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## How wine is really purchased? A systematic multi-country, multi-panel analysis

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### Abstract

It is often believed that the way consumers purchase wine differs from the way they purchase other fast-moving consumer goods (FMCG). This review tests this claim by summarising over 15 years of investigation of actual consumer purchases of wine in Australia, Belgium, Italy, Germany, France, the UK and the US, in both the off-trade and online markets. The observed levels of penetration and purchase frequencies are benchmarked against the respective theoretical values one would expect to find in a perfect Dirichlet world. The results disprove the common belief and provide academics and brand managers with a series of evidence-based implications, which they can use to develop efficient marketing strategies.

### Highlights

- Wine purchases are not that different from other FMCG purchases.
- Wine purchase behaviours are consistent across countries.
- Online wine purchases follow the same patterns as brick-and-mortar purchases.
- The Dirichlet model helps managers develop evidence-based marketing strategies.

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## Introduction

Wine is consumed almost worldwide [1], and although overall volumes have been decreasing, the overall value is on the rise [2]. So far, the vast majority of research on wine focuses on the attitudes and preferences consumers have towards it, rather than on their actual behaviour. Behaviours are important, though, as they are the drivers of attitudes, rather than the other way around [3]. In addition, previous purchases are more strongly associated to loyalty (measured as repurchase probability), whereas attitudes are more predictive of recommendations and positive word-of-mouth, but poorly related to loyalty [4].

This paper summarises over 15 years of investigation into consumer behaviour in regard to wine in Australia, Belgium, Italy, Germany, France, the UK and the US, in both off-trade and online markets. We present cases relative to France, Belgium and Germany, as examples. The purchase patterns exemplified in these cases also apply to other markets. We, therefore, invite readers to browse through the literature we present below, should they be interested in other country-specific cases.

This analysis of consumer behaviour is carried out using a well-known technique: the Dirichlet Model. This model is a comprehensive stochastic preference model, and it is used to describe the competition of multiple alternatives within a category. It is now recognised as one of the most well-established empirical generalisations in marketing [5; 6; 7; 8].

The results of these studies help to explain how consumers ‘really’ purchase wine – not what they state they do – and how brands perform in this industry. This lays a solid foundation of knowledge about this product category in a variety of research fields—from health to social marketing and from brand to store management. In addition, a systematic understanding of wine purchase behaviours gives wine professionals a better and more realistic understanding of how to design marketing interventions to generate behaviour modifications.

## Literature Review

Purchase data can be analysed with either scanner data or panel data, but we want to focus, in this manuscript, on panel data only, because of the richness of information they provide [9].

The first paper on wine loyalty that used wine purchase data was published in 2003 [10]. The study utilised a database of 38,514 purchases, created from a sample of 1,092 Australian consumers in the year 1999–2000. The authors adopted a Dirichlet model to show that while niche positioning typically occurs very rarely in numerous markets, it is more frequently observed in the wine industry, in which small wine brands can show excessively high purchase frequencies among their smaller customer bases. In addition, the Dirichlet model demonstrates that Australians are indeed loyal to brands, but a well-known region of origin stimulates loyalty even more reliably than a brand [10]. In the following years, the research of Jarvis and Goodman [11] and Cohen et al. [12] deepened these concepts. Jarvis and Goodman [11] analysed purchase data in the Australian wine market

over a population of 4,000 wine shoppers, in a 12-month period. By applying the same methodology used by Jarvis et al. [10] to the analysis of loyalty towards price ranges, results showed that niche and change-of-pace situations are prevalent in the wine market and that wines below AUD 7.50 and above AUD 17.50 stimulate the highest levels of loyalty. Cohen et al. [12] showed that Chardonnay is the only grape variety with excess loyalty in Australia, while both red and white cask wines demonstrate a niching behaviour.

Most recently, Trinh et al. [13] proposed an alternative approach to the usual cognitive investigation of wine purchasing behaviour using Dirichlet modelling. The analysis involved two large datasets of wine purchases in the UK, relative to the year 2006–2007, showing that the way UK consumers purchase wine follows the same patterns seen with many other fast-moving consumer goods (FMCG). Lastly, Wilson and Winchester [14] analysed the purchase of 25,000 loyalty-card-holding customers of an English-speaking, European, independent wine retail chain relative to the year 2014. Once again, the results showed that consumer purchase behaviour of the top-20 wine brands could have been largely predicted by the Dirichlet modelling paradigm, although a small number of exceptions exist.

As one can see, there has been a considerable attention in the literature about the analysis of wine purchases by product attributes using the Dirichlet model. However, each of these articles focus on just one market, and/or one or more product attribute(s). This literature review summaries under one cohesive roof the most important papers one should read to approach the topic.

## Methodology & Samples

Following many years of investigation into, and observations of, buyers' real purchase behaviour surrounding goods, Goodhardt et al. [15] proposed the Dirichlet model of repeat purchase behaviour. The Dirichlet model demonstrates the existence of recurrent patterns in the way people purchase goods, based on four major assumptions: (a) people buy very infrequently, (b) people buy *as if* randomly, (c) people are multi-brand buyers and (d) people have different preferences [14]. Showing that a market behaves according to the Dirichlet model is extremely useful, as one can easily predict the trends that will happen in the market [3].

Kearns (16) developed an Excel-based macro to perform Dirichlet analysis and Bound [17] provided a user-friendly guide to the macro, explaining what the macro is and does. Due to space limitations, we recommend those interested in the mechanics of the macro to read Bound [17]. In brief, to use the macro, one needs to input the following parameters:

- the category penetration;
- the category purchase frequency;
- the penetration for each category's brand;
- the purchase frequency for each category's brand.

Dirichlet analysis is generally conducted on the brands that people purchase. However, when consumers purchase wine, they often look at product attributes, like country of origin, region of origin, grape variety and price, in the same way they look at brands [18].

Therefore, while the vast majority of Dirichlet analyses have identified brands as the object of investigation, product attributes are used in lieu of brands when it comes to wine.

After the user supplies these parameters to the Excel-based macro, the Dirichlet software returns the ideal penetration and purchase frequency for each brand/product attribute in an ideal Dirichlet-type market. At this point, one needs to compare the observed penetrations and purchase frequencies with the theoretical penetrations and purchase frequencies, according to the procedures and benchmark suggested by Driesener et al. [19]. From a more qualitative perspective, if one sees no patterns in the deviation between theoretical and observed values, and the mean absolute deviation is small, one can say that the market under investigation is indeed a Dirichlet-type market. If that is the case, one can also be sure that four main phenomena will occur in the market: double jeopardy law, duplication of purchase law, loyalty does not vary much between brands, and niche and change-of-pace brands are hard to find [3].

In this paper, we show the results of a Dirichlet analysis on wine purchases recorded in France, Belgium and Germany, in relation to country of origin and region of origin purchases. We show how close or far the theoretical values are to the observed values—revealing whether wine purchases behave according to the Dirichlet model.

One of the largest French retail chains provided a database of wine purchases, which we used. The dataset included over 400,000 customers, who purchased over six million bottles of wine, across eight hypermarkets or supermarkets in the year 2010. The supermarkets are equally spaced across four geographic areas: the north, south, east and west of France. In Belgium, two types of dataset were used: real wine purchase data from two brick-and-mortar stores (using customer loyalty card data) and the website orders of the same major retail chain. A few differences can be observed between offline and online wine purchases. People buying wine online buy a minimum of six bottles and the number of stock keeping units (SKUs) available for purchase is higher online (about 1500 SKUs) vs. offline (about 900 SKUs). The buyer base includes 19,770 wine buyers in the brick-and-mortar stores vs. 8,376 wine buyers online. The period of analysis was from August 2014 to July 2015. In Germany, data came from a large online retailer that owns several wine shops across Europe. The dataset is from 2014, during which more than 154,000 transactions were made by 22,000 customers.

## Results

For each market, we present a chart that links the penetration rate (in percentage) and the purchase frequency (in number of bottles). If the markets under investigation are Dirichlet-like, we should find a positive relationship between the two variables. The greater the penetration rate, the greater the frequency of purchase. In addition, in a Dirichlet-like market, the observed values will not differ much from the theoretical ones.

In France, the Bordeaux wine region is the biggest region of origin purchased, with a 55% of penetration rate (percentage of shoppers who actually bought wine from the Bordeaux region), and 4.6 bottles purchased, on average, per buyer. Conversely, Jura-Savoy are the

smallest wine regions, with a 3.9% of penetration rate and 1.5 bottles purchased, on average, during 2010 (see

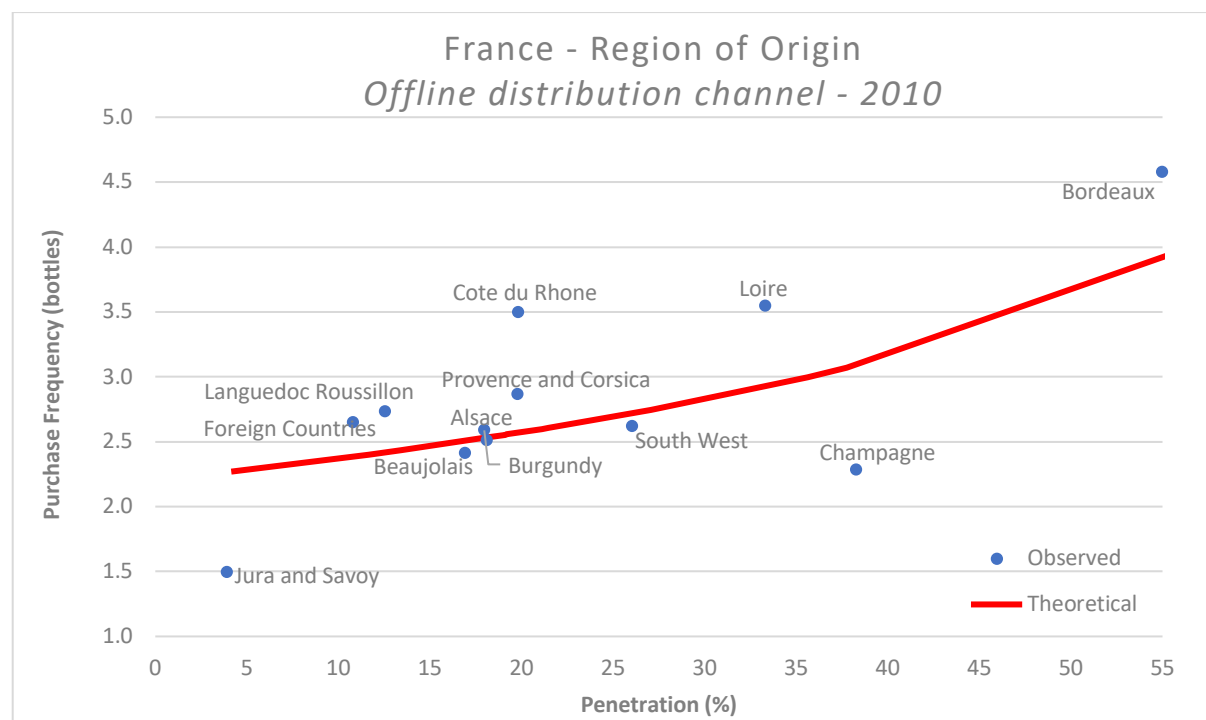
Figure 1).

Figure 1 also shows a positive relationship between the penetration rate and the purchase frequency. The greater the penetration, the greater the purchase frequency. However, the deviation in purchase frequency is smaller than the penetration rate.

Comparing the observed data with data generated by the Dirichlet model, we can estimate analyse the performance of the wine regions offered in that market. The results show that:

- The Beaujolais, Alsace, Burgundy and South West wine regions perform well, that is, have good alignment between observed and theoretical data.
- Cotes du Rhône, Loire and Bordeaux have lower than expected penetration rates and higher than expected purchase frequencies. Based on the assumption underpinning the Dirichlet model, these shops would gain to have more SKUs from these regions to generate greater penetration.
- Champagne and Jura-Savoy have lower than expected purchase frequency and higher than expected penetration rate. Champagne is highly typical of 'change of pace' brands: many people buy champagne (whether expensive or inexpensive), but they do not repeatedly purchase it throughout the year.

**Figure 1: Dirichlet model—France—by Region-of-Origin—Offline**



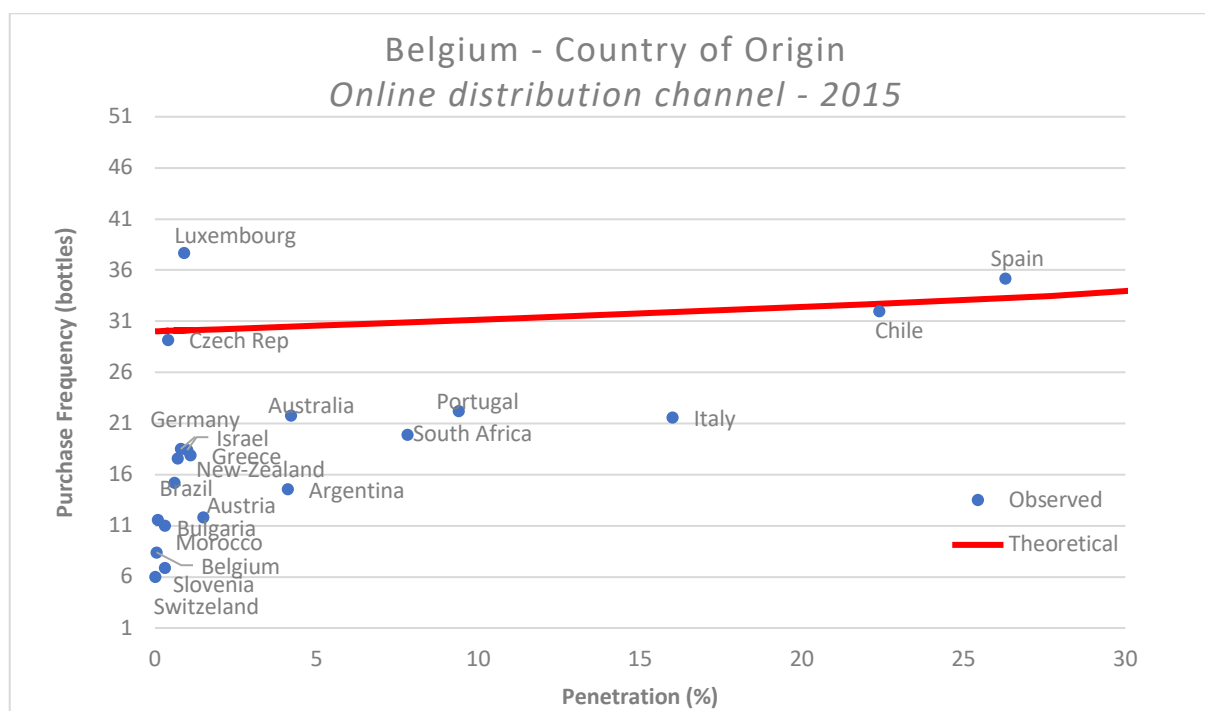
In the Belgium-market model (see Figure 2), it is important to note that the retailer requires a minimum order of six bottles, and consequently, purchase frequencies appear higher than average. In particular, online purchase data show that wines from Chile experience more than 25% of penetration rate, with 32 bottles purchased on average. In contrast, very few people purchase brands from Slovenia and Brazil (0.4% of penetration rate), with 7 and 14 bottles purchased on average, respectively [20].

Again, the deviation of penetration rate is much greater than that of purchase frequency. From the smallest to the biggest country of origin, the penetration rate is multiplied by 25, whereas the frequency of purchase is multiplied only by 3.

Comparing the observed data with the data generated by the Dirichlet model, we can estimate that:

- Spain, Chile and the Czech Republic perform well, that is, have good alignment between observed and theoretical data.
- Luxembourg and France have lower than expected penetration rates and higher than expected purchase frequencies. Based on the assumption underpinning the Dirichlet model, the online shop would benefit in having more SKUs from these two countries, to generate greater penetration.
- All other countries have lower than expected purchase frequencies and higher than expected penetration rates.

**Figure 2: Dirichlet model—Belgium—by Country-of-Origin—Online**



**Note:** we removed France (as country-of-origin) from Figure 2, to make the Figure clearer. In the Belgium online market, in fact, France has a penetration rate of 66% and a purchase frequency of 47 bottles per year.

Turning to the two brick-and-mortar stores, purchase behaviour by country of origin is similar; the greater the penetration rate, the greater the purchase frequency (see

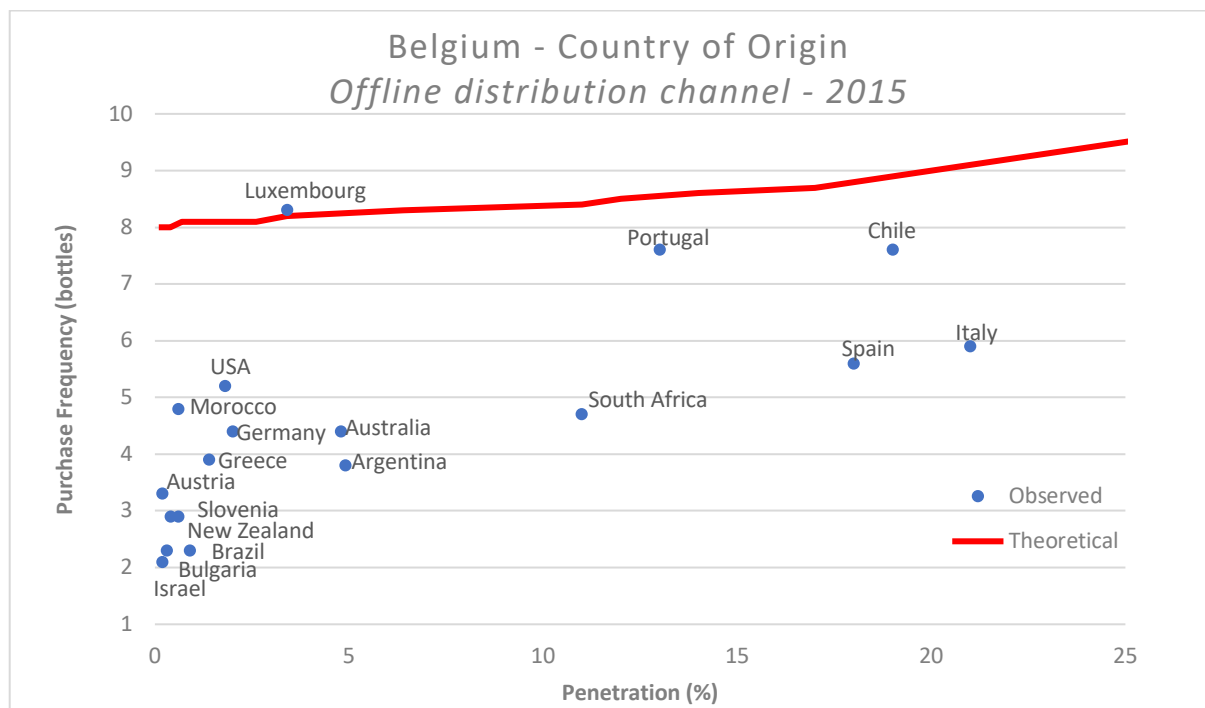
Figure 3).

Italy is the wine country with the greatest penetration rate (21%) and an average purchase frequency of 5.9 bottles. Conversely, Israel achieves only 0.2% of penetration rate and buyers purchased 2.1 bottles on average during the year.

Comparing the observed data with data generated by the Dirichlet model, we can estimate that:

- Luxembourg and, to a lesser extent, Portugal and Chile perform well, that is, have good alignment between observed and theoretical data.
- France has a lower than expected penetration rate (86% of observed penetration rate vs. 91% in theory) and a higher than expected purchase frequency.
- All other countries have lower than expected purchase frequencies and higher than expected penetration rates.

**Figure 3: Dirichlet model—Belgium—by Country-of-Origin—Offline**



**Note:** we removed France (as country-of-origin) from Figure 3, to make the Figure clearer. In the Belgium offline market, in fact, France has a penetration rate of 86% and a purchase frequency of 17 bottles per year.

In Germany, Mueller et al. [21] found a similar situation with South Africa experiencing more buyers (27% of penetration rate) purchasing more frequently (about 10 bottles during



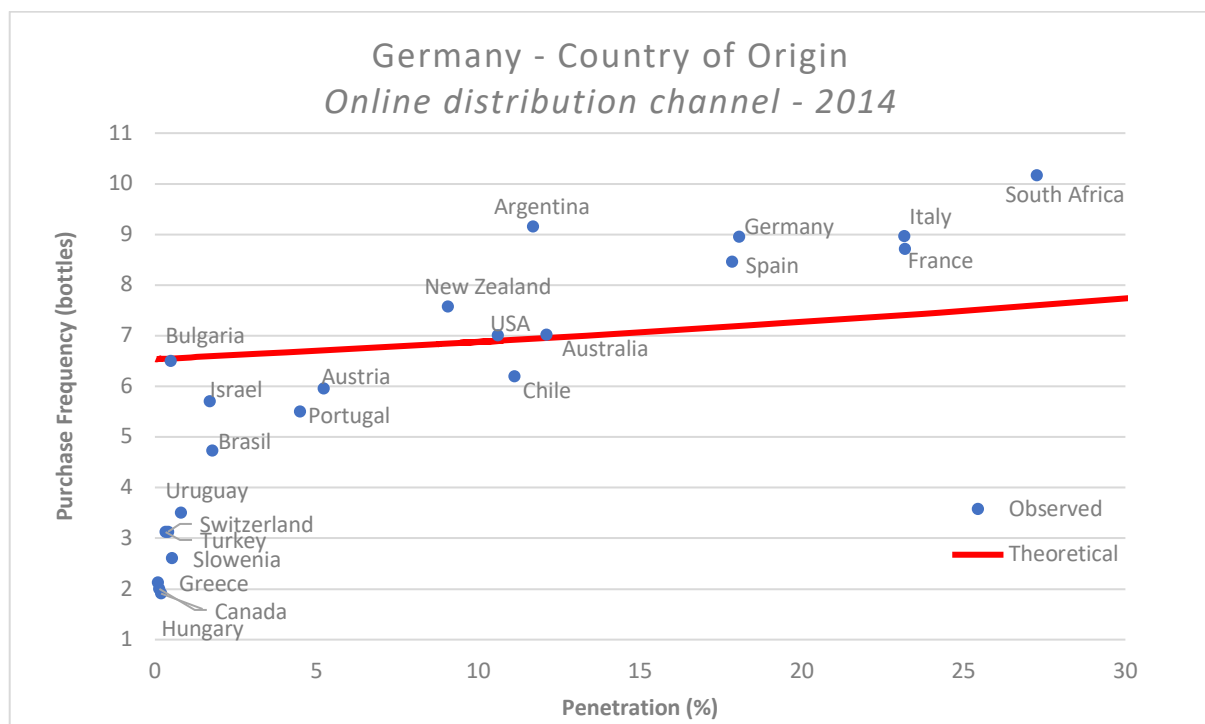
the 12-month period). In contrast, smaller wine-producing countries, such as Hungary, Turkey and Slovenia, had a lower penetration rate (less than 1%), with two to three bottles purchased, on average, by these buyers (see

Figure 4).

Comparing the observed data with data generated by the Dirichlet model, we can estimate that:

- Bulgaria, the US and Australia perform well, that is, have good alignment between observed and theoretical data.
- A few countries (New Zealand, Argentina, Spain, Germany, France, Italy and South Africa) have lower than expected penetration rates and higher than expected purchase frequencies. Based on the assumption underpinning the Dirichlet model, the online store would benefit in having more SKUs from these countries, to generate greater penetration.
- All other countries have lower than expected purchase frequencies and higher than expected penetration rates. This is especially the case for Uruguay, Switzerland, Turkey, Slovenia, Greece, Canada and Hungary.

**Figure 4: Dirichlet model—Germany—by Country-of-Origin—Online**



## Discussion

The results of the investigations conducted in France, Belgium and Germany show that wine purchases can be modelled using the assumptions that inform the Dirichlet model. One can

see, for example, that the penetration values between the smallest and the biggest country or region of origin vary four times more than the respective purchase frequency values in France, seven times more in Belgium and three times more in Germany. Analogous results can be seen in Australia [11], Italy [22], the UK [13] and the US [23]. Knowing this fundamental information is critical for brand managers, as they can base their marketing strategies on, and evaluate their successes by, four phenomena: the double jeopardy law, the duplication of purchase law, the fact that loyalty seldom varies between brands, and the lack of niche and change-of-pace brands. Consequently:

- If a region, country or a wine brand wants to grow, the best way to do so is to increase the number of people buying it, rather than trying to sell more to those who have already purchased them.
- Second, this means that a small brand, region or country will likely share its customers with a big brand, region or country, while the opposite seldom occurs.
- Third, it is risky to propose a strategy based on a small customer base that purchases high volumes of a given region or brand (i.e. niching strategy). This can be a successful strategy for a limited number of ultra-premium regions or brands, which are produced in very small quantities, but for many other regions or brands, including family-owned wineries, pursuing this sort of strategy simply means holding back the full growth potential of the brand.
- Last, given that brands are not significantly different from one another, one should not engage in a differentiation strategy, but rather aim to be distinctive and make them stand out from the crowd.

To do this, one should work on two main levels, which the literature refers to as mental and physical availability [3]. The former refers to the ability of a brand to be thought of in a buying situation. The second refers to fact that for a brand to be bought, it has to be seen. Therefore, it is important that brand managers make their products available in as many locations as possible.

The other element worth noting is that the way people purchase wine is not different from the way they purchase other FMCG, such as soft drinks and shampoo. This is contrary to what several academic and wine industry operators often propose. This does not mean we deny the existence of very special wines, purchase occasions, or segments of the population that purchase wine in a different way to the vast majority of the population, but the truth is that the majority of wine brands compete head-on to reach the same consumers.

Last, online wine purchases seem to follow the same patterns as brick-and-mortar purchases. Average purchase frequencies are higher when people buy wine online, as shipping costs encourage people to purchase wines in six-bottle cases (at least in one of the markets being analysed), but the trends are the same. This means that brand managers can use the same strategies they develop for traditional wine sales to sell wine online.

## Conclusions

This paper offers an overview of the past 15 years of actual wine purchase patterns across multiple countries, showing that wine markets are largely Dirichlet-like.

While the breadth and depth of data give us confidence that the results are robust and the recommendations effective, we should also note that no research is exempt from limitations. The analysis we have conducted so far come from large retailers. While these purchases are representative for the majority of purchases happening in each country, we know that certain brands simply do not sell through large retailers. It would, therefore, be valuable to replicate the Dirichlet analysis on wine purchases from independent retailers and on-premise venues (bars, restaurants, cafés, etc.), to ascertain whether the model holds true under different conditions. Second, the analyses we conducted so far are all relevant to mature wine markets. It would be worthwhile to access wine purchase data from countries such as China, Russia and India, particularly from multiple years, to see how wine purchases have evolved in these markets (i.e. from a non-Dirichlet market to a Dirichlet market or vice versa). Third, while Dirichlet analysis tells us a great deal about what is bought by whom, it does not consider attitudes or psychographic variables, which might help to explain why peoples' behaviours differ. It would be advantageous to close this gap in the future, to facilitate the design of more efficient marketing strategies.

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