# Is the policy of progressive beer duty working as intended?

A report for the Society of Independent Brewers (SIBA)

Cebr

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**Cebr, London**

# Contents

# Executive Summary

This is a short summary of Cebr's study, on behalf of the Society of Independent Brewers (SIBA), on the Progressive Beer Duty system in the UK. The report examines the current system of excise duty relief, analysing its current structure in terms of levels of relief and the process of tapering these benefits. The report also aims to assess the economic impact of the UK's small and independent brewing sector that the relief system is designed to support.

## Markey entry and exit

- The Brewery Manual 2017 reports 1,544 commercial breweries at the end of 2016. This constitutes a doubling in eight years or compound annual growth of 10% per annum. The British Beer and Pub Association reports on the total number of registered brewers, including hobby brewers, and presents a longer time series. This suggests that growth in the number of breweries was strong in the period 2002-2009, in the years following the introduction of the PBD system in 2002. But the period 2010-2013 shows even stronger growth.

- To glean further insight, we examined data on brewery openings and closures from the Brewery Manual 2017. After a period of four years during which the number of breweries opening in the UK increased strongly, the number has decreased sharply in 2014. Strong growth in the 2010-2013 period coincided with the 'craft beer revolution' gathering steam in the UK. This explosion in consumer demand for new and diverse ranges of craft beer led to a significant quickening of the pace of new brewery openings.

- The 2002-2009 period should offer a more accurate representation of the impact of the PBD system operating in isolation. The much stronger growth in the 2010-2014 period can be viewed in terms of the combined effect of Small Brewer's Relief and the perceived commercial opportunities offered by the craft beer revolution.

- On the other side of the coin, the number of brewery closures has been trending upwards since 2012, and more noticeably so since 2014. In fact, the number of brewery closures reached a peak in 2014, when 65 closed, a year after the peak was reached in terms of new openings. All of this points to an intensification of competition in the market and a need for small brewers to work harder to ensure survival.

- Net growth in brewery numbers has dropped remarkably in 2016, from a net increase of 101 in 2015 to a net increase of only 2 in 2016. The combination of this evidence seems to indicate that the number of new breweries in the UK is not likely to continue to increase at previous levels, and the total number may even have already begun to plateau.

## SBR, economies of scale and market access

- Analysing the detailed revenue, cost and production data sourced by SIBA from a small sample of its member breweries, a simple visual examination of the data reveals that the brewery with the highest average cost (both underlying and including beer duty) is the brewery with the third lowest level of production. Likewise, it is not unreasonable to conclude that the majority of breweries with the lowest average cost per hectolitre produced are the ones with the highest production volumes.

- There are undoubtedly outliers in the sample, but these are likely to be driven by one or any combination of three main factors: (i) differences in the strength of the beer being produced and

sold; (ii) the mix of production for the domestic market, on which duty is paid, and the export market, on which UK duty is not levied; and/or (iii) packaging requirements, with higher proportions of small pack sales (e.g., single-serving bottles, as opposed to kegs and barrels), as may be more common for small breweries, driving higher costs.

- While there is some evidence of a closing of the gap between the average cost of small and large brewers when duty is included, it is difficult to see how, in the majority of cases, smaller brewers could reasonably be expected to compete with the levels of average cost (incl. duty) apparent at higher levels of production. In other words, it would be difficult to conclude that SBR is doing enough to bridge the cost competitiveness gap between large and small brewers.

- The statistical relationship between scale and underlying average cost (excl. duty) apparent in the data, and our econometric testing of that relationship, certainly support the proposition that there are underlying economies of scale in beer production.

- However, the statistical relationship between scale and average cost incl. duty also suggests the presence of economies of scale that, on the face of it, appear only slightly weaker than in the case of underlying average cost. Therefore, while it is difficult to be conclusive given the small sample size, it is certainly not possible to conclude that SBR is doing enough to bridge the gap in underlying unit costs of production between smaller and larger breweries arising from the economies of scale benefiting the latter.

- This, in turn, raises questions as to whether SBR, as currently designed, does enough to improve the survivability of small brewers. In turn, this has a bearing on whether market access, competition and diversity in the domestic beer industry to the benefit of consumers can be said to have genuinely improved.

## Prices and margins: are there adequate incentives to expand?

- The data for the 21 breweries in our sample reveal a weak negative relationship between scale of production and average sale price achieved per hectolitre of beer sold. But this appears confined to small-scale producers with the average price appearing to level out beyond a certain scale. This is not inconsistent with the proposition of a highly competitive marketplace. To explain this, we can point to some of the idiosyncracies of the market:

  - One possible reason for the higher average sale price per HL achieved by smaller breweries would be that they have a higher share of small-pack sales, which would mean higher packaging costs. This would reflect strongly in their higher average cost per HL. These higher costs are likely to be reflected in higher prices as they seek to recoup some or all of these higher costs – all the more difficult in a market that is as price competitive as the statistical relationship between scale and price suggests.

  - At higher levels of production, there can be expected to be general downward price pressures either because of a need to sell the higher volumes produced or because only larger brewers are in a position to deal with larger customers who demand highly competitive prices, both in the on-trade and off-trade channels. In other words, bulk discounting can be expected when dealing with large customers who have greater bargaining power but who also offer certainty (of demand) for a brewer's beer.

- Across the sample, as production volume increases, the underlying average cost of production per HL (excl. duty) as a percentage of achieved sale price per HL, broadly decreases. While SBR appears to

mitigate somewhat the magnitude of these differences, the situation looks financially precarious for many, with one-third selling their beer at an average sale price that is equal to or lower than their average cost of production. Furthermore, even for those breweries showing an average achieved sale price that is greater than their average cost per HL, even small reductions in price or small increases in cost could jeopardise their financial sustainability.

- The data suggest that, anywhere up to at least a scale of 10,000 HL, there is no guarantee that a brewery will manage to cover its costs and make a reasonable rate of return on capital employed. This may well be dampening the incentive to expand from the very small scale to levels up to 10,000 HL because, until that kind of scale is reached, breweries are faced with the prospect of accumulating significant losses before they reach a point where they can secure a stable margin in price above average cost.

- Finally, we assess the relationship between scale and margins specifically. This suggests that margins increase with scale up to between 15,000 and 20,000 HL, at which point they begin to decline, in line with the aforementioned increasing prevalence of volume discounting as the brewery increases in size.

- However, it is clear that, at smaller scales of production, there is an area of significant uncertainty. Our analysis suggests that, at any scale between 0 and 10,000 HL, a brewery could be equally likely to make a loss on each hectolitre of beer sold as it is to make a profit. The outcome for any particular brewery will depend on their specific circumstances – the differing strength of the beer being produced and sold, the mix of domestic- vs. export-oriented production and differing packaging requirements.

- This picture will undoubtedly impact decision-making not only on whether to enter the brewing market in the first place, but also on whether to invest more heavily in it through expansion. Expansion involves commercial risks and brewers faced with a decision on expansion must have an expectation of achieving margins that will cover their costs and provide a reasonable rate of return that covers the cost of financing the outlay and rewards the risks involved in doing so.

- The analysis above suggests that, unless brewers are already close to or at the 10,000 HL level, there are not strong incentives to expand from levels of production on which breweries are managing to sustain healthy margins at their current scale of production. The uncertainty surrounding whether it is possible to achieve sustainable margins before reaching a scale approaching 10,000 HL, which could require time and multiple further waves of investment and demand growth, will certainly dampen enthusiasm for any brewery looking to expand to anything below the 9,000 HL level from where they are today, especially if they are managing to carve out healthy margins at their current scale of production. This is counter-productive from an efficiency perspective as brewers need to achieve scale to realise the corresponding cost reductions that allow lower prices to be charged to consumers, thus further enhancing competition in the market.

- While this evidence cannot be said to be conclusive, due to the small sample size, Cebr would hold the view that an isolated examination of production for the domestic market only would serve to strengthen the conclusions arising from the limited analysis contained herein. We would expect such an analysis to reveal even less favourable results from the point of view of the small independent brewer looking to enter or expand their existing small presence.

# 1 Introduction

This is a report by the Centre for Economics and Business Research (Cebr), on behalf of the Society of Independent Brewers (SIBA), on the Progressive Beer Duty (PBD) system in the UK.

Cebr was commissioned by SIBA to examine the current system of excise duty relief, analysing its current structure in terms of levels of relief and the process of tapering these benefits. The report also aims to assess the economic impact of the UK's small and independent brewing sector that the relief system is designed to support.

Our analysis of PBD is couched in terms of the original objective of Small Brewers Relief (SBR), which was to improve market access and increase competition and diversity in the market.

The report is separated into four sections. The first provides an overview of the UK beer industry and explores historic trends in the size of the industry and in beer sales. Key policy trends that have affected the industry are also reviewed in this section.

Second, we examine trends in the total number of brewers in the market as the starting point in assessing whether the PBD system has increased the rate of business formation within the UK's brewing industry. We also consider recent trends in openings and closures, which provides insights on the most likely driver, the intensification of competition in the market.

Thirdly, using information from a sample of breweries collected as part of a survey of SIBA's members, we analyse production costs, sales prices and margins. These, when analysed with and without beer duty under the PBD regime, can be used to understand the underlying cost structure of independent brewers and whether Small Brewers Relief alters the cost structure in favour of smaller brewers who do not benefit from economies of scale like the larger brewers in the manner intended by the policy. As part of this, we assess whether the level and structure of the current beer duty system provides a disincentive for smaller brewers to increase production – a criticism often levelled at the current regime.

Finally, we quantify the economic impact of SIBA's membership as a proxy for the UK's small and independent brewing sector.

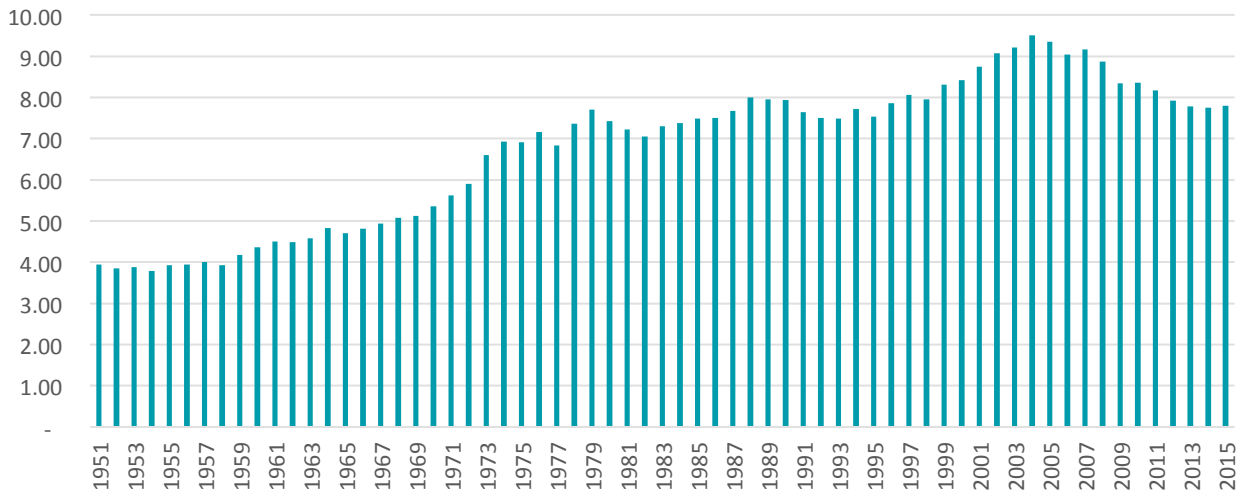
# 2 Excise duties and the UK beer industry

After a period of elevated consumption in the late 1990s and early 2000s, per capita alcohol consumption declined for more than a decade and now stands at levels not seen since the early 1990s. While consumption has varied over the course of the 20th century, recent history represents a sustained and significant decline in per capita alcohol consumption as shown in Figure 1.

## 2.1 Structural trends in the beer market

In 2015, alcohol consumption per capita stood at 7.8 litres per head. This constitutes an 18% decline since the 2004 peak of 9.5 litres per head.

*Figure 1: Alcohol consumption per capita, litres per head*



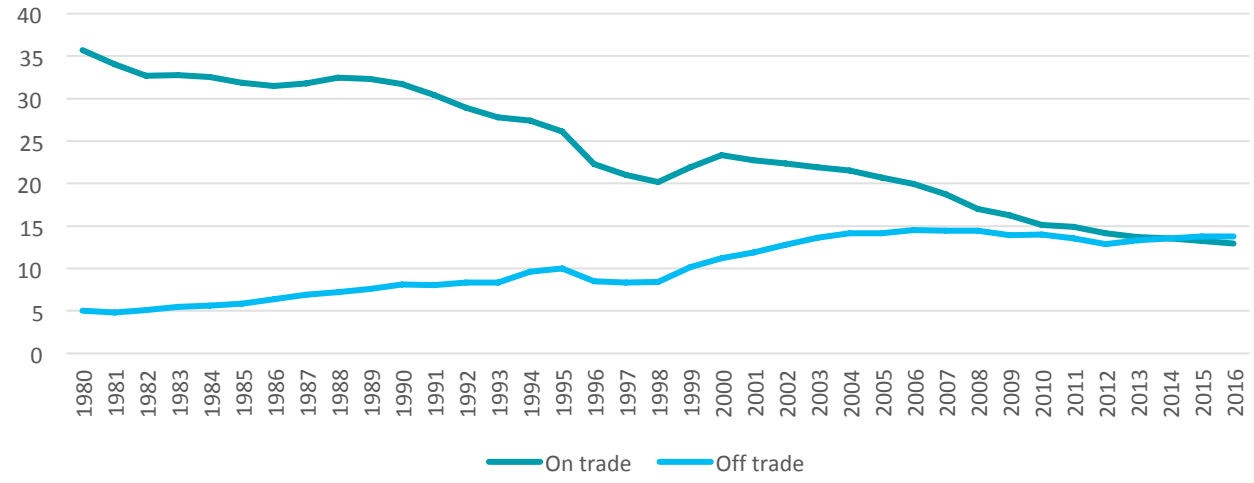

*Source: British Beer and Pub Association, HM Revenue & Customs*

An important element of the story of this decline relates to the difficulties faced by the UK beer industry. The sector remains an important contributor to UK economy. However, it has witnessed a structural decline in sales since the 1980s. In particular, there has been a significant contraction in the volume of beer consumed through the "on-trade" – which includes restaurants, hotels and pubs.

In 2016, sales through the on-trade channel were just under 13 million barrels, a value well below the annual 30 million barrels or more seen in the 1980s. Over the three decades between 1980 and 2016, sales through this channel fell by 64%, largely mirroring the decline seen across a number of industrial and manufacturing industries in Britain since the 1970s.

The off-trade channel overtook the on-trade in terms of market share in 2014 and, by 2016, the volume of beer released through the off-trade exceeded the on-trade by almost 1 million barrels. But, despite this substantial growth in the off-trade channel (175% over the same time period), overall consumption of beer in the UK has fallen by more than a third (34%) over the three decades to 2016.

*Figure 2: Beer quantity released for UK consumption, million barrels*




*Source: British Beer and Pub Association, HM Revenue & Customs*

The structural changes observed in the industry in terms of beer sales has resulted from a combination of forces, such as cultural shifts and changes in taxes and regulation. These, alongside competition and promotional activities in the retail sector, have led to the growth in sales of alcohol in the off-trade for consumption outside of pubs and bars. With the former being particularly associated with the consumption of beer, it is beer sales that have been hit the hardest. Beer has been the main driver of the overall reduction in per capita alcohol consumption outlined above.

While the fall in the relative price of off-trade alcohol is likely one of the major forces at play, the rise in excise duties placed on beer, particularly relative to other alcohol products, is also likely to have played a role.

## 2.2 Beer duty and how it compares to other alcohol duties

Excise duty on beer is the oldest source of revenue still collected by the UK Government, being introduced properly on beer in 1643 in order to raise cash for Parliamentary forces during the civil war. After a period during which duties were levied on the inputs into the brewing process, rather than on the beer itself, the Inland Revenue Act of 1880 replaced duties on malt and sugar with Beer Duty, with rates based on the strength of the beer. From 1993, the wort[1] based system was changed so that beer duty was charged according to alcohol by volume (abv) – the alcoholic strength of the beer. In general, the current system means that breweries pay a flat rate of excise duty per hectolitre per percentage of alcohol content.

Whilst excise duty on spirits was frozen over the decade to 2007, duty on beer was increased broadly in line with the rate of inflation, as measured by RPI. This allowed the price of spirits relative to beer to fall.

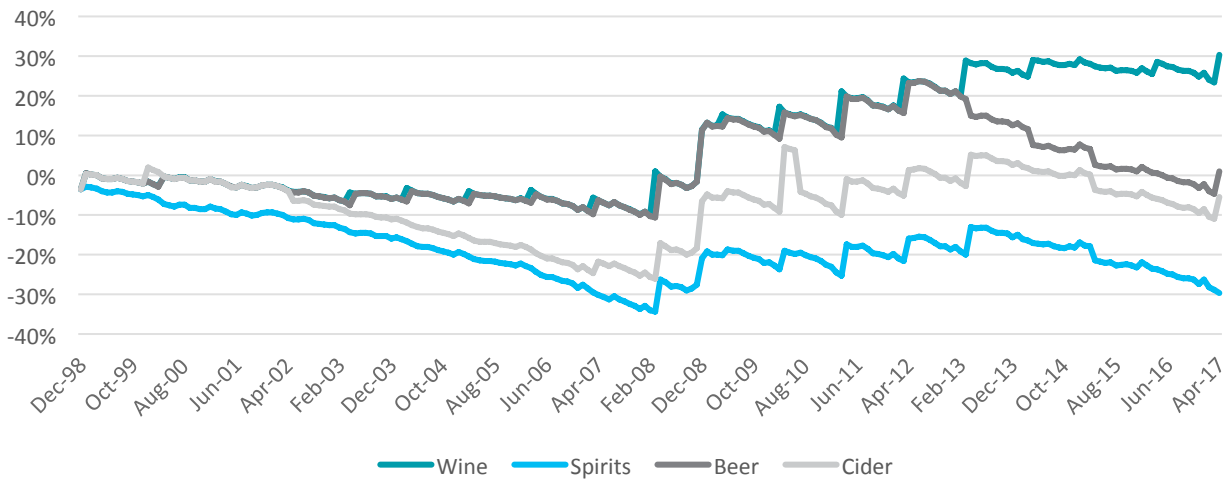
The introduction of the alcohol duty 'escalator' in the 2008 Budget, which raised duty by RPI inflation plus 2 percentage points each year, meant that the cost of all categories of alcoholic beverage (beer, cider, spirits, wine) increased significantly faster than the general rate of price rises across the economy. After a well-reasoned campaign from the beer industry, the duty escalator was scrapped in the 2013

[1] Wort is the liquid extracted from the mashing process during the brewing of beer prior to fermentation.

Budget and duty rates on beer have been cut by 1p each year for three consecutive years, helping to bring down the rate both in real terms and relative to other alcohol products.

By April 2015, beer duty remained just under 3% higher in real terms than in 1997, while duty on spirits had fallen by over 21% in real terms and cider duty had remained broadly constant. However, the picture has since altered somewhat. By March 2017, duty on beer had fallen -4.6% in real terms since 1997. Nevertheless, spirits duty still remained well below the 1997 level, having fallen even further (-28.8%) in real terms by March 2017.

*Figure 3: Real change in United Kingdom alcohol excise duty since Dec 1998*




*Source: HM Revenue & Customs, Cebr analysis*

With further changes coming on stream for the new fiscal year, April 2017 has seen another alteration of the picture, with the real terms change in beer duty (relative to the 1997 level) turning positive again to reach +1%. Spirits was the only category to see a continuing real terms decline that continues to increase in magnitude, reaching -29.6% by April 2017.

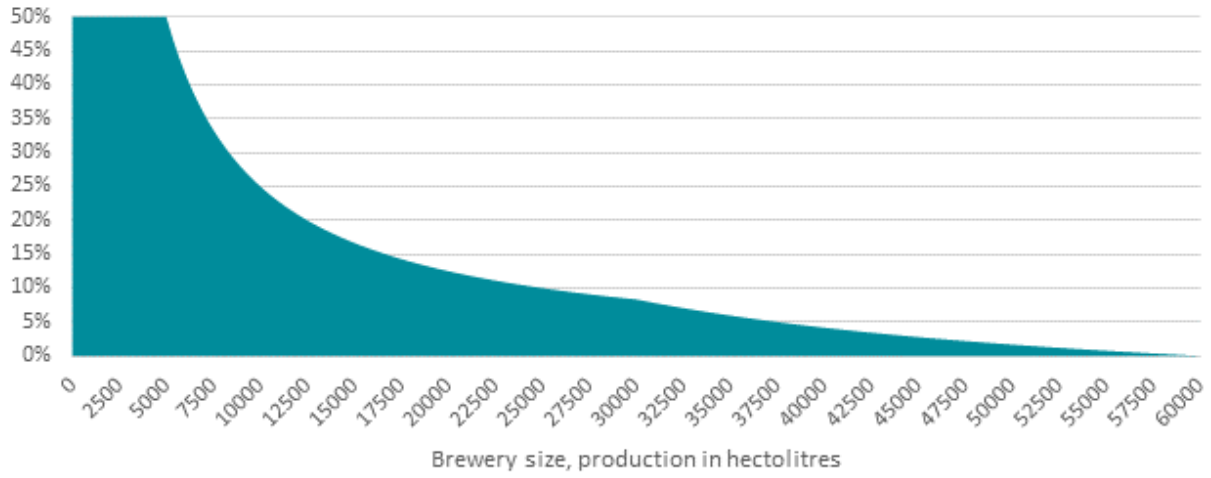
Duty on wine has increased by over 30% in real terms between 1997 and April 2017, rising substantially from a real terms increase of 23.4% since March 2017. Duty on cider, on the other hand, had declined, by -5.5% in real terms, between 1997 and April 2017, whereas this decline had measured -11.0% the previous month.

## 2.3 Progressive beer duty policy: Small Brewers Relief

While the standard rate of beer duty increased from the turn of the millennium, a system of rate relief for smaller beer producers was introduced in 2002 following a long-running campaign by SIBA. Progressive Beer Duty (PBD) is a system, permitted under European Union (EU) law, which allows smaller breweries to pay a lower rate of tax on the beer that they produce.

PBD systems exist in many EU countries and each system operates within two constraints set by the EU: the rate of relief cannot exceed 50% and cannot be awarded to brewers producing over 200,000hl in a given year. The UK's system of relief takes advantage of the full 50% relief for those breweries producing up to 5,000hl. Beyond this point the rate of relief is gradually phased out, effectively capped in cash terms up to 30,000hl and gradually reduced to zero between 30,000-60,000hl.

*Figure 4: Effective rate of relief under UK PDB system by brewery size*




*Source: HM Revenue & Customs, Cebr analysis*

Given an average beer strength of 4.14%, the main rate of beer duty would imply a cost of just over £79[2] per hectolitre of beer produced. The PBD system in the UK means that a brewery producing up to 5,000hl would receive relief of around £39.50 per hectolitre. As the size of the brewery increases, this relief falls and the amount of duty paid per hectolitre rises. For instance, a brewery producing 20,000hl will receive relief of around £9.88 while a brewer producing at 40,000hl will receive relief of around £3.29 per hectolitre.

One of the key objectives behind the introduction of a progressive beer duty system in the UK in 2003 was to improve market access and increase competition and diversity in the domestic beer industry. A year after the scheme was introduced, the Government launched a survey to gather evidence on the impact of SBR in its first year of operation and to assess how successful the scheme had been in meeting its objectives.[3]

Responses to the survey suggest that the SBR scheme has been successful in achieving its objectives of helping the smallest breweries to invest in product development, compete better in the market and so maintain the diversity of products available to the consumer. Some breweries stated that, without SBR, their business would not have been able to survive, while there were other examples of SBR itself creating incentives for market entry by new brewers. Nonetheless, 44% of breweries surveyed still considered that the duty rate was not set at the correct level.

[2] This corresponds to the most recent duty data from HMRC (April 2017).

[3] The findings of this study were published in the document "Small Breweries' Relief: A Call for Evidence – summary of responses", (May 2004).

# 3 Trends in market entry and exit

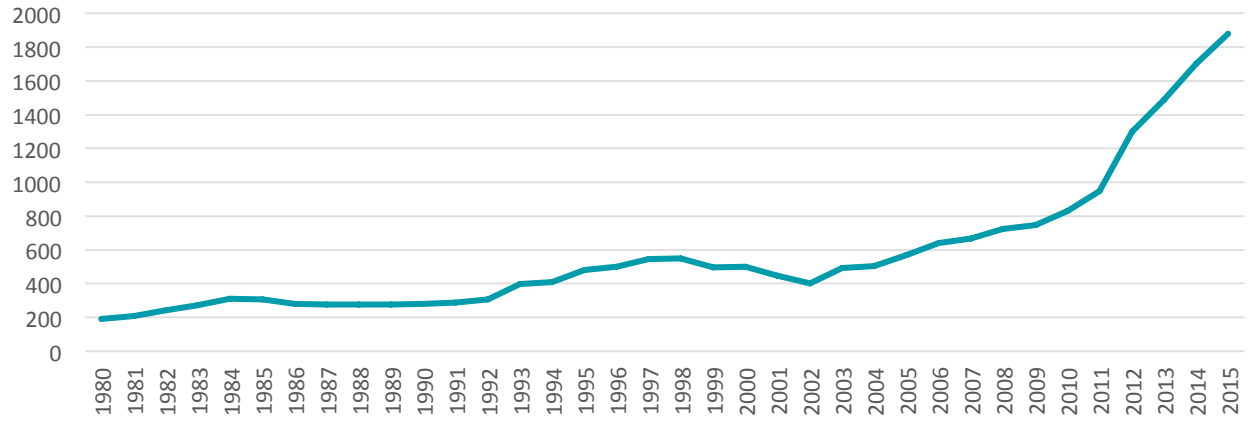
The introduction of the system of beer duty relief for small brewers was to "encourage one group of small businesses: the nation's small brewers". In this section, we examine trends in the total number of brewers in the market as the starting point in assessing whether the PBD system has increased the rate of business formation with the UK's brewing industry. We also consider recent trends in closures, which provides some insight on the most likely driver, the intensification of competition in the market.

## 3.1 Trends in total brewery numbers

The Brewery Manual 2017 reports 1,544 commercial breweries by the end of 2016, which has reportedly grown from 772 in 2009. This constitutes a doubling in eight years, or compound annual growth of 10% each year.

A longer time trend is possible to view through a different data source. The British Beer and Pub Association (BBPA) reports the total number of registered brewers, which includes all hobby brewers not producing for commercial purposes. This is illustrated in Figure 5 below. This confirms the sharp upward increase in the number of breweries suggested by the Brewery Manual data between 2009 and 2015-16. It also suggests strong growth in the preceding period between 2002-03, when the PBD system was introduced, and 2009-10.

*Figure 5: Total number of breweries in the UK, all brewers (commercial and hobby)*



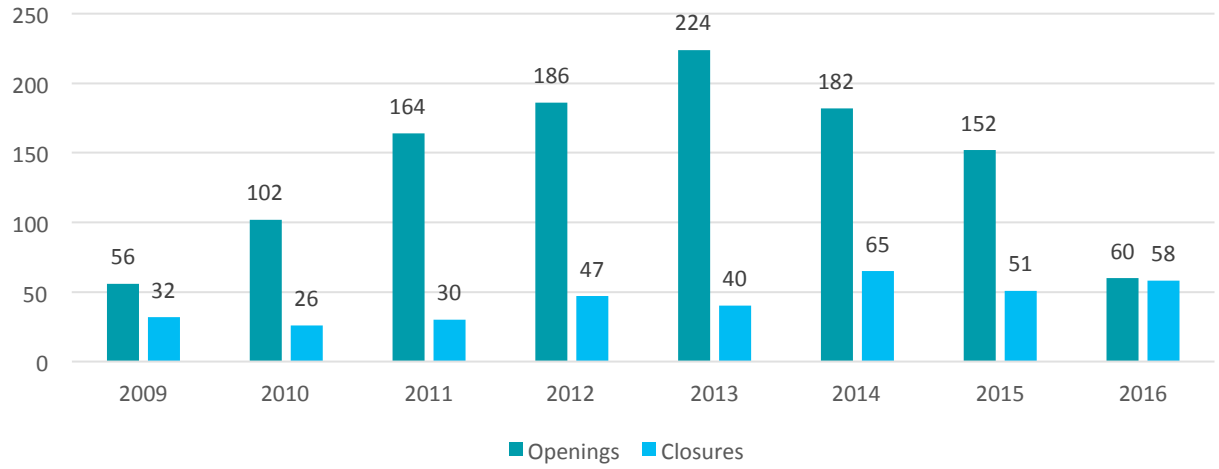

*Source: British Beer and Pub Association*

Small operations make up the majority of the totals suggested by the Brewery Manual and shown in Figure 5 and a small number of larger brewers continue to account for the majority of beer production across the UK. Heineken UK Ltd, the UK's largest brewing company held a 20% volume share in 2014, while the brand Carling, owned by Molson Coors Brewing Co. (UK) Ltd, held a 14% volume share.

## 3.2 Trends in brewery openings and closures

Further insight can be gained from the Brewery Manual data on brewery openings and closures, which are illustrated together for the period 2009-2016 in Figure 6 below.

*Figure 6: Brewery openings and closures in the UK, 2009-16*




*Source: The Brewery Manual*

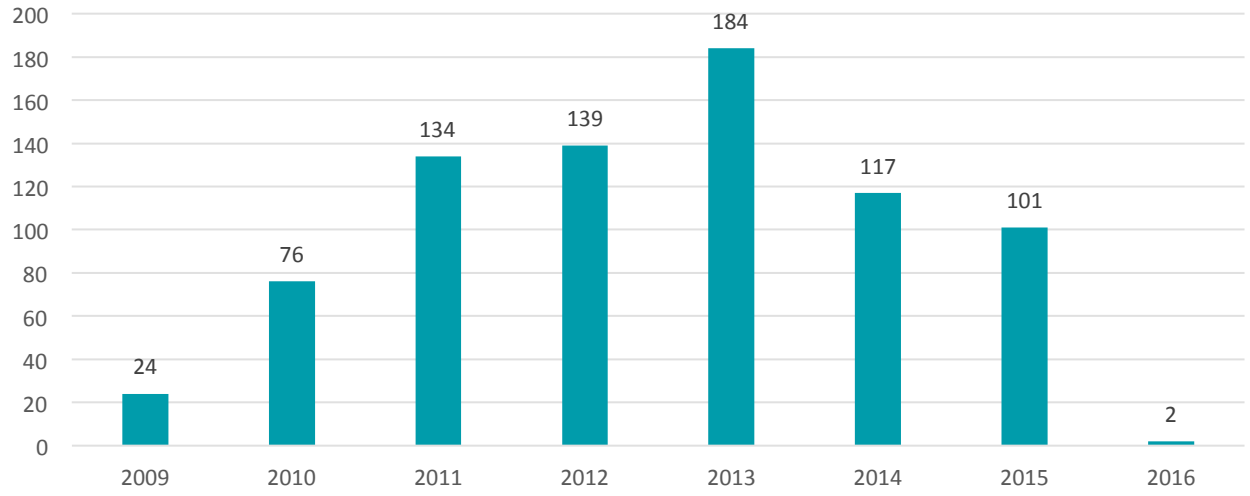
After a period of four years in which the number of breweries opening in the UK increased steadily, at an average annual growth rate of 44%, the number has decreased sharply since 2014. Strong growth in the 2010-2013 period coincided with the so-called 'craft beer revolution' gathering steam in the UK. It is apparent from Figure 5 that this explosion in consumer demand for new and diverse ranges of craft beer led to a significant quickening of the pace of new brewery openings beyond 2009-10. The steeper slope of the curve in Figure 5 beyond 2009 can thus be viewed as the combined effect of SBR and the perceived commercial opportunities offered by the craft beer revolution. This can be contrasted with the weaker, yet steady growth in the 2002-09 period, which should offer a more accurate representation of the impact of SBR operating in isolation.

The sharp decline in the number of new brewery openings since 2014 has been particularly severe over the past 12-18 months. The Brewery Manual 2017 reports only 60 new brewery openings in 2016.

The number of brewery closures in the UK follows a considerably more erratic trend, as illustrated in Figure 6 above. Despite the less constant evolution, it is clear to see that the number has been trending upwards since about 2012, and more noticeably since 2014. Interestingly, the number of brewery closures reached a peak in 2014, when 65 breweries closed, a year after the peak was reached in terms of new openings. All of this points to an intensification of competition and a need for small breweries to work harder to ensure survival.

Figure 7 shows how net growth in brewery numbers has dropped remarkably in 2016, from a net increase of 101 in 2015 to a net increase of only 2 in 2016, according to the Brewery Manual. This and the individual openings and closure data seem to indicate that the number of breweries in the UK is not likely to continue to increase at previous levels, and the total number may already have begun to plateau.

*Figure 7: Net change in number of breweries (difference between openings and closures) in the UK, 2009-2016*




*Source: The Brewery Manual*

# 4 Does SBR creates the conditions necessary to improve market access?

One of the primary objectives supporting the introduction of the progressive beer duty regime in 2003 was to allow smaller breweries to compete given the economies of scale available to larger producers.

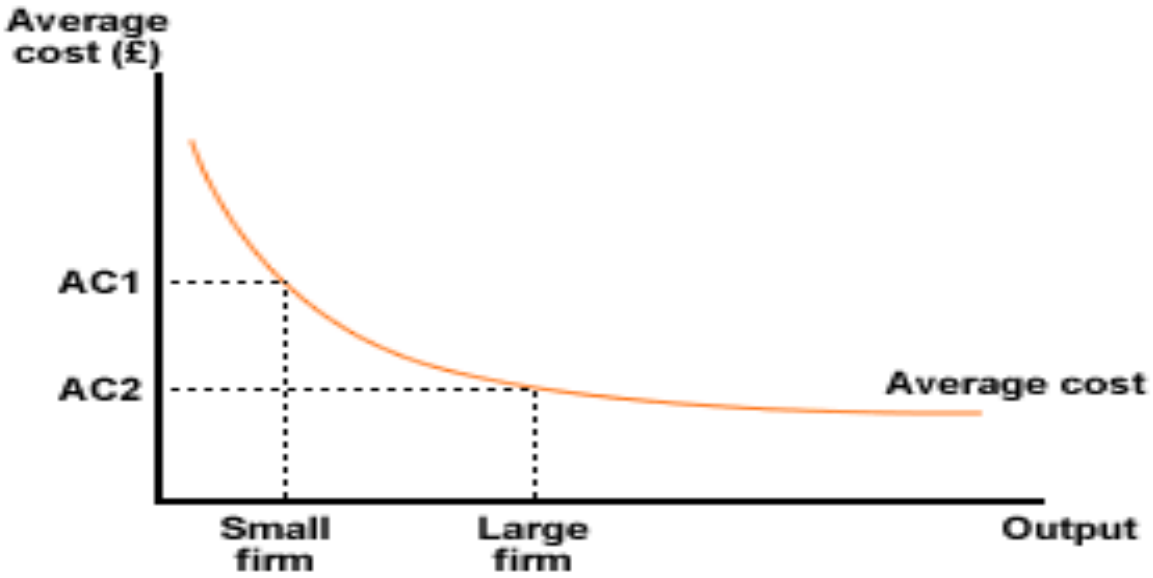
In order to assess whether Small Brewers Relief in its current form is appropriately designed to meet the objectives of improving market access and increasing competition and diversity in the domestic beer industry, this report examines the available evidence to assess whether the brewing of beer can be characterised by economies of scale. Economies of scale create barriers to entry, making access for new small brewers more difficult, thus restricting competition and diversity to the detriment of consumers.

This will facilitate an assessment of whether the current structure of beer duty relief does enough to allow small breweries to compete with the larger, more established players, by compensating them through the PBD system for the lack scale economies that it is generally only possible to achieve when engaged in large-scale production.

## 4.1 The theory of economies of scale

In economic theory, economies of scale describe the cost advantages that can often be achieved as a firm increases the level of its production. The unit cost of production has a tendency to decline as output increases because fixed costs are spread out over an increasing number of units of production. Likewise, scale can deliver operational efficiencies if, for example, larger, more mechanised brewing equipment available to larger brewers helps to reduce the input of labour required in daily production.

*Figure 8: The effects of economies of scale on average costs*




There are also, particularly for the largest brewing companies, benefits to be gained through economies of scope. This describes the cost savings that can be achieved by producing two or more distinct products together. For instance, combining the bottling and distribution for different beer product lines can reduce the individual average cost of production of each line.

Economies of scale (and scope) can have considerable implications for the market structure of a given industry. In markets in which scale economies are strong, a smaller number of larger firms tend to dominate the market, with smaller firms facing the difficult task of competing with the cost advantages available to these larger companies as a result of their scale.

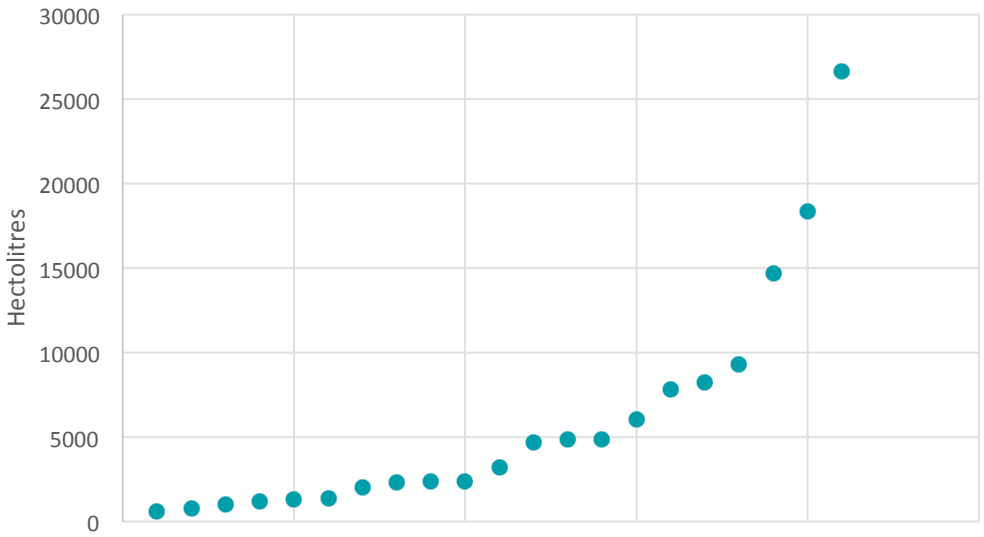
## 4.2 Data on the production costs of brewing

Data for this section have been sourced from a SIBA data gathering exercise from a small sample of members. The data gathering questionnaire requested the sampled breweries to indicate their levels of production and their production costs and were asked to provide their detailed professionally prepared accounts. From these, the relevant data were extracted and anonymised and SIBA used accounting expertise to establish consistency between the data for all sampled breweries. At this point, the data was provided to Cebr.

The data facilitated an estimation by Cebr of the underlying average cost of production per hectolitre for different levels of beer production, thus providing the means with which to analyse whether the industry exhibits economies of scale. We then compared underlying average cost with average cost including beer duty, thus providing an indication of whether Small Brewers Relief alters the cost structure of beer brewing in favour of smaller brewers (in the manner intended by the policy) who do not benefit from the scale economies of the larger brewers. This is the subject of subsection 4.3 below.

Detailed data were gathered and made available for 21 breweries, each with production ranging from a minimum of 620 hectolitres to a maximum of 27,000 hectolitres in 2016. The below figure demonstrates the range of brewery size (by volume in hectolitres) within the sample used in the analysis. As is evident, most are below the 10,000 hectolitre level of production, with a sizeable chunk at or below the 5,000 hectolitre level.

*Figure 9: Distribution of respondents by annual production volume, 2016 (producers ranked from smallest to largest)*




*Source: SIBA Members' survey*

Table 1 presents the average cost with and without duty for our sample of 21 breweries. The table is ordered according to the magnitude of the level of production. The brewery with the highest average cost (with and without duty) is the brewery with the third lowest level of production. But, it is not

unreasonable to conclude that the majority of the breweries with the lowest average cost are the ones with the highest production volumes.

*Table 1: Production volume in hectolitres, average cost with and without duty and average actual duty paid, 2016*

| Production volume | Average cost excl. duty £/HL | Average cost incl. duty £/HL | Average actual duty paid £/HL |
|---|---|---|---|
| 616 | 144.0 | 182.2 | 38.3 |
| 755 | 154.0 | 189.9 | 35.9 |
| 1013 | 208.5 | 255.2 | 46.7 |
| 1220 | 144.0 | 183.8 | 39.8 |
| 1301 | 113.4 | 150.8 | 37.4 |
| 1361 | 150.1 | 186.1 | 36.0 |
| 2033 | 127.8 | 163.6 | 35.7 |
| 2289 | 109.4 | 138.5 | 29.2 |
| 2381 | 180.3 | 220.1 | 39.8 |
| 2394 | 147.3 | 185.5 | 38.3 |
| 3174 | 155.1 | 192.9 | 37.8 |
| 4690 | 131.2 | 172.6 | 41.4 |
| 4850 | 161.8 | 201.9 | 40.2 |
| 4853 | 199.8 | 241.6 | 41.7 |
| 6027 | 99.0 | 141.2 | 42.2 |
| 7792 | 134.6 | 175.2 | 40.5 |
| 8257 | 145.4 | 187.6 | 42.2 |
| 9315 | 100.9 | 153.0 | 52.2 |
| 14697 | 85.7 | 150.3 | 64.6 |
| 18345 | 78.2 | 130.1 | 51.9 |
| 26627 | 107.2 | 160.5 | 53.3 |

*Source: SIBA Members' survey*

Based on the last column, showing actual duty paid per HL by each of the breweries in our sample, it is fair to say that duty paid is broadly increasing with scale. There are two factors that are likely to result in certain breweries deviating from this relationship. The first is the strength of beer being produced, with stronger beer incurring higher duty rates per HL sold. The second is the extent of production for export, which are not subject to UK beer duty. Consequently, breweries with exceptionally high levels of duty paid per HL relative to those around them in scale terms are likely have a relatively low export content, while those with exceptionally low levels of duty are more likely to have a relatively high export content. The corollary to this is that differences in actual duty paid at very similar levels of production can be expected to arise from the differing strength of the beer being produced by different brewers and by the different mixes of production for the domestic market, on which duty must be paid, and for the export market, on which UK duty is not levied.

Considering the other columns of Table 1, apart from a few outliers, one can certainly observe that, in general terms, underlying average cost (excl. duty) is higher at lower levels of production. Turning to average cost including duty, while there is some evidence to suggest a closing of the gap in average cost between small and large brewers, it is difficult to see how, in the majority of cases, smaller brewers could reasonably be expected to compete with the levels of average cost including duty apparent at

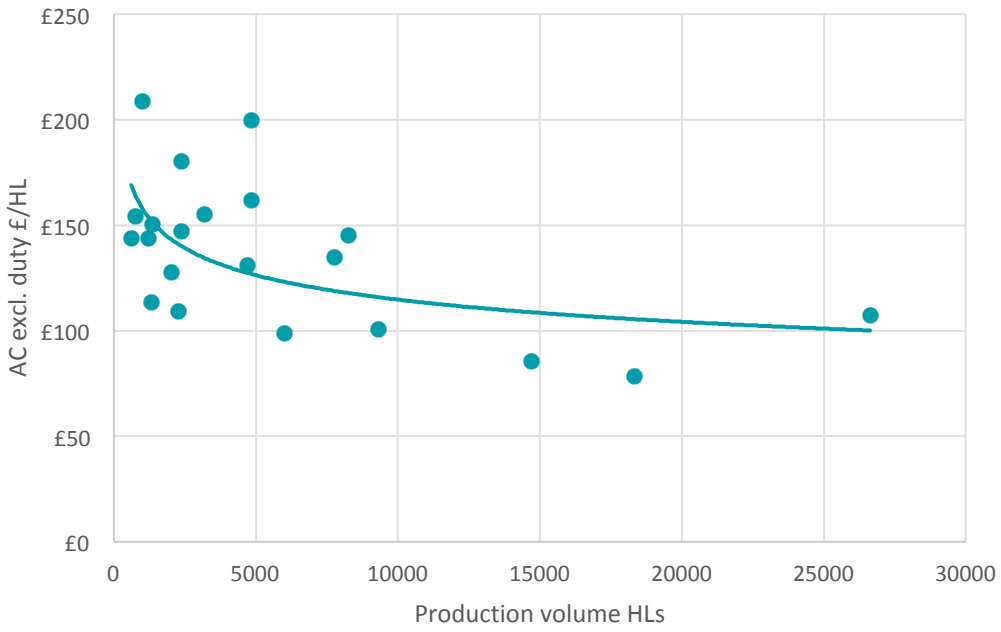
higher levels of production. In other words, it would be difficult to conclude from Table 1 that SBR is doing enough to bridge the cost competitiveness gap between large and small brewers.

Another complicating factor is how the different sales mix of a brewery can drive differences in certain costs, such as packaging. Breweries that sell their beer in barrels or kegs can be expected to have lower packaging costs than those supplying in individual bottles or cans. Higher packaging costs can be expected in breweries with high concentrations of small-pack sales. While this is a common feature amongst the smallest breweries, any size of brewery could have any mix. Features like this are, like the export content, likely to provide further explanation for the observance of 'outliers' in the sample.

## 4.3 Does the cost structure of brewing exhibit economies of scale?

Figure 10 plots the data from Table 1 on average cost excluding beer duty for each of the 21 breweries in the sample, mapped against their annual production. The figure also establishes the statistical relationship apparent in the data, which certainly suggests evidence of economies of scale, given the smooth decline in underlying average cost as scale increases.

*Figure 10: Average costs without duty vs. Production volume in hectolitres (HLs)*




*Source: SIBA Members' survey, Cebr analysis*

While it is difficult to be conclusive based on the relatively small sample for which data are available (21 breweries out of a total of at least 1,500), econometric testing of the relationship between scale of production and underlying average cost produces a statistically significant result. (See Appendix for further details.)

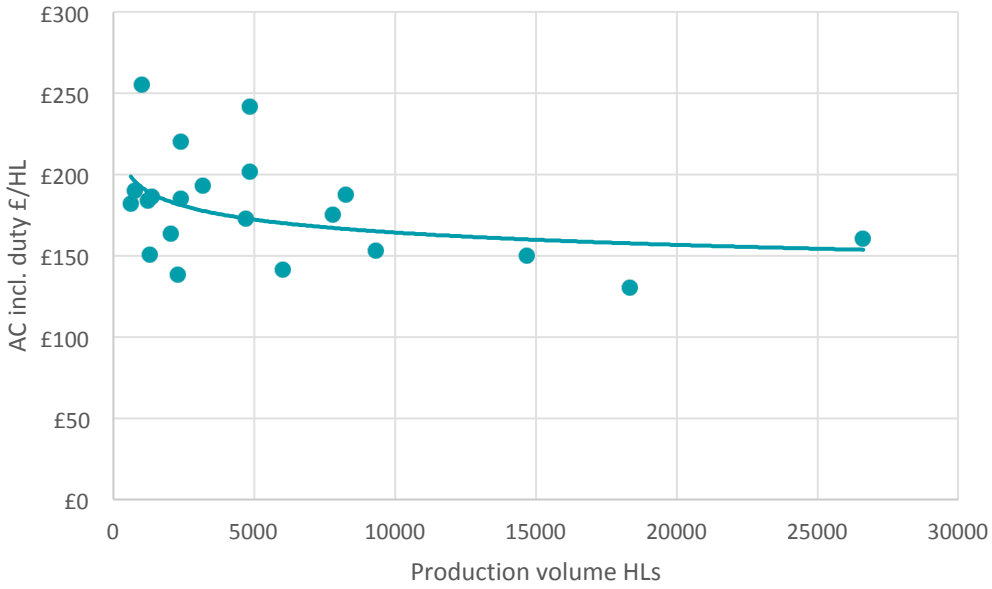
## 4.4 Does SBR compensate small brewers for the lack of scale economies?

Figure 11 plots average cost including actual beer duty paid, also from Table 1 above. The statistical relationship apparent in this data is also suggestive of economies of scale, albeit less extreme than in the case of underlying average cost (excl. duty). However, while the range from top to bottom of the

modelled average cost curve in Figure 10 is about £65-£70 per HL, in Figure 11, the range is smaller but still substantial at £45-£50 per HL.

Again, while it is difficult to be conclusive given the small sample size, it would certainly not be possible to conclude on the basis of this evidence that SBR is doing enough to bridge the gap in average costs of production between smaller and larger brewers arising from the economies of scale benefiting the latter. This, in turn, raises questions as to whether SBR, as currently designed, does enough to improve the survivability of small brewers. This, in turn, has an important bearing on whether market access, competition and diversity in the domestic beer industry to the benefit of consumers can be said to have genuinely improved. These, as noted earlier, were the original intentions of the Progressive Beer Duty policy.

*Figure 11: Average cost with duty vs. Production volume in hectolitres (HLs)*




*Source: SIBA Members' survey, Cebr analysis*

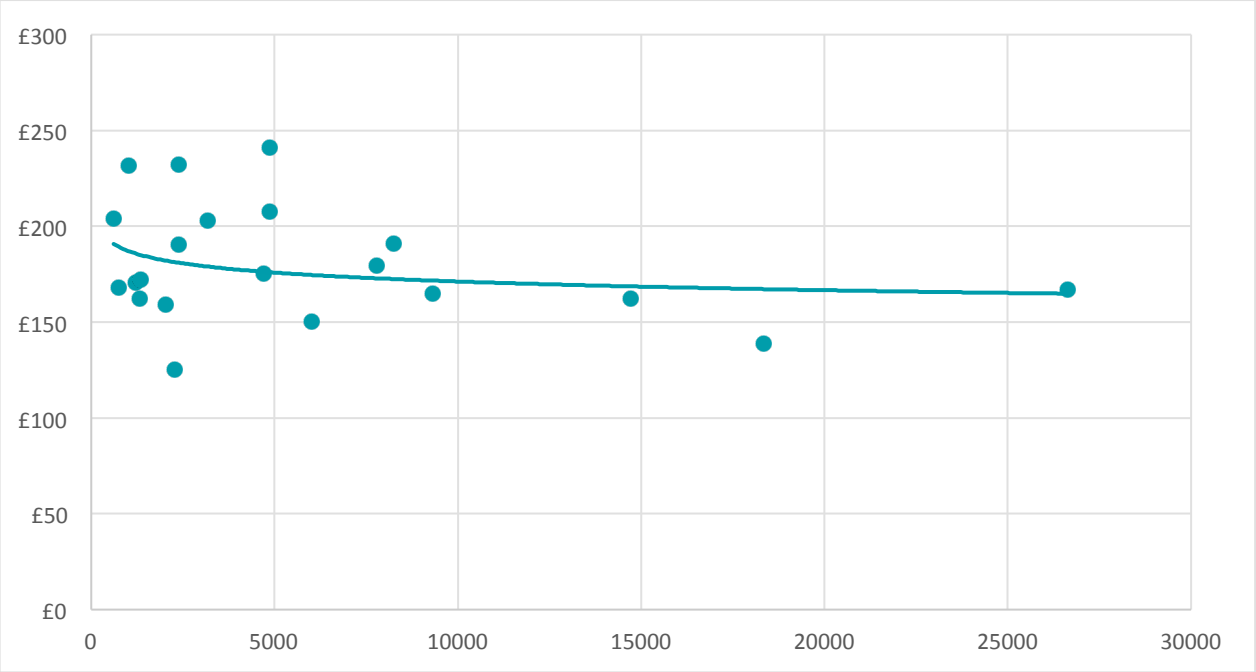
# 5 Prices and margins: Whither the incentive to expand production?

For the same sample of 21 breweries, it was possible to combine the data on production volumes with that on sales revenues to derive an achieved sale price per HL for each.[4] From this, SIBA's accounting expert derived ratios of average cost-to-achieved sale price per HL for each brewery in the sample, both with and without duty. These ratios reveal the implicit margin per HL sold that the breweries have been able to achieve through their average sale price. By doing this, we hoped to assess whether the current system risks providing a disincentive to eligible small breweries to expand and grow production.

## 5.1 Relationship between scale and price

Figure 12 below plots the sale price per hectolitre for each of the 21 breweries in the sample, as well as the statistical relationship between scale and sale price achieved represented by the dotted line. This suggests a weak negative relationship between average sale price and scale that could be confined to small-scale producers. Otherwise, the curve is rather flat, which is not inconsistent with the proposition of a highly competitive industry.

*Figure 12: Sale price per hectolitre, £*




*Source: SIBA Members' survey*

One possible reason for the higher average sale price per HL achieved by smaller breweries would be that they have a higher share of small-pack sales, which would mean higher packaging costs. This would reflect strongly in their higher average cost per HL, as illustrated in Figure 10 above. These higher costs

[4] This is combined with a simplifying assumption that a brewery's opening stock and closing stock would be at similar levels, which facilitates a further assumption that, in any one year, sales volumes equal production volumes.

are likely to be reflected in higher prices as they seek to recoup some or all of these higher costs – all the more difficult in a market that is as price competitive as the one apparent from Figure 12 above.

The apparent weak negative relationship between price and scale of production would not be unexpected even in a highly competitive market. At higher levels of production, there can be expected to be general downward price pressure either because of a need to sell the higher volumes produced or because only larger brewers are in a position to deal with larger clients who demand highly competitive prices both in the on-trade and off-trade channel. Essentially, bulk discounting can always be expected when dealing with large customers who have greater bargaining power but who also offer certainty (of demand) for a brewer's beer.

## 5.2 How sale prices compare with average costs

The table below shows the distribution of sale price per HL mapped against the production scale of each brewery in the sample, alongside the ratio of average cost-to-sale price with and without duty.

*Table 2: Sales price per hectolitre, average cost with and without duty as % of sale price, 2016*

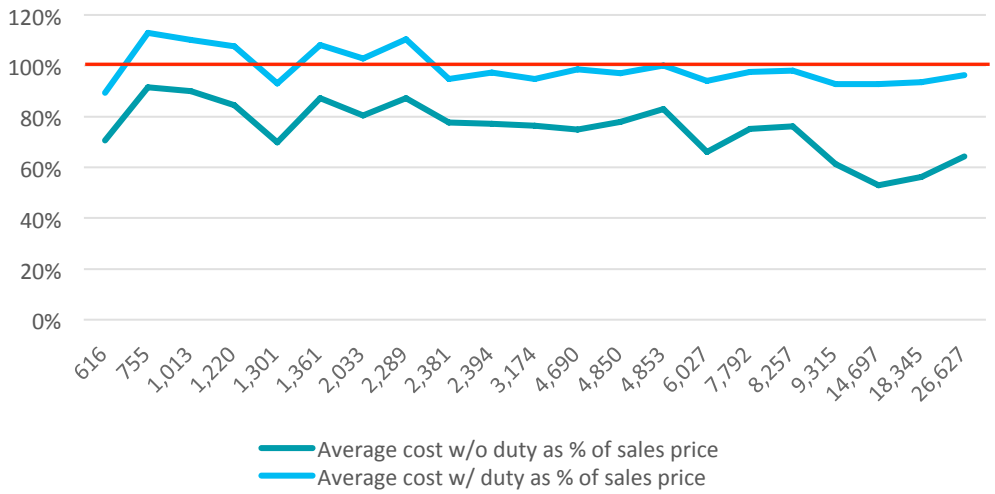
| Production volume | Sale price achieved £/HL | Average cost excl. duty as % of sale price achieved | Average cost incl. duty as % of sale price achieved |
|---|---|---|---|
| 616 | 203.9 | 71% | 89% |
| 755 | 168.1 | 92% | 113% |
| 1013 | 231.8 | 90% | 110% |
| 1220 | 170.6 | 84% | 108% |
| 1301 | 162.1 | 70% | 93% |
| 1361 | 172.2 | 87% | 108% |
| 2033 | 159.0 | 80% | 103% |
| 2289 | 125.3 | 87% | 111% |
| 2381 | 232.3 | 78% | 95% |
| 2394 | 190.6 | 77% | 97% |
| 3174 | 203.2 | 76% | 95% |
| 4690 | 174.9 | 75% | 99% |
| 4850 | 207.9 | 78% | 97% |
| 4853 | 241.2 | 83% | 100% |
| 6027 | 150.1 | 66% | 94% |
| 7792 | 179.4 | 75% | 98% |
| 8257 | 191.2 | 76% | 98% |
| 9315 | 164.7 | 61% | 93% |
| 14697 | 162.1 | 53% | 93% |
| 18345 | 138.9 | 56% | 94% |
| 26627 | 166.7 | 64% | 96% |

*Source: SIBA Members' survey, Cebr analysis*

Note that a ratio of average cost-to-sale price that exceeds 100% indicates a negative margin on each HL sold. In the sample of 21 breweries, as production volume increases, the average cost (including and excluding the duty) as a percentage of sale price broadly decreases. While SBR appears to mitigate

somewhat the magnitudes of these differences, the situation looks financially precarious for many breweries in the sample, with one-third selling their beer at an average sale price that is equal to or lower than their average cost of production. By way of illustration, the ratios of average cost-to-sale price from Table 1 are plotted in Figure 13 below.

*Figure 13: Average costs with and without duty as % of sale price*



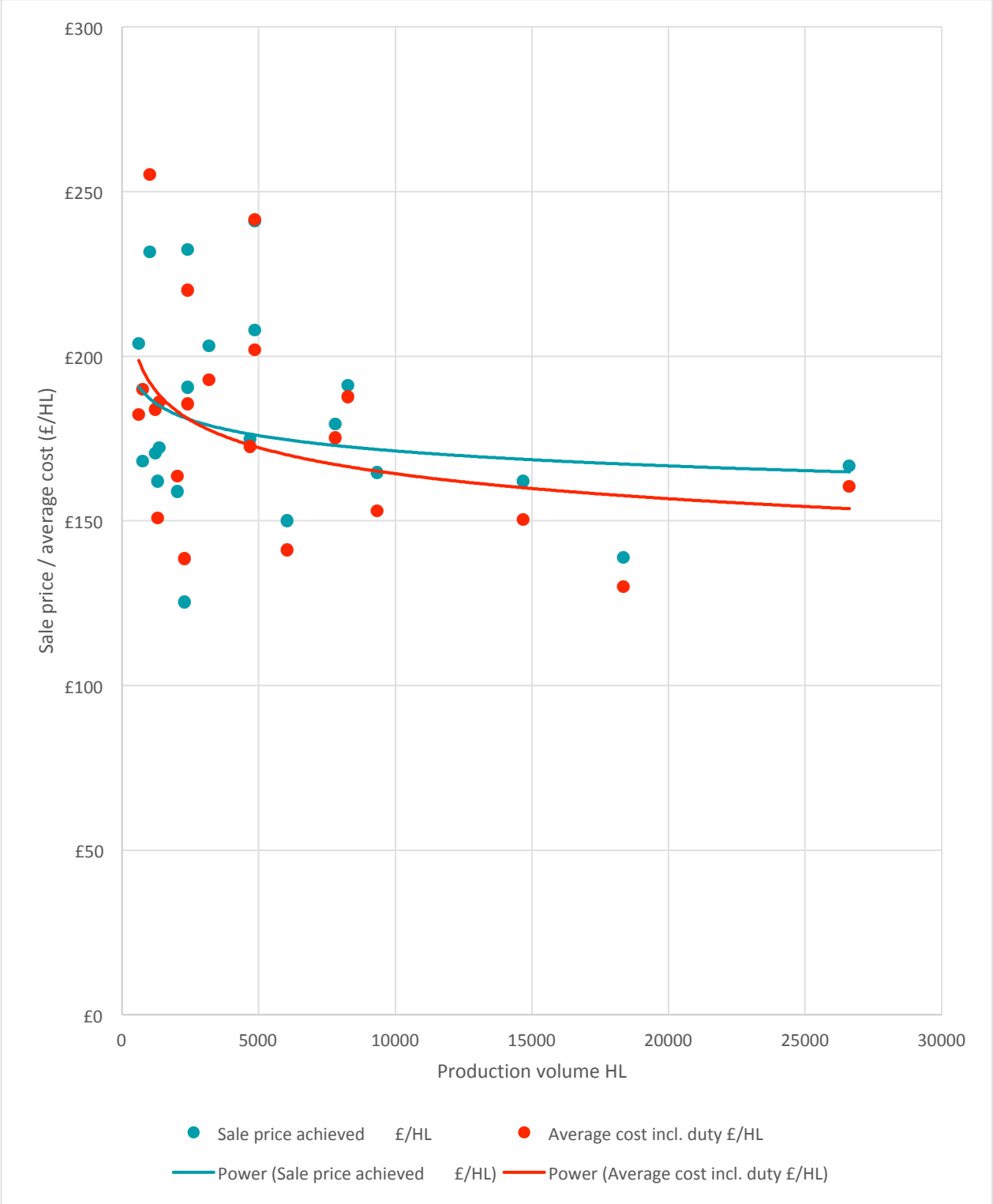

*Source: SIBA Members' survey, Cebr analysis*

This demonstrates that, even for those breweries showing an average achieved sale price greater than their average cost per HL, even small reductions in price or small increases in cost could jeopardise their financial sustainability.

Figure 14 below compares the data and statistical relationships between scale and each of average cost incl. duty (from Figure 11) and sale price achieved (from Figure 12). This shows the flatter slope of the curve defining the statistical relationship between scale and price apparent in the sample data relative to that between scale and average cost. This apparent lack of much differentiation on price is likely to be a function of intense competition in the market, while the steeper slope of average cost would be expected in the presence of economies of scale.

Figure 14 is likewise illuminating the same point made in reference to Figure 13, that is, anywhere up to a 10,000 HL scale at least, there is no guarantee that a brewery will manage to cover its costs and make a reasonable return on capital employed. This may well be dampening the incentive to expand from the very small scale to levels up to 10,000 HL, because until that kind of scale is reached, which could take many years, breweries are faced with the prospects of accumulating significant losses before they reach a point where they can secure a stable margin in price above average cost.

*Figure 14: The relationships apparent in brewery data between scale and each of AC (incl. duty) and average sale price achieved, £/HL*

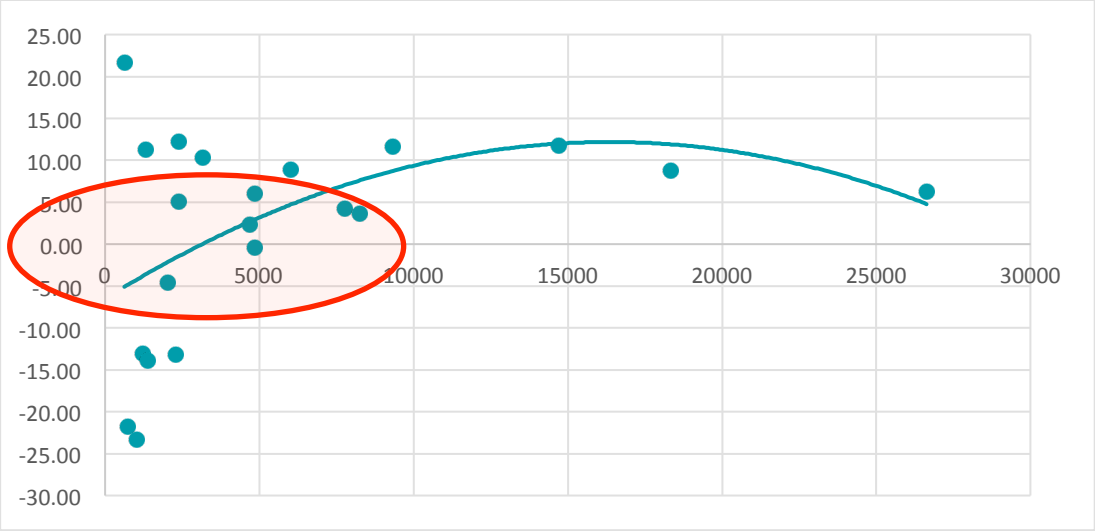



*Source: SIBA Members' survey, Cebr analysis*

## 5.3 Squeezed margins at low levels of production

Figure 15 below plots each brewery's average monetary profit or loss on a per hectolitre basis and maps the statistical relationship between scale and margin apparent in the data for the sample of breweries. This suggests that margins increase with scale up to between 15,000 and 20,000 HL, at which point they may begin to decline again due to aforementioned factors such as bulk discounting.

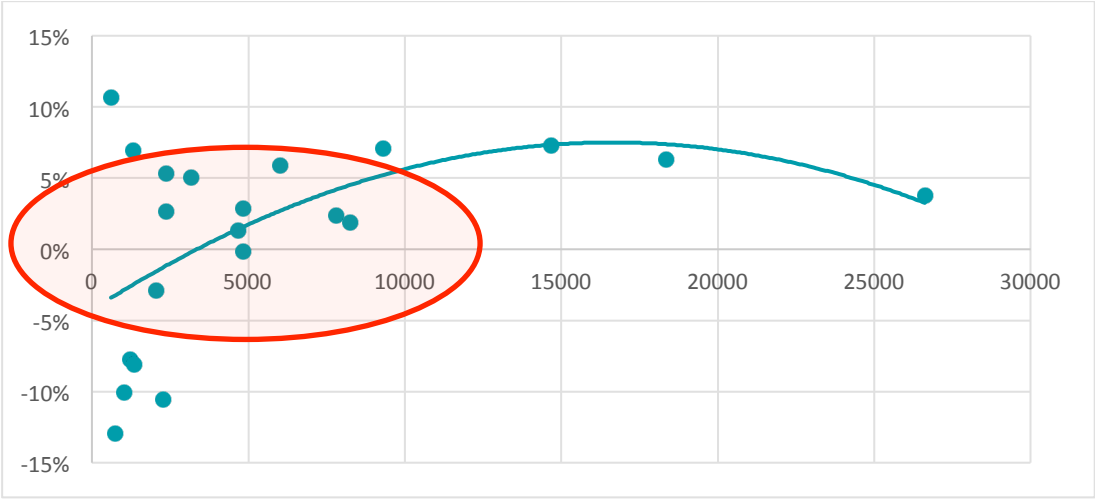
*Figure 15: Profit/Loss per hectolitre, £/HL*




*Source: SIBA Members' survey, Cebr analysis*

These patterns appear to be confirmed when margins are expressed as a percentage of sale price achieved, as illustrated in Figure 16 below.

*Figure 16: % margin in sale price per HL (average sale price and average cost per HL)*




*Source: SIBA Members' survey, Cebr analysis*

In both figures, we have highlighted what might be interpreted as an area of significant uncertainty, drawn roughly around the plus or minus £5 or 5% margin marks. The percentage margins in Figure 16 are more informative and this suggests that, at any scale between 0 and 10,000 HL, a brewery could be

equally likely to make a loss on each hectolitre of beer sold as it is to make a profit, with the outcome depending on the specific circumstances facing the brewery – as outlined previously, issues like the strength of the beer in abv terms, the mix of production for the domestic market vs for export or differing packaging requirements, depending on the nature of customer demand and what that means for the mix of large and small pack sales.

This picture will undoubtedly impact decision-making not only on whether to enter the brewing market in the first place, but also on whether to invest more heavily in it through expansion. Expansion involves commercial risks especially (according to SIBA) when expanding to or beyond the 5,000 HL level, largely due to the often significant capital outlay required. To have the incentive to do this, brewers faced with a decision on expansion must have an expectation of achieving margins that will cover their costs and provide a reasonable rate of return that covers the cost of financing the outlay and rewards the risks involved in doing so.

The analysis above suggests that, unless brewers are already close to or at the 10,000 HL level, there are not strong incentives to expand from levels of production on which breweries are managing to sustain healthy margins given their specific circumstances and arrangements – namely, beer strength, domestic-export mix and packaging requirements. The uncertainty surrounding whether it possible to achieve sustainable margins before reaching a scale approaching 10,000 HL, which could require time and multiple further waves of investment and demand growth, will certainly dampen enthusiasm for any brewery looking to expand to anything below the 9,000 HL level from where they are today, especially if they are managing to carve out healthy margins at their current scale of production. This is counter-productive from an efficiency perspective as brewers need to achieve scale to achieve economies of scale and the cost reductions that allow lower prices to be charged to consumers, thus further enhancing competition in the market.

While this evidence cannot be said to be conclusive, due to the small sample size, Cebr is of the view that, if it were possible to understand the average abv strength of the beer being sold by each brewery, to isolate production and sales revenues deriving from exports and to control for differences in packaging requirements, an even clearer picture, based on an isolated examination of production for the domestic market only, would emerge. We would expect such an analysis to reveal even less favourable results from the point of view of the small independent brewer looking to enter or expand their existing small presence. For instance, we would expect more of the curves illustrated in both Figure 15 and Figure 16 to be sitting in negative territory.

# 6 Economic impact of the independent beer brewing sector

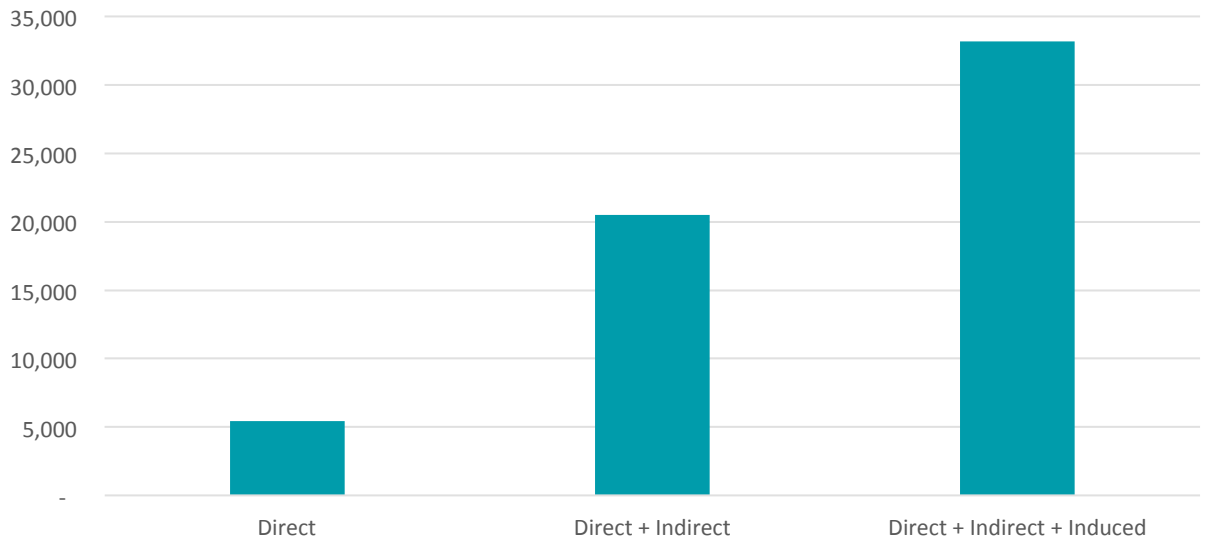
In this section of the report, we utilise the insights of the 2017 SIBA members' survey to assess the economic contributions of SIBA's membership as a proxy for the contribution of the UK's small and independent beer brewing sector to the economy. Combining this with ONS industry data, the direct, indirect and induced impacts of the UK's independent brewing sector are estimated.

The direct impact is defined as the effect generated directly by the activities of the brewing sector. The indirect impact represents the wider impact of the sector through the supply chain, for example the activity generated by the purchase of materials such as malt, hops and water. The induced impact traces the effect of the household spending supported by the employee incomes paid by independent brewers and their supply chain.

## 6.1 Economic impact of SIBA members on employment

Utilising data on employment across the sector collected in the SIBA members' survey, we first analyse the employment levels of the typical independent brewery before aggregating this up to all SIBA members.

*Figure 17: Full-time Equivalent Employment impacts of SIBA breweries, 2016*




*Source: SIBA Members' Survey, Cebr analysis*

The latest annual survey for 2016 shows that, on average, the typical independent brewery in the UK employs 5.5 full-time and 1.9 part-time staff. Across SIBA's membership this would equate to over 6,200 jobs directly supported by the independent brewing sector. In terms of Full Time Equivalent (FTE) employment, this implies that just over 5,400 FTE jobs are directly supported by SIBA members, as can be seen illustrated in Figure 17 above.

However, the impact of the brewing industry on employment does not end there. Each of the jobs in the manufacture of beer creates jobs elsewhere in the supply chain. The overall employment impact of the sector notably increases as we take into account the effect of this additional activity in the supply chain.

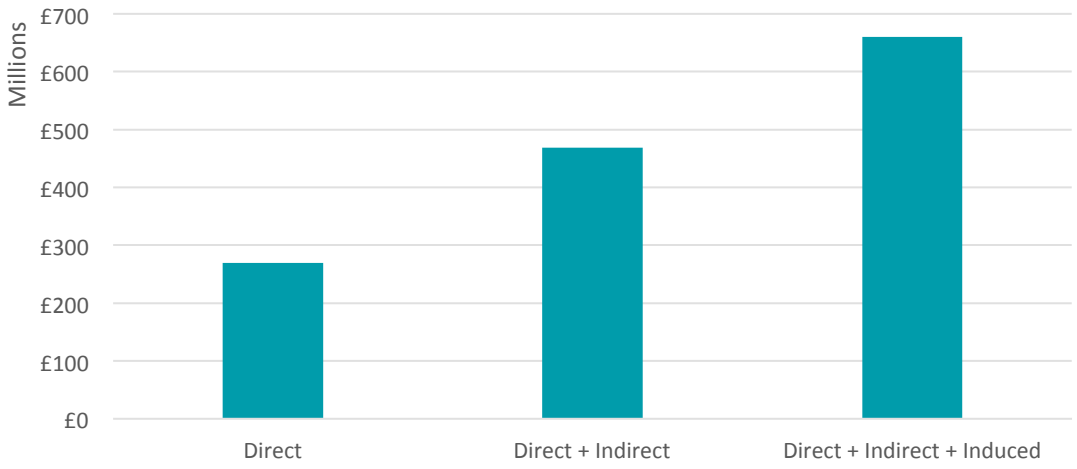
Using associated multipliers for the manufacturing of beer, we estimate that the direct and indirect impact of SIBA breweries on employment stands at just under 20,500 jobs.

Incorporating the wider impact of the household spending of these employees (the induced impact), the employment impact increases further, with over 33,100 jobs supported in total as a result of the brewing activities of SIBA members.

## 6.2 Economic impact of SIBA members on GVA

GVA is a measure of the value of goods produced in a sector, taking into account the value of the inputs into the given production process. To estimate the GVA directly generated by the members of SIBA, we once again utilise data collected in the SIBA members' survey.

*Figure 18: GVA impacts of SIBA breweries, 2016*




*Source: SIBA Members' Survey, Cebr analysis*

Using this turnover data and wider information about the link between gross output (the national accounting equivalent of turnover) and GVA in the wider sector[5], we convert the aggregate figure for turnover across SIBA members into an estimate of their GVA contributions to GDP. Then, we use the appropriate multipliers for the manufacture of beer to estimate the indirect and induced impacts of the brewing activity of SIBA members.

Our calculations suggest that SIBA members directly contribute just under £270 million in GVA contributions to UK GDP each year through the manufacturing of their beer products.

As shown in Figure 18, this impact once again increases considerably when assessing the wider impact of the activities of the sector. The combination of direct and indirect impacts from SIBA members amount to just under £470 million in GVA contributions to GDP. This rises to £660 million a year once the induced employee spending impacts associated with SIBA's members and their supply chains are included.

[5] Alcoholic beverages and tobacco products

# Appendix 1: Data gathering methodology

The underlying data supporting the analysis in Sections 4 and 5 of this report have been sourced from a SIBA data gathering exercise from a small sample of member breweries. This 'Accounts Survey' elicited 21 responses (20 full responses and one "pre-summarised" response).

### Methodology

Each respondent was asked to submit their most recent detailed professionally prepared profit and loss account, together with details of their production volume in hectolitres for the period corresponding to those accounts and an allocation of wage and salary costs (which typically appears as one figure in P&L accounts) across production, distribution and sales / admin costs.

Staff members, such as owners and directors were also asked to disclose remuneration received by way of dividend (but not a dividend intended to distribute profit). Such remuneration was allocated in the same way across the three cost categories. Non-relevant costs such as charitable donations and goodwill amortisation were, if posted in a P&L account, eliminated for the sake of consistency.

The data supplied by each brewery respondent were analysed and summarised on a consistent basis, allocating stated costs against the 3 cost categories of production, distribution and sales / admin. However, the exercise cannot be viewed as an exact science as the 21 sets of accounts received will have been prepared by 21 different accountants and every professional accountant can be expected to allocate costs slightly differently.

Further details of the interpretation methodology used are provided below.

### Production costs

1. Raw materials / packaging

Some breweries separately identify packaging costs, while others include them within raw material purchases. The packaging mix will also vary by brewery between cask, keg and small pack all with varying cost differentials depending as to whether packaging is carried out in house or is subcontracted.

2. Production labour

Variances appear high between breweries. This may be caused by any number of factors, such as efficiency / inefficiency of plant, size of plant, higher salaries paid in larger entities to professionally qualified individuals, packaging mix (if small pack is produced in house it can be quite labour intensive).

3. Premises overheads

These will vary because some breweries will operate from freehold premises whereas others will lease. Included in premises overheads are business rates and commercial insurance.

4. Heat, power and water

These costs will vary due to the method of brew heating (some very small brewers use electrically heated plant) whereas the larger brewers will probably have steam boilers, usually gas fired, which are far more efficient.

5. Plant repairs / equipment hire

These costs depend on a myriad factors – e.g., age /complexity of plant, whether plant is leased or owned etc. Some accounts include cask/keg hire under this heading whilst others may have included this under packaging costs.

6. Depreciation

Where this was separately disclosed in a brewer's accounts, it covers building and plant depreciation only. If not separately disclosed, it could include vehicle depreciation which should be categorised as a distribution cost. However, this is not thought to make a significant difference. If vehicle depreciation was disclosed, it was shown as a vehicle cost under the distribution cost category.

### Distribution costs

Breweries were asked to allocate delivery staff costs across the three cost categories as some smaller brewers employ staff who both produce and deliver beer. Vehicle running costs including vehicle depreciation if separately disclosed.

Third party distribution costs can also be relevant when particularly large breweries distribute beer further afield into national distribution chains by way of third party pallet distribution. Third party distribution is generally cheaper per HL.

### Sales / admin costs

This includes:

- Labour costs, which have been allocated as described above – across the three cost categories. Only the smallest brewery did not allocate any costs here.
- Advertising and marketing costs.
- General office costs, which include costs related to telephony, postage, stationary, computing, accountancy and professional fees plus bank charges and miscellaneous expenses. However, travel (non-delivery) costs, subscriptions and consultancy fees are also included here if disclosed and may vary considerably by brewery.
- Finance costs, which will vary considerably by brewery depending on individual ownership circumstances.

# Appendix 2: Details of econometric testing

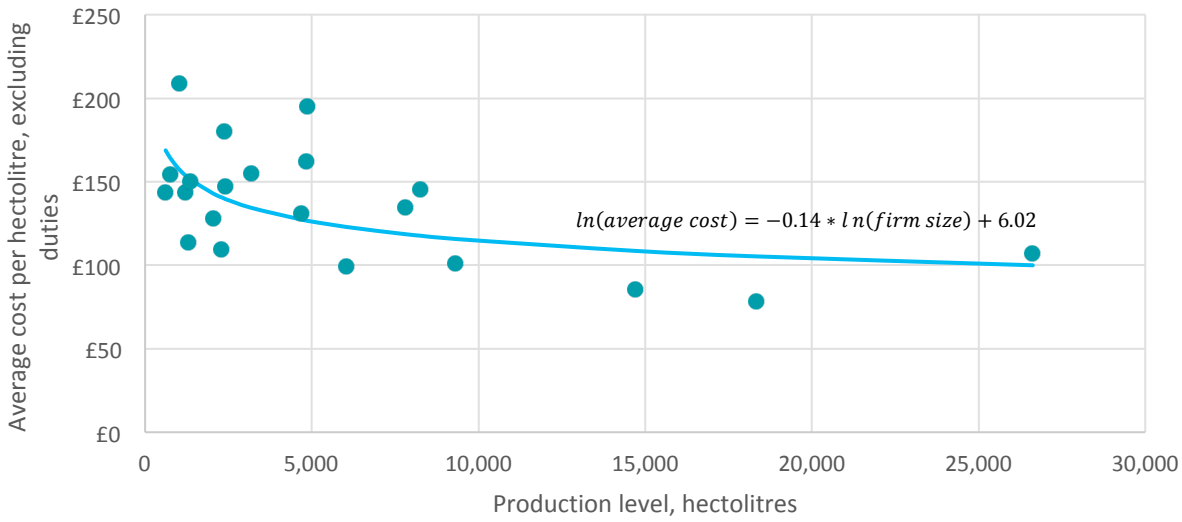
### Analysing beer costs of production

This appendix analyses the potential to conclude that there are economies of scale present in beer brewing through more detailed econometric testing. This is done by first examining average cost of production per hectolitre of beer produced, before the levying of beer duties. By plotting average cost of production against the scale of production of the brewery, we can estimate the shape of the average cost curve. Economies of scale would be suggested by a negative trend between brewery size and average cost, while diseconomies of scale would be illustrated by an upwards trend.[6]

### Average costs of production with duties excluded

This relationship between average costs (excluding duties) and firm size within our sample is illustrated in Figure 19 below.

*Figure 19: Average production costs (excl. duties) per hectolitre of beer produced*




*Source: SIBA Members' survey, Cebr analysis*

By conducting an Ordinary Least Squares (OLS) regression, the results suggest that the brewing industry does exhibit economies of scale. The regression equation of $ln(average\ cost) = -0.14 * ln(firm\ size) + 6.02$ implies that for every 1% increase in firm size, average production costs fall by 0.14%.[7] This is a statistically significant result at the 1% level – the p-value on the firm size coefficient is 0.006, meaning that there is a 0.6% chance that the relationship is down to chance alone.

[6] It is important to note that finding such trends does not necessarily imply causality in either direction: firms might tend to have low average costs because they are large or, equally, firms might be large because they have low average costs.

[7] Natural logs were taken due to heteroscedasticity observed when using linear regressions.

The sample data therefore suggest that, the larger a brewery in terms of scale of production, the lower its underlying average cost per unit of production. This provides good evidence to suggest that there are economies of scale in beer production.

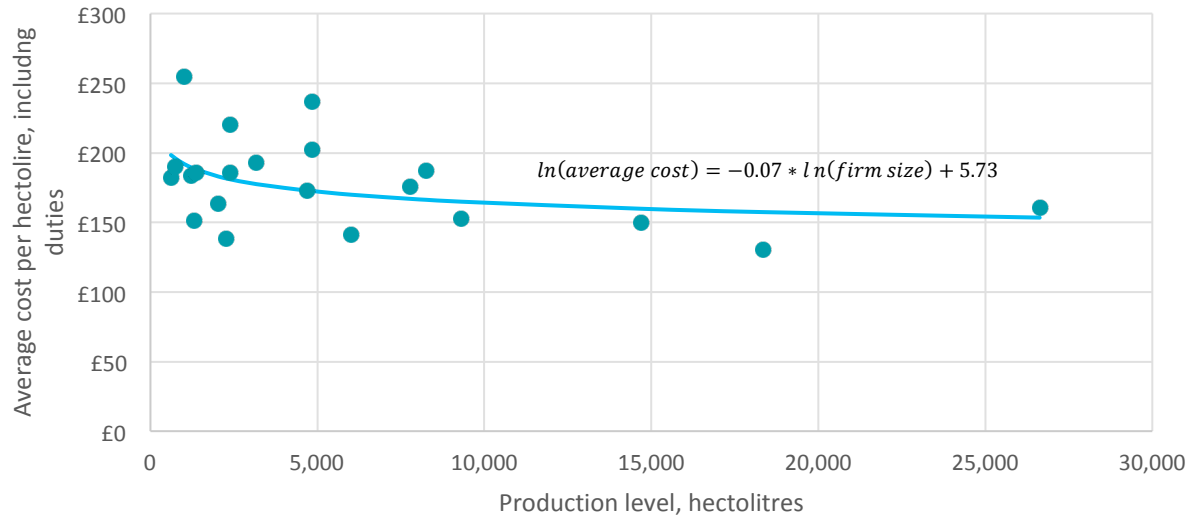
### Average costs of production with duties included

To analyse the extent to which the inclusion of duties within average costs of production alters the picture, Cebr produced a separate econometric analysis of how average costs per hectolitre including duties relates to the scale of production by beer brewers. The results are illustrated in Figure 20 below.

The resulting regression equation suggests that every 1% increase in firm size is associated with a 0.07% reduction in average costs. While less extreme, the analysis suggests that there is still evidence of economies of scale when duties are included in our measure of average cost. This is a statistically significant result at the 10% level. While this means that it is not possible to attach the same level of certainty to this result, the probability of the relationship being solely attributable to chance is still low.

Taking these results at face value suggests that the SBR system may not be doing enough to 'level the playing field'. In other words, it may be failing to sufficiently compensate small brewers for the absence of the economies of scale that characterise higher levels of production.

*Figure 20: Average production costs (incl. duties) per hectolitre of beer produced*




*Source: SIBA Members' survey, Cebr analysis*