* showed a negative price coefficient of -28.4 % in relative terms which shows that organic German wines only received a small premium of 4.1 % (0.09 € per litre) in the low-price segment. However, conventional domestic wines received a relative price premium of 22.5 % within this segment and for New World countries high price premiums were found compared to higher price segments. Store effects were mostly negative.

Findings reversed in the mid-price segment. The main effect of the organic label was low (0.7 %) and statistically not significant. However, organic wine from Germany received an additional premium of 4.7 % (0.12 € per litre). Overall, country effects were much lower and largely negative compared to the low-price model. Wine speciality stores received a small premium in the mid-price segment of 8.5 % (0.32 € per litre) compared to food retailers.

Table 18: Willingness-to-pay model for wine characteristics in different price categories

Price category	Coefficient (robust standard error)			Relative price effect (%) ^a			Absolute price effect (€) ^b		
	Low (< 3 €)	Mid (≥ 3 € to < 5 €)	Premium (≥ 5 €)	Low- (< 3 €)	Mid (≥ 3 € to < 5 €)	Premium (≥ 5 €)	Low- (< 3 €)	Mid (≥ 3 € to < 5 €)	Premium (≥ 5 €)
Constant term	0.71 (0.01)	1.34 (0.00)	1.86 (0.01)						
Organic	0.28*** (0.01)	0.01 (0.01)	-0.02 (0.01)	32.57	0.69	-2.20	0.70	0.03	-0.15
Organic* Germany	-0.33*** (0.04)	0.05*** (0.01)	0.02 (0.02)	-28.44	4.67	1.68	-0.61	0.18	0.12
November and December	0.00 (0.00)	0.00* (0.00)	0.04*** (0.00)	0.23	0.33	3.69	0.01	0.01	0.26
Country of origin (Reference category: Italy)									
Germany	0.20*** (0.01)	0.05*** (0.00)	-0.07*** (0.01)	22.52	4.84	-6.74	0.49	0.18	-0.47
France	0.17*** (0.01)	0.03*** (0.00)	0.00 (0.01)	18.21	2.81	0.17	0.39	0.11	0.01
Spain	-0.02 (0.01)	0.02*** (0.00)	-0.05*** (0.01)	-1.49	2.09	-5.25	-0.03	0.08	-0.37
Southeast Europe	0.02 (0.01)	-0.01 (0.01)	-0.08 (0.05)	1.85	-1.13	-8.02	0.04	-0.04	-0.56
Austria	0.24*** (0.01)	0.09*** (0.01)	-0.01*** (0.02)	26.84	9.75	-5.85	0.58	0.37	-0.41
South Africa	0.04 (0.02)	-0.03*** (0.00)	-0.07*** (0.01)	4.42	-3.02	-6.95	0.10	-0.11	-0.49
USA (California)	0.26*** (0.01)	-0.02** (0.01)	-0.06*** (0.02)	29.44	-1.82	-5.38	0.63	-0.07	-0.38
Chile	0.05* (0.02)	-0.03*** (0.01)	-0.07* (0.03)	5.17	-2.62	-6.82	0.11	-0.10	-0.48
Australia	0.25*** (0.02)	-0.06*** (0.01)	-0.01 (0.02)	27.80	-5.51	-1.20	0.60	-0.21	-0.08
Others	-0.29*** (0.02)	-0.01 (0.01)	-0.01 (0.01)	-25.38	-0.76	-0.76	-0.55	-0.03	-0.05
Store (Reference category: Food retailer)									
Discount store	-0.03*** (0.00)	-0.05*** (0.00)	0.09*** (0.01)	-3.27	-5.03	9.11	-0.07	-0.19	0.64
Wine specialty store	-0.06 (0.07)	0.08*** (0.01)	0.33*** (0.01)	-5.40	8.45	38.93	-0.12	0.32	2.72
Direct wine seller	-0.22*** (0.06)	0.00 (0.01)	0.23*** (0.01)	-19.59	-0.04	25.41	-0.42	0.00	1.78
Organic store	-0.15** (0.05)	0.01 (0.02)	0.13*** (0.03)	-14.12	1.09	13.62	-0.30	0.04	0.95
Others	0.01 (0.02)	0.01* (0.01)	0.14*** (0.01)	1.05	1.24	14.98	0.02	0.05	1.05
Colour (Reference category: Red)									
White	-0.01* (0.00)	-0.02*** (0.00)	-0.00 (0.01)	-0.94	-1.59	-0.29	-0.02	-0.06	-0.02
Rosé	-0.10*** (0.01)	-0.03*** (0.00)	-0.05*** (0.01)	-9.07	-2.51	-5.34	-0.20	-0.09	-0.37
Number of households	9,388	7,641	5,791						
Observations	104,186	45,043	23,625						
R ²	0.360	0.889	0.760						

***, **, and * indicate the 0.1%, 1% and 5% significance levels.

^a When interpreting the coefficients of dummy variables in semi-logarithmic regression equations, the formula given by Halvorsen and Palmquist (1980) must be applied. The relative effect of dummy variables is calculated as follows:

relative change in $Y = 100 \cdot (e^{\beta} - 1)$.

^b Given the average prices of 2.16 € (low-price segment), 3.77 € (medium-price segment), and 6.99 € (premium-price segment) per litre.

In the premium-price segment, no significant coefficient for organic production existed neither for foreign, nor for domestic wine. Country coefficients were small and slightly negative (except France). However, store effects became large and in the season around Christmastime (November and December) prices were 0.26 € per litre higher compared to the rest of the year.

3.4.6 Discussion

The presented findings were in line with elasticity estimates for wine found in previous review studies (Fogarty, 2009; Gallet, 2007; Wagenaar *et al.*, 2009) which proved the relation of price and purchase quantity to be negative and inelastic. This points to the general relevance of price for consumer behaviour (Aschemann-Witzel and Zielke, 2017) and more specifically for wine choices (Bernabéu *et al.*, 2008; Mann *et al.*, 2012) due to the role of price as a budget constraint. The present analysis of high frequency purchase data confirmed prior consumer studies based on stated preferences through the analysis of real purchase data.

However, for organic wine, low price sensitivity was found, on average, across all price segments in contrast to most of the previous research on organic food (Fourmouzi *et al.*, 2012; Schröck, 2013). This result points to the existence of specific preferences for organic wine, e.g. with regard to quality, taste, health and the environment (Schäufele and Hamm, 2017).

Price sensitivity for organic wine, however, differed strongly regarding price categories and these findings give new insights for price research. In the low-price segment, consumers were highly sensitive to price changes of organic wine, far more than for conventional wine. In the mid-price category, prices for both organic and conventional wine were not a decisive factor for wine sales. This result, based on actual purchase data, confirms previous survey and experimental studies which found evidence for a preference for mid-priced wines (Bazoche *et al.*, 2015; Chiodo *et al.*, 2011). In the premium-price segment, positive price elasticities for organic and conventional wine give evidence that wine prices were used as quality cues as in previous experimental studies (Palma *et al.*, 2016; Schmidt *et al.*, 2017).

In line with preceding studies (Schäufele and Hamm, 2017), consumers' were willing to pay price premiums for organic wine compared to conventional wine, on average, over all price categories. The hypothetical price premiums of former studies were confirmed through the estimation of revealed willingness-to-pay values. An additional price premium for organic wine of domestic origin was found in line with previous experimental studies for local organic wine (Ay *et al.*, 2014; Grebitus *et al.*, 2013). However, real purchase data analysis revealed that country effects and organic premiums differ between price categories.

Organic wine of domestic origin was only preferred in the mid-price segment, whereas a preference for foreign organic wines was revealed for low-priced wines. In the premium-price category, however, the organic label no longer showed an effect on price, while the place of purchase (wine speciality stores and direct wine sellers) became most important. The results point to the importance of wine selling services; for example, personal advice, wine presentation and instructed wine tastings. In prior studies, trust in the wine maker or the wine retailer was revealed as decisive factors for consumers' behaviour regarding organic wine (Bonn *et al.*, 2016; Kim and Bonn, 2015). The results imply that, in line with this development, labels like the organic one become less important for premium wines. Research studies analysing only wines of the high price category (Abraben *et al.*, 2017; Delmas and Grant, 2008) were therefore not able to find an organic label effect.

Overall, wine purchase behaviour for the German population was highly determined by sociodemographic characteristics. Older and wealthier people showed higher preferences for wine and favoured wines in higher price classes. Organic wine consumers purchased considerably less wine on each single purchasing occasion, perhaps due to their generally more health-conscious life style. Price promotion was an important driver for wine sales as in Australia (Johnston *et al.*, 2017) and the UK (Ritchie *et al.*, 2010). Due to the storability of wine, this appears plausible. Moreover, price mark-ups paid for premium priced wines in the season around Christmas indicates the efficacy of promoting high quality wines in this period.

3.4.7 Conclusions

New knowledge was generated through the analysis of a large amount of disaggregated data on single consumer purchases. This approach allowed price category specific analyses and revealed interesting insights for the German wine market and future consumer behaviour research. The previously found hypothetical results of earlier studies on consumers' price behaviour could be verified and embedded into a real market context.

In conclusion, foreign organic wine producers may benefit from producing organic wine in the low-price segment, but must be aware of consumer's high price sensitivity. For German wine producers, the mid-price segment is the most attractive, and due to the low price sensitivity, they are advised to expend the price barrier of 4.99 €. However, in the high-price segment, organic is not a relevant wine characteristic and wine producers may not directly benefit from organic certification.

To expand the currently minor organic wine market in Germany (market share: 5 %), awareness of the quality benefits of organic production needs to be raised, especially in the premium segment. To communicate these benefits in a plausible manner, prices in the premium segment should be remarkably higher than those of corresponding conventional wines because prices are perceived as quality cues. To avoid the long-term negative effects of price promotions, marketing activities like tastings, leaflets, or secondary placements are recommended instead.

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3.4.9 References

- Abraben, L.A., Grogan, K.A. and Gao, Z. (2017), "Organic price premium or penalty? A comparative market analysis of organic wines from Tuscany", *Food Policy*, Vol. 69, pp. 154–165.
- Akaichi, F. and Revoredo-Giha, C. (2016), "Consumers demand for products with animal welfare attributes. Evidence from homescan data for Scotland", *British Food Journal*, Vol. 118 No. 7, pp. 1682–1711.
- Alviola, P.A. and Capps, O. (2010), "Household demand analysis of organic and conventional fluid milk in the United States based on the 2004 Nielsen Homescan panel", *Agribusiness*, 369–388.
- Anders, S. and Moeser, A. (2008), "Assessing the demand for value-based organic meats in Canada: A combined retail and household scanner-data approach", *International Journal of Consumer Studies*, Vol. 32 No. 5, pp. 457–469.
- Ankamah-Yeboah, I., Nielsen, M. and Nielsen, R. (2016), "Price premium of organic salmon in Danish retail sale", *Ecological Economics*, Vol. 122, pp. 54–60.
- Arellano, M. (1987), "Computing robust standard errors for within-groups estimators", *Oxford bulletin of Economics and Statistics*, Vol. 49 No. 4, pp. 431–434.
- Aschemann-Witzel, J. and Niebuhr Aagaard, E.M. (2014), "Elaborating on the attitude-behaviour gap regarding organic products: Young Danish consumers and in-store food choice", *International Journal of Consumer Studies*, Vol. 38 No. 5, pp. 550–558.
- Aschemann-Witzel, J. and Zielke, S. (2017), "Can't buy me green? A review of consumer perceptions of and behavior toward the price of organic food", *Journal of Consumer Affairs*, Vol. 51 No. 1, pp. 211–251.
- Ay, J.-S., Chakir, R. and Marette, S. (2014), "Does living close to a vineyard increase the willingness-to-pay for organic and local wine?", paper prepared for the EAAE 2014 Congress 'Agri-Food and Rural Innovations for Healthier Societies'. Ljubljana, Slovenia, August 26–29, 2014, available at: <http://purl.umn.edu/183075> (accessed 18 February 2016).
- Bazoche, P., Deola, C. and Soler, L.G. (2008), "An experimental study of wine consumers' willingness to pay for environmental characteristics", paper prepared for the EAAE International Congress. Ghent, Belgium, August 26–29, 2008, available at: <http://purl.umn.edu/43651> (accessed 18 February 2016).

- Bazoche, P., Issanchou, S., Brouard, J., Maratray, J. and Ginon, E. (2015), "Evaluating consumers' sustainable choice of wine: A virtual shop experiment. paper prepared for the EAAE-AAEA Joint Seminar 'Consumer Behavior in a Changing World: Food, Culture, Society'. Naples, Italy, March 25–27, 2015", available at: <http://purl.umn.edu/202735> (accessed 22 March 2016).
- Bernabéu, R., Brugarolas, M., Martínez-Carrasco, L. and Díaz, M. (2008), "Wine origin and organic elaboration, differentiating strategies in traditional producing countries", *British Food Journal*, Vol. 110 No. 2, pp. 174–188.
- Bezawada, R. and Pauwels, K. (2013), "What is special about marketing organic products? How organic assortment, price, and promotions drive retailer performance", *Journal of Marketing*, Vol. 77 No. 1, pp. 31–51.
- Bonn, M.A., Cronin, J.J. and Cho, M. (2016), "Do environmental sustainable practices of organic wine suppliers affect consumers behavioral intentions? The moderating role of trust", *Cornell Hospitality Quarterly*, Vol. 57 No. 1, pp. 21–37.
- Brugarolas, M., Martinez-Carrasco Martinez, L., Bernabéu, R. and Martinez-Poveda, A. (2010), "A contingent valuation analysis to determine profitability of establishing local organic wine markets in Spain", *Renewable Agriculture and Food Systems*, Vol. 25 No. 1, pp. 35–44.
- Cembalo, L., Caracciolo, F. and Pomarici, E. (2014), "Drinking cheaply: The demand for basic wine in Italy", *Australian Journal of Agricultural and Resource Economics*, Vol. 58 No. 3, pp. 374–391.
- Chiodo, E., Casolani, N. and Fantini, A. (2011), "Evaluation of the effects of changes in regulatory policies on consumers perception: The case of designations of origin in the wine common market organisation", paper prepared for the EAAE 122nd Seminar. Ancona, Italy, February 17–18, 2011, available at: <http://purl.umn.edu/99590> (accessed 18 February 2016).
- Cornelsen, L., Mazzocchi, M., Green, R., Dangour, A.D. and Smith, R.D. (2016), "Estimating the relationship between food prices and food consumption – Methods matter", *Applied Economic Perspectives and Policy*, Vol. 38 No. 3, pp. 546–561.
- Corsi, A.M., Mueller, S. and Lockshin, L. (2012), "Let's see what they have: What consumers look for in a restaurant wine list", *Cornell Hospitality Quarterly*, Vol. 53 No. 2, pp. 110–121.

- Costanigro, M. and McCluskey, J.J. (2012), “Hedonic price analysis in food markets”, in Lusk, J.L., Roosen, J. and Shogren, J.F. (Eds.), *The Oxford Handbook of the Economics of Food Consumption and Policy*, Oxford University Press, pp. 152–180.
- Costanigro, M., McCluskey, J.J. and Mittelhammer, R.C. (2007), “Segmenting the wine market based on price: Hedonic regression when different prices mean different products”, *Journal of Agricultural Economics*, Vol. 58 No. 3, pp. 454–466.
- D'Amico, M., Di Vita, G. and Monaco, L. (2016), “Exploring environmental consciousness and consumer preferences for organic wines without sulfites”, *Journal of Cleaner Production*, Vol. 120, pp. 64–71.
- Delmas, M.A. and Grant, L.E. (2008), “Eco-labeling strategies: The eco-premium puzzle in the wine industry”, *American Association of Wine Economists, Working Papers No. 13*, available at: <http://purl.umn.edu/37325> (accessed 30 January 2017).
- Delmas, M.A. and Lessem, N. (2017), “Eco-premium or eco-penalty? Eco-labels and quality in the organic wine market”, *Business & Society*, Vol. 56 No. 2, pp. 318–356.
- Durham, C.A., Pardoe, I. and Vega-H, E. (2004), “A methodology for evaluating how product characteristics impact choice in retail settings with many zero observations: An application to restaurant wine purchase”, *Journal of Agricultural and Resource Economics*, Vol. 29 No. 1, pp. 112–131.
- Fogarty, J. (2009), “The demand for beer, wine and spirits: A survey of the literature”, *Journal of Economic Surveys*, Vol. 16 No. 4, p. 531.
- Fourmouzi, V., Genius, M. and Midmore, P. (2012), “The demand for organic and conventional produce in London, UK. A system approach”, *Journal of Agricultural Economics*, Vol. 63 No. 3, pp. 677–693.
- Gallet, C.A. (2007), “The demand for alcohol: A meta-analysis of elasticities”, *The Australian Journal of Agricultural and Resource Economics*, Vol. 51 No. 2, pp. 121–135.
- Glaser, L.K. and Thompson, G.D. (2000), “Demand for organic and conventional beverage milk”, paper prepared for the Western Agricultural Economics Association Annual Meetings. Vancouver, British Columbia, June 29–July 1, 2000, available at: <https://ageconsearch.umn.edu/bitstream/36346/1/sp00gl01.pdf> (accessed 19 December 2017).
- Grebitus, C., Lusk, J.L. and Nayga, R.M. (2013), “Effect of distance of transportation on willingness to pay for food”, *Ecological Economics*, Vol. 88, pp. 67–75.

- Guerrero-López, C.M., Unar-Munguía, M. and Colchero, M.A. (2017), “Price elasticity of the demand for soft drinks, other sugar-sweetened beverages and energy dense food in Chile”, *BMC public health*, Vol. 17 No. 1, p. 180.
- Halvorsen, R. and Palmquist, R. (1980), “The interpretation of dummy variables in semilogarithmic equations”, *American Economic Review*, Vol. 70 No. 3, pp. 474–475.
- Hollebeek, L.D., Jaeger, S.R., Brodie, R.J. and Balemi, A. (2007), “The influence of involvement on purchase intention for new world wine”, *Food Quality and Preference*, Vol. 18 No. 8, pp. 1033–1049.
- Hsiao, C. (2007), *Analysis of panel data*, Vol. 34, 28th ed., *Econometric Society monographs*. Cambridge Univ. Press, Cambridge [u.a.].
- Huang, C.L. and Lin, B.-H. (2007), “A hedonic analysis of fresh tomato prices among regional markets”, *Review of Agricultural Economics*, Vol. 29 No. 4, pp. 783–800.
- Jiang, H., Livingston, M., Room, R. and Callinan, S. (2016), “Price elasticity of on- and off-premises demand for alcoholic drinks: A Tobit analysis”, *Drug and Alcohol Dependence*, Vol. 163, pp. 222–228.
- Johnston, R., Stafford, J., Pierce, H. and Daube, M. (2017), “Alcohol promotions in Australian supermarket catalogues”, *Drug and Alcohol Review*, Vol. 36 No. 4, pp. 456–463.
- Kasteridis, P. and Yen, S.T. (2012), “U.S. demand for organic and conventional vegetables: Bayesian censored system approach”, *Australian Journal of Agricultural and Resource Economics*, Vol. 56 No. 3, pp. 405–425.
- Kim, H. and Bonn, M.A. (2015), “The moderating effects of overall and organic wine knowledge on consumer behavioral intention”, *Scandinavian Journal of Hospitality and Tourism*, Vol. 15 No. 3, pp. 295–310.
- Kwong, L.M.K., Cyr, D., Kushner, J. and Ogwang, T. (2011), “A semiparametric hedonic pricing model of Ontario wines”, *Canadian Journal of Agricultural Economics*, Vol. 59 No. 3, pp. 361–381.
- Ladd, G.W. and Suvannunt, V. (1976), “A model of consumer goods characteristics”, *American Journal of Agricultural Economics*, Vol. 58 No. 3, pp. 504–510.
- Lancaster, K.J. (1966), “A new approach to consumer theory”, *The journal of political economy*, Vol. 74 No. 2, pp. 132–157.
- Lin, B.-H., Smith, T.A. and Huang, C.L. (2008), “Organic premiums of US fresh produce”, *Renewable Agriculture and Food Systems*, Vol. 23 No. 3, pp. 208–216.

- Lin, B.-H., Yen, S.T., Huang, C.L. and Smith, T.A. (2009), "U.S. demand for organic and conventional fresh fruits: The roles of income and price", *Sustainability*, Vol. 1 No. 3, pp. 464–478.
- Lockshin, L. and Corsi, A.M. (2012), "Consumer behaviour for wine 2.0: A review since 2003 and future directions", *Wine Economics and Policy*, Vol. 1 No. 1, pp. 2–23.
- Lockshin, L., Jarvis, W., d'Hauteville, F. and Perrouty, J.-P. (2006), "Using simulations from discrete choice experiments to measure consumer sensitivity to brand, region, price, and awards in wine choice", *Food Quality and Preference*, Vol. 17 No. 3–4, pp. 166–178.
- Ludbrook, A., Holmes, J. and Stockwell, T. (2014), "Gender differences in alcohol demand: A systematic review of the role of prices and taxes. Comment on conclusions by Nelson", *Health Economics*, Vol. 23 No. 10, pp. 1281–1283.
- Lynn, J. (2004), "Demand for domestic and imported table wine in British Columbia: A source-differentiated almost ideal demand system approach", *Canadian Journal of Agricultural Economics*, No. 52, pp. 183–199.
- Malasevska, I. and Haugom, E. (2018), "Optimal prices for alpine ski passes", *Tourism Management*, Vol. 64, pp. 291–302.
- Mann, S., Ferjani, A. and Reissig, L. (2012), "What matters to consumers of organic wine?", *British Food Journal*, Vol. 114 No. 2, pp. 272–284.
- Manning, K.C., Sprott, D.E. and Miyazaki, A.D. (2003), "Unit price usage knowledge", *Journal of Business Research*, Vol. 56 No. 5, pp. 367–377.
- Marian, L., Chrysochou, P., Krystallis, A. and Thøgersen, J. (2014), "The role of price as a product attribute in the organic food context: An exploration based on actual purchase data", *Food Quality and Preference*, Vol. 37, pp. 52–60.
- Meng, Y., Brennan, A., Purshouse, R., Hill-McManus, D., Angus, C., Holmes, J. and Meier, P.S. (2014), "Estimation of own and cross price elasticities of alcohol demand in the UK – A pseudo-panel approach using the Living Costs and Food Survey 2001–2009", *Journal of Health Economics*, Vol. 34, pp. 96–103.
- Mitchell, V.-W., Lennard, D. and McGoldrick, P. (2003), "Consumer awareness, understanding and usage of unit pricing", *British Journal of Management*, Vol. 14 No. 2, pp. 173–187.
- Mizdrak, A., Scarborough, P., Waterlander, W.E. and Rayner, M. (2015), "Differential responses to food price changes by personal characteristic: A systematic review of experimental studies", *PloS one*, Vol. 10 No. 7, 1-19.

- Mueller, S., Lockshin, L., Saltman, Y. and Blanford, J. (2010a), "Message on a bottle: The relative influence of wine back label information on wine choice", *Food Quality and Preference*, Vol. 21 No. 1, pp. 22–32.
- Mueller, S., Osidacz, P., Francis, I.L. and Lockshin, L. (2010b), "Combining discrete choice and informed sensory testing in a two-stage process. Can it predict wine market share?", *Food Quality and Preference*, Vol. 21 No. 7, pp. 741–754.
- Natarajan, T., Balasubramanian, S.A. and Kasilingam, D.L. (2017), "Understanding the intention to use mobile shopping applications and its influence on price sensitivity", *Journal of Retailing and Consumer Services*, Vol. 37, pp. 8–22.
- Ngobo, P.V. (2011), "What drives household choice of organic products in grocery stores?", *Journal of Retailing*, Vol. 87 No. 1, pp. 90–100.
- Oczkowski, E. and Doucouliagos, H. (2014), "Wine prices and quality ratings: A meta-regression analysis", *American Journal of Agricultural Economics*, Vol. 97 No. 1, pp. 103–121.
- Pagliarini, E., Laureati, M. and Gaeta, D. (2013), "Sensory descriptors, hedonic perception and consumer's attitudes to Sangiovese red wine deriving from organically and conventionally grown grapes", *Frontiers in Psychology*, Vol. 4, pp. 1–7.
- Palma, D., Ortúzar, J.d.D., Rizzi, L.I., Guevara, C.A., Casaubon, G. and Ma, H. (2016), "Modelling choice when price is a cue for quality: A case study with Chinese consumers", *Journal of Choice Modelling*, Vol. 19, pp. 24–39.
- Pearson, D., Henryks, J. and Jones, H. (2011), "Organic food: What we know (and do not know) about consumers", *Renewable Agriculture and Food Systems*, Vol. 26 No. 2, pp. 171–177.
- Plassmann, H., O'Doherty, J., Shiv, B. and Rangel, A. (2008), "Marketing actions can modulate neural representations of experienced pleasantness", *Proceedings of the National Academy of Sciences*, Vol. 105 No. 3, pp. 1050–1054.
- Ritchie, C., Elliott, G. and Flynn, M. (2010), "Buying wine on promotion is trading-up in UK supermarkets", *International Journal of Wine Business Research*, Vol. 22 No. 2, pp. 102–121.
- Rödiger, M. and Hamm, U. (2015), "How are organic food prices affecting consumer behaviour? A review", *Food Quality and Preference*, Vol. 43, pp. 10–20.
- Rosen, S. (1974), "Hedonic prices and implicit markets: Product differentiation in pure competition", *Journal of Political Economy*, Vol. 82 No. 1, pp. 34–55.

- Schäufele, I. and Hamm, U. (2017), "Consumers' perceptions, preferences and willingness-to-pay for wine with sustainability characteristics: A review", *Journal of Cleaner Production*, Vol. 147, pp. 379–394.
- Schäufele, I., Herrmann, R. and Szolnoki, G. (2016), "Erzielen Weine mit höherer Qualität höhere Preise? Eine hedonische Preisanalyse zur DLG-Bundesweinprämierung (Do high-quality wines capture higher prices? A hedonic price analysis on DLG quality tests)", *German Journal of Agricultural Economics*, Vol. 65 No. 2, pp. 132–150.
- Schmidt, L., Skvortsova, V., Kullen, C., Weber, B. and Plassmann, H. (2017), "How context alters value. The brain's valuation and affective regulation system link price cues to experienced taste pleasantness", *Scientific Reports*, Vol. 7 No. 1, p. 8098.
- Schmit, T.M., Rickard, B.J. and Taber, J. (2013), "Consumer valuation of environmentally friendly production practices in wines, considering asymmetric information and sensory effects", *Journal of Agricultural Economics*, Vol. 64 No. 2, pp. 483–504.
- Schröck, R. (2012), "The organic milk market in Germany is maturing: A demand system analysis of organic and conventional fresh milk segmented by consumer groups", *Agribusiness*, Vol. 28 No. 3, pp. 274–292.
- Schröck, R. (2013), "Quality and endogeneity issues in demand systems: A comparative estimation of price and expenditure elasticities of the demand for organic and conventional vegetables in Germany", *German Journal of Agricultural Economics*, Vol. 62 No. 1, pp. 18–38.
- Sharma, A., Sinha, K. and Vandenberg, B. (2017), "Pricing as a means of controlling alcohol consumption", *British Medical Bulletin*, Vol. 123 No. 1, pp. 149–158.
- Smith, T.A., Huang, C.L. and Lin, B.-H. (2009), "Estimating organic premiums in the US fluid milk market", *Renewable Agriculture and Food Systems*, Vol. 24 No. 3, pp. 197–204.
- Soosay, C., Fearne, A. and Dent, B. (2012), "Sustainable value chain analysis – A case study of Oxford Landing from 'vine to dine'", *Supply Chain Management: An International Journal*, Vol. 17 No. 1, pp. 68–77.
- Verbeek, M. (2012), *A guide to modern econometrics*, 4th ed., Wiley, Chichester.
- Wagenaar, A.C., Salois, M.J. and Komro, K.A. (2009), "Effects of beverage alcohol price and tax levels on drinking. A meta-analysis of 1003 estimates from 112 studies", *Addiction*, Vol. 104 No. 2, pp. 179–190.

- Waldrop, M.E., McCluskey, J.J. and Mittelhammer, R.C. (2017), "Products with multiple certifications: Insights from the US wine market", *European Review of Agricultural Economics*, Vol. 44 No. 4, pp. 658–682.
- White, H. (1980), "A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity", *Econometrica: Journal of the Econometric Society*, pp. 817–838.
- Wiedmann, K.-P., Hennigs, N., Behrens, S.H. and Klarmann, C. (2014), "Tasting green: An experimental design for investigating consumer perception of organic wine", *British Food Journal*, Vol. 116 No. 2, pp. 197–211.
- Wier, M., O'Doherty Jensen, K., Andersen, L.M. and Millock, K. (2008), "The character of demand in mature organic food markets: Great Britain and Denmark compared", *Food Policy*, Vol. 33 No. 5, pp. 406–421.
- Wooldridge, J. (2013), *Introductory econometrics a modern approach*, 5th ed., South-Western, Melbourne.
- Zhang, F., Huang, C.L., Lin, B.-H., Epperson, J.E. and Houston, J.E. (2011), "National demand for fresh organic and conventional vegetables: Scanner data evidence", *Journal of Food Products Marketing*, Vol. 17 No. 4, pp. 441–458.

4 Discussion

4.1 Data basis

Household panel surveys measure consumers' real purchase behaviour and therefore provide the most appropriate data basis to analyse attitude-behaviour relations. Due to high costs of data collection it is expensive for researchers to use them for scientific studies. Surveys and purchase experiments are, therefore, most often used to conclude on actual purchase behaviour, even though these methods face many constraints regarding the validity of measurement. In surveys, direct questioning on purchase behaviour relies on consumers' self-reporting and is therefore subjective and, moreover, prone to social desirability. Purchase experiments are most often of hypothetical nature and not incentive-compatible. The comparatively high validity of household panel data is therefore considered to be a decisive advantage (Fleuchaus and Arnold, 2011).

However, it needs to be recognised that household panels also hold some restrictions which need to be discussed in detail. Constant reporting on purchase data is very time-consuming. An accurate and complete reporting of participants may often not be realised in everyday life due to the high efforts required. Moreover, the acquisition of participants is challenging, and the GfK research institute motivates people to take part through the provision of gifts. Nevertheless, the rate of refusals is still extremely large and households constantly leave the panel (panel mortality) (Kuß *et al.*, 2014). The sample's representativeness of the population, or external validity, has been therefore often questioned (Einav *et al.*, 2008). However, interview-related problems such as a low willingness to participate (low response rate) are valid for surveys and experiments as well. Moreover, the sample size of household panel data is extremely large and the survey is carried out nation-wide. In contrast to retail panels, which are focused on specific shopping locations, a wide range of stores is considered including direct wine sellers and organic food stores. Overall, in comparison to other marketing research methods, external validity is assumed to be high.

With regard to wine, specific properties of household panel data must be considered. With regard to the question if the data is representative of the wine drinking population in Germany, it needs to be considered that households belonging to high and low social classes do have a lower willingness to participate in the panel and are thus poorly represented. This issue is not relevant for products of daily use but could cause biases for very low- and high-priced products due to below-average reporting (Kuß *et al.*, 2014). It could therefore be assumed that wine consumers, specifically those of the premium wine market, are not sufficiently covered in the household panel data since they belong to higher social classes (Szolnoki and Hoffmann, 2014).

However, a comparison of the present sample (wine purchasing households) and the German population showed that households of the sample have higher formal education and income compared to the average population (see section 3.2.5). Moreover, we clearly found evidence for price-segment-specific consumer behaviour which concurs with previous research. Therefore, it can be assumed that the sample represents wine consumption in Germany quite well.

A further wine-specific issue is the poor coverage of direct purchases (Fleuchaus and Arnold, 2011). This problem is attributed to the fact that directly marketed wines are often not equipped with an EAN code which makes it more complicated for participants to record their purchases. Since the premium wine market in Germany is mainly operated by direct sellers and wine specialty stores (Szolnoki and Hoffmann, 2014), it is expected that purchases in supermarkets and discount stores are overrepresented in the household panel data set. In addition to that, it was assumed that people do not want to report on alcohol consumption due to social constraints. As these constraints apply for conventional wine in the same manner as for organic wine, it is assumed that the relevance of organic wine compared to conventional wine is depicted quite well (Janssen *et al.*, 2012).

4.2 Market potential for organic wine

The overarching subject of the present thesis was the analysis of consumer behaviour towards organic wine in order to give marketing recommendations for the further development of the organic wine market in Germany. The availability of actual purchase data in conjunction with consumers' attitudes allowed to analyse attitude-behaviour relations and the impact of impeding factors. This aspect was shown to be a highly important issue for marketing researchers in order to induce desirable behaviours through marketing measures, for example, social and environmentally friendly purchase patterns such as the purchase of organic products. Moreover, many (environmental) consumer behaviour researchers have stressed the importance of the need to analyse real world settings (see section 2.3). The literature review has shown that so far all consumer behaviour studies on organic wine relied on the measurement of attitudes and purchase intentions and gave evidence for an attitude-behaviour gap (see section 3.1). Determining the predictive power of attitudes on future behaviour and the reasons why attitudes do not always translate into behaviour turned out to be highly important.

The theoretical background and the state of the art indicated that even though attitudes and behaviour are somehow interrelated, this correlation is considered to be fairly low. The two-part fractional regression model confirmed the findings of the literature on consumer behaviour

(see section 3.2). Consumer attitudes towards organic products were in line with organic wine purchase behaviour but the influence of attitudes on behaviour was rather weak, and only a small part of the variance in consumption behaviour could be explained. The results of the cluster analysis (see section 3.3) gave specific insights on the gap between attitude and behaviour: clusters with above-average attitudes towards organic production only showed organic wine budget shares of 4 to 7 %. In line with a recent household panel study on determinants of organic food purchases (Janssen, 2018), the dissertation at hand gives evidence for an attitude-behaviour gap. However, in the study of Janssen (2018), attitudes measured through the GfK survey explained 50 % of the variance in organic food purchases which is a much higher share compared to the study at hand. The comparison gives evidence that the attitude-behaviour gap for wine is higher than for food in general and hints that specific purchase barriers for organic wine exist.

In light of the largely positive consumer perceptions of organic wine found in previous studies (see literature review, section 3.1), the high share of wine consumers (88 %) in Germany who did not buy organic wine at all within the research period further points to the existence of an attitude-behaviour gap. A self-reported consumer survey indicated the share of non-buyers to be around 74 % (Szolnoki and Pabst, 2017) which gives evidence that consumers overestimate their organic wine consumption. In accordance with the study of Szolnoki and Pabst (2017), non-organic wine buyers in the present study had lower incomes compared to organic wine buyers. It is therefore assumed that the price premium of organic wine was a relevant purchase barrier for this consumer group. Contrary to the study of Szolnoki and Pabst (2017), organic wine consumers purchased less wine than conventional consumers on each single shopping trip. This may be attributed to organic consumers' higher health consciousness (Apaolaza *et al.*, 2018), which is accompanied by lower alcohol intake (Kesse-Guyot *et al.*, 2013). Apart from that, organic consumers' low interest in wine could be an explanation (Janssen *et al.*, 2012) for this result.

This study proved the relevance of price and price promotion for the purchase of wine (see section 3.3). In-store stimuli seem to be important in guiding wine purchase behaviour. While previous studies showed that the price premium of organic wine was a major purchase barrier (Bernabéu *et al.*, 2008; Mann *et al.*, 2012), the influence of price in this study, however, varied by price category. In accordance to Palma *et al.* (2016) and Schmidt *et al.* (2017) the present study gave evidence that price functioned as quality signal in the premium segment. According to previous studies (Abraben *et al.*, 2017; Delmas and Grant, 2008), consumers did not prefer

organic over conventional wine in the premium segment, i.e. organic premium wine producers could not differentiate themselves from conventional producers.

The findings so far suggest that additional marketing efforts are required in order to create added value for consumers. The study subsequently gives advice on how to gain differentiation and meet consumer needs. It was found that along with actual preferences for organic products, the purchase of organic wine was driven by sustainability concerns. Organic wine consumers' preference for sustainable production has previously been revealed by Mueller Loose and Remaud (2013) and Bonn *et al.* (2016). Actually, the present research identified a sustainably oriented segment named "Holistics" that showed high organic wine purchase levels. In line with the segment "Sustainable wine drinkers" identified in a recent study by Klohr (2017), the "Holistics" purchased wine more often, were willing to pay higher prices, had higher incomes and belonged to older age groups. However, the segment "Holistics" (21 % of German wine consumers) was considerably smaller than the "Sustainable wine drinkers" (30 % of German wine consumers). The results of this research suggest that studies not taking real purchase behaviour into account tend to overestimate the sustainably oriented consumer segment.

While the results document the existence of a positive relationship between the purchase of organic wine and sustainability concerns, consumers' attitudes towards local and domestic products were not associated with the purchase of organic wine. This finding is in contrast to previous studies that emphasise an overlap of preferences for organic and local products. In a recent German study, organic consumers preferred local production when it comes to the purchase of steaks, apples, butter and flour (Hempel and Hamm, 2016). Since for wine the country or region of origin was found to be one of the major purchase criteria (Defrancesco *et al.*, 2012; Jaeger *et al.*, 2013; Yang and Paladino, 2015) this quality characteristic might be more important than the proximity to production. The results of the present research suggest that pronounced preferences for specific origins present purchase barriers for German organic wine. Beyond that, the supply situation might also serve as possible explanation: in Spain, Italy and France the largest organic grape growing areas can be found (over 60,000 ha), whereas the German organic area is particularly small (7,500 ha).

Even though the above mentioned results proved that attitudes towards local and domestic products did not become apparent in the purchase of organic wine, the segmentation study identified a cluster with positive attitudes towards organic and local products (The "Local-Organics", see section 3.3.5.3.2). This cluster showed relatively high expenditure shares for organic and domestic wine and is of high potential for the German wine market as discussed in section 3.3.6).

4.3 Merits and limitations of the dissertation

This research study is the first one that analysed consumer behaviour for organic wine with household panel data. Previous consumer studies relied on surveys and purchase experiments which are prone to social desirability and other weaknesses of stated preference studies and therefore tend to overestimate consumers' purchase activities. Since the analysed data set comprises consumers' actual purchase acts at the point of sale, the present study offers a high degree of validity compared to usually applied marketing research methods. Even though the data set experiences some problems regarding the coverage of the wine market (see discussion in section 4.1), the above mentioned advantages far outweigh the disadvantages. Knowledge on attitude-behaviour consistencies and the attitude-behaviour gap was generated within the context of the German wine market.

Given the importance of situational factors for the purchase of wine and that the Alphabet Theory strives to depict real-life purchase decisions through the inclusion of personal and external environmental influences, the choice of the Alphabet Theory as theoretical model was proven to provide a suitable framework to analyse organic wine purchase behaviour. Through this rather affective approach it was possible to explain wine consumer behaviour and to better understand why attitudes do not completely translate into behaviour.

However, despite the valuable contributions, the present research could not avoid limitations. Within the scope of the research it was not possible to analyse all relevant factors that might moderate the attitude-behaviour relation; several factors remained unconsidered. With regard to internal psychological processes, the study was limited to attitudinal statements provided by the GfK institute. The gap between attitudes and behaviour might also result from other personal factors such as quality, brand or price consciousness. Moreover, the investigated attitudes with regard to organic, local and sustainable products were measured in a rather general way (food consumption), whereas behaviour specifically referred to the purchase of wine. Some consumers may have positive preferences for local or organic fresh produce or milk, but this might not hold true for organic wine, possibly due to its negative image (Delmas and Grant, 2008; Mann *et al.*, 2012; Stolz and Schmid, 2008). This study did not respect for such wine-specific preferences which probably resulted in an overestimation of the attitude-behaviour gap.

In addition to this restriction, the present study did not account for the knowledge of wine consumers even though this is an important aspect of wine involvement, a variable that determines wine purchase behaviour significantly. Moreover, the contextual variables taste and

variety essentially affect wine purchase behaviour and moderate the translation of attitudes into behaviour with regard to organic wine. However, these variables also remained unconsidered because they were not accessible.

5 Conclusions

The analysis of real purchase data confirmed many general trends which were previously found by means of stated preference studies, for example, the willingness-to-pay higher prices for organic wine or the influence of prices and origins on wine purchases. The results imply that surveys and purchase experiments provide valid conclusions on antecedents of organic wine purchase behaviour. However, the analyses of household panel data revealed that stated preference studies tend to be too optimistic on consumers' real purchase behaviour: even though attitudes towards organic and sustainable products were largely positive, only a small share of consumers purchased organic wine in a real market context. Therefore, stated attitudes should not be used to conclude on purchase behaviour.

5.1 Marketing of organic wine

Based on the findings of the present dissertation, marketing implications for stakeholders of the organic wine market in Germany are given in the following. In general, it can be concluded that marketing strategies should be price-category- and target-group-specific. The subsequent section is divided according to the four marketing instruments *Product*, *Price*, *Place* (Distribution) and *Promotion* (Kotler and Keller, 2013), introduced as marketing stimuli of the SOR model in section 2.1. This structure is aimed to help market actors to actually implement the given recommendations within their marketing strategy.

Product

Since consumers valued organic over conventional wine production, the organic production standard should be highlighted at the wine label for low- and medium-priced organic wines. In the high-price segment, however, consumers were not willing to pay price premiums for the organic production method; this gives evidence that organic labelling alone will not help to gain significant differentiation and to achieve competitive advantage within the highly differentiated wine market. Up to now, "organic" seems to be just an additional benefit, not a decisive purchase factor. Additional product benefits which exceed the minimum organic requirements are needed to create value for consumers and to gain price premiums in the high-price segment in the long term. The results of this study suggest that local production and sustainability provide starting points for specific target groups. Higher prices for organic wine should be implemented stepwise in line with restructuring measures regarding wine quality to fulfil consumers' high quality expectations for premium wine (for example, new product line or participation in quality competitions).

Price

The results of the present thesis suggest that the low-price segment is highly competitive due to consumers' high price sensitivity. German producers did not gain price premiums in this segment while foreign producers achieved considerable premiums. Hence, German producers are not successful in competing with foreign producers and they are therefore advised not to market wines in the low-price segment. The mid-price segment, however, is most attractive for German organic producers due to obtainable price-premiums and consumers' lower price sensitivity. In the premium-price segment, competition from conventional producers is high and in order to communicate the benefits of organic production in a plausible manner, prices should be remarkably higher than for the respective conventional wine. Results of the cluster analysis give evidence for the unused potential of organic wine in the premium segment: consumers with a higher preference for organic production had higher wine expenditures and higher price acceptance.

Place

The results point to the importance of the chosen shopping venue for consumers' final purchase decision. In store stimuli such as price and promotion seem to have a high impact on the final purchase decision and may hinder the conversion of attitudes into behaviour. Discounters or supermarkets, which are specifically preferred by price-sensitive wine consumers with low preferences for organic products (The Unconcerned; see section 3.3.5.3.6), may be a suitable sales channel to induce initial organic wine purchases through marketing activities such as secondary placements or price promotions. Instead, direct wine sellers and organic stores in Germany should raise awareness for the benefits of local organic wine through personal advice or instructed wine tastings because the segment of "Local-Organics" offers high market potential for these shopping locations (see section 3.3.5.3.2). The results further hint that organic production is less important for purchases at wine speciality stores. The focus on sustainably oriented wine consumers (the "Holistics"; see section 3.3.5.3.1) seems to be, however, a promising marketing strategy for wine speciality stores. In general, the still low availability and product assortment of organic wine is a major purchase barrier due to heterogeneous preferences of wine consumers. Therefore, wine producers and retailers are advised to enlarge their organic wine product range.

Promotion

The awareness for benefits of organic wine production needs to be raised through information campaigns. This is in particular needed for premium wines due to the fact that consumers do

not value organic production in this segment. The quality of organic wine should take centre stage. Participation in quality contests or wine tastings may help to transport the quality message to consumers. Moreover, results of the dissertation indicate that producers and retailers should communicate sustainability (environmental and social aspects) in relation to organic wine. German wine producers should focus on local aspects (e.g. biodiversity, landscape or environmental pollution). Specifically young consumers seem to be a promising target group to develop the German organic wine market. Since the New World countries communicate sustainability issues in a dedicated way via nationwide sustainability programs (e.g. California Sustainable Winegrowing Program), the development and communication of a sustainability strategy at a national level in Germany should be initiated to increase the competitiveness of the German wine industry and to reinforce the purchase of German (organic) wine.

5.2 Future research

The dissertation showed that the analysis of consumers' actual purchase data is of high importance due to survey-specific problems and purchase barriers which results in an attitude-behaviour gap. This points to the importance of a constant tracking of household panel data over several years in order to get a valid picture of the development of the organic wine market in Germany with regard to consumers' expenditure share for organic wine.

Even though the household panel study found evidence for an overestimation of consumers' purchase preferences for organic wine, several findings based on actual purchase data were in line with previous research findings, for example, the role of price, socio-demographic profile of (organic) wine consumers or consumer characteristics of local and sustainability-oriented consumers. Future research studies based on surveys can be a reliable source for specific aspects of consumer behaviour but should be aware that the expenditure share of organic wine as well as the segment of wine drinkers oriented to sustainability will probably be overestimated.

The study further suggests that preferences for organic food products in general do not strongly affect the purchase of organic wine. Therefore, future studies should focus on wine-specific barriers which may prevent that attitudes translate into behaviour such as knowledge gaps about organic wine production and standards, social acceptance of organic wine (in different consumption situations), or the belief that organic wine is of lower quality. Since the annual GfK household panel survey does not respect for specific consumer attitudes regarding wine, a subsample of panel members could be surveyed in order to compare wine-specific attitudes and actual purchase behaviour to make more reliable conclusions on the attitude-behaviour gap. It is assumed that specific attitudes towards organic wine are more closely related to the purchase

of organic wine than overall attitudes for organic products. Moreover, it could be beneficial to analyse wine consumers' total organic food expenditures against their organic attitudes. A closer relation would provide first answers to the existence of specific attitudes towards organic wine which prevent actual purchases and give evidence that the attitude-behaviour gap is product-category-specific.

The study revealed market potential for organic wine of local origin but did not allow for specific investigation since information on households' residence was not available in the data set for this analysis. However, first indications of a link between attitudes towards local production and the purchase of German wine (The "Local-Organics") were given and provide a starting point for further investigation. Future research should figure out if households' distance to the next wine growing region influences actual purchase behaviour for local wine. So far, knowledge regarding local wine was only analysed within experimental settings (e.g. Ay *et al.*, 2017). The analysis of real purchase data would give a better understanding of consumer purchase decisions regarding local organic wine and offer implications on how to compete with organic wines of foreign origin.

In addition to the consumer perspective, other actors of the organic wine market in Germany should be studied to find out further drivers and barriers for the supply and demand of organic wine in Germany. Qualitative interviews of wine growers, wine retailers or wine associations may result in rich information on why consumer attitudes do not generally translate into behaviour. An investigation of these market actors would allow for further insights to explore the German wine market.

Within the aim and the scope of the analysis it was not possible to analyse all market areas relevant for the distribution of organic wine. An investigation of the out-of-home market (restaurants, hotels, bars, catering) could be valuable for the development of the organic wine market since this market accounts for about one fifth of the wine consumption in Germany (German Wine Institute, 2016). In addition, an analysis of export markets for organic wine could provide a prospect for German wine producers. Moreover, the internet and digital technologies offer benefits for the marketing of wine, for example, in the area of online retailing (Galati *et al.*, 2016). Future studies on consumer behaviour for organic wine are advised to consider these new developments.

6 Summary

6.1 English Summary

Consumer studies based on surveys and purchase experiments show positive attitudes towards organic wine in large consumer segments. Health, environmental and quality benefits are stated most often as drivers for purchase decisions and certain consumer groups are willing to pay price premiums for organic wines. However, the market share of organic wine still remains small. Apparently, there is a gap between consumer attitudes and real purchase behaviour but no study so far analysed this attitude-behaviour relation in a real market context. Research based on real market data is needed to gain insights into why attitudes do not fully translate into purchase behaviour. The need for an investigation of real market data becomes even more apparent when looking at the challenging conditions of the organic wine market particularly from the perspective of the producers. The organic grape growing area is increasing and a supply growth is expected in the coming years. This holds true especially for German producers since Germany is the biggest import market for organic wine in the world and German organic wine producers face strong competition from organic wine producers from Spain and Italy who benefit from economies of scale and cost-effective climate conditions. Moreover, various sustainability programs and labels have been developed over the past years which compete with the organic certification system.

This dissertation focuses on the German market for the reasons mentioned above and also because it is the market leader for organic food and beverages in Europe. The main objectives of the dissertation were: firstly, to analyse the relation between consumer attitudes and purchase behaviour regarding organic wine, and secondly, to discover barriers which hinder the translation of attitudes into purchase behaviour. Special emphasis is laid on wine consumers' preferences for local/domestic and sustainable production methods. Two sub-objectives of the dissertation were to figure out if local/domestic production is perceived as an additional benefit for consumers of organic wine and if sustainability concerns affect actual organic wine purchases. On the basis of the results recommendations for actors in the market are given in order to develop targeted marketing actions.

The objectives were addressed by an investigation of household panel data from the market research institute GfK. The data were obtained from a sample of 30,000 households, representative of the German population, households who constantly report on their grocery purchases and in addition complete an annual survey on attitudinal statements about their

consumption behaviour and socio-demographics. The study focused on households who bought wine at least once during the research period (December 2014 to November 2015).

The investigation revealed rather low levels of expenditure shares for organic wine even in consumer segments with rather positive attitudes towards organic and/or sustainable production. Although this result points to the existence of an attitude-behaviour gap, a statistically significant influence of attitudes towards organic and sustainable production on the purchase of organic wine was revealed. The results suggest potential for the development of targeted marketing strategies in order to increase the hitherto small number of organic wine buyers (only 12 % of wine consumers buy organic wine) and to increase the budget share for organic wine (on average 5 %).

Therefore, the identification of purchase barriers, which hinder the translation of attitudes into purchase behaviour (second key objective) took centre stage within the present dissertation. The results suggest that a low level of knowledge regarding organic production is one barrier for purchasing organic wine. Moreover, in light of the still low availability and product assortment of organic wine, preferences for specific countries or regions of origin may stand in the way of consumers purchasing more organic wine. The fact that no significant relationship exists between the appreciation of local and domestic products and the purchase of organic wine appears to further underline the overwhelming importance of the country or region of origin for the purchase of wine. Another relevant purchase barrier for wine consumers in Germany was found to be the price premium of organic wine. The price of organic wine seemed to be an effective barrier especially for the low-income cluster even though households from this cluster claimed a positive attitude towards sustainability.

Since price was found to be a highly relevant factor for the purchase of organic wine, deeper price specific analyses were carried out. In the low price category, consumers' price sensitivity was high. Moreover, wine consumers did not pay price premiums for German organic wines but for foreign organic wines. German producers are therefore advised not to market wines in the low-price segment. The mid-price segment, however, should be the most attractive segment for German organic wine producers due to consumers' willingness to pay price premiums for organic wine in this segment. In the premium-price category, consumers were not price-sensitive at all: price functioned as a quality signal both for organic and conventional wine. However, consumers did not prefer organic over conventional wine in the premium segment, i.e. organic wine producers could not achieve price premiums. Additional benefits beyond the minimum organic requirements need to be communicated to create value for consumers and to gain price premiums in the high-price segment in the long term. The identification of clusters

based on consumer attitudes allows for a strategic market development. One of the most attractive segments was found to be the cluster of the “Holistics” which is characterised by strong pro-environmental attitudes and a preference for organic and sustainable products (21 % of wine consumers). Raising awareness for quality benefits of organic wine production within a comprehensive communication strategy on sustainability issues is recommended.

The present dissertation provides an important contribution to research since it was the first study that analysed consumer behaviour for organic wine with real purchase data. Of particular value was the single data source for attitudes and real buying behaviour that allowed the investigation of the attitude-behaviour gap. The results confirmed many results which were previously found by means of stated preference studies. However, attitudes and purchase intentions tend to overestimate actual purchases of organic wine. Stated preference studies, therefore, only provide valid conclusions on antecedents of actual purchase behaviour.

The present study, despite being based on a large and very comprehensive data base, does have a number of limitations which give indications for future research. For instance, the GfK household panel data set does not allow for an investigation of the online and the out-of-home market which are both relevant for the marketing of wine. Furthermore, it was not possible to investigate the influence of specific preferences for organic wine such as knowledge on organic wine production or quality perceptions of organic wine that might affect actual purchase behaviour. Finally, several contextual variables such as wine style, grape variety and reputation of wineries or brands that might hinder the translation of attitudes into purchase behaviour could not be investigated.

6.2 German Summary

Konsumentenstudien basierend auf Befragungen und Kaufexperimenten zeigen, dass weitgehend positive Konsumenteneinstellungen gegenüber Öko-Wein vorliegen. Als Motive für den Kauf von Öko-Wein werden häufig positive Effekte für die Umwelt, die eigene Gesundheit und die Weinqualität angegeben. Zudem sind bestimmte Konsumentengruppen bereit, einen Preisaufschlag für Öko-Wein zu bezahlen. Der Marktanteil von Öko-Wein ist derzeit hingegen gering. Offenbar liegt eine Lücke zwischen Einstellungen und Verhalten vor, die bisher in noch keiner Studie auf Basis realer Einkaufsdaten untersucht wurde. Hier besteht folglich Forschungsbedarf. Vor dem Hintergrund der anspruchsvollen Bedingungen auf dem Öko-Weinmarkt wird der Bedarf einer Analyse realer Marktdaten besonders deutlich. Die weltweite Öko-Rebfläche wächst und es ist ein Anstieg des Öko-Weinangebots in den nächsten Jahren zu erwarten, was besonders deutsche Weinproduzenten unter Druck setzt. Deutschland

ist der größte Öko-Wein-Importeur, wodurch deutsche Öko-Weinproduzenten einem starken Wettbewerb durch spanische und italienische Öko-Weinproduzenten ausgesetzt sind. Darüber hinaus verschärfen sich die Wettbewerbsbedingungen auf dem Öko-Weinmarkt durch Nachhaltigkeitsprogramme und -siegel, die in den letzten Jahren verstärkt aufgekommen sind.

Der Untersuchungsgegenstand der Dissertation ist der deutsche Weinmarkt aus den oben genannten Gründen, und weil Deutschland der Marktführer für Öko-Lebensmittel in Europa ist. Die primären Ziele der Dissertation waren zum einen, den Zusammenhang zwischen Konsumenteneinstellungen und Verhalten bezüglich Öko-Wein zu analysieren, und zum zweiten, Faktoren zu identifizieren, die verhindern, dass Einstellungen verhaltenswirksam werden. Ein spezifischer Fokus der Arbeit lag auf Konsumentenpräferenzen bezüglich deutscher/regionaler und nachhaltiger Produktion. Es galt somit herauszufinden, ob deutsche/regionale Produktion einen Mehrwert für Öko-Weinkonsumenten schafft und ob das Interesse an Nachhaltigkeit das tatsächliche Kaufverhalten beeinflusst. Schließlich sollen zielgerichtete Marketingempfehlungen für Akteure des Öko-Weinmarktes abgeleitet werden.

In der vorliegenden Arbeit wurden Haushaltspaneldaten der GfK (Gesellschaft für Konsumforschung) analysiert – einem auf realen Einkaufsdaten basierenden Datensatz – der mit einer Stichprobe von 30.000 Haushalten die Bevölkerung in Deutschland repräsentiert. Teilnehmende Haushalte berichten regelmäßig ihre Lebensmitteleinkäufe und nehmen außerdem jährlich an einer Befragung zu Einstellungen bezüglich ihrem Konsumverhalten und zu soziodemografischen Daten teil. In dieser Untersuchung wurden alle Haushalte einbezogen, die mindestens einmal im Untersuchungszeitraum (Dezember 2014 – November 2015) Wein gekauft haben.

Die Analyse der Daten machte deutlich, dass der Ausgabenanteil bei Öko-Wein selbst bei Konsumentengruppen mit eher positiven Einstellungen zu ökologischer und/oder nachhaltiger Produktion gering ist. Auch wenn dieses Ergebnis das Vorliegen einer Einstellungs-Verhaltenslücke nahelegt, konnte ein statistisch signifikanter Einfluss von Einstellungen zu ökologischer und nachhaltiger Produktion auf den Kauf von Öko-Wein nachgewiesen werden. Die Ergebnisse zeigen, dass Potenzial für die Entwicklung zielgerichteter Marketingstrategien auf Basis von Einstellungen vorliegt, um die bislang kleine Käuferschaft (12 % der Weinkonsumenten) und den geringen Ausgabenanteil bei Öko-Wein (durchschnittlich 5 %) auszubauen.

Der Identifikation von Kaufbarrieren kam daher eine wichtige Rolle in der vorliegenden Dissertation zu. Die Ergebnisse deuten darauf hin, dass ein geringes Wissen über die

ökologische Produktionsweise den Kauf von ökologischem Wein negativ beeinflusst. Die geringe Verfügbarkeit und Sortimentsvielfalt bei Öko-Wein und spezifische Präferenzen für bestimmte Herkunftsländer und -regionen scheinen eine weitere Kaufbarriere darzustellen. Eine regionale Herkunft war hingegen nicht ausschlaggebend für den Kauf von Öko-Wein, was auf die hohe Bedeutung des Herkunftslandes bzw. der Herkunftsregion bei Wein zurückzuführen sein könnte. Schließlich war eine weitere wichtige Kaufbarriere der Preisaufschlag bei Öko-Wein. Insbesondere für Konsumentensegmente mit geringem Einkommen scheint der Öko-Preisaufschlag ein Kaufhindernis zu sein und zwar trotz positiver Einstellungen bezüglich Nachhaltigkeit.

Aufgrund der hohen Bedeutung des Preises für den Kauf von Öko-Wein wurden weitere segmentspezifische Preisanalysen durchgeführt. Im Niedrigpreissegment lag ein hohes Preisbewusstsein vor und Konsumenten bezahlten einen Preisaufschlag für ausländische Öko-Weine, nicht jedoch für deutsche Weine. Von einer Positionierung deutscher Öko-Weine im Niedrigpreissegment wird daher abgeraten. Das Mittelpreissegment scheint allerdings attraktiv für deutsche Öko-Weinproduzenten, da eine Mehrpreisbereitschaft für deutschen Öko-Wein vorlag. Im Premiumpreissegment fungierte der Preis sowohl bei konventionellem als auch bei ökologischem Wein als Qualitätssignal. Allerdings bezahlten Konsumenten keinen Preisaufschlag für die ökologische Produktion. Um für Konsumenten einen Mehrwert zu schaffen und langfristig auch im Premiumpreissegment Preisaufschläge zu generieren, müssen Vorteile der ökologischen Produktion kommuniziert werden, die über die gesetzlichen Mindeststandards hinausgehen. Die Identifikation von einstellungsbasierten Konsumentensegmenten bietet Ansatzpunkte für eine strategische Marktbearbeitung. Eines der vielversprechendsten Segmente für den Öko-Weinmarkt in Deutschland sind die „Nachhaltigkeits-Orientierten“, die positive Einstellungen bezüglich Umweltschutz und eine Präferenz für ökologische und nachhaltige Produktion haben (21 % der Weinkonsumenten). Es wird empfohlen, innerhalb einer umfassenden Nachhaltigkeitskommunikation das Bewusstsein für die Qualität ökologischer Weine zu steigern.

Die vorliegende Dissertation liefert einen wichtigen Forschungsbeitrag, da erstmals das reale Kaufverhalten bei Öko-Wein analysiert wurde. Der besondere Wert von Haushaltspaneldaten ist das Vorliegen von Einstellungs- und Kaufverhaltensdaten aus einer einzigen, gemeinsamen Datenquelle, wodurch die Analyse von Einstellungs-Verhaltenszusammenhängen ermöglicht wurde. Die Ergebnisse der Studie bestätigen viele Erkenntnisse, die bereits zuvor in anderen Studien durch Befragungen und Kaufexperimente gewonnen wurden. Es zeigte sich aber auch, dass nicht direkt von Einstellungen zu ökologischer Produktion auf das Kaufverhalten bei Öko-

Wein geschlossen werden kann, da sonst der Einkauf von Öko-Wein überschätzt wird. Daher lassen Befragungsdaten nur gültige Schlüsse bezüglich den Vorläufern tatsächlichen Kaufverhaltens zu.

Trotz der Vorteile des Datensatzes weist die Dissertation gewisse Einschränkungen auf, wodurch sich aber wiederum Ansätze für die Durchführung weiterer Studien ergeben. Beispielsweise war es mit Hilfe der GfK Haushaltspaneldaten nicht möglich, den Onlinemarkt und den Außer-Haus-Markt zu analysieren, welche beide relevant für die Vermarktung von Wein sind. Außerdem konnten spezifische Präferenzen für Öko-Wein, wie beispielsweise Kenntnisse über die ökologische Weinproduktion oder die Qualitätswahrnehmungen bei Öko-Wein nicht in die Analyse einbezogen werden. Schließlich fand der Einfluss verschiedener Weincharakteristika, wie beispielsweise Weinart, Rebsorte oder die Reputation von Weingütern oder Weinmarken keine Berücksichtigung. Da diese Faktoren verhindern können, dass positive Einstellungen zur ökologischen Produktion nicht verhaltenswirksam werden, sollten sie in künftigen Forschungsarbeiten aufgegriffen werden.

References

- Abraben, L.A., Grogan, K.A. and Gao, Z. (2017), “Organic price premium or penalty? A comparative market analysis of organic wines from Tuscany”, *Food Policy*, Vol. 69, pp. 154–165.
- Aertsens, J., Mondelaers, K., Verbeke, W., Buysse, J. and Van Huylenbroeck, G. (2011), “The influence of subjective and objective knowledge on attitude, motivations and consumption of organic food”, *British Food Journal*, Vol. 113 No. 11, pp. 1353–1378.
- Aertsens, J., Verbeke, W., Mondelaers, K., Van Huylenbroeck, G. and Van Huylenbroeck, G. (2009), “Personal determinants of organic food consumption: A review”, *British Food Journal*, Vol. 111 No. 10, pp. 1140–1167.
- Ajzen, I. (1985), “From intentions to actions: A theory of planned behavior”, in Kuhl, J. and Beckmann, J. (Eds.), *Action control: From cognition to behavior*, Springer series in social psychology, Springer-Verlag, Berlin, Heidelberg, pp. 11–39.
- Ajzen, I. (1991), “The theory of planned behavior”, *Theories of Cognitive Self-Regulation*, Vol. 50 No. 2, pp. 179–211.
- Ajzen, I. and Fishbein, M. (1977), “Attitude-behavior relations: A theoretical analysis and review of empirical research”, *Psychological Bulletin*, Vol. 84 No. 5, pp. 888–918.
- Akaichi, F. and Revoredo-Giha, C. (2016), “Consumers demand for products with animal welfare attributes. Evidence from homescan data for Scotland”, *British Food Journal*, Vol. 118 No. 7, pp. 1682–1711.
- Alviola, P.A. and Capps, O. (2010), “Household demand analysis of organic and conventional fluid milk in the United States based on the 2004 Nielsen Homescan panel”, *Agribusiness*, 369–388.
- Anders, S. and Moeser, A. (2008), “Assessing the demand for value-based organic meats in Canada: A combined retail and household scanner-data approach”, *International Journal of Consumer Studies*, Vol. 32 No. 5, pp. 457–469.
- Andersen, L.M. (2011), “Animal welfare and eggs – Cheap talk or money on the counter?”, *Journal of Agricultural Economics*, Vol. 62 No. 3, pp. 565–584.
- Ankamah-Yeboah, I., Nielsen, M. and Nielsen, R. (2016), “Price premium of organic salmon in Danish retail sale”, *Ecological Economics*, Vol. 122, pp. 54–60.
- Apaolaza, V., Hartmann, P., D'Souza, C. and López, C.M. (2018), “Eat organic – Feel good? The relationship between organic food consumption, health concern and subjective wellbeing”, *Food Quality and Preference*, Vol. 63, pp. 51–62.

- Arellano, M. (1987), "Computing robust standard errors for within-groups estimators", *Oxford bulletin of Economics and Statistics*, Vol. 49 No. 4, pp. 431–434.
- Aschemann-Witzel, J. and Niebuhr Aagaard, E.M. (2014), "Elaborating on the attitude-behaviour gap regarding organic products: Young Danish consumers and in-store food choice", *International Journal of Consumer Studies*, Vol. 38 No. 5, pp. 550–558.
- Aschemann-Witzel, J. and Zielke, S. (2017), "Can't buy me green? A review of consumer perceptions of and behavior toward the price of organic food", *Journal of Consumer Affairs*, Vol. 51 No. 1, pp. 211–251.
- Auger, P. and Devinney, T.M. (2007), "Do what consumers say matter? The misalignment of preferences with unconstrained ethical intentions", *Journal of Business Ethics*, Vol. 76 No. 4, pp. 361–383.
- Ay, J.-S., Chakir, R. and Marette, S. (2014), "Does living close to a vineyard increase the willingness-to-pay for organic and local wine?", paper prepared for the EAAE 2014 Congress 'Agri-Food and Rural Innovations for Healthier Societies'. Ljubljana, Slovenia, August 26–29, 2014, available at: <http://purl.umn.edu/183075> (accessed 18 February 2016).
- Ay, J.-S., Chakir, R. and Marette, S. (2017), "Distance decay in the willingness to pay for wine: Disentangling local and organic attributes", *Environmental and Resource Economics*, Vol. 68 No. 4, pp. 997–1019.
- Barber, N., Bishop, M. and Gruen, T. (2014), "Who pays more (or less) for pro-environmental consumer goods? Using the auction method to assess actual willingness-to-pay", *Journal of Environmental Psychology*, Vol. 40, pp. 218–227.
- Barber, N., Ismail, J. and Dodd, T. (2007), "Purchase attributes of wine consumers with low involvement", *Journal of Food Products Marketing*, Vol. 14 No. 1, pp. 69–86.
- Barber, N., Taylor, D.C. and Deale, C.S. (2010), "Wine tourism, environmental concerns, and purchase intention", *Journal of Travel & Tourism Marketing*, Vol. 27 No. 2, pp. 146–165.
- Bazoche, P., Deola, C. and Soler, L.G. (2008), "An experimental study of wine consumers' willingness to pay for environmental characteristics", paper prepared for the EAAE International Congress. Ghent, Belgium, August 26–29, 2008, available at: <http://purl.umn.edu/43651> (accessed 18 February 2016).
- Bazoche, P., Issanchou, S., Brouard, J., Maratray, J. and Ginon, E. (2015), "Evaluating consumers' sustainable choice of wine: A virtual shop experiment", paper prepared for the EAAE-AAEA Joint Seminar 'Consumer Behavior in a Changing World: Food, Culture,

- Society⁴. Naples, Italy, March 25–27, 2015, available at: <http://purl.umn.edu/202735> (accessed 22 March 2016).
- Bernabéu, R., Brugarolas, M., Martínez-Carrasco, L. and Díaz, M. (2008), “Wine origin and organic elaboration, differentiating strategies in traditional producing countries”, *British Food Journal*, Vol. 110 No. 2, pp. 174–188.
- Berry, W.D. (1993), *Understanding regression assumptions: Quantitative applications in the social sciences*, Vol. 92, Sage Publications, Newbury Park, California.
- Bezawada, R. and Pauwels, K. (2013), “What is special about marketing organic products? How organic assortment, price, and promotions drive retailer performance”, *Journal of Marketing*, Vol. 77 No. 1, pp. 31–51.
- Bonn, M.A., Cronin, J.J. and Cho, M. (2016), “Do environmental sustainable practices of organic wine suppliers affect consumers behavioral intentions? The moderating role of trust”, *Cornell Hospitality Quarterly*, Vol. 57 No. 1, pp. 21–37.
- Bray, J., Johns, N. and Kilburn, D. (2011), “An exploratory study into the factors impeding ethical consumption”, *Journal of Business Ethics*, Vol. 98 No. 4, pp. 597–608.
- Brugarolas, M., Martínez-Carrasco Martínez, L., Bernabéu, R. and Martínez-Poveda, A. (2010), “A contingent valuation analysis to determine profitability of establishing local organic wine markets in Spain”, *Renewable Agriculture and Food Systems*, Vol. 25 No. 1, pp. 35–44.
- Brugarolas Mollá-Bauzá, M., Martínez-Carrasco Martínez, L., Martínez Poveda, A. and Rico Pérez, M. (2005), “Determination of the surplus that consumers are willing to pay for an organic wine”, *Spanish Journal of Agricultural Research*, Vol. 3 No. 1, pp. 43–51.
- Buder, F. (2011), *Das Kaufverhalten bei Öko-Lebensmitteln. Kausalanalytische Untersuchung der Determinanten der Nachfrage nach ökologisch Erzeugten Lebensmitteln*, Dr. Kovac, Hamburg.
- Buder, F., Feldmann, C. and Hamm, U. (2014), “Why regular buyers of organic food still buy many conventional products”, *British Food Journal*, Vol. 116 No. 3, pp. 390–404.
- Cameron, A.C. and Trivedi, P.K. (2009), *Microeconometrics using stata*, Stata Press, College Station, Texas.
- Carrigan, M. and Attalla, A. (2001), “The myth of the ethical consumer – Do ethics matter in purchase behaviour?”, *Journal of Consumer Marketing*, Vol. 18 No. 7, pp. 560–578.
- Carrington, M.J., Neville, B.A. and Whitwell, G.J. (2010), “Why ethical consumers don’t walk their talk: Towards a framework for understanding the gap between the ethical

- purchase intentions and actual buying behaviour of ethically minded consumers”, *Journal of Business Ethics*, Vol. 97 No. 1, pp. 139–158.
- Cembalo, L., Caracciolo, F. and Pomarici, E. (2014), “Drinking cheaply: The demand for basic wine in Italy”, *Australian Journal of Agricultural and Resource Economics*, Vol. 58 No. 3, pp. 374–391.
- Chiodo, E., Casolani, N. and Fantini, A. (2011), “Evaluation of the effects of changes in regulatory policies on consumers perception: The case of designations of origin in the wine common market organisation”, paper prepared for the EAAE 122nd Seminar. Ancona, Italy, February 17–18, 2011, available at: <http://purl.umh.edu/99590> (accessed 18 February 2016).
- Christ, K.L. and Burritt, R.L. (2013), “Critical environmental concerns in wine production: An integrative review”, *Journal of Cleaner Production*, Vol. 53, pp. 232–242.
- Cook, D.O., Kieschnick, R. and McCullough, B.D. (2008), “Regression analysis of proportions in finance with self selection”, *Journal of Empirical Finance*, Vol. 15 No. 5, pp. 860–867.
- Cornelsen, L., Mazzocchi, M., Green, R., Dangour, A.D. and Smith, R.D. (2016), “Estimating the relationship between food prices and food consumption – Methods matter”, *Applied Economic Perspectives and Policy*, Vol. 38 No. 3, pp. 546–561.
- Corsi, A.M., Mueller, S. and Lockshin, L. (2012), “Let’s see what they have: What consumers look for in a restaurant wine list”, *Cornell Hospitality Quarterly*, Vol. 53 No. 2, pp. 110–121.
- Costanigro, M. and McCluskey, J.J. (2012), “Hedonic price analysis in food markets”, in Lusk, J.L., Roosen, J. and Shogren, J.F. (Eds.), *The Oxford Handbook of the Economics of Food Consumption and Policy*, Oxford University Press, pp. 152–180.
- Costanigro, M., McCluskey, J.J. and Mittelhammer, R.C. (2007), “Segmenting the wine market based on price: Hedonic regression when different prices mean different products”, *Journal of Agricultural Economics*, Vol. 58 No. 3, pp. 454–466.
- Curtis, F. (2003), “Eco-localism and sustainability”, *Ecological Economics*, Vol. 46 No. 1, pp. 83–102.
- D’Amico, M., Di Vita, G., Chinnici, G., Pappalardo, G. and Pecorino, B. (2014), “Short food supply chain and locally produced wines: Factors affecting consumer behavior”, *Italian Journal of Food Science*, Vol. 26 No. 3, pp. 329–334.

- D'Amico, M., Di Vita, G. and Monaco, L. (2016), "Exploring environmental consciousness and consumer preferences for organic wines without sulfites", *Journal of Cleaner Production*, Vol. 120, pp. 64–71.
- De Pelsmacker, P., Driesen, L. and Rayp, G. (2005), "Do consumers care about ethics? Willingness to pay for fair-trade coffee", *Journal of consumer affairs*, Vol. 39 No. 2, pp. 363–385.
- Defrancesco, E., Estrella Orrego, J. and Gennari, A. (2012), "Would 'New World' wines benefit from protected geographical indications in international markets? The case of Argentinean Malbec", *Wine Economics and Policy*, Vol. 1 No. 1, pp. 63–72.
- Dejas, R. and Hofmann, U. (2013), "Ökologischer Weinbau – Markt und internationaler Handel", in IFOAM EU Group (Ed.), *EU Vorschriften für die ökologische Weinerzeugung: Hintergrund, Bewertung und Weiterentwicklung des Sektors*, IFOAM EU Group, Brüssel, pp. 42–43.
- Delmas, M.A. and Grant, L.E. (2008), "Eco-labeling strategies: The eco-premium puzzle in the wine industry", *American Association of Wine Economists, Working Papers No. 13*, available at: <http://purl.umn.edu/37325> (accessed 30 January 2017).
- Delmas, M.A. and Lessem, N. (2017), "Eco-premium or eco-penalty? Eco-labels and quality in the organic wine market", *Business & Society*, Vol. 56 No. 2, pp. 318–356.
- Dettmann, R.L. and Dimitri, C. (2009), "Who's buying organic vegetables? Demographic characteristics of U.S. consumers", *Journal of Food Products Marketing*, Vol. 16 No. 1, pp. 79–91.
- Drennan, J., Bianchi, C., Cacho-Elizondo, S., Louriero, S., Guibert, N. and Proud, W. (2015), "Examining the role of wine brand love on brand loyalty: A multi-country comparison", *International Journal of Hospitality Management*, Vol. 49, pp. 47–55.
- Drukker, D.M. (2002), "Bootstrapping a conditional moments test for normality after tobit estimation", *The Stata Journal*, Vol. 2 No. 2, pp. 125–139.
- Dunlap, R.E. and Van Liere, K.D. (1978), "The 'New Environmental Paradigm'", *The Journal of Environmental Education*, Vol. 9 No. 4, pp. 10–19.
- Dunlap, R.E., Van Liere, K.D., Mertig, A.G. and Jones, R.E. (2000), "Measuring endorsement of the New Ecological Paradigm: A revised NEP Scale", *Journal of Social Issues*, Vol. 56 No. 3, pp. 425–442.
- Durham, C.A., Pardoe, I. and Vega-H, E. (2004), "A methodology for evaluating how product characteristics impact choice in retail settings with many zero observations: An

- application to restaurant wine purchase”, *Journal of Agricultural and Resource Economics*, Vol. 29 No. 1, pp. 112–131.
- Einav, L., Leibtag, E. and Nevo, A. (2008), “On the Accuracy of Nielsen Homescan Data”, United States Department of Agriculture, Economic Research Report, No. 69.
- EU (2012), “Regulation (EU) No 1151/2012 of the European Parliament and of the Council of 21 November 2012 on quality schemes for agricultural products and foodstuffs”.
- EU Commission (2008), “Regulation (EU) No 889/2008 of 5 September 2008 laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007 on organic production and labelling of organic products with regard to organic production, labelling and control”.
- EU Commission (2012), “Regulation (EU) No 203/2012 of 8 March 2012 Amending Regulation (EC) No 889/2008 Laying Down Detailed Rules for the Implementation of Council Regulation (EC) No 834/2007, as Regards Detailed Rules on Organic Wine”.
- Eurobarometer (2013), “Attitudes of Europeans towards building the single market for green products: Flash Eurobarometer 367”, available at:
<http://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/ResultDoc/download/DocumentKy/60379/> (accessed 11 May 2017).
- Fairtrade Foundation (2016), “Fairtrade wine”, available at:
<http://www.fairtrade.org.uk/en/buying-fairtrade/wine> (accessed 17 March 2016).
- Feldmann, C. and Hamm, U. (2015), “Consumers’ perceptions and preferences for local food: A review”, *Food Quality and Preference*, Vol. 40, pp. 152–164.
- Fernqvist, F. and Ekelund, L. (2014), “Credence and the effect on consumer liking of food – A review”, *Food Quality and Preference*, Vol. 32, pp. 340–353.
- Fleuchaus, R. and Arnold, R.C.G. (2011), *Weinmarketing. Kundenwünsche erforschen, Zielgruppen identifizieren, innovative Produkte entwickeln*, Gabler, Wiesbaden.
- Fogarty, J. (2009), “The demand for beer, wine and spirits: A survey of the literature”, *Journal of Economic Surveys*, Vol. 16 No. 4, p. 531.
- Forbes, S.L., Cohen, D.A., Cullen, R., Wratten, S.D. and Fountain, J. (2009), “Consumer attitudes regarding environmentally sustainable wine: An exploratory study of the New Zealand marketplace”, *Journal of Cleaner Production*, Vol. 17 No. 13, pp. 1195–1199.
- Forbes, S.L. and DeSilva, T.-A. (2012), “Analysis of environmental management systems in New Zealand wineries”, *International Journal of Wine Business Research*, Vol. 24 No. 2, pp. 98–114.

- Foscht, T., Swoboda, B. and Schramm-Klein, H. (2017), *Käuferverhalten: Grundlagen – Perspektiven – Anwendungen*, 6th ed., Springer, Wiesbaden.
- Fotopoulos, C., Krystallis, A. and Ness, M. (2003), “Wine produced by organic grapes in Greece: using means-end chains analysis to reveal organic buyers' purchasing motives in comparison to the non-buyers”, *Food Quality and Preference*, Vol. 14 No. 7, pp. 549–566.
- Fourmouzi, V., Genius, M. and Midmore, P. (2012), “The demand for organic and conventional produce in London, UK. A system approach”, *Journal of Agricultural Economics*, Vol. 63 No. 3, pp. 677–693.
- Frostling-Henningson, M., Hedbom, M. and Wilandh, L. (2014), “Intentions to buy 'organic' not manifested in practice”, *British Food Journal*, Vol. 116 No. 5, pp. 872–887.
- Galati, A., Crescimanno, M., Tinervia, S. and Siggia, D. (2016), “Website quality and internal business factors: An empirical investigation in the Italian wine industry”, *International Journal of Wine Business Research*, Vol. 28 No. 4, pp. 308–326.
- Gallet, C.A. (2007), “The demand for alcohol: A meta-analysis of elasticities”, *The Australian Journal of Agricultural and Resource Economics*, Vol. 51 No. 2, pp. 121–135.
- Gassler, B. (2015), “How green is your ‘Grüner’? Millennial wine consumers’ preferences and willingness-to-pay for eco-labeled wine”, *Jahrbuch der Österreichischen Gesellschaft für Agrarökonomie*, Vol. 24, pp. 131–140.
- German Federal Statistical Office (2016), *Statistical Yearbook 2016*, Federal Statistical Office, Wiesbaden.
- German Wine Institute (DWI) (2016), “German Wine Statistics (Deutscher Wein Statistik). The Wine Market in 2015”, available at:
http://www.deutscheweine.de/fileadmin/user_upload/Website/Service/Downloads/Statistik_2016-2017-neu.pdf (accessed 12 January 2018).
- Ginon, E., Ares, G., Esteves dos Santos Laboissière, Lúcia Helena, Brouard, J., Issanchou, S. and Deliza, R. (2014), “Logos indicating environmental sustainability in wine production: An exploratory study on how do Burgundy wine consumers perceive them”, *Food Research International*, Vol. 62, pp. 837–845.
- Glaser, L.K. and Thompson, G.D. (2000), “Demand for organic and conventional beverage milk”, paper prepared for the Western Agricultural Economics Association Annual Meetings. Vancouver, British Columbia, June 29–July 1, 2000, available at:
<https://ageconsearch.umn.edu/bitstream/36346/1/sp00gl01.pdf> (accessed 19 December 2017).

- Gottschalk, I. and Leistner, T. (2013), "Consumer reactions to the availability of organic food in discount supermarkets", *International Journal of Consumer Studies*, Vol. 37 No. 2, pp. 136–142.
- Grebitus, C., Lusk, J.L. and Nayga, R.M. (2013), "Effect of distance of transportation on willingness to pay for food", *Ecological Economics*, Vol. 88, pp. 67–75.
- Guagnano, G.A., Stern, P.C. and Dietz, T. (1995), "Influences on attitude-behavior relationships. A natural experiment with curbside recycling", *Environment and Behavior*, Vol. 27 No. 5, pp. 699–718.
- Guerrero-López, C.M., Unar-Munguía, M. and Colchero, M.A. (2017), "Price elasticity of the demand for soft drinks, other sugar-sweetened beverages and energy dense food in Chile", *BMC public health*, Vol. 17 No. 1, p. 180.
- Gujarati, D.N. (2004), *Basic econometrics*, 4th ed., Tata McGraw-Hill, New York.
- Günther, M., Vossebein, U. and Wildner, R. (2006), *Marktforschung mit Panels: Arten Erhebung Analyse Anwendung*, 2nd ed., Gabler, Wiesbaden.
- Gustafson, C.R., Lybbert, T.J. and Sumner, D.A. (2016), "Consumer sorting and hedonic valuation of wine attributes: Exploiting data from a field experiment", *Agricultural Economics*, Vol. 47 No. 1, pp. 91–103.
- Halvorsen, R. and Palmquist, R. (1980), "The interpretation of dummy variables in semilogarithmic equations", *American Economic Review*, Vol. 70 No. 3, pp. 474–475.
- Hempel, C. and Hamm, U. (2016), "How important is local food to organic-minded consumers?", *Appetite*, Vol. 96, pp. 309–318.
- Hoang, V., Iida, T., Matsumoto, S., Watanabe, N. and Wilson, C. (2016), "Consumer's comparison between local and imported organic products: A hedonic analysis of the Japanese table wine market", *Eurasian Business Review*, Vol. 6 No. 3, pp. 405–415.
- Hoffmann, D. and Szolnoki, G. (2010), "Wie ticken die Verbraucher bei Bio?", *Weinwirtschaft*, No. 18, pp. 40–46.
- Hollebeek, L.D., Jaeger, S.R., Brodie, R.J. and Balemi, A. (2007), "The influence of involvement on purchase intention for new world wine", *Food Quality and Preference*, Vol. 18 No. 8, pp. 1033–1049.
- Hsiao, C. (2007), *Analysis of panel data*, Vol. 34, 28th ed., *Econometric Society monographs*. Cambridge Univ. Press, Cambridge [u.a.].
- Huang, C.L. and Lin, B.-H. (2007), "A hedonic analysis of fresh tomato prices among regional markets", *Review of Agricultural Economics*, Vol. 29 No. 4, pp. 783–800.

- International Organisation of Vine and Wine (OIV) (2017), “Weltkonjunkturbericht”, available at: <http://www.oiv.int/public/medias/5285/oiv-noteconjmars2017-de.pdf> (accessed 19 December 2017).
- Jaeger, S.R., Mielby, L.H., Heymann, H., Jia, Y. and Frøst, M.B. (2013), “Analysing conjoint data with OLS and PLS regression: A case study with wine”, *Journal of the Science of Food and Agriculture*, Vol. 93 No. 15, pp. 3682–3690.
- Janssen, M. (2018), “Determinants of organic food purchases: Evidence from household panel data”, *Food Quality and Preference*, Vol. 68, pp. 19–28.
- Janssen, M., Zander, K. and Hamm, U. (2012), “Präferenzen und Zahlungsbereitschaft deutscher Verbraucher bei Öko-Wein. Abschlussbericht zum gleichnamigen Forschungsprojekt im Rahmen des des Bundesprogramms ökologischer Landbau und anderer Formen nachhaltiger Landwirtschaft. Universität Kassel”, available at: <http://orgprints.org/20975/>.
- Jiang, H., Livingston, M., Room, R. and Callinan, S. (2016), “Price elasticity of on- and off-premises demand for alcoholic drinks: A Tobit analysis”, *Drug and Alcohol Dependence*, Vol. 163, pp. 222–228.
- Johnson, T. and Bastian, S.E.P. (2015), “A fine wine instrument – An alternative for segmenting the Australian wine market”, *International Journal of Wine Business Research*, Vol. 27 No. 3, pp. 182–202.
- Johnson, T. and Bruwer, J. (2003), “An empirical confirmation of wine-related lifestyle segments in the Australian wine market”, *International Journal of Wine Marketing*, Vol. 15 No. 1, pp. 5–33.
- Johnston, R., Stafford, J., Pierce, H. and Daube, M. (2017), “Alcohol promotions in Australian supermarket catalogues”, *Drug and Alcohol Review*, Vol. 36 No. 4, pp. 456–463.
- Jones, G. and Grandjean, E. (2017), “Creating the market for organic wine: Sulfites, certification, and green values”, Harvard Business School General Management Unit, Working Paper No. 18-048, pp. 1–59.
- Joshi, Y. and Rahman, Z. (2015), “Factors affecting green purchase behaviour and future research directions”, *International Strategic Management Review*, Vol. 3 No. 1-2, pp. 128–143.
- Kasteridis, P. and Yen, S.T. (2012), “U.S. demand for organic and conventional vegetables: Bayesian censored system approach”, *Australian Journal of Agricultural and Resource Economics*, Vol. 56 No. 3, pp. 405–425.

- Kesse-Guyot, E., Péneau, S., Méjean, C., Szabo de Edelenyi, F., Galan, P., Herberg, S. and Lairon, D. (2013), "Profiles of organic food consumers in a large sample of French adults: Results from the Nutrinet-Santé cohort study", *PloS one*, Vol. 8 No. 10, 1-13.
- Kim, H. and Bonn, M.A. (2015), "The moderating effects of overall and organic wine knowledge on consumer behavioral intention", *Scandinavian Journal of Hospitality and Tourism*, Vol. 15 No. 3, pp. 295–310.
- Klohr, B. (2017), *Einfluss von Nachhaltigkeitsaspekten auf die Kaufentscheidung deutscher Weinkonsumenten*, Internationale Reihe Agribusiness, Vol. 23, Cuvillier Verlag, Göttingen.
- Klohr, B., Fleuchaus, R. and Theuvsen, L. (2013), "Sustainability: Implementation programs and communication in the leading wine producing countries", paper prepared for the 7th International Conference of the AWBR, June 12–15, 2013, Ontario, Canada., available at: <http://academyofwinebusiness.com/wp-content/uploads/2013/04/Klohr-Fleuchaus-Theuvsen.pdf> (accessed 23 May 2016).
- Kneafsey, M., Venn, L., Schmutz, U., Balázs, B., Trenchard, L., Eyden-Wood, T., Bos, E., Sutton, G. and Blackett, M. (2013), *Short food supply chains and local food systems in the EU: A state of play of their socio-economic characteristics*, Publications Office of the European Union, Luxemburg.
- Kolyesnikova, N., Dodd, T.H. and Duhan, D.F. (2008), "Consumer attitudes towards local wines in an emerging region: A segmentation approach", *International Journal of Wine Business Research*, Vol. 20 No. 4, pp. 321–334.
- Kotler, P. and Keller, K.L. (2013), *Marketing management*, 14th ed., Pearson Prentice-Hall, Boston.
- Kotler, P., Keller, K.L., Brady, M., Goodman, M. and Hansen, T. (2016), *Marketing Management*, 3rd ed., Pearson, Harlow.
- Kroeber-Riel, W. and Gröppel-Klein, A. (2013), *Konsumentenverhalten*, 10th ed., Franz Vahlen, München.
- Kuß, A., Wildner, R. and Kreis, H. (2014), *Marktforschung*, 5th ed., Springer Fachmedien Wiesbaden, Wiesbaden.
- Kwong, L.M.K., Cyr, D., Kushner, J. and Ogwang, T. (2011), "A semiparametric hedonic pricing model of Ontario wines", *Canadian Journal of Agricultural Economics*, Vol. 59 No. 3, pp. 361–381.
- Ladd, G.W. and Suvannunt, V. (1976), "A model of consumer goods characteristics", *American Journal of Agricultural Economics*, Vol. 58 No. 3, pp. 504–510.

- Lancaster, K.J. (1966), "A new approach to consumer theory", *The journal of political economy*, Vol. 74 No. 2, pp. 132–157.
- Lernoud, J. and Willer, H. (2017a), "Current statistics on organic agriculture worldwide: Area, producers, markets, and selected crops", in Willer, H. and Lernoud, J. (Eds.), *The World of organic agriculture: Statistics and emerging trends 2017*, Research Institute of Organic Agriculture (FiBL), Frick, and IFOAM - Organics International, Frick and Bonn.
- Lernoud, J. and Willer, H. (2017b), "Land use and commodities in organic agriculture", in Willer, H. and Lernoud, J. (Eds.), *The World of organic agriculture: Statistics and emerging trends 2017*, Research Institute of Organic Agriculture (FiBL), Frick, and IFOAM - Organics International, Frick and Bonn, pp. 77–135.
- Lernoud, J. and Willer, H. (2018), "Current statistics on organic agriculture worldwide: Area, operators, and market", in Willer, H. and Lernoud, J. (Eds.), *The World of organic agriculture: Statistics and emerging trends 2018*, Research Institute of Organic Agriculture (FiBL), Frick, and IFOAM - Organics International, Frick and Bonn, pp. 34–125.
- Lesschaeve, I., Bowen, A. and Bruwer, J. (2012), "Determining the impact of consumer characteristics to project sensory preferences in commercial white wines", *American Journal of Enology and Viticulture*, Vol. 63 No. 4, pp. 487–493.
- Lin, B.-H., Smith, T.A. and Huang, C.L. (2008), "Organic premiums of US fresh produce", *Renewable Agriculture and Food Systems*, Vol. 23 No. 3, pp. 208–216.
- Lin, B.-H., Yen, S.T., Huang, C.L. and Smith, T.A. (2009), "U.S. demand for organic and conventional fresh fruits: The roles of income and price", *Sustainability*, Vol. 1 No. 3, pp. 464–478.
- Lockshin, L. and Corsi, A.M. (2012), "Consumer behaviour for wine 2.0: A review since 2003 and future directions", *Wine Economics and Policy*, Vol. 1 No. 1, pp. 2–23.
- Lockshin, L. and Hall, J. (2003), "Consumer purchasing behaviour for wine: What we know and where we are going", proceedings of the International Wine Marketing Colloquium. Adelaide, Australia, Juli 2013, available at: <http://academyofwinebusiness.com/wp-content/uploads/2010/05/File-030.pdf> (accessed 20 June 2016).
- Lockshin, L., Jarvis, W., d'Hauteville, F. and Perrouy, J.-P. (2006), "Using simulations from discrete choice experiments to measure consumer sensitivity to brand, region, price, and awards in wine choice", *Food Quality and Preference*, Vol. 17 No. 3–4, pp. 166–178.
- Lockshin, L., Quester, P. and Spawton, T. (2001), "Segmentation by involvement or nationality for global retailing: a cross-national comparative study of wine shopping behaviours", *Journal of Wine Research*, Vol. 12 No. 3, pp. 223–236.

- Long, M.A. and Murray, D.L. (2013), "Ethical consumption, values convergence/divergence and community development", *Journal of Agricultural and Environmental Ethics*, Vol. 26 No. 2, pp. 351–375.
- Lopez, E. and Lopez, R.A. (2009), "Demand for differentiated milk products: Implications for price competition", *Agribusiness*, Vol. 25 No. 4, pp. 453–465.
- Loureiro, M.L. (2003), "Rethinking new wines: Implications of local and environmentally friendly labels", *Food Policy*, Vol. 28 No. 5–6, pp. 547–560.
- Ludbrook, A., Holmes, J. and Stockwell, T. (2014), "Gender differences in alcohol demand: A systematic review of the role of prices and taxes. Comment on conclusions by Nelson", *Health Economics*, Vol. 23 No. 10, pp. 1281–1283.
- Lynn, J. (2004), "Demand for domestic and imported table wine in British Columbia: A source-differentiated almost ideal demand system approach", *Canadian Journal of Agricultural Economics*, No. 52, pp. 183–199.
- Maddala, G.S. (1991), "A perspective on the use of limited-dependent and qualitative variables models in accounting research", *The Accounting Review*, Vol. 66 No. 4, pp. 788–807.
- Malasevska, I. and Haugom, E. (2018), "Optimal prices for alpine ski passes", *Tourism Management*, Vol. 64, pp. 291–302.
- Mann, S., Ferjani, A. and Reissig, L. (2012), "What matters to consumers of organic wine?", *British Food Journal*, Vol. 114 No. 2, pp. 272–284.
- Manning, K.C., Sprott, D.E. and Miyazaki, A.D. (2003), "Unit price usage knowledge", *Journal of Business Research*, Vol. 56 No. 5, pp. 367–377.
- Marian, L., Chrysochou, P., Krystallis, A. and Thøgersen, J. (2014), "The role of price as a product attribute in the organic food context: An exploration based on actual purchase data", *Food Quality and Preference*, Vol. 37, pp. 52–60.
- Mariani, A. and Vastola, A. (2015), "Sustainable winegrowing: Current perspectives", *International Journal of Wine Research*, Vol. 7, pp. 37–48.
- Martínez-Carrasco, L., Brugarolas, M., Martínez-Poveda, A. and Ruiz-Martínez, J.J. (2015), "Comparing hypothetical versus non-hypothetical methods for measuring willingness to pay in a food context", *Spanish Journal of Agricultural Research*, Vol. 13 No. 4, pp. 1–12.
- Meng, Y., Brennan, A., Purshouse, R., Hill-McManus, D., Angus, C., Holmes, J. and Meier, P.S. (2014), "Estimation of own and cross price elasticities of alcohol demand in the UK – A pseudo-panel approach using the Living Costs and Food Survey 2001–2009", *Journal of Health Economics*, Vol. 34, pp. 96–103.

- Miller, K.M., Hofstetter, R., Krohmer, H. and Zhang, Z.J. (2011), "How should consumers' willingness to pay be measured? An empirical comparison of state-of-the-art approaches", *Journal of Marketing Research*, Vol. 48 No. 1, pp. 172–184.
- Mitchell, V.-W., Lennard, D. and McGoldrick, P. (2003), "Consumer awareness, understanding and usage of unit pricing", *British Journal of Management*, Vol. 14 No. 2, pp. 173–187.
- Mizdrak, A., Scarborough, P., Waterlander, W.E. and Rayner, M. (2015), "Differential responses to food price changes by personal characteristic: A systematic review of experimental studies", *PloS one*, Vol. 10 No. 7, 1-19.
- Monier, S., Hassan, D., Nichèle, V. and Simion, M. (2009), "Organic food consumption patterns", *Journal of Agricultural and Food Industrial Organization*, Vol. 7 No. 2, pp. 1–25.
- Moser, A.K. (2016), "Consumers' purchasing decisions regarding environmentally friendly products. An empirical analysis of German consumers", *Journal of Retailing and Consumer Services*, Vol. 31, pp. 389–397.
- Mueller, S., Lockshin, L., Saltman, Y. and Blanford, J. (2010a), "Message on a bottle: The relative influence of wine back label information on wine choice", *Food Quality and Preference*, Vol. 21 No. 1, pp. 22–32.
- Mueller, S., Osidacz, P., Francis, I.L. and Lockshin, L. (2010b), "Combining discrete choice and informed sensory testing in a two-stage process. Can it predict wine market share?", *Food Quality and Preference*, Vol. 21 No. 7, pp. 741–754.
- Mueller, S. and Szolnoki, G. (2010), "The relative influence of packaging, labelling, branding and sensory attributes on liking and purchase intent: Consumers differ in their responsiveness", *Food Quality and Preference*, Vol. 21 No. 7, pp. 774–783.
- Mueller Loose, S. and Lockshin, L. (2013), "Testing the robustness of best worst scaling for cross-national segmentation with different numbers of choice sets", *Food Quality and Preference*, Vol. 27 No. 2, pp. 230–242.
- Mueller Loose, S. and Remaud, H. (2013), "Impact of corporate social responsibility claims on consumer food choice: A cross-cultural comparison", *British Food Journal*, Vol. 115 No. 1, pp. 142–166.
- Mueller Loose, S. and Szolnoki, G. (2012), "Market price differentials for food packaging characteristics", *Food Quality and Preference*, Vol. 25 No. 2, pp. 171–182.

- Natarajan, T., Balasubramanian, S.A. and Kasilingam, D.L. (2017), "Understanding the intention to use mobile shopping applications and its influence on price sensitivity", *Journal of Retailing and Consumer Services*, Vol. 37, pp. 8–22.
- Ngobo, P.V. (2011), "What drives household choice of organic products in grocery stores?", *Journal of Retailing*, Vol. 87 No. 1, pp. 90–100.
- Nuttavuthisit, K. and Thøgersen, J. (2017), "The importance of consumer trust for the emergence of a market for green products: The case of organic food", *Journal of Business Ethics*, Vol. 140 No. 2, pp. 323–337.
- O'Donovan, P. and McCarthy, M. (2002), "Irish consumer preference for organic meat", *British Food Journal*, Vol. 104 No. 3/4/5, pp. 353–370.
- Oczkowski, E. and Doucouliagos, H. (2014), "Wine prices and quality ratings: A meta-regression analysis", *American Journal of Agricultural Economics*, Vol. 97 No. 1, pp. 103–121.
- OIV International Organisation of Vine and Wine (2015), "World Vitiviniculture situation", available at: <http://www.oiv.int/public/medias/2777/report-mainz-congress-2015-oiv-en-7.pdf> (accessed 18 April 2016).
- Olsen, J., Thach, L. and Hemphill, L. (2012), "The impact of environmental protection and hedonistic values on organic wine purchases in the US", *International Journal of Wine Business Research*, Vol. 24 No. 1, pp. 47–67.
- Olsen, J., Thach, L. and Nowak, L. (2007), "Wine for my generation: Exploring how US wine consumers are socialized to wine", *Journal of Wine Research*, Vol. 18 No. 1, pp. 1–18.
- Orth, U.R. (2005), "Consumer personality and other factors in situational brand choice variation", *Journal of Brand Management*, Vol. 13 No. 2, pp. 115–133.
- Orth, U.R. and Krška, P. (2001), "Quality signals in wine marketing: The role of exhibition awards", *The International Food and Agribusiness Management Review*, Vol. 4 No. 4, pp. 385–397.
- Padel, S. and Foster, C. (2005), "Exploring the gap between attitudes and behaviour: Understanding why consumers buy or do not buy organic food", *British Food Journal*, Vol. 107 No. 8, pp. 606–625.
- Padilla Bravo, C., Cordts, A., Schulze, B. and Spiller, A. (2013), "Assessing determinants of organic food consumption using data from the German National Nutrition Survey II", *Food Quality and Preference*, Vol. 28 No. 1, pp. 60–70.

- Pagliarini, E., Laureati, M. and Gaeta, D. (2013), "Sensory descriptors, hedonic perception and consumer's attitudes to Sangiovese red wine deriving from organically and conventionally grown grapes", *Frontiers in Psychology*, Vol. 4, pp. 1–7.
- Palma, D., Ortúzar, J.d.D., Rizzi, L.I., Guevara, C.A., Casaubon, G. and Ma, H. (2016), "Modelling choice when price is a cue for quality: A case study with Chinese consumers", *Journal of Choice Modelling*, Vol. 19, pp. 24–39.
- Panzone, L.A. (2014), "Why are discounted prices presented with full prices? The role of external price information on consumers' likelihood to purchase", *Food Quality and Preference*, Vol. 31, pp. 69–80.
- Papke, L.E. and Wooldridge, J.M. (1996), "Econometric methods for fractional response variables with an application to 401 (K) plan participation rates", *Journal of Applied Econometrics*, Vol. 11, pp. 619–632.
- Pearson, D., Henryks, J. and Jones, H. (2011), "Organic food: What we know (and do not know) about consumers", *Renewable Agriculture and Food Systems*, Vol. 26 No. 2, pp. 171–177.
- Plassmann, H., O'Doherty, J., Shiv, B. and Rangel, A. (2008), "Marketing actions can modulate neural representations of experienced pleasantness", *Proceedings of the National Academy of Sciences*, Vol. 105 No. 3, pp. 1050–1054.
- Pomarici, E., Amato, M. and Vecchio, R. (2016), "Environmental friendly wines: A consumer segmentation study", *Agriculture and Agricultural Science Procedia*, Vol. 8, pp. 534–541.
- Pomarici, E. and Vecchio, R. (2014), "Millennial generation attitudes to sustainable wine: An exploratory study on Italian consumers", *Journal of Cleaner Production*, Vol. 66, pp. 537–545.
- Rahman, I. and Reynolds, D. (2017), "Organic wine: The influence of biospheric, altruistic, and egoistic values on purchase intention, willingness to pay more, and willingness to sacrifice", *International Journal of Hospitality Beverage Management*, Vol. 1 No. 1, pp. 1–47.
- Rahman, I., Stumpf, T. and Reynolds, D. (2014), "A comparison of the influence of purchaser attitudes and product attributes on organic wine preferences", *Cornell Hospitality Quarterly*, Vol. 55 No. 1, pp. 127–134.
- Ramalho, E.A., Ramalho, J.J.S. and Murteira, J.M.R. (2011), "Alternative estimating and testing empirical strategies for fractional regression models", *Journal of Economic Surveys*, Vol. 25 No. 1, pp. 19–68.

- Ramalho, E.A., Ramalho, J.J.S. and Murteira, J.M.R. (2014), "A generalized goodness-of-functional form test for binary and fractional regression models", *The Manchester School*, Vol. 82 No. 4, pp. 488–507.
- Ritchie, C., Elliott, G. and Flynn, M. (2010), "Buying wine on promotion is trading-up in UK supermarkets", *International Journal of Wine Business Research*, Vol. 22 No. 2, pp. 102–121.
- Rödiger, M. and Hamm, U. (2015), "How are organic food prices affecting consumer behaviour? A review", *Food Quality and Preference*, Vol. 43, pp. 10–20.
- Rojas-Méndez, J.I., Le Nestour, M. and Rod, M. (2014), "Understanding Attitude and Behavior of Canadian Consumers Toward Organic Wine", *Journal of Food Products Marketing*, Vol. 21 No. 4, pp. 375–396.
- Rosen, S. (1974), "Hedonic prices and implicit markets: Product differentiation in pure competition", *Journal of Political Economy*, Vol. 82 No. 1, pp. 34–55.
- Sáenz-Navajas, M.-P., Campo, E., Sutan, A., Ballester, J. and Valentin, D. (2013), "Perception of wine quality according to extrinsic cues: The case of Burgundy wine consumers", *Food Quality and Preference*, Vol. 27 No. 1, pp. 44–53.
- Sahota, A. (2018), "The global market for organic food & drink", in Willer, H. and Lernoud, J. (Eds.), *The World of organic agriculture: Statistics and emerging trends 2018*, Research Institute of Organic Agriculture (FiBL), Frick, and IFOAM - Organics International, Frick and Bonn, pp. 138–142.
- Scalco, A., Noventa, S., Sartori, R. and Ceschi, A. (2017), "Predicting organic food consumption: A meta-analytic structural equation model based on the theory of planned behavior", *Appetite*, Vol. 112, pp. 235–248.
- Schäufele, I. and Hamm, U. (2017), "Consumers' perceptions, preferences and willingness-to-pay for wine with sustainability characteristics: A review", *Journal of Cleaner Production*, Vol. 147, pp. 379–394.
- Schäufele, I., Herrmann, R. and Szolnoki, G. (2016), "Erzielen Weine mit höherer Qualität höhere Preise? Eine hedonische Preisanalyse zur DLG-Bundesweinprämierung (Do high-quality wines capture higher prices? A hedonic price analysis on DLG quality tests)", *German Journal of Agricultural Economics*, Vol. 65 No. 2, pp. 132–150.
- Schiffman, L.G., Kanuk, L.L. and Wisenblit, J. (2010), *Consumer behavior*, 10th ed., Pearson Prentice Hall, Upper Saddle River, New Jersey.

- Schmidt, L., Skvortsova, V., Kullen, C., Weber, B. and Plassmann, H. (2017), "How context alters value. The brain's valuation and affective regulation system link price cues to experienced taste pleasantness", *Scientific Reports*, Vol. 7 No. 1, p. 8098.
- Schmit, T.M., Rickard, B.J. and Taber, J. (2013), "Consumer valuation of environmentally friendly production practices in wines, considering asymmetric information and sensory effects", *Journal of Agricultural Economics*, Vol. 64 No. 2, pp. 483–504.
- Schröck, R. (2012), "The organic milk market in Germany is maturing: A demand system analysis of organic and conventional fresh milk segmented by consumer groups", *Agribusiness*, Vol. 28 No. 3, pp. 274–292.
- Schröck, R. (2013), "Quality and endogeneity issues in demand systems: A comparative estimation of price and expenditure elasticities of the demand for organic and conventional vegetables in Germany", *German Journal of Agricultural Economics*, Vol. 62 No. 1, pp. 18–38.
- Schwartz, S.H. (1977), "Normative influences on altruism", *Advances in Experimental Social Psychology*, Vol. 10, pp. 221–279.
- Schwartz, S.H. (1994), "Are there universal aspects in the structure and contents of human values?", *Journal of Social Issues*, Vol. 50 No. 4, pp. 19–45.
- Schwiebert, J. and Wagner, J. (2015), "A generalized two-part model for fractional response variables with excess zeros", *Beiträge zur Jahrestagung des Vereins für Socialpolitik 2015: Ökonomische Entwicklung - Theorie und Politik - Session: Microeconometrics*, No. B04-V2.
- Sellers, R. (2016), "Would you pay a price premium for a sustainable wine? The voice of the Spanish consumer", *Agriculture and Agricultural Science Procedia*, Vol. 8, pp. 10–16.
- Sharma, A., Sinha, K. and Vandenberg, B. (2017), "Pricing as a means of controlling alcohol consumption", *British Medical Bulletin*, Vol. 123 No. 1, pp. 149–158.
- Smith, T.A., Huang, C.L. and Lin, B.-H. (2009a), "Does price or income affect organic choice? Analysis of U.S. fresh produce users", *Journal of Agricultural and Applied Economics*, Vol. 41 No. 3, pp. 731–744.
- Smith, T.A., Huang, C.L. and Lin, B.-H. (2009b), "Estimating organic premiums in the US fluid milk market", *Renewable Agriculture and Food Systems*, Vol. 24 No. 3, pp. 197–204.
- Smithson, M. and Merkle, E.C. (2014), *Generalized linear models for categorical and continuous limited dependent variables: Statistics in the social and behavioral sciences series*, CRC Press, Boca Raton, Florida, USA.

- Sogari, G., Corbo, C., Macconi, M., Menozzi, D. and Mora, C. (2015), "Consumer attitude towards sustainable-labelled wine: An exploratory approach", *International Journal of Wine Business Research*, Vol. 27 No. 4, pp. 312–328.
- Sogari, G., Mora, C. and Menozzi, D. (2016), "Factors driving sustainable choice: The case of wine", *British Food Journal*, Vol. 118 No. 3, pp. 632–646.
- Solomon, M. (2015), *Consumer behavior: Buying, having, and being*, 11th ed., Pearson, Harlow.
- Soosay, C., Fearne, A. and Dent, B. (2012), "Sustainable value chain analysis – A case study of Oxford Landing from 'vine to dine'", *Supply Chain Management: An International Journal*, Vol. 17 No. 1, pp. 68–77.
- Sridhar, K., Bezawada, R. and Trivedi, M. (2012), "Investigating the drivers of consumer cross-category learning for new products using multiple data sets", *Marketing Science*, Vol. 31 No. 4, pp. 668–688.
- Steg, L. and Vlek, C. (2009), "Encouraging pro-environmental behaviour: An integrative review and research agenda", *Journal of Environmental Psychology*, Vol. 29 No. 3, pp. 309–317.
- Stern, P.C. (2000), "New environmental theories: Toward a coherent theory of environmentally significant behavior", *Journal of Social Issues*, Vol. 56 No. 3, pp. 407–424.
- Stern, P.C., Dietz, T., Abel, T.D., Guagnano, G.A. and Kalof, L. (1999), "A value-belief-norm theory of support for social movements: The case of environmentalism", *Human Ecology Review*, Vol. 6 No. 2, pp. 81–97.
- Stern, P.C., Kalof, L., Dietz, T. and Guagnano, G.A. (1995), "Values, beliefs, and proenvironmental action: Attitude formation toward emergent attitude objects", *Journal of Applied Social Psychology*, Vol. 25 No. 18, pp. 1611–1636.
- Stolz, H. and Schmid, O. (2008), "Consumer attitudes and expectations of organic wine", paper prepared for the 16th IFOAM Organic World Congress. Modena, Italy, June 16–20, 2008, available at: <http://orgprints.org/13974/> (accessed 24 August 2016).
- Strange, T. and Bayley, A. (2008), *OECD Insights: Sustainable development: Linking economy, society, environment*, OECD Publishing, Paris.
- Szolnoki, G. (2013), "A cross-national comparison of sustainability in the wine industry", *Journal of Cleaner Production*, Vol. 53, pp. 243–251.

- Szolnoki, G. and Hoffmann, D. (2014), "Consumer segmentation based on usage of sales channels in the German wine market", *International Journal of Wine Business Research*, Vol. 26 No. 1, pp. 27–44.
- Szolnoki, G. and Pabst, E. (2017), "Wer kauft "Bio"?", *Der deutsche Weinbau*, No. 12, pp. 34–38.
- Thach, E.C. and Olsen, J. (2004), "The search for new wine consumers: Marketing focus on consumer lifestyle or lifecycle", *International Journal of Wine Marketing*, Vol. 16 No. 3, pp. 44–57.
- Thach, E.C. and Olsen, J. (2006), "Market segment analysis to target young adult wine drinkers", *Agribusiness*, Vol. 22 No. 3, pp. 307–322.
- Thilmany, D., Bond, C.A. and Bond, J.K. (2008), "Going local: Exploring consumer behavior and motivations for direct food purchases", *American Journal of Agricultural Economics*, Vol. 90 No. 5, 1303–1309.
- Thomas, A. and Pickering, G. (2003), "Behavioural segmentation: A New Zealand wine market application", *Journal of Wine Research*, Vol. 14 No. 2-3, pp. 127–138.
- Tsourgiannis, L., Karasavvoglou, A. and Nikolaidis, M. (2013), "Exploring consumers' purchasing behaviour regarding organic wine in a convergence E.U. region: The case of east Macedonia and Thrace, Greece", in Karasavvoglou, A. and Polychronidou, P. (Eds.), *Balkan and eastern European countries in the midst of the global economic crisis: Contributions to economics*, Physica-Verlag HD, Heidelberg, pp. 133–155.
- Tsourgiannis, L., Loizou, E., Karasavvoglou, A., Tsourgiannis, C.A. and Florou, G. (2015), "Consumers' purchasing behaviour patterns regarding organic wine in a southern E.U. country", proceedings of the 7th International Conference on Information and Communication Technologies in Agriculture, Food and Environment (HAICTA).
- United States Department of Agriculture (2000), "National Organic Program", Title 7. Part 205. 65 FR 80637, Dec 21, 2000.
- Van Doorn, J. and Verhoef, P.C. (2015), "Drivers of and barriers to organic purchase behavior", *Journal of Retailing*, Vol. 91 No. 3, pp. 436–450.
- Van Tonder, E.M. and Mulder, D. (2015), "Marketing communication for organic wine: Semiotic guidelines for wine bottle front labels", *Communicatio: South African Journal for Communication Theory and Research*, Vol. 41 No. 1, pp. 131–151.
- Veale, R. (2008), "Sensing or knowing?", *International Journal of Wine Business Research*, Vol. 20 No. 4, pp. 352–366.

- Vecchio, R. (2013), "Determinants of willingness-to-pay for sustainable wine: Evidence from experimental auctions", *Wine Economics and Policy*, Vol. 2 No. 2, pp. 85–92.
- Verbeek, M. (2012), *A guide to modern econometrics*, 4th ed., Wiley, Chichester.
- Wagenaar, A.C., Salois, M.J. and Komro, K.A. (2009), "Effects of beverage alcohol price and tax levels on drinking. A meta-analysis of 1003 estimates from 112 studies", *Addiction*, Vol. 104 No. 2, pp. 179–190.
- Waldrop, M.E., McCluskey, J.J. and Mittelhammer, R.C. (2017), "Products with multiple certifications: Insights from the US wine market", *European Review of Agricultural Economics*, Vol. 44 No. 4, pp. 658–682.
- Wegmann, A.L. (2015), "Generation Y trinkt Bio: Was erwartet sie?", *Der deutsche Weinbau*, No. 9, pp. 24–26.
- White, H. (1980), "A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity", *Econometrica: Journal of the Econometric Society*, pp. 817–838.
- Wiedmann, K.-P., Hennigs, N., Behrens, S.H. and Klarmann, C. (2014), "Tasting green: An experimental design for investigating consumer perception of organic wine", *British Food Journal*, Vol. 116 No. 2, pp. 197–211.
- Wier, M., O'Doherty Jensen, K., Andersen, L.M. and Millock, K. (2008), "The character of demand in mature organic food markets: Great Britain and Denmark compared", *Food Policy*, Vol. 33 No. 5, pp. 406–421.
- Willer, H. (2014), "Update on organic viticulture in Europe", Vortrag at: IFOAM Organic World Congress 2014, Istanbul, Turkey, 13-15 October 2014, available at: <http://orgprints.org/23692/>.
- Willer, H., Schaack, D. and Lernoud, J. (2017), "Organic farming and market development in Europe and the European Union", in Willer, H. and Lernoud, J. (Eds.), *The World of organic agriculture: Statistics and emerging trends 2017*, Research Institute of Organic Agriculture (FiBL), Frick, and IFOAM - Organics International, Frick and Bonn.
- Woods, T.A., Nogueira, L. and Yang, S.-H. (2013), "Linking wine consumers to the consumption of local wines and winery visits in the Northern Appalachian States", *International Food and Agribusiness Management Review*, Vol. 16 No. 4, pp. 181–205.
- Wooldridge, J. (2013), *Introductory econometrics a modern approach*, 5th ed., South-Western, Melbourne.
- Wrenn, B., Stevens, R. and Loudon, D. (2002), *Marketing Research*, Haworth Press, Binghamton.

- Yang, Y. and Paladino, A. (2015), "The case of wine: Understanding Chinese gift-giving behavior", *Marketing Letters*, Vol. 26 No. 3, pp. 335–361.
- Zepeda, L. and Deal, D. (2009), "Organic and local food consumer behaviour: Alphabet Theory", *International Journal of Consumer Studies*, Vol. 33 No. 6, pp. 697–705.
- Zhang, F., Epperson, J.E., Huang, C.L. and Houston, J.E. (2009), "Organic price premiums paid for fresh tomatoes and apples by US households: Evidence from Nielsen Homescan Data", *Journal of Food Distribution Research*, Vol. 40 No. 3, pp. 105–114.
- Zhang, F., Huang, C.L., Lin, B.-H., Epperson, J.E. and Houston, J.E. (2011), "National demand for fresh organic and conventional vegetables: Scanner data evidence", *Journal of Food Products Marketing*, Vol. 17 No. 4, pp. 441–458.
- Zikmund, W.G., Babin, B.J., Carr, J.C. and Griffin, M. (2009), *Business research methods*, 8th ed., Cengage Learning, USA.