



The Brewers of Europe
Cost comparability study
Final report

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Europe Economics

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Executive Summary

This study by Europe Economics assesses the cost comparability of beer, wine and spirits. The beer, wine and spirits industries are compared in terms of the costs involved at the three key stages of the supply chain: production; distribution; and retail.

The main results from our analysis are the following:

At the **production stage** our estimates of the costs incurred by producers of the different alcohol beverage categories per litre of finished product showed spirits to be the most costly beverage to produce: a litre of spirits cost €2.50, followed by wine (€1.38) then beer (€0.74).

However, when cost is analysed in terms of costs per litre of pure alcohol, the position is reversed with beer being the most expensive to produce: €16.54 for beer, €11.00 for wine and €6.65 for spirits. So, in terms of pure alcohol, beer production is 2.5 times more costly than spirits production and 1.5 times more costly than wine.

If **excise duty** were added (using the minimum rates specified in the EU Minimum Rates Directive) to the cost of production of a litre of pure alcohol in the different categories, beer remains the highest cost per litre of pure alcohol to produce at €18.41, compared to €12.15 for spirits, with the costs for wine unchanged at €11.00 (as the minimum excise duty for wine is zero).

The **distribution stage** is found to represent approximately 9 per cent of total supply chain costs. Evidence suggests the costs of distributing a litre of liquid are broadly the same regardless of whether this is in the form of beer, wine or spirits. This by extension means that, when considered in terms of costs per litre of pure alcohol, beer is significantly more expensive to distribute than wine (3 times greater) and spirits (8 times greater).

The **retail stage** of the supply chain is considered both in terms of the on-trade costs and the off-trade costs. There is a significant difference in the mark-ups applied in these different routes to market, with higher mark-ups in the on-trade reflecting the additional costs in retailing these beverages such as the cost of staff service time and amenities including music, entertainment and food.

However, no material differences were identified in the cost of retailing the different alcohol beverage categories for either the on- or off-trade per litre of finished product.

Given no material differences in the costs per litre of finished product, when costs are expressed per litre of pure alcohol, the cost of retailing beer will be in the order of 8 times more than spirits and 3 times more than wine.

1 Introduction

The Brewers of Europe wish to understand the cost structure of different alcoholic beverages to be able to enrich the discussion on implementing a fair and equitable tax regime on beer.

The primary objective of the study is to gain a 'clear and comprehensive' view of the relative costs incurred in the production and sale of beer, wine and spirits. The results of this study will then feed into The Brewers of Europe's work on understanding what would be a fair and equitable fiscal policy structure, i.e. one that fully recognises the cost asymmetries between the beer industry and the wine and spirits industries.

In order to achieve this primary objective, the study sets out some initial objectives, which were to understand the relative costs of beer, wine and spirits production at each stage of the value chain, namely: production, packaging, distribution and retail. Through the research, however, it became clear that the supply chain is best understood as comprising three key stages, namely production, distribution and retail (as packaging is incorporated into the production stage of the supply chain).

Other intermediate objectives of the study are to understand the cost breakdowns in term of: on-trade and off-trade costs; and cost per litre of finished product and per litre of pure alcohol. Again, it became clear through further desk-based research and conversations with the industry that there were no strong reasons to suggest that production and distribution costs would differ markedly for the on- and off-trade. However, there are significant differences in the costs at the retail stages of the supply chain for the on- and off-trade and these have been explored through a combination of desk-based research and interviews with associations and industry experts.

1.1 Overview of the alcohol industry supply chain

Before presenting our analysis, we provide a brief overview of the industry supply chain as this forms the structure of the analysis undertaken. The alcohol industry supply chain can be considered as four key stages:

- **Supply of raw materials** – this is primarily the agricultural sector, which provides the organic inputs, such as barley, wheat, grapes, sugar etc.
- **Production** – this is the conversion of the raw material inputs into finished products ready at the factory through such processes as brewing, fermentation, distillation and packaging (e.g. bottling).
- **Distribution** – this is the transportation, warehousing and delivery of finished products from the factory gate to retail premises.
- **Retail** – this is the sale of the alcohol at retail premises, either on-trade (where alcohol is bought to be consumed on the premises, e.g. bars and restaurants) and off-trade (where alcohol is bought to be consumed off the premises at a later date, e.g. supermarkets and independent stores).

In our analysis, the costs of raw material supply have been captured at the production stage of the supply chain, as part of manufacturers' material costs. Therefore, our analysis (and the structure of this report) consists of three stages: production (Chapter 2); distribution (Chapter 3); and retail (Chapter 4).

Although the supply chain can be represented in these clear stages, it is important to recognise that the organisations in control of each stage may be the same. This is because there are many instances of vertical integration in the alcohol industry supply chains, whereby an organisation may operate at multiple levels of the supply chain, e.g. a manufacturer may also engage in both distribution and retailing.

1.2 Overview of methodology

We analyse the supply chain costs for beer, wine and spirits across the EU as a whole, but also draws on specific evidence from seven EU Member States, namely: Czech Republic; France; Germany; Poland; Spain; Sweden; and United Kingdom. This sample of countries was chosen as it is considered representative of the EU alcoholic beverages industry as a whole. It is also consistent with the sample of countries used for the previous 2010 report “European analysis of the costs of producing beer and the impact of excise duties” (Finland was replaced in the analysis by Sweden due to lack of data).

Different data is used for the three main stages of the supply chain. Production is analysed at the EU level primarily using data from Eurostat’s Structural Business Statistics (SBS) and Community Production (PRODCOM) databases. This is complemented by Bloomberg firm-level data from each of the seven countries listed above.

Analysis of the subsequent stages of the supply chain, i.e. distribution and retail, has drawn on a combination of desk-based research and interviews with national associations and industry experts.

A model is used to input the data so as to assess the cost differences across beer, wine and spirits at each of the three stages of the supply chain. The costs are presented in two forms:

- **Costs per litre of finished product** – this reflects the costs per litre for each of the considered drinks (beer, wine and spirits) in the form in which they are consumed.
- **Costs per litre of pure alcohol** – this reflects the costs per litre of each product in their pure alcohol form. In these calculations, typical alcohol by volume (abv) figures for each drink are used in order to estimate the costs per litre of pure alcohol, namely: 4.5 per cent for beer; 12.5 per cent for wine; and 37.5 per cent for spirits.¹ These abv figures imply that to get a litre of pure alcohol one would need 2.7 litres of spirits, 8 litres of wine or 22 litres of beer.

Further details of the different data sources can be found in Annex 1. Annex 2 contains some additional analysis of our calculations.

1.3 Structure

The structure of the study is as follows:

- Chapter 2: Production.
- Chapter 3: Distribution.
- Chapter 4: Retail.
- Chapter 5: Conclusions.
- Annex 1: Methodology and data.
- Annex 2: Additional analysis.

¹ For consistency, we have used the same values used in the previous cost comparability study (see “European analysis of the costs of producing beer and the impact of excise duties”, PwC, September 2010). These are typical values used by the alcohol industry.

2 Production

In this section we provide an analysis of the production of alcoholic drinks in the EU. We do this by first looking at a high level overview of the sector (and recent evolution). We then investigate the production cost components and the costs of production of the three main drinks categories: beer, wine and spirits. In the last section we analyse the incidence of the current duty rates on the different costs of production.

The key findings of this chapter are:

- The costs per litre of finished product (subtracting the margins made at the production stage) are €0.74 for beer, €1.38 for wine and €2.50 for spirits.
- When expressed in terms of costs per litre of pure alcohol the costs are €16.54 for beer, €11.00 for wine and €6.65 for spirits. This means that in terms of pure alcohol beer production is: 2.5 times more costly to produce than spirits; and 1.5 times more costly to produce than wines.
- When excise is added to the cost per litre of pure alcohol (based on the minimum rates specified in the EU Minimum Rates Directive²), costs are increased to €18.41 for beer, €11.00 for wine and €12.15 for spirits.

2.1 Overview of production

The alcoholic drinks sector is composed of three main different types of drinks which have very different characteristics. The analysis in this section looks at the volumes and the values of production in Europe which shows some disparity in the volumes and associated values of manufacturing of the different alcoholic beverages (something that will become more evident when we analyse the comparable costs of production in section 2.3).

The analysis is based on statistics from PRODCOM, a Eurostat database covering data on the production of industrial manufactured goods in the EU. In PRODCOM, products are detailed at an eight-digit level, using the classification of Combined Nomenclature. Data is provided for quantity and value of production sold in Euros (excluding alcohol duties and VAT).

The database contains data on different alcohol products. However, whilst there is only one category for beer, the categories for wines and spirits are defined more granularly (some of which contain sub-categories which are of a quite dissimilar nature to beer). Beer is generally a quite homogeneous product, whereas the sub-categories for wine and spirits may include for example spirits distilled from fruits, pure alcohol and Champagne. Some of the sub-categories therefore have very specific characteristics and belong to the high-value end of the market, and as such we do not believe that they represent a fair comparison with beer.

To make the analysis comparable, our analysis excludes those wine and spirit products from the high end of the market (which are often luxury drinks) and thus the analysis is limited to products which could be considered closer in the market to beer. The 11 products we consider are the following (a full description of the categories included and excluded in the analysis is provided in Annex 1).

² Directive 92/84/EEC.

- Beer:
 - beer (made from malt).
- Wines:
 - white PDO³ (such as Bordeaux, Burgundy...);
 - red PDO (such as Bordeaux, Burgundy...);
 - non-PDO (white and red wines including PGI⁴ wines); and
 - semi-sparkling wines (Spritzig, Frizzante and Pétillant and wines with “mushroom” stoppers but with 1-3 atmospheres of pressure).
- Spirits:
 - gin and jenever;
 - rums (and sugar-cane products);
 - strong spirits (Vodka with more than 45.4%, Liqueurs and cordials, Arrack, Ouzo, Tequila);
 - vodka; and
 - whisky (i.e. Bourbon and Scotch).

The four categories of wine together account for 93 per cent of the production volume of wine in 2015 in the EU28 (with the analysis excluding Champagne, Ports, Vermouths and wines from other fermented beverages). The spirit categories together account for more than 84 per cent of the production volume in the EU28 (with the analysis excluding spirits such as Cognac, spirits obtained from fruits and pure alcohol).

Volumes

The total volume of the categories analysed of beer, spirits and wine produced in the EU in 2015 amounts to almost 54 billion litres overall. Beer accounts for 70 per cent of the total produced volume, while wine and spirits account for 22 per cent and 8 per cent respectively.⁵ This already demonstrates the high-volume nature of beer: in terms of volumes, beer is by far the most produced drink (Figure 2.1a shows volumes in thousands of litres).

Besides the total volumes produced, it is also interesting to consider the total production volume in litres of pure alcohol. We have used typical alcohol by volume (abv) figures for each drink (4.5 per cent for beer, 12.5 per cent for wine and 37.5 per cent for spirits) to estimate volumes of pure alcohol in each category. In terms of pure alcohol, the production volumes are much more similar – 1.7 billion litres for beer, 1.5 billion for wine and 1.6 billion for spirits in 2015 (Figure 2.1b).

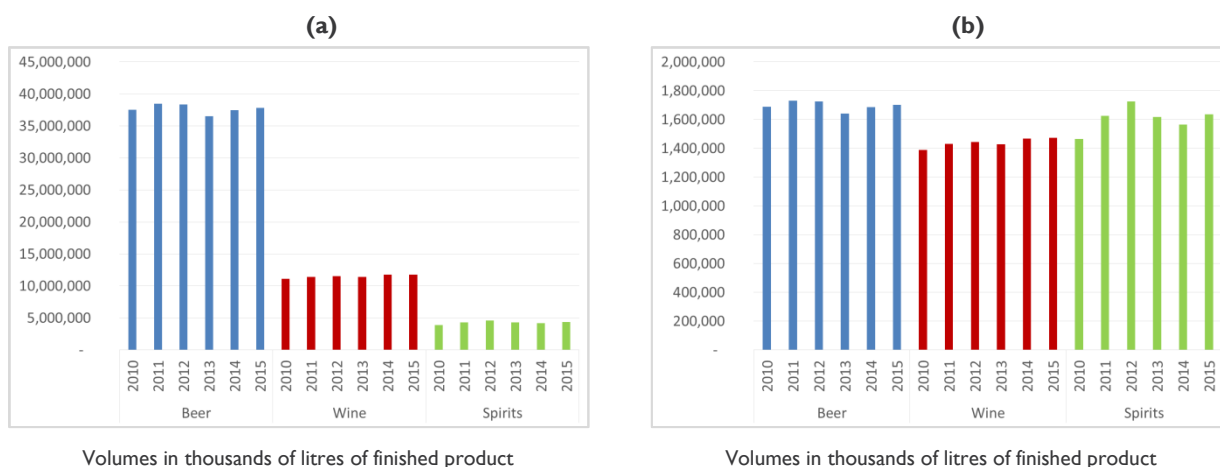
The figures below show some erratic evolution in the production volumes of beer and spirits, but there seems to be some small increasing trend in the case of wine production (Figure 2.1a and b).

³ Protected Designation of Origin (PDO) is one of the European Union schemes of geographical indications and traditional specialties to promote and protect names of quality agricultural products and foodstuffs. To receive the PDO status, the entire product must be traditionally and entirely manufactured (prepared, processed and produced) within the specific region and thus acquire unique properties.

⁴ Protected Geographical Indication (PGI) is another EU schemes of geographical indications and traditional specialties. To receive PGI status, the product must be traditionally and at least partially manufactured (prepared, processed or produced) within the specific region and thus acquire unique properties.

⁵ Data for spirits is provided in volume of pure alcohol. We transformed the volumes to spirituous drinks by dividing volumes by a typical abv strength, which we took as 37.5.

Figure 2.1: Evolution of production volumes in EU28 (total litres and pure alcohol, 000)



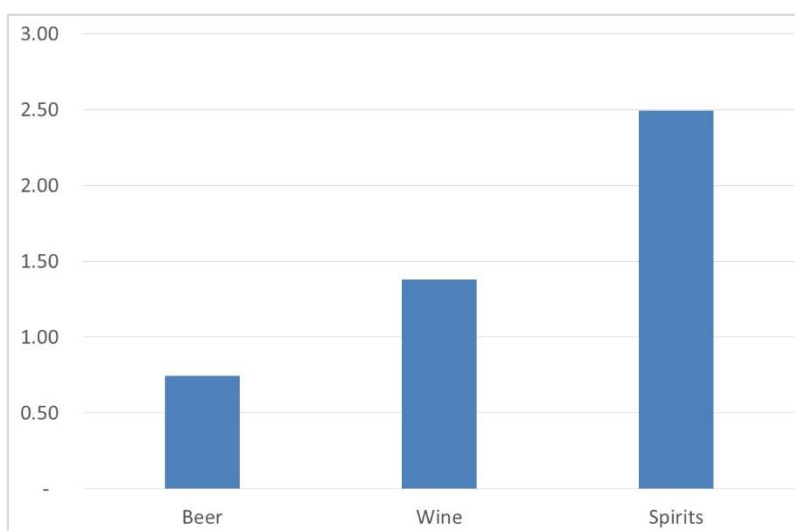
Source: PRODCOM; Europe Economics calculations.

Costs per unit of production

Costs per unit of production are also provided in PRODCOM and refer to the costs (in euros) per litre of product volume.

Because of the different nature of the drinks, production unit costs show some significant differences across the three categories. The unit cost for one litre of beer is about €0.83, while it is €3.06 for one litre of spirits and €1.50 for one litre of wine (note that these costs include both the costs of inputs and production margins). Production unit cost figures exclude duty and taxes and thus show the differences in the production value for one litre of the different alcoholic drink categories (Figure 2.2).

Figure 2.2: Unit cost of production* (€/litre finished product, EU28)



Source: PRODCOM; Europe Economics calculations.

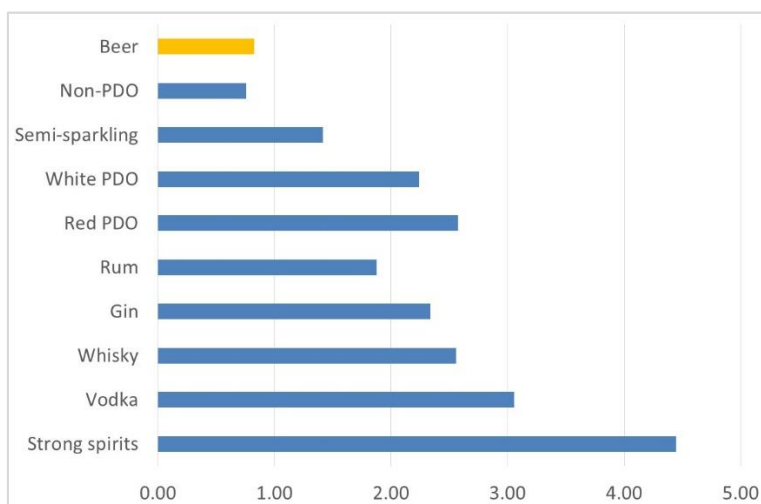
*Note: Unit cost of production includes the cost of inputs and production margins.

The figures used reflect a weighted average unit cost of production for each category across the EU28. However, as explained earlier, there are very different types of drinks within both the wine and spirits categories. In the wine category, the most expensive products are those produced under a Protected Designation of Origin (PDO) and this reflects well the high value added of such wines (which must be

produced under certain requirements and in a specific region).⁶ However, the wine category also includes other products (non-PDO) which are much cheaper to produce (and cheaper than beer). In the spirits category, products also vary significantly in terms of unit costs. Most of them are of a unit cost similar to, or greater than, that for PDO wines (the only exception being rum, which is slightly lower than PDO wines).

Overall, there is some disparity in the unit costs of production. In terms of litres of finished product, the unit production values of all alcoholic drink types are higher than that for one litre of beer, with the exception of non-PDO wines (Figure 2.3).

Figure 2.3: Unit cost of production* (€/litre of finished product)



Source: PRODCOM; Europe Economics calculations.

*Note: Unit cost of production includes the cost of inputs and production margins.

2.2 Production costs

In this subsection we investigate the costs of production for the different categories of alcoholic beverages. The investigation of costs incurred at the manufacturing stage of the value chain has been undertaken using data from company reports in Bloomberg and data from Eurostat.

Bloomberg covers a wide range of companies, from relatively small, purely domestic players (such as Park & Bellheimer AG, a regional beer manufacturer in Germany) to large multinationals (such as Diageo). We gathered data on the following five major cost categories:

- Materials (“raw materials and other supplies”);
- Labour (“wages, salaries and related costs”);
- Capital (“amortisation and depreciation”);
- Operations (“other operating expenses”); and
- Margins (“operating income/loss”).⁷

⁶ Red PDO accounts for 26% of the volume of produced wine (45% by value) and white PDO accounts for 13% (20% by value).

⁷ Labour contains wages and salaries. Capital and margins show the amortisation, depreciation and return on investment. The components materials and operations contain the price of different inputs. These represent agricultural inputs, cost of utilities, costs of packaging, transport and storage and other services purchased, such as media and marketing (a disaggregation of the purchased components is now shown further down).

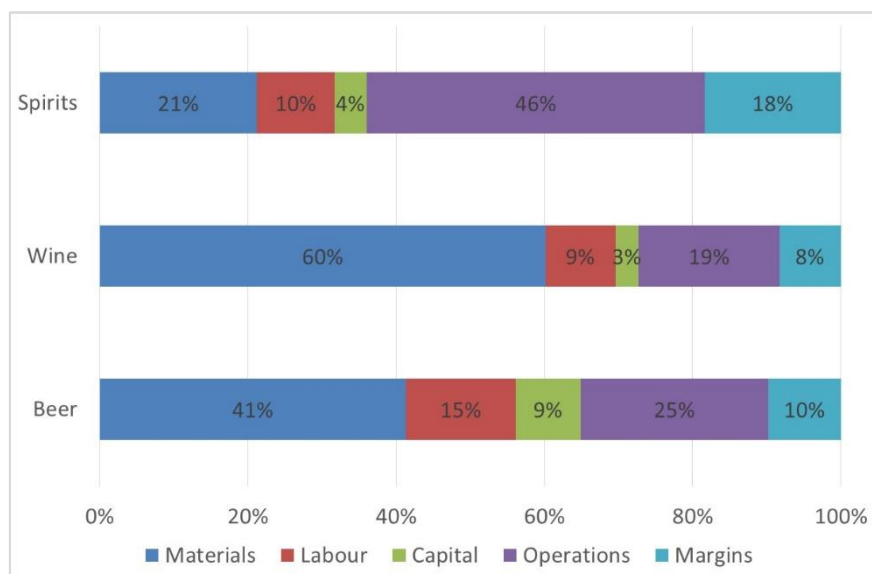
Given the range of different companies covered, we used the median values of the sample (as the median is not affected by the presence of outliers).⁸

Eurostat also provides financial data but only under the following three headings: “purchases”; “labour costs”; and “gross operating surplus (GOS)”⁹. To obtain the same headings across the Eurostat and Bloomberg data sources, we disaggregated the Eurostat “Purchases” data into “Materials” and “Operations” using the ratios calculated from Bloomberg data (for those same two categories). We disaggregated “GOS” into “Capital” and “Margins” in the same way.

We have made use of the Eurostat data in our quantitative analysis. This is because, being an official source, it provides a good coverage of the industries in each Member State. Another advantage is that it also provides data broken down for EU28 Member States. The choice of such data source, however, does not have significant implications for our analysis because, as will be shown later, the Eurostat data is very similar to that provided by company reports from Bloomberg.

Eurostat data shows some significant differences in the relative shares of different cost components for the different categories of alcoholic beverages. The “Materials” component is largest for wine (60 per cent) and then beer (41 per cent), but reflects only 21 per cent of the production of spirits. In terms of “Labour”, the costs are highest for beer (15 per cent), while representing only around 10 per cent in the case of wine and spirits. This implies that the number of jobs associated with the manufacturing stage of the supply chain is highest in the case of beer (i.e. beer is a more labour-intensive industry compared to either wine or spirits). The estimates show some low margins for beer and wine – 10 per cent and 8 per cent respectively – compared with margins of 18 per cent for spirits (Figure 2.4).

Figure 2.4: Cost shares (%)



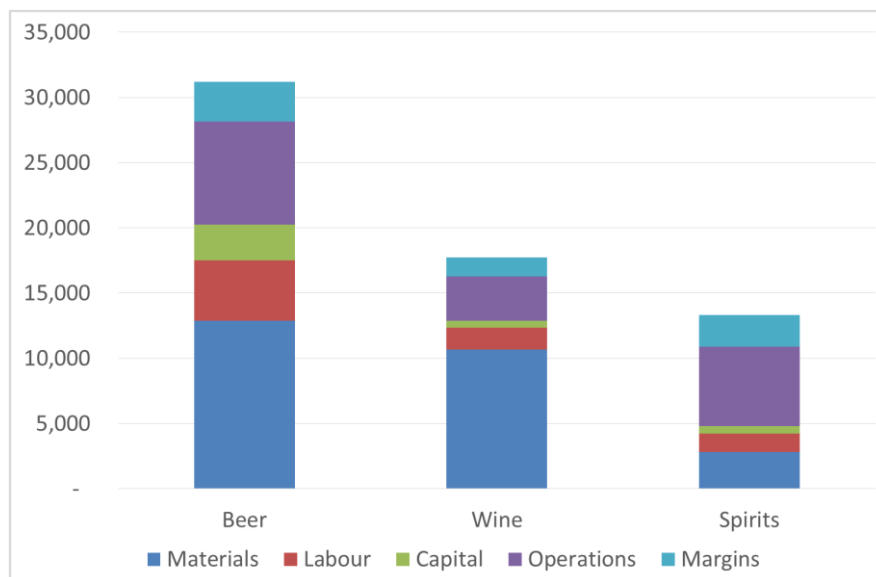
Source: Eurostat, Bloomberg, Europe Economics calculations.

⁸ As a sense check, a weighted average calculation was also performed, with the exclusion of outliers – companies reporting in excess of 20 per cent profits (e.g. Baron de Ley, a French wine manufacturer), or in excess of 20 per cent losses (e.g. Mackmyra Svensk Whisky, a Swedish spirits manufacturer). This approach achieved very similar results to the median approach.

⁹ Gross operating surplus, GOS, is the sum of capital used up in the production process (due to amortisation and depreciation) and the return on capital employed in the production process.

The cost shares can be used to calculate a cost breakdown of the total production (for the drinks categories included in our analysis). The total production value of beer dominates the other two categories, in total and for each of the cost components included (Figure 2.5).

Figure 2.5: Cost breakdown (million €)



Source: PRODCOM, Eurostat; Europe Economics calculations.

Comparison with other data sources

Eurostat data is robust when compared to other data sources. We have compared the Eurostat data with data obtained from Bloomberg and, for comparison purposes, with data from the 2010 PwC report (taken from Chart 7 of the PwC report). The percentage shares of the different cost components are found to be very similar when the different data sources are used (see Annex 2).¹⁰

The subsequent analysis makes use of the costs of production of the different alcoholic beverages. These can be constructed by subtracting the estimated margins (contained within Figure 2.4) from the production values estimated in subsection 2.1.

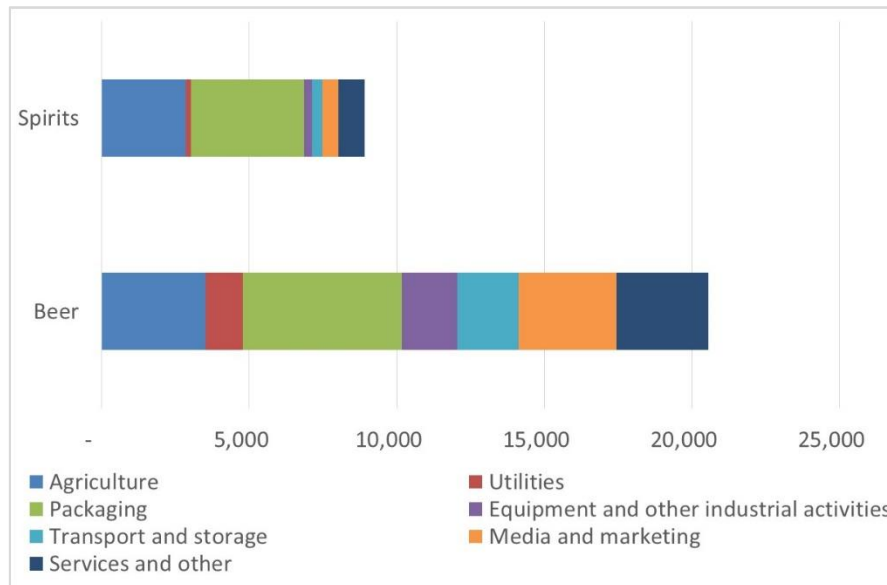
Manufacturer's purchases by supply sector

We can use the shares of purchases reported in two industry reports ("The contribution made by beer to the European Economy", 2016 and "The contribution made by spirits to the European Economy", 2010, there is no equivalent data for wine) to get estimates of the breakdown of purchases (materials and operation costs) reported earlier for the beverages of our analysis. For both beer and spirits, packaging represents a significant proportion of the purchases for each of these drinks categories (26% of total purchases in the case of beer and 43% in the case of spirits). Again, beer dominates in every component of purchases of materials and operation costs and this is due to its high volumes of production.

¹⁰ Data from the International Brewers Questionnaire (IBQ data) have been investigated thoroughly but were excluded from the analysis. This is because the data were showing GOS shares well in excess of those expected based on desk-based research, with half of respondents having a GOS share in excess of 30 per cent, which we consider unrealistic. This may in part be attributable to the way in which the large breweries, with multinational operations, record their profits, or to errors in the recording of the data provided.

This lower relative packaging cost for beer may be attributed to the fact that the beer industry makes more significant use of returnable packaging. This takes the form of kegs and casks used to transport draft beer in the retail on-trade¹¹ and returnable bottles (which may be a significant part of the market in some EU countries).

Figure 2.6: Breakdown of purchases of goods and services for beer and spirits (million €)



Source: “The contribution made by beer to the European Economy”. Europe Economics (2016). “The contribution made by spirits to the European Economy”. Ernst & Young (2010). Data from this report and own calculations.

2.3 Comparable costs of production

In this section we calculate the costs of producing the different alcoholic beverages. We express the costs in litres of finished product and in litres of pure alcohol.

The costs per unit of finished product can be calculated using the unit cost of production per litre (Figure 2.2) and subtracting the margins made at the production stage (contained within Figure 2.4). Based on this calculation, the costs of production (per litre of finished product) are €0.74 for one litre of beer, €1.38 for one litre of wine and €2.50 for one litre of spirits (Figure 2.7a).

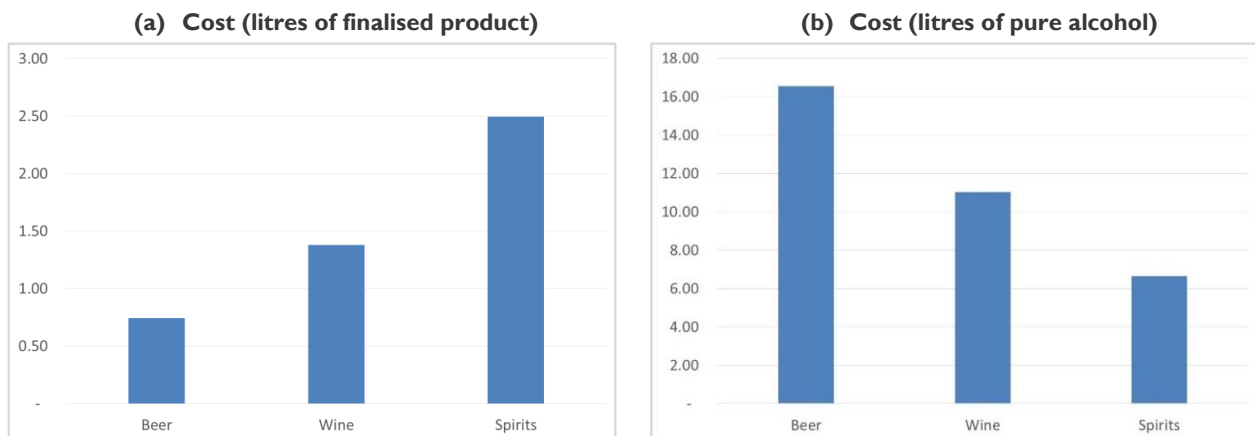
The costs per unit of pure alcohol can be calculated using the costs of production (per litre of finished product) and the alcohol content in each drink (abv figures of 4.5, 12.5 and 37.5 per cent have been used for beer, wine and spirits, respectively). The results in terms of production of pure alcohol are reversed: it costs €16.54 to produce a litre of alcohol through beer, while it only costs €11.00 and €6.65 to produce a litre of alcohol through wine and spirits respectively (Figure 2.7b).

Hence the analysis of production in terms of pure alcohol shows that beer production is:

- 2.5 times more costly than spirits; and
- 1.5 times more costly than wines.

¹¹ These casks and kegs are returnable, running continuously between factory gate and retail on-trade outlets, and can have a lifespan of up to 30 years. However, the industry is progressively using kegs made from other materials (plastic) which are non-returnable.

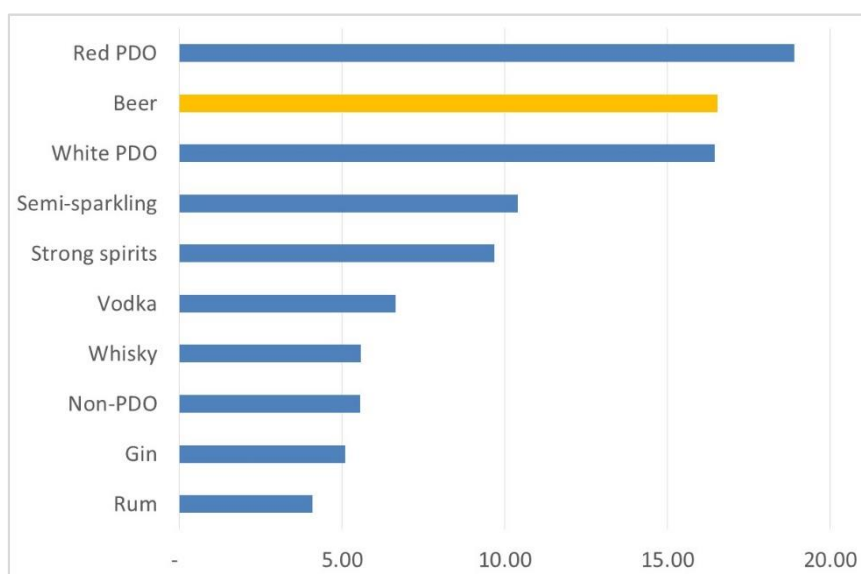
Figure 2.7: Costs of production (€)



Source: PRODCOM; Europe Economics calculations.

As already mentioned, the categories of drinks used, reflect a weighted average of production. However, as explained in subsection 2.1, in the wine and spirits categories there are different sub-categories of products. Therefore, we now calculate the costs of production (in terms of litres of pure alcohol) for the different types of beverages within each category. The results are illustrated in Figure 2.8 and show that in general beer is the most costly way of producing pure alcohol.

- The costs of producing alcohol through spirits are in the order of 4 to 7 Euros per litre (for Rum, Gin Whisky and Vodka), which means it costs between 2.5 and 4 times more to produce alcohol through beer than through these types of spirits.
- The costs of producing alcohol using non-PDO wine or semi-sparkling wine is 5.54 and 10.39 Euros, respectively, per litre of pure alcohol. This implies that the costs of producing pure alcohol through beer are almost 3 times that of non-PDO wine and 1.6 times that of semi-sparkling.
- The only exception to the finding is that of PDO wines. It costs almost 19 Euros and 17 Euros to produce one litre of pure alcohol using red PDO and white PDO respectively, which is similar to the cost of producing beer. In the case of red PDOs, it is in fact slightly cheaper to produce alcohol using beer (beer is 0.87 the cost of red PDO).

Figure 2.8: Costs of production (€, litre of pure alcohol)

Source: PRODCOM; Europe Economics calculations.

To test the sensitivity of our results we have also calculated the costs of production when using different production margins. In a second step we have experimented with some other assumptions of alcohol content (abv). The results of the analysis showed robustness to the different specifications used (see Annex 2).

We can therefore assert that the main cost driver is derived from the unit costs of production (and not from difference in the margins or abv figures being used in the analysis). Our analysis has shown that these unit costs of production vary significantly across (and within) different categories of alcohol beverages. Specifically, it has been shown that the costs of production in pure alcohol terms are always higher for beer than for other alcoholic drinks, and may in fact be similar to those products which are marketed as high-value added products (such as PDO wines, which use regulated practices and certain requirements of specific regions).

2.4 The incidence of duty rates

To ensure comprehensive analysis for the different alcohol beverages we also reviewed the impact of excise on the cost of production of different types of alcoholic beverage.

Table 2.1 summarises the harmonised minimum rates set out by EU legislation for beer, wine and spirits. Member States are then free to apply excise duty rates above these minima, according to their own national needs. The minimum duty rate is €1.87 per hectolitre per degree alcohol for beer, while it is €550 per hectolitre of pure alcohol for spirits. No minimum excise rate is set for wine.

Table 2.1 Minimum excise duties in the EU per category

Sector	Minimum excise duty rates (EU)	Unit
Beer	€ 1.87	hl/degree of alcohol
Wine	€ 0	hl
Spirits	€ 550	hl pure alcohol

Source: European Commission. Directive 92/84/EEC.

We can use the minimum duty rates to show the level of incidence for each product. Figure 2.9a shows the production costs and duty for the different products.¹²

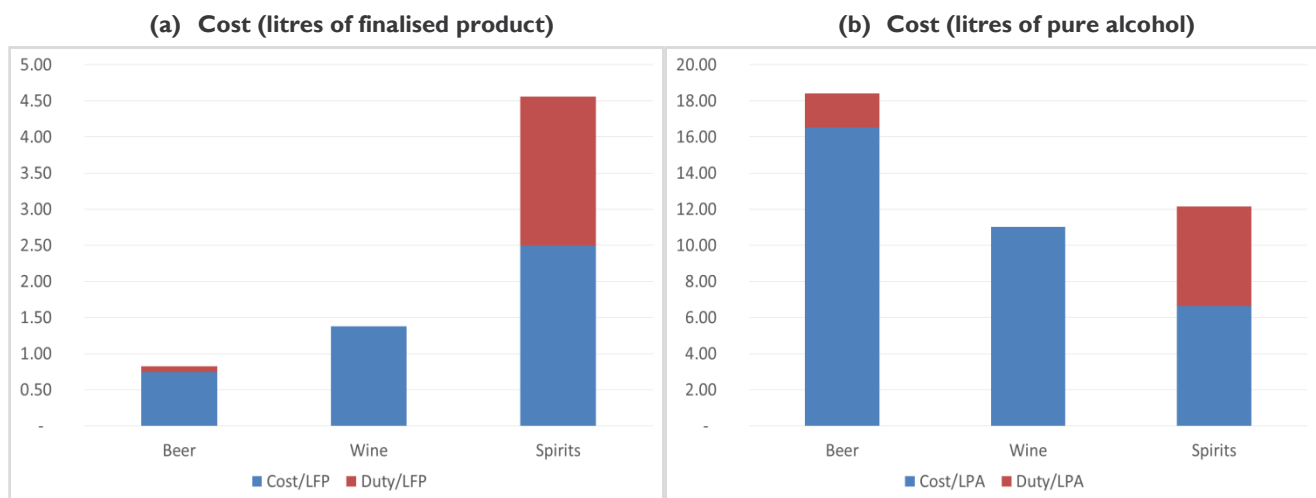
- For beer, the duty adds €0.08 per litre of final product to give a total cost of €0.83 (an 11 per cent increase).
- For spirits, the duty adds €2.06 per litre of final product to give a total cost of €4.56 (an 83 per cent increase).

Duty increases the costs of beer and spirits when looked at on the basis of taxation of a litre of finished product. However, when shown in terms of pure alcohol, the picture is different (Figure 2.9b).

- For beer, the duty adds €1.87 per litre of pure alcohol to give a total production cost of €18.41.
- For spirits, the duty adds €5.5 per litre of pure alcohol to give a total production cost of € 12.15.
- For wine the cost per litre of pure alcohol is unchanged at €11.00 due to the zero excise rate.

The addition of excise causes the cost difference between beer (€16.5), wine (€11.0) and spirits (€6.7) to reduce per litre of pure alcohol (a ratio of 2.5 beer-to-spirit and 1.5 beer-to-wine) to a cost difference of €18.4 for beer, €12.2 for spirit, wine unchanged at €11.0 per litre of pure alcohol (a ratio of 1.5 beer-to-spirit and 1.7 beer-to-wine). On this basis, inclusive of excise¹³, beer still remains with the highest production cost per litre of pure alcohol produced, when compared to both spirits and wine.

Figure 2.9: Incidence of duty rates



Source: PRODCOM, European Commission, Europe Economics calculations.

¹² Abv figures of 4.5, 12.5 and 37.5 per cent have been used for beer, wine and spirits, respectively.

¹³ Based on EU minimum excise rates.

3 Distribution

Distribution is the stage of the supply chain that consists of transporting the finished manufactured product (in its packaging) from the 'factory gate' to the on- and off-trade retail outlets. It therefore primarily reflects the transport costs associated with getting the product from the manufacturer in one place to the retailer in another.

This chapter looks at the distribution models, cost estimates and drivers that may explain any particularities in the distribution of the different drinks. The evidence is based on a literature review and interviews with industry stakeholders and experts.

The key findings of this chapter are:

- Distribution costs represent a small proportion of total supply chain costs (about 9%, less if duty and VAT are included in the supply chain)
- There is no material difference in the distribution costs for the different types of alcoholic beverage in terms of distributing a litre of finished product.
- Because of the large volumes and lower alcohol content of beer, this implies significant differences in distribution costs when measured in terms of litres of pure alcohol: distribution costs are in the order of 3 times greater for beer than for wine and 8 times greater for beer than for spirits.

3.1 Distribution models

While distribution should be considered as a separate stage of the supply chain, this does not necessarily mean that distribution is carried out by different sets of organisations to those responsible for manufacture and/or retail. There are primarily three models for distribution:

- The manufacturer is vertically integrated, so that it is responsible for both the manufacture and distribution stages of the supply chain.
- The retailer is vertically integrated, so that it is responsible for both the distribution and retail stages of the supply chain.
- There is no vertical integration and therefore an independent distributor is responsible for the distribution stage of the supply chain.

These models are of course not mutually exclusive, as it may be, for example, that a manufacturer both engages in distribution itself and contracts out some distribution activities to third party distributors. It is often quite common for the first two models to be combined, whereby the manufacturer is responsible for distributing its product to warehouses owned by retailers, from which point the retailer takes over responsibility of distributing these products from their warehouses to their on-trade premises. In this case, the distribution costs are in part incurred by the manufacturer and in part incurred by the retailer.

3.2 Distribution cost estimates

Desk-based research has provided a number of estimates of the distribution costs as a proportion of the total cost of the finished product. The two key findings of our research are:

- Distribution costs are a small proportion of total supply chain costs and in the order of 9% (smaller if duty and VAT are included in the supply chain).
- Distribution costs do not vary significantly across different types of alcoholic beverage for one litre of finished product.

With regard to beer, some sources estimate the breakdown of the retail price of beer across the different stages of the supply chain¹⁴. The average distribution costs are approximately 9% of total on-trade supply chain costs for beer (when excluding duty and VAT; distribution represents 5%-9% of the supply chain including duty and VAT). The data also show a mark-up of 36% in relation to the manufacturing stage (median estimate). When this mark-up is applied to the typical beer manufacturing price of €0.83 per litre (i.e. the cost per unit of production, as estimated in Chapter 2, Figure 2.2, which includes the costs of inputs and production margins), this implies a distribution cost of €1.13 per litre of finished product, as shown in Table 3.1.

Table 3.1: Beer supply chain cost breakdown summary

Stage	Cost (% total supply chain)	Percentage cost increase (in relation to previous stage)	Pre-tax price (€/per litre)
Brewery	24%	-	€0.83
Distributor	9%	36%	€1.13
Retailer	67%	220%	€3.62

Note: Industry interviews did not provide major discrepancies to these estimates.

Source: Europe Economics' analysis.

In relation to wine, there are several sources which provide a breakdown of the cost of a bottle of wine across the key stages of the supply chain: manufacturer (winery), distributor, retailer, duty and VAT¹⁵. There are no material differences in distribution costs for the on- and off-trade routes to market and, as such, these data for the off-trade route to market can also be considered as representative of the distribution costs faced in the on-trade route to market.

Distribution costs are on average 9% of total supply chain costs for wine (when excluding duty and VAT). The data also show a median 20% mark-up on the costs at the manufacturing stage of the supply chain. When this mark-up is applied to the typical wine manufacturing price of €1.50 per litre of finished product (i.e. the cost per unit of production, as estimated in Chapter 2, Figure 2.2, which includes the costs of inputs and production margins), this implies a distribution cost of €1.80 per litre, as shown in Table 3.2.

¹⁴ Y. Seth (2014) "Who gets how much of your CASK BITTER £?"

¹⁵ Yahoo Finance (2013) "The real cost of... a bottle of wine"; Gavin Quinney (2014) "Where the money goes on a bottle of wine in the UK"; Robert Joseph (2012) "Lifting the stone on the UK wine trade"; ThirtyFifty (2016) "Wine Pricing".

Table 3.2: Wine supply chain cost breakdown summary

Stage	Cost (% total supply chain)	Percentage cost increase (in relation to previous stage)	Pre-tax price (€/per litre)
Winery	43%	-	€1.50
Distributor	9%	20%	€1.80
Retailer	48%	92%	€3.44

Note: Industry interviews did not provide major discrepancies to these estimates.

Source: Europe Economics' analysis.

There are no available estimates on the distribution costs of spirits. However, many of the consulted sources, as well as evidence from interviews with industry experts, have indicated that the distribution costs are not materially different across the different beverage types. One industry source consulted for this study indicated that a mark-up of 25% can be used as a guide (i.e. a distribution price of 1.25 times the factory gate price). This is a mark-up typical for small brands, as distribution costs do vary somewhat with the volumes distributed.

3.3 Distribution cost drivers

We considered a number of factors that may be driving differences in distribution costs, including: average distance travelled; warehousing costs; care taken during transportation (e.g. refrigeration) and during loading/unloading; restrictions imposed by licence/charter requirements (e.g. on loading and distribution time and number of movements); the type of packaging (e.g. bottle compared with keg); the cost of accompanying products); losses due to spillages and /or breakages; and volume.

Our analysis is based on desk-based research and in-depth interviews with industry experts. The findings of our research consistently showed that there were only two key differences across the different types of alcoholic beverages:

- Differences in the type of packaging.
- Differences in volume of finished product.

The remaining differences were not reported as being significant.

With regard to differences in the type of packaging, interview evidence suggested that the cost of transporting a given volume of liquid was less expensive in the case of beer. In some markets this may be because a significant portion of beer distribution is in returnable containers (kegs, casks, bottles and crates). However, although these returnable items may reduce the costs at the packaging stage, it should be noted that re-use may impose additional costs in the collection process.¹⁶ Therefore, it is not so clear that these constitute a significant distribution cost saving compared to transport of one-way bottles. In addition, it should be recognised that beer in kegs represents a small percentage of beer volume in the EU as a whole (in the order of 20 per cent of total beer volume in EU, compared with 44 per cent in glass bottles and 25 per cent in metal cans).¹⁷ This means that any lower costs associated with transporting draft beer, in casks and kegs, only applies to a fraction (approximately one-fifth) of the total market for beer distribution.

¹⁶ Interview evidence suggested that additional distribution costs would be incurred in terms of the extra labour time required to load the empty kegs, casks and bottles into the vehicle for return to the brewery and the extra fuel costs associated with the vehicles being heavier on return to the factory. It should be noted that the costs of cleaning the returned kegs, casks and bottles are included in the cost of production (rather than costs of distribution).

¹⁷ Packaging used by European Breweries (2010) as reported in The Brewers of Europe (2012) "The Environmental Performance of the European Brewing Sector". There is some variation across Member States. In the UK,

Interview evidence suggested no significant factors that would result in material differences in the distribution costs (per litre of finished product). In other words, the costs of distributing a litre of liquid are broadly the same regardless of whether this is beer, wine or spirit. However, it was interesting to note that once a distribution network is established, it simply makes commercial sense to diversify in terms of the products supplied through that distribution network as there are significant economies of scale to be achieved.¹⁸ As such, established distribution networks are typically used to transport all types of alcoholic beverage (as well as other beverages and food products).

Even though no significant differences in distribution costs per litre of finished product have been observed, the differences in volume (noted as the second bullet point above) imply that when considering the transport of litres of pure alcohol, distribution costs associated with beer are significantly higher than those associated with wine or spirits. This is for the simple fact that, in order to transport a given amount of pure alcohol, significantly more beer must be transported than either wine or spirits. Using typical alcoholic strengths of 4.5%, 12.5% and 37.5% for beer, wine and spirits respectively, it becomes clear that in pure alcohol terms:

- wine that can fit in one delivery truck, would require 3 delivery trucks in the case of beer; and
- spirits that can fit in one delivery truck, would require 8 delivery trucks in the case of beer.

This means that, although in terms of litres of finished product the differences in distribution costs are not material, once considered in terms of litres of pure alcohol the distribution costs are significantly higher for beer than for either wine or spirits.

Further to the above, no evidence was found of there being any notable difference in distributor mark-up in the on- and off-trade, apart from that already explained by the factors discussed above. Literature also suggests that distributor mark-ups are driven by retail purchase volumes and, to some extent, the size of the distributor and its underlying relationship with the manufacturer. Therefore, lower mark-ups in the off-trade are more likely to be a consequence of high-volume purchases in that market.

collectively, draft beer accounted for 47% of UK beer volume according to the BBPA Statistical Handbook 2016. Interview evidence suggested that, in Spain, the volume of casks and kegs is thought to represent about 55-60% of the on-trade market, while, in France, kegs represent around 85% of the on-trade market by volume.

¹⁸ This finding is corroborated by interview evidence.

4 Retail

A similar exercise to that for distribution was undertaken for the retail stage of the supply chain. However, unlike manufacturing and distribution, costs (as reflected by mark-ups) vary significantly between the on- and off-trade channels at the retail stage and, therefore, we consider the on- and off-trade channels separately in this analysis.

- Retail on-trade refers to the sale of alcoholic beverages in premises, where the alcohol will be consumed on that premise, e.g. bars, clubs, hotels, pubs and restaurants.
- Retail off-trade, as we shall come onto discuss, refers to sale in premises of alcoholic beverages which are then consumed off premise, e.g. supermarkets, grocers and off-licences.

The key findings of this chapter are:

- In the on-trade, interviews typically acknowledged no significant differences across drinks: mark-ups typically are in the region of four times the cost price (although in some instances beer could be as low as 2 times depending on the competitive environment where bars operate).
- Retail mark-ups in the off-trade are significantly lower than in the on-trade, across all types of alcoholic beverage.
- Although it is difficult to quantify precise costs in terms of the cost to retail litres of finished product, we have found no significant differences across different beverages on the costs of unloading and storage (although differences in serving could mean that the costs are higher for spirits).
- The finding implies that the costs of retailing beer in terms of pure alcohol (unloading and storage) will be in the order of 8 times more than for spirits and 3 times more than for wine. This reflects again the large volume of beer which, for example, would require more space for storing and would involve higher handling costs. Such costs will compensate for any differences in the costs of serving the different beverages.

4.1 Retail on-trade

The retail on-trade part of the supply chain reflects all the things that happen from the point of delivery of the product at the premises to the point of consumption of that product on the premises. This therefore can be thought to include, at a high level, unloading, initial set-up, storage, maintenance and serving.

As with distribution, although the retail stage is a separate stage of the supply chain, it does not necessarily mean that all retail is carried out by a different set of organisations to those responsible for manufacture and/or distribution. It may be that the manufacturer is vertically integrated throughout the supply chain including (distribution and) the retail on-trade.

4.1.1 Retail on-trade mark-up

A combination of desk-based research and interview evidence was used to estimate the costs faced in the retail on-trade. A number of online sources suggested a mark-up on cost (wholesale) price of four in the retail on-trade for all different types of alcoholic beverage. Interview evidence corroborated this finding, explaining that this was a typical mark-up applied in the on-trade in order to achieve an acceptable gross profit margin.

There are a number of sources that quote mark-ups for serving beer in the range from 2.5 to 5. Evidence from interviews tends to support these findings in general. Data from the literature review provided in Section 3 also shows a retail mark-up of around three for beer.

Similar evidence can be found for the wine and spirits industries. In the case of wine, one source says that “if the restaurant were to pour it by the glass, the typical mark-up is to charge bottle cost for each glass of wine”.¹⁹ Given that a standard bottle of wine is 750ml and a regular glass typically served as 175ml, this equates to a mark-up of approximately four times. Many other sources corroborate this finding for wine. For spirits, evidence again suggests a mark-up in the order of four. One source says that the “goal is to realise a profit of 70% to 80% on liquor sales”, which equates to a mark-up between 3.3 and 5.²⁰

While the mark-up is typically in the region of four times the cost price, there are obviously variations in this, some of the key drivers of which are:

- the exact nature of the product – for example, the mark-up on beer will vary depending on whether it is bottled or draught; in the case of wine, wine-by-the-glass typically commands a higher mark-up than by the bottle, while spirits in mixed drinks typically achieve a lower mark-up than straight spirit drinks.
- the type of on-trade premise and, by extension, the volumes of sales they typically generate²¹ – for example, the variation across on-trade premises may be driven by a combination of supply-side cost factors (e.g. the additional services provided by a high-end club which need to be factored into the beverage price) and demand-side factors (e.g. volume and willingness to pay). A bar serving higher volumes might operate at “a 30% liquor cost” (equating to a mark-up of 3.3), while a high-end cocktail bar might operate at “an 18% cost” (equating to a mark-up of 5.6): and
- the size of on-trade premise.

Overall, the evidence shows some variations in mark-up related to the type of product being sold, the type and size of premise. However, the interviews typically acknowledged no further differences across drinks – mark-ups typically remain in the region of four times the cost price. In some cases, comments mentioned that beer can be on the low end of the mark-ups being applied (around 2 times) depending on the extent of the competitive environment in which bars operate.

4.1.2 Retail on-trade cost drivers

As with the distribution analysis, we explored a number of possible reasons why costs may differ across the alcoholic beverage types. As mentioned above, these can broadly be separated into three key areas:

- unloading and initial set-up;
- storage and maintenance; and
- serving.

From the outset, we ignored costs related to rent and upkeep of the premises, as there is no reason that these should vary across the different types of alcoholic beverage.

Interview evidence suggested that there are higher initial set-up costs associated with the retail of beer in the on-trade where it is served on draught (as opposed to in bottles). These higher initial set-up costs relate to the costs of establishing a cellar to store the beer in and keep it cool, as well the dispense equipment required to link the beer kegs in the cellar to the beer taps at the front of house. On an ongoing basis, the costs of unloading and initial set up for beer are more material than for either wine or spirits. In the case of draft beer, casks must be loaded onto stillage, old product cleaned out of the pipes, the casks tapped, the piping

¹⁹ See: <http://tablascreek.typepad.com/tablas/2009/02/wine-markups-at-the-wholesale-restaurant-and-retail-level.html>.

²⁰ See: <http://yourbusiness.azcentral.com/retail-markup-liquor-27837.html>.

²¹ See: <http://smallbusiness.chron.com/price-bar-drinks-12936.html>.

attached and the new product pulled through. This is a notable additional resource cost for beer, as there are no corresponding actions required for wine or spirits.

In terms of the costs actually incurred by the on-trade retailers in storage and maintenance, interview evidence suggested that the cost differences across beverage types are effectively negligible. There are some additional costs associated with beer, such as the cooling of the storage cellar and the cleaning of pipes, but these costs are fairly marginal when considered across the total amount of beer served. It should also be noted that wine may also incur refrigeration costs, as do spirits indirectly in terms of the costs of producing (or in some cases purchasing) the ice that typically goes into spirit-based drinks. The interview evidence suggested no major differences in the serving costs, in terms of labour input, for the different types of alcoholic beverages. That said, when compared in terms of litres of finished product, it seems logical that serving a litre of spirits (e.g. through 40 shot servings) could be more time intensive than serving a litre of wine or beer, but this may depend on many other factors.²²

Overall, our research suggests that there are some differences in the costs incurred at the retail on-trade stage of the supply chain across beer, wine and spirits (in terms of litres of finished product). In particular, while the effort required to serve a litre of spirits may be slightly more than that to serve a litre of beer or wine, more effort is required in the cooling, storage and handling of beer than for either spirits or wine. Taken as a whole, however, these differences largely even out such that overall we did not find any reported material differences in the total on-trade retailing costs for the different beverage types.

Given no material differences in the costs per litre of finished product for set-up and storage, when costs are expressed per litre of pure alcohol, the cost of on-trade beer retail will be in the order of 8 times more than spirits and 3 times more than wine (using alcoholic strengths of 4.5%, 12.5% and 37.5% for beer, wine and spirits respectively). This reflects the large volume of beer in the on-trade which requires more effort in unloading and more space for storage. Such higher costs will compensate for any differences in the costs of serving per litre of finished product.

4.2 Retail off-trade

Retail off-trade refers to the sale of alcoholic beverages in premises which are then consumed off premise, e.g. supermarkets, grocers and off-licences. This continues to represent a growing proportion of total sales of alcoholic beverages.

The retail off-trade part of the supply chain captures all the things that happen from the point of delivery of the product at the premises to the point of sale of that product on those premises. Similar to the retail on-trade, this can be thought of as primarily three activities: unloading; storage; and sale.

4.2.1 Retail off-trade mark-up

In terms of the off-trade retail channel, mark-ups are typically in the same region for all of the individual alcohol beverage types, with retailers typically applying mark-ups in the region of 20% to 35%.²³ In the case

²² The cost of serving spirits are dependent on the exact form in which the spirit is served (i.e. straight, with mixer or in a cocktail), but on average the overall on-trade costs per litre of finished product for spirits are found to be constant and equal to that of wine and spirits.

²³ Several commentaries and advisory blogs for independent retailers suggest and recommend that beer should be marked up in the region of 25-35% in the off-trade. Having reviewed many online sources, quotes include “from my experience, it is anywhere from 20-35%”, “a 25% mark-up on all bottles”, “25-30% is standard” and “retail stores usually mark up 25-30%” (see: <https://www.beeradvocate.com/community/threads/retail-mark-up.31383/>). A very similar picture is found in the wine industry, where one source suggests margins in the region of 20%, which equates to a mark-up of 25% (see: <http://gavinquinney.com/2014/02/05/where-the-money-goes-on-a-bottle-of-wine-in-the-uk-2/>). In the case of spirits, data for the UK gin industry provides an average mark-up in the region of 30%.

of large-scale retailers (big supermarket chains), mark-ups may be lower than this, as these retailers look to cut margins in order to attract more customers.

It is clear that retail mark-ups in the off-trade are significantly lower than in the on-trade, across all types of alcoholic beverage. This is, in part, a reflection of the additional costs in retailing these beverages in the on-trade relative to the off-trade, mainly due to serving the beverage (e.g. the cost of additional ingredients and staff service time) and amenities offered in such places (music, entertainment and serving of food).

4.2.2 Retail off-trade cost drivers

The existing literature and the interviews conducted have provided little evidence to suggest that there is any material differences in the costs associated with selling beer, wine and spirits in the off-trade.

In terms of storage, off-trade retail outlets typically sell a mixture of refrigerated and non-refrigerated alcoholic beverages. However, costs associated with this are unlikely to be material.

There are also no clear reasons why the costs of unloading and sale would differ significantly across alcohol beverage types, i.e. it would cost the same to unload, store and sell a volume of a finished alcohol beverage regardless of whether it was beer, wine or spirits. It may be that specialist wine merchants are more commonplace than specialist beer or spirits merchants, and this comes with higher associated staff costs, as these people are trained in understanding the different wines and describing them to customers as part of the sales process. However, specialist stores represent a small fraction of the total off-trade market and, therefore, this is unlikely to have any material impact on cost differentials. In the UK for example, independent specialist retailers accounted for only 10% of the wine market by value (and 9% by volume) in 2014.²⁴ The equivalent figures for France are 11% and 10% respectively (for 2012). It may also be the case that the higher value of spirits and wine mean these products may require more supervision and anti-theft mechanisms (although these costs are likely to be small).

As in the on-trade, it is difficult to distinguish the costs of retailing the different alcoholic beverages. However, the volume argument would mean that off-trade costs for beer (in terms of pure alcohol) would also be in the order of 8 times more than for spirits, 3 more than for wine. Again, this reflects the large volume of beer which would require more storing space and handling costs per litre of pure alcohol.

²⁴ See: ProWein (2015), "Wine retail trends in Germany, UK, USA, Australia, Japan, France, Spain and Italy".

5 Summary

This study has analysed the comparable supply chain costs of beer, wine and spirits, by investigating costs at the three key stages of the supply chain: production; distribution; and retail (the costs of raw material inputs and packaging have been assessed as part of the production stage).

The key findings for each of these stages of the supply chain are the following.

The **production stage** drew on quantitative analysis to estimate the costs per litre of finished product at €0.74 for beer, €1.38 for wine and €2.50 for spirits. When this is expressed in terms of costs per litre of pure alcohol (using typical abv figures of 4.5%, 12.5% and 37.5% for beer, wine and spirits respectively), the corresponding cost figures become €16.54 for beer, €11.00 for wine and €6.65 for spirits. This means that, in terms of pure alcohol, beer production is 2.5 times more costly than spirits production and 1.5 times more costly than wine production. When excise duty is added to the cost per litre of pure alcohol (using the minimum rates specified in the EU Minimum Rates Directive), the costs are increased to €18.41 for beer and €12.15 for spirits, with the costs for wine unchanged at €11.00 (as there is no minimum excise duty for wine). This shows that beer production, in terms of cost per litre of pure alcohol, remains the most expensive once excise duty is applied.

The **distribution stage** is found to represent a small proportion (about 9 per cent) of total supply chain costs. Evidence suggests that there are no material differences in the costs of distribution across the different types of alcoholic beverage for a litre of finished product. In other words, the costs of distributing a litre of liquid are broadly the same regardless of whether this is in the form of beer, wine or spirits. This by extension means that, when considered in terms of costs per litre of pure alcohol, beer is significantly more expensive to distribute than wine (3 times greater) and spirits (8 times greater).

The **retail stage** of the supply chain is considered both in terms of the on-trade costs and the off-trade costs. In the on-trade, interviews typically acknowledged no significant differences across drink types, with mark-ups typically in the region of four times the cost price, although beer mark-up could in some cases be as low as 2 times cost price. Evidence suggests some cost differences per litre of finished product in the on-trade (e.g. higher serving costs for spirits, but higher unloading, storage and set-up costs for beer). Given no material differences in the costs per litre of finished product, when costs are expressed per litre of pure alcohol, the cost of on-trade beer will be in the order of 8 times more than spirits and 3 times more than wine. Off-trade retail costs were found to be significantly lower than for the on-trade (with the retail off-trade mark-ups also significantly lower), but in terms of cost comparability the same picture holds as for the retail on-trade: i.e. the cost of beer per litre of pure alcohol remains the highest.

6 Annex 1: Methodology and Data

We have used a number of different data sources to identify the relevant supply chains for each beverage category, and to estimate the cost share parameters (share of costs between different stages of the supply chain, and the share of costs between the different sales channels).

Eurostat

The Eurostat structural business statistics (SBS) provide data on the structure, conduct and performance of businesses in the European Union. Data are available for all member states of the EU. The SBS are based on data from enterprises, or parts of enterprises, which are classified by their principal economic activity based on the NACE (NACE Rev. 2) system of classification of economic activities.

SBS contain data (available up to 2014) on the following relevant industrial categories:

- manufacture of beer (NACE C1105);
- manufacture of wine from grape (NACE C1102); and
- distilling, rectifying and blending of spirits (NACE C1101).²⁵

For each of these NACE codes, a range of industry metrics are available. The relevant variables for use in our study are:

- gross operating surplus (V12170);
- personnel costs (V13310);
- total purchases of goods and services (V13110); and
- turnover (V12110).

We define each of these variables in turn.

‘Gross operating surplus’ is defined in Eurostat as the “surplus generated by operating activities after the labour factor input has been recompensed”. Thus it is the value added by the production process less the personnel costs. Gross operating surplus includes the depreciation and amortisation of the existing capital stock, as well as the returns on the capital invested (i.e. the profit), but does not provide a breakdown of these components, unlike the company level data which we discuss in Section 0 below.

‘Personnel costs’ is defined in Eurostat as the “total remuneration, in cash or in kind, payable by an employer to an employee...”. This includes wages and salaries, whether based on working time or output, and whether paid regularly or ad hoc (e.g. performance bonuses and ex gratia payments), as well as any additional allowances, e.g. for living, transport and night work. The other key components are taxes and, both compulsory and voluntary, social security contributions (e.g. for pensions, sickness and maternity).

‘Total purchases of goods and services’ is defined in Eurostat as “the value of all goods and services purchased... for resale or consumption in the production process, excluding capital goods”. It, therefore,

²⁵ According to Eurostat Methodologies and Working Papers, “NACE Rev. 2 - Statistical classification of economic activities in the European Community”: manufacture of beer (NACE C1105) includes the manufacture of malt liquors, such as beer, ale, porter and stout, and the manufacture of low alcohol or non-alcoholic beer; manufacture of wine from grape (NACE C1102) includes the manufacture of wine, sparkling wine, wine from concentrated grape must and low or non-alcoholic wine, and the blending, purification and bottling of wine, but excludes merely bottling and labelling; and distilling, rectifying and blending of spirits (NACE C1101) includes the manufacture of distilled, potable alcoholic beverages (whisky, brandy, gin, liqueurs etc.), the manufacture of drinks mixed with distilled alcoholic beverages, blending of distilled spirits and production of neutral spirits.

includes goods and services sold with or without any further transformation, goods and services completely used up by the production process, and goods and services added to firms' stock.

'Turnover' is defined in Eurostat as "the totals invoiced by the observation unit during the reference period, and this corresponds to market sales of goods or services supplied to third parties". It includes duties and other non-deductible taxes, but excludes VAT and other deductible taxes directly linked to turnover. It excludes income classified as other operating income, financial income and extraordinary income.

We calculated the share of each of these variables as a percentage of the sum of the three variables. It is important to note that we did not calculate shares as a percentage of production value, as the Eurostat variable 'production value' contains additional items that are excluded from the summation of the above three variables, namely: taxes; changes in stock; and some purchases.

PRODCOM

PRODCOM provides statistics on the production of manufactured goods for enterprises active in the mining and manufacturing sectors (NACE Rev. 2, Sections B and C). The basic building blocks for PRODCOM are the European Classification of Economic Activities (NACE) and the European Classification of Products by Activity (CPA). The list of products is therefore developed in close association with these two nomenclatures.²⁶ We use PRODCOM codes which link to NACE categories C1105, C1102, and C1101 (for beer, wine and spirits, respectively).

PRODCOM categories are provided in Table 7.1, together with the name used in this study.

²⁶ Specifically, products are identified by an 8-digit code: the first four digits are the classification of the producing enterprise given by the Statistical Classification of Economic Activities in the European Community (NACE) and the first six correspond to the CPA; the remaining digits specify the product in more detail.

Table 6.1: PRODCOM: Definitions and categories included in our analysis

Name	Definition
Beer	11051000: Beer made from malt
Whisky	11011030: Whisky Includes whisky of different types, i.e. both Bourbon and Scotch whisky
Rum	11011040: Rum and other spirits obtained by distilling fermented sugar-cane products It includes various Rums as well as other spirits obtained by distilling fermented sugar-cane products
Gin	11011050: Gin and geneva
Vodka	11011063: Vodka
Strong spirits	11011080: Spirits, liqueurs and other spirituous beverages This includes other spirits, liqueurs and spirituous beverages such as Vodka more than 45.4%, Liqueurs and cordials, Arrack, Ouzo, Tequila;
White PDO	11021211: White wine with a protected designation of origin (PDO) Includes white wine, such as Bordeaux, Burgundy, Loire Valley, Mosel.
Semi-sparkling	11021215: Wine and grape must with fermentation prevented or arrested by the addition of alcohol, put up with pressure of CO ₂ in solution ≥ 1 bar < 3 , at 20C This includes wines such as the Spritzig, Frizzante and Pétillant types which have the same “mushroom” stoppers as Champagne but, conversely to standard sparkling wine, they are characterised by a range of 1-3 atmospheres of pressures (sparkling wine such as champagne is defined as any wine with an excess of 3 atmospheres in pressure).
Red PDO	11021217: Quality wine and grape must with fermentation prevented or arrested by the addition of alcohol, with a protected designation of origin (PDO) produced of an alcoholic strength of $\leq 15\%$ Includes wine, such as Bordeaux, Burgundy, Beaujolais, and Côtes-du-Rhône (and others).
Non-PDO	11021220: Wine and grape must with fermentation prevented or arrested by the addition of alcohol, of an alcoholic strength $\leq 15\%$ Includes Non-PDO white and red wines. This category includes protected geographical indication (PGI) wines and others
Categories excluded	11011020: Spirits obtained from distilled grape wine or grape marc 11011065: Spirits distilled from fruit 11011070: Pure alcohols 11021130: Champagne 11021190: Sparkling wine from fresh grapes 11021231: Port, Madeira, Sherry and other $> 15\%$ alcohol 11021250: Grape must (excluding alcohol duty) 11031000: Fermented beverages and mixtures thereof (including with non-alcoholic beverages, cider, perry and mead; excluding malt beer, wine of grapes flavoured with plants or aromatic substances) 11041000: Vermouth and other wine of fresh grapes flavoured with plants or aromatic substances

PRODCOM provides the statistics of value and the physical volume of production sold in 2014. These variables are defined as follows:

- Volume: the physical volume of production sold is defined as the production sold outside the enterprise during the reference period (2014). It is expressed in the volume unit specified in the corresponding PRODCOM list, which is litre for beer and wine and litre of pure alcohol (100%) for spirits.

- Value: the value of production sold in 2014 is provided in Euros. The Member States report in national currency which is converted if necessary to Euros by Eurostat before publishing. All the data reported by PRODCOM excludes alcohol duties and VAT.
- Unit value: The unit value is provided in Euro and refers to the value per unit of volume.

There are some gaps in PRODCOM data and this can happen for two reasons: the data is either confidential or missing. For year 2014, confidential data represent only 4-6% of total production of the individual Member States (the same order of magnitude for the countries in our analysis).

Moreover, there are cases where only volume (or value) data is reported as confidential. In those cases, we look at the average unit value of comparable products and made assumptions accordingly. At the EU aggregate level, however, confidential data is included in the calculations. Eurostat is indeed able to publish EU figures containing confidential data if this can be done without revealing the confidential items within the total. In this way, statistics related to the EU28 group would not be affected by the confidentiality constraint. Similarly, if data is missing for one or more Member States, an estimate is made by Eurostat. The estimate itself is not published, but it is included in the corresponding EU total as well, which is then marked as estimated.

Company reports

Company reports and financial data on publicly-listed companies have been accessed through Bloomberg. The selection criteria of companies was related to relevant products ('brewers' and 'distillers and vintners') and countries of the analysis (Czech Republic, France, Germany, Poland, Spain, Sweden and UK). This initial filtering found a total of 19 breweries and 28 distillers and vintners.

Further scrutiny of the data led to the exclusion of four breweries, ten wineries and one distillery. Companies were excluded on the following bases:

- Significant secondary revenue streams (this could be either due to significant revenues from operation in other markets or in other stages of the supply chain (e.g. primarily a distributor)).
- Manufacture of a non-market representative product (e.g. champagne).
- Insufficient data.

Once these exclusions had been made, this led to a final sample of fifteen breweries, ten wineries and seven distilleries. Relevant data for these companies were collected from 2015 income statements (and in a small number of cases from earlier income statements, where the 2015 data were not available).

For each company, data were collected on variables relating to²⁷:

- **Company revenue** defined as the total of operating revenues less various adjustments to gross sales.²⁸
- **Purchase costs** defined as "raw materials and consumables used".
- **Labour costs** defined as "wages and salaries" plus "social security costs".
- **Capital costs** defined as "depreciation [of tangible assets] and amortization [of intangible assets]".
- **Operating margin** defined as "operating income (loss)" which is "revenue" plus "other operating income", less "operating expenses".
- **Other operating income/expenses** defined as the residual of company revenue less costs and operating margin.

²⁷ The precise variables included in income statements vary slightly across companies. When 'raw materials and consumables used' was not available the following variables were used: 'cost of materials'; 'cost of purchased services'. When 'wages and salaries' and 'social security costs' were not available we used: 'personnel costs'; or 'salaries, wages and employee benefits'. When 'depreciation and amortization' was not available 'depreciation expense' plus 'amortization of intangible assets' was used.

²⁸ Adjustments include returns, discounts, allowances, excise taxes, insurance charges, sales taxes and value added taxes.

The residual 'other operating income/expenses' can be interpreted as additional purchase costs that are not captured as part of "raw materials and consumables used". This is because labour costs are already fully captured in "wages and salaries" and "social security costs", while capital costs are already fully captured by "depreciation and amortization".

Therefore, total purchases are calculated as the sum of "raw materials and consumables used"

Desk-based research

Desk-based research was undertaken to provide another potential source of evidence on cost shares, as well as to provide information on distribution and retail mark-ups (in the on- and off-trade). The research covered articles, blogs, specialist websites and other sources, drawing on various sources to provide more robust estimates of the variables in question. Greater weighting was placed on data from more recently published and reputable sources.

Consultation with national associations

We undertook interviews with national brewers associations of the Member States covered by this study to ask for their views on the supply models prevailing in their countries and any key performance indicators they may hold for their respective brewing sectors. In particular, the engagement with national associations asked them to:

- sense check our estimates of unit manufacturing costs based on PRODCOM data; and
- explain the costs incurred at subsequent stages of the supply chain, i.e. distribution and retail, including any significant differences in costs across types of alcoholic beverage.

Interviews with industry experts

We also carried out a small number of in-depth interviews with industry experts. These experts have been identified by our contacts with the national brewers associations. The main aim of the engagement with industry experts was to understand their views on the distribution and retail stages of the supply chain.

Brewing companies

Data from the recent report "The Contribution made by Beer to the European Economy, 2016" was available for this study on: company performance; economic indicators for distribution channels and payments to suppliers; and important ongoing developments, opportunities and threats in the beer sector.

We have investigated this data thoroughly for use in this study. However, we have found that the data lacks credibility, insofar as the data were showing GOS shares well in excess of those expected based on desk-based research, with half of respondents indicating a GOS share in excess of 30 per cent, which we consider unrealistic. This may in part be attributable to the way in which the large breweries, with multinational operations, record their profits, or to errors in the recording of the data provided.

7 Annex 2: Additional Analysis

This annex covers additional evidence used for the comparison of data provided by different sources, and the results of the sensitivity analysis undertaken as part of Chapter 2.

Comparison with other data sources

The percentage shares of the different cost components are very similar across different data sources investigated for this study (Table 7.1).²⁹

- For beer, the main differences are in the share of labour provided by Bloomberg (22% compared to around 15% in Eurostat and PwC). There are also differences in the share of operations provided by PwC (32%) compared to around 25% in Eurostat and Bloomberg. However, the cost shares obtained are of similar magnitudes. The margins show slightly higher values for Eurostat (10%) compared to Bloomberg (8%) and PwC (7%) but such differences are very small.
- For wine, there are similarities in the values of margins provided by the two most recent sources (around 8% in Bloomberg and Eurostat), but the values are much lower for PwC data (the differences may be due to the period being used, as PwC refer to 2007). It is important to note some differences in the materials provided in Eurostat (60%) compared to around 53% for Bloomberg and PwC; and the labour share costs in Eurostat (9%) compared to 16% for the other sources.
- For spirits, the margins provided by the three different sources are of a similar magnitude and around 18%. There are no significant differences between the figures provided by Bloomberg and Eurostat, but there are some differences between those sources and PwC. The differences may be attributed to the different reference period of the figures being used.

Table 7.1: Cost shares based on company reports (5 cost categories)

Sector	Materials	Labour	Capital	Operations	Margins	Source
Beer	39%	22%	7%	24%	8%	Bloomberg (2015)
Beer	41%	15%	9%	25%	10%	Eurostat (2013)
Beer	41%	14%	6%	32%	7%	PwC 2010
Wine	54%	16%	3%	17%	9%	Bloomberg (2015)
Wine	60%	9%	3%	19%	8%	Eurostat (2013)
Wine	52%	15%	3%	27%	3%	PwC 2010
Spirits	21%	14%	4%	44%	17%	Bloomberg (2015)
Spirits	21%	10%	4%	46%	18%	Eurostat (2013)
Spirits	36%	8%	1%	36%	19%	PwC 2010

Since all data sources estimate similar margins, the analysis is robust to the source of data used (the only exception is the low value encountered for the margins of wine using PwC data, but we attribute this

²⁹ Data from the International Brewers Questionnaire (IBQ data) have been investigated thoroughly but were excluded from the analysis. This is because the data were showing GOS shares well in excess of those expected based on desk-based research, with half of respondents having a GOS share in excess of 30 per cent, which we consider unrealistic. This may in part be attributable to the way in which the large breweries, with multinational operations, record their profits, or to errors in the recording of the data provided.

difference to the time period being used). In any case, to analyse the dependency of our results on the assumptions used, we conduct sensitivity tests by changing some of the figures used (further below).

Sensitivity analysis

In this section, we provide some sensitivity analysis of our results in relation to some of the data used.

We first analyse the sensitivity of the results when changing the production margins. In our analysis we have used margins of 10 per cent, 8 per cent and 18 per cent (for beer, wine and spirits, respectively). To illustrate the sensitivity of our results to the margins used, we take a very extreme case where the shares of production costs are very low for beer and very high for wine and spirits. The assumptions made are:

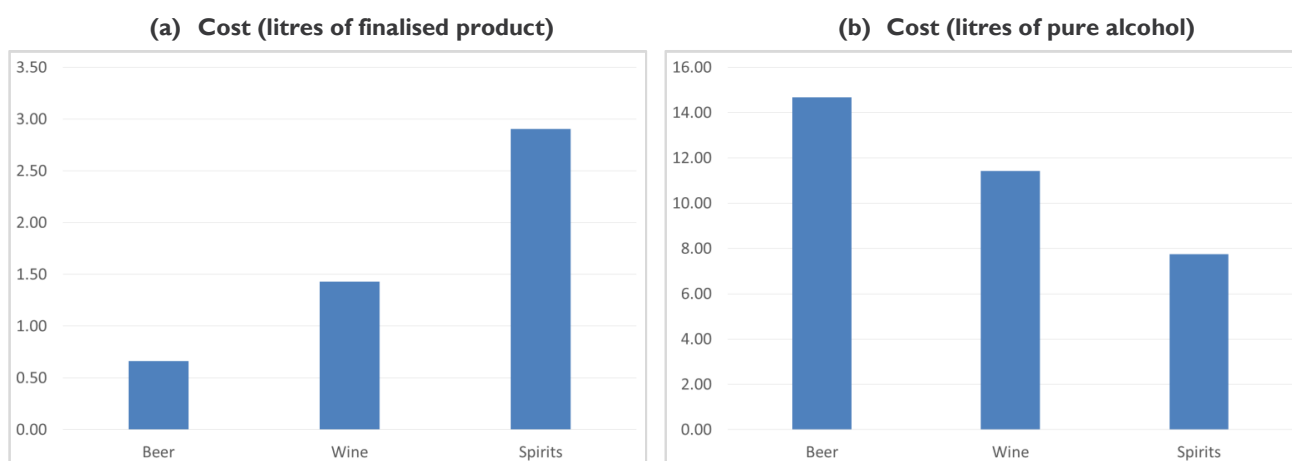
- 80 per cent production costs for beer (i.e. a 20 per cent margin),
- 95 per cent production costs for both wine and spirit (5 per cent margin).

We believe these are unrealistic assumptions (spirits, particularly, tend to apply higher margins), but it is nevertheless helpful to understand the influence of such assumptions on the results.

Our results under these extreme assumptions change very little: production costs become €0.66, €1.43 and €2.90 per litre of beer, wine and spirit respectively, while the corresponding costs for a litre of pure alcohol are €14.67, €11.43 and €7.74 (Figure 7.1). This implies that alcohol produced through beer is:

- 1.9 times more costly to produce than spirits (compared to 2.5 without extreme assumptions);
- 1.3 times more costly to produce than wines (compared to 1.5).

Figure 7.1: Sensitivity on costs of production (€)



Source: PRODCOM; Europe Economics calculations.

In a second step we have experimented with some other assumptions of alcohol content (abv). When using a 45 per cent abv for spirits this would result in a cost per litre of pure alcohol equal to €5.54. This would make the costs of spirits even lower compared to beer (it would cost three times as much to produce pure alcohol using beer than using spirits).

The results of the analysis showed robustness to the different specifications used. We can therefore assert that the main cost driver is derived from the unit costs of production (and not from difference in the margins or abv figures being used in the analysis).



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