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The impact of ownership structure on the market value of companies in response to COVID-19

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Abstract

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The paper focuses on differences in the valuations of privately held companies and publicly traded companies in the EU market as a result of the first year of the COVID-19 pandemic. This exercise is carried out by employing a unique dataset of individually assessed valuations of companies from the brewing industry for 2019 and 2020. The results confirm the existence of a discount in the valuation of private companies and indicate that it increased during the pandemic. The paper also identifies a significant difference between the median multiple and the market capitalization of the whole of the industry sector. This provides more detailed data on the differences with respect to ownership structure, but also information that allows the practical use of multiples in the valuation of privately held companies.

Key words

private company valuation, private vs. public, COVID-19, brewery, private company discount, industry multiples

JEL: G12, G32

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Introduction

Within international business scholars it is widely asserted that there is a discount premia in the valuation of publicly held versus privately held companies (e.g., Koeplin et al., 2005; Damodaran 2012; Goetz, 2021). However, given the very limited availability of data on the financial results of private companies, empirical literature that confirms these theoretical assumptions is scarce. Even though there are well-described mechanisms for the assessment of market value, the dynamics of the capital markets sometimes provide a different perspective and an overreaction (De Bondt and Thaler; 1985 and onwards) that causes inefficiencies in the valuation of companies. The importance of valuations significantly increases in times when there is a high level of uncertainty as various crises cause values to deviate from the norms and the outlook for the future becomes more difficult to estimate. The COVID-19 pandemic was one such period, and we can observe wide swings in the valuations of publicly traded companies on the stock market. Evidence indicates that publicly traded companies should have dropped in value during the pandemic (Rizvi, Yarovaya, Mirza, and Naqvi; 2022), but a research gap is clear when we focus on the impact of the pandemic on the valuation of privately held companies.

In this paper, we focus on the valuation of privately held companies and the differences in comparison to publicly traded companies within the EU market as a result of the first year of the COVID-19 pandemic. Company valuations provide an inter alia prospective for buyers and sellers for possible exit strategies and play an important role in the M&A industry. The difficulty when valuing private companies is the absence of market values as well as the lack of publicly available data. To address this issue, we assessed the whole (99% of the industry's turnover) market value of the Brewing industry in the Czech Republic for 2019 and 2020, through an individual assessment of each company, adhering to valuation standards. Even though our data is limited to a specific country and industry, we selected our data sample based on several characteristics. Firstly, brewers are a sector that was directly affected by the pandemic and related restrictions, mostly due to restrictions in the operation of pubs and restaurants (Gordon-Wilson, 2021; Boogaerts et al., 2022). Secondly, the Czech brewing industry provides a sufficiently large dataset of companies, which is, in practical terms, still possible to assess individually. In addition, since we made individual assessments of company values, we avoided any potential bias from different practices in the valuation procedures. Thirdly, the brewing industry is a relatively more homogenous sector when compared to others. And finally, the availability of data.

Our contribution to the current literature is twofold. Firstly, although the dataset that we created is interesting per se, our data allows us to estimate whether and how, any potential discount in the valuation of private companies, in comparison to public companies traded in EU, differs before and in response to the pandemic. This is important because the current literature mainly focuses on public companies and the non-European environment, and data such as ours is not publicly available. Secondly, we provide the results of the individual valuation multiples for every company analysed. This exercise provides even more detailed data on the differences with respect to ownership structure, but also provides information that has a practical purpose in respect to the estimation of multiples for the valuation of privately held brewing companies.

Our results show the existence of a discount in the value of private companies, in 2019 and 2020, of 15% – 61%, in 2019, that depended on the chosen valuation multiple. In 2020, after the first year of the pandemic, the discount range had increased to 36% to 71%. In addition, the results also show a significant difference between the multiple related to the entire market capitalization of the industry and the median multiple.

To add robustness to our results, we carried out two further tests. First, we recalculated our estimated valuation of private companies after the exclusion of companies with a significant proportion of the industry market capitalization. This test will help us to compare whether and how the valuation multiples have changed. Secondly, we use real market transactions, an approach that is most commonly used in the literature due to the availability of data. This data is not as detailed or market-specific, but it provides support to back up our results. The paper is organized as follows: Section 2: a literature review of conducted studies. Section 3: the data and methods used. Section 4: the results. Section 5: the robustness analysis. Section 6: conclusions. Appendices follow.

1 Literature Review

There is a significant amount of information related to the valuation of business's in both the academic and practical literature (e.g., Damodaran 2012; Duff & Phelps 2017; Koller, Goedhart and Wessels 2020) and further information is also provided by International (IVS, 2017) and European standards for the valuation of companies (EVS, 2016). Even though the market value of a company is arguably the best measure of its success, any changes, either directly within the company or in the market as a whole is reflected in the company valuation.

In this paper, we cover the challenging period posed by the COVID-19 pandemic to corporate valuations. Unlike past crises (e.g., the global financial crisis of 2007/8), which has a wide range of

research outputs that describe their impacts (Bessler et al., 2021; Claessens, Tong and Huertas, 2011) the impact of the current pandemic is not yet well documented. Currently, there are several papers dedicated to the impact of the COVID-19 pandemic on the stock markets, but a research gap is especially evident when we focus on the impact of the pandemic on the valuations of privately held companies.

Rizvi et al. (2022) dealt with the impact of COVID-19 on the valuations of non-financial European firms. They analysed a range of scenarios and found that there was a significant reduction in valuations across all sectors. This was possibly due to a decline in sales and an increase in equity cost. In extreme cases, an average firm in some industry sectors may have lost up to 60% of their intrinsic value in a single year. These authors also reported that if there were policy interventions intended to provide financial flexibility, the loss in intrinsic value could be limited to around 10%. According to them these findings highlight the severity of the impact of COVID-19 on the value of companies and highlight the need for a systematic state response. However, the results in the cited paper greatly vary within different scenarios and sectors. In the S3-E2 scenario (FCFF model with a 25% drop in sales in the first year and a 2% increase in the cost of equity), which is the most relevant to our data sample, there is a 18.6% drop in the value of manufacturing firms during 2020. Additionally, if there were government intervention, the authors modelled it as a reduction in the cost of equity, the decline in value for the above scenario would only be 4.2%.

Sharma and Nicolau (2020) were more focused on those sectors most affected by the pandemic - i.e., the travel and tourism industry (airlines, hotels, cruise lines and rental cars) and found that these sectors experienced a significant drop in value. Other studies have focused on the airline industry or tourism in general and their results are consistent.

The results of the study by Maneenop and Kotcharin‘s (2020), for the global airline industry, show that market values dropped significantly below the fair value of most companies, leading to significant average differences in the mean and median values of -22.10% and -48.00%, respectively. These authors also stated that investors overreacted to the COVID-19 pandemic. Atems and Yimga (2021) focused on the US airline industry and found evidence that for all of the stock prices considered, the contemporaneous response to a 1% COVID-19 shock was an average drop in company value of approximately 0.1%.

Poretti and Heo‘s (2022) results for globally listed tourism companies (airlines, casinos, hotels) are more focused on the impact of firm value drivers on cumulative abnormal returns following the

announcement of COVID-19 as a pandemic. In all cases, an abnormal negative cumulative return was observed.

Ding, Fan and Lin (2022) analysed Chinese listed companies in the early days of the spread of COVID-19 and found that the Chinese stock market responded in a significantly negative way to the domestic outbreak of the disease but in a significantly positive way to the containment of the disease in China and the outbreak overseas.

However, apart from the first study mentioned above, all the papers are related to non-European environments, but this is the area that is of interest to us. Within research that focuses on the European environment, Heyden and Heyden (2021) are noteworthy, but their paper only focuses on the reaction of the stock market to the first cases of infection and deaths related to COVID-19. Moreover, all the cited papers focus on the impact of the pandemic on the valuations of publicly traded companies. To the best of our knowledge, we are the first to investigate these changes by employing a unique dataset that consists of individually assessed companies in the context of the pandemic.

The main difference, when looking at the valuation of privately held companies, is that information on their valuations is generally not publicly available, which makes any further analysis, specifically an analysis of the impact of the COVID-19 pandemic, significantly more difficult. Thus, for privately held companies, we generally have only two ways in which we can determine their market value. The first and most commonly used option found in published literature, is to use data relating to a recent share transaction in the company, if this information is available, and the second option is to assess the market value of the company itself.

The first approach is more often used as it is much less laborious and, at first glance, more objective. However, the problem is that there are not many transactions for which cost information is available, and it is almost impossible to create a consistent and geographically uniform sample for a specific industry. However, this is possible through the second approach, which we see as a significant advantage and the added value of our research. A theoretical disadvantage of the second approach may be a lower degree of objectivity, we have attempted to minimize this through the use of a precise and detailed valuation procedure (see Drábek, 2022).

According to Koeplin, Sharin and Shapiro (2005), U.S. private companies are acquired at an average discount of 20–30% in comparison to similar public companies when earnings multiples are used as the basis for the valuation of the transaction. The average discount, calculated using price-to-book value multiples is somewhat lower. Non-U.S. private companies are acquired at an average discount

of 40–50% in comparison to similar public companies when using earnings multiples to value the transaction. However, the authors stated that the measured discount is not as statistically significant as it is for U.S. companies. Later research by Paglia and Harjoto (2010) even indicates a discount level of 65-70% for privately held US companies.

Draper and Paudyal (2006) focused on UK "private vs. public" companies. Their research confirmed that the acquisition of private companies yields higher returns when compared to the acquisition of public companies. However, they did not directly address the differences in the valuations of these two types of companies.

According to Klein and Scheibel (2012), there is also a private company discount for privately owned European companies. They identified a valuation discount of around 5% for privately owned eurozone companies. They also found that when using the acquisition approach, size and profitability have no significant influence on the size of the privately owned company discount.

However, contrary to the above studies, Elnathan, Gavious and Hauser (2010) state that the results that indicate the existence of a discount in the valuations of privately owned companies may just as easily be explained by the compliance of valuation experts with the interests of the party that commissioned the valuation, and not only through the standard explanation, that is a lack of liquidity. The conclusions of these authors are viewed as more of a minority opinion, and as our research will not be based on the acquisition approach or transaction prices, the possibility that these assumptions are correct will not affect the accuracy of our conclusions.

2 Data and Methods

For the valuations and comparison purposes, we used two data sets. The first set of publicly traded companies consists of valuation data for breweries listed on European[1] stock exchanges (18 companies in total). The second sample of privately held companies is made up of data from the brewing industry in the Czech Republic (50 companies who generate 99% of the industry turnover). Due to the availability of accounting data for privately owned companies, we work with the valuation data from 31/12/2019 and 31/12/2020.

We have limited our data to the brewing industry because this data is not normally available, so it is necessary to assess the individual market value of each of the fifty companies. Despite limiting our

[1] We only used comparisons with European companies as we identified only 4 US publicly traded breweries, of whom only 1 had data in sufficient extent.

data to a specific country and industry, we selected our data sample based on several characteristic. Firstly, the brewery industry was directly affected by the impact of the pandemic and related restrictions (see e.g., Czech Beer and Malt Association, 2022). Secondly, the Czech brewing industry provides a sufficiently large dataset of companies, but that is still small enough that it is practically possible to make individual assessments. Thirdly, the brewing industry represents a relatively more homogenous sector in comparison to others. And finally, the availability of the necessary data.

Data on the market value of publicly traded companies can be obtained directly from the relevant market on which the company is listed. For privately held companies, we carried out an assessment of the market value of each of the fifty companies using the income approach – the discounted cash flow method (DCF). We use the standard formula for the two-stage model of entity variation to assess the enterprise value EV (e.g., Damodaran, 2012):

$$EV = \sum_{t=1}^{T} \frac{FCFF_t}{(1+WACC)^t} + \frac{TV}{(1+WACC)^T} \quad (1)$$

where "FCFF" free cash flow to the firm, "TV" terminal value, "WACC" weighted average cost of capital, "t" represents the individual years of the first phase and "T" represents the length of the first phase.

To calculate FCFF, we used the following formula:

$$FCFF = EBIT \times (1+tax) - NI - \Delta NWC \quad (2)$$

where "NI" represents net investments in operational fixed assets (i.e., gross investments less depreciation), "ΔNWC" represents the change in net working capital. By "tax" we mean the corporate tax rate. EBIT is adjusted by non-operating income and expenses as well as non-recurring items thus giving the adjusted operating profit.

The terminal value calculation is based on the model by Copeland, Kollerr and Murrin (1994). We use the following parametric formula in our calculations:

$$TV = \frac{EBIT_{T+1} \times (1-RR)}{WACC - g} \quad (3)$$

where "$EBIT_{T+1}$" represents the adjusted EBIT in the first year of the second phase, "*RR*" represents the reinvestment rate in the second phase and "*g*" represents the assumed free cash flow growth rate for the second phase.

Within the WACCs, the cost of equity is estimated using the CAPM model modified by extending the market risk premium to include country risk and a premium for smaller market capitalisation. The cost of debt is primarily based on the bank loan interest rate database, ARAD (Czech National Bank, 2021).

The above methodological framework is a relatively brief description of the DCF valuation procedure applied to our sample of companies. However, this step is critical in relation to the results provided by our research. Due to the nature of the DCF method, there may be a relatively large opportunity for bias and potential inaccuracies, as despite all our professional efforts, this is still only our estimate of the market value of the companies in this study. For this reason, we consider it essential to refer to the paper by Drábek, (2022), in which the methodological approach we have used is described in detail, including a discussion of the individual risk premiums, methods for the estimation of revenues and costs, and other aspects of the financial plan.

The calculated market value of each company was converted into valuation multiples using reference variables (e.g., EAT, EBIT, Sales) that allow both year-on-year comparisons between companies as well as comparisons with publicly traded companies

3 Results

In this section we focus on the estimation of valuation multiples. First, we focus on privately held breweries and then compare the results to the values for publicly traded breweries. For both samples we use trailing multiples determined by reference variables on the valuation dates, 31/12/2019 (referred to as 2019) and 31/12/2020 (2020). For the sample of privately held breweries, one year forward multiples, for 2020 (FW20), are also used, these are based on the valuation results for 31/12/2019 and for 2021 (FW21) they are based on the valuation results from 31/12/2020.

Of the forward multiples for publicly traded companies, only forward P/E multiples were available. For all samples, the term "total" refers to the total industry multiple (sum of the market value of all companies divided by the sum of the reference variable of all companies).

3.1 Privately held breweries

Our results suggest that the total enterprise value of the brewing industry in the Czech Republic decreased by 4.46% between 2019 and 2020. The market value of the equity declined by 7.08% over the same period, while the book value of the equity declined by 8.19%. Therefore, the pandemic had a noticeable negative impact on the value of companies in the brewing industry. The results are shown in Figure 1.

Figure 1 shows that between 2019 and 2020, the median trailing multiple increased by 5.25% while the industrial trailing multiple increased by 13.10%. The 2020 industrial trailing multiple increased by 15.01% compared to the 2020 industrial forward multiple, while the median increased by 10.80%. The median forward multiple increased by 11.83% year-over-year and the industrial forward multiple increased by 2.71%. This increase in all types of multiples indicates that the market value of the companies has declined much less than their reported EBITDA, which may indicate that the decline in earnings is perceived to be temporary with the expectation of an early return to pre-pandemic levels.

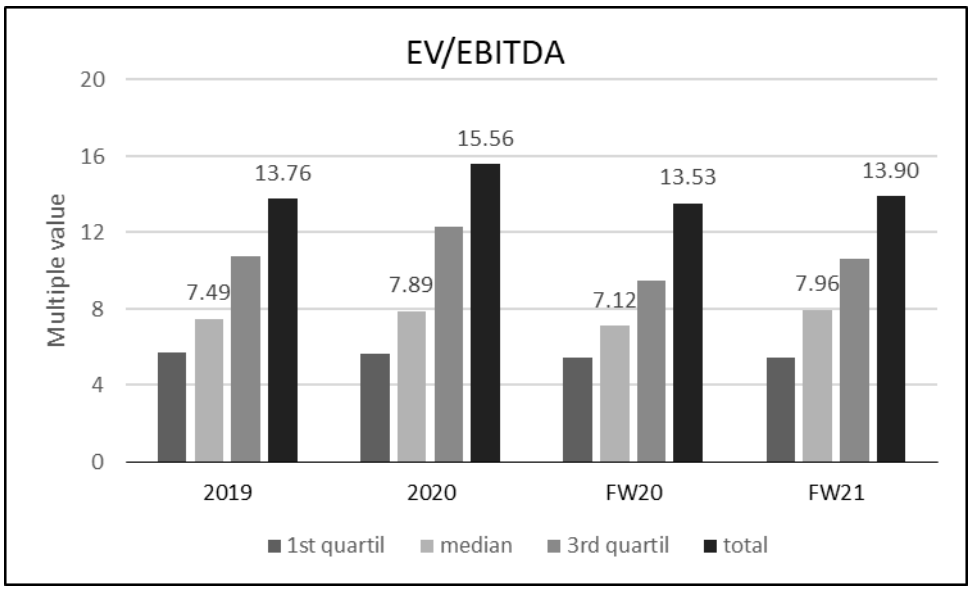

Figure 1: EV/EBITDA ratio of the Czech brewing industry in 2019 and 2020 (dimensionless)

Notes: the values of basic EV/EBITDA valuation multiple statistics are shown for the Czech brewing industry with a trailing and forward perspective (FW) to the 2019 and 2020 valuation dates.

For more detail, several other valuation multiples (P/E, EV/EBIT, EV/S, P/S, P/BV, EV/IC), for privately owned Czech breweries, are shown in Figures A1-A6 in the Appendix. Regarding changes in the other valuation multiples, the median multiples related to EAT and EBIT decreased year-on-year, while the overall industrial multiples increased. The EV/S and P/BV multiples did not show any significant year-on-year fluctuations. In contrast, the EV/IC multiple significantly declined in both its median and industry-wide aggregate values. The median P/S multiple increased year-on-year, while the aggregate remained almost unchanged. Overall, a slight year-on-year increase in the values of these multiples prevailed.

The results shown in Table 1 summarise the changes within each multiple, for the trailing annual change (20/19), for the trailing 2020 vs forward 2020 multiple (20/FW20) and for the forward annual change (FW21/FW20). Changes are shown for both the median and the total industry (total).

Table 1: Year-on-year changes in valuation multiples for the Czech brewing industry

Multiple	20/19		20/FW20		FW21/FW20	
	median	total	median	total	median	total
P/E	-8.08%	14.44%	-10.84%	16.87%	-6.96%	5.23%
EV/EBIT	-17.26%	28.73%	-15.81%	40.30%	-3.86%	7.56%
EV/EBITDA	5.25%	13.10%	10.80%	15.01%	11.83%	2.71%
P/S	14.58%	0.13%	16.87%	4.87%	13.19%	0.84%
EV/S	-4.73%	2.96%	-1.25%	7.83%	0.60%	3.69%
P/BV	-1.20%	1.21%	-	-	-	-
EV/IC	-19.92%	-9.45%	-	-	-	-

Notes: the table summarise changes within selected valuation multiples, the trailing annual change (20/19), the trailing 2020 vs forward 2020 multiple (20/FW20) and the forward annual change (FW21/FW20). Changes are shown in both the median and for the total industry (total).

From Table 1, it is clear that while the median of most multiples declined year-on-year, the aggregate industry-wide multiple increased. In particular, the EV/EBIT multiple shows the greatest changes, while the P/BV ratio is almost unchanged. The EV/S ratio also shows a quite minor year-on-year change.

3.2 Publicly traded breweries

For the brewing industry in the EU (the publicly traded alone), our results show that the total enterprise value decreased by 5.10% between 2019 and 2020. The market value of the equity declined by 6.06% over the same period, while the book value of the equity declined by 12.24%. These results show that the impact of the pandemic on the market value of publicly traded companies was about the same as that on privately held companies. However, the book value of publicly traded companies showed significantly greater declines. The results are shown in Figure 2.

Figure 2 shows the valuation multiples for the European brewing industry (only publicly traded) for 2019 and 2020. The median EV/EBITDA was 9.63 in 2019, rising to 12.39 in 2020. On an aggregate industry-wide basis, this ratio rose from 11.74 to 14.26. Only the median of the P/E ratio exceeded the aggregate industry-wide value.

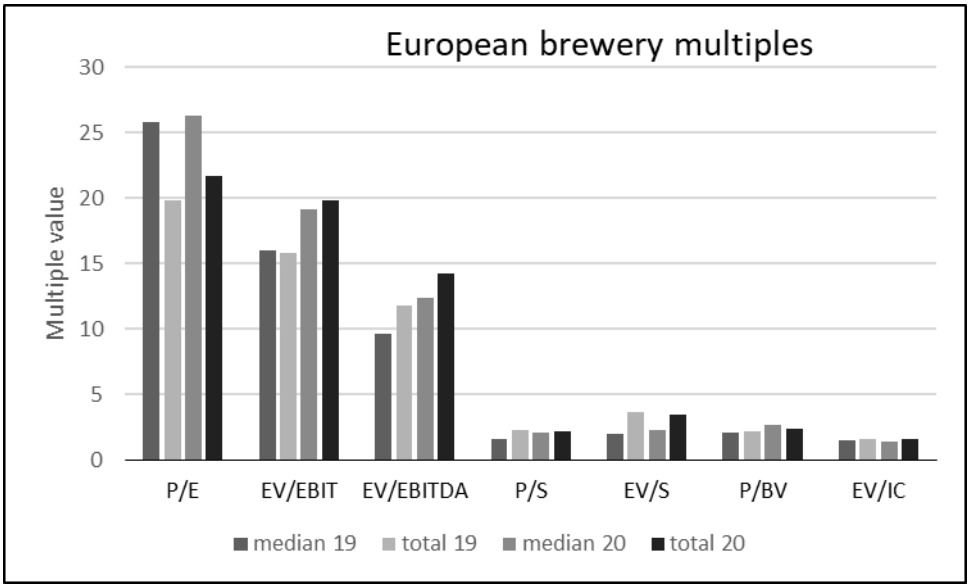

Figure 2: Valuation multiples for the European brewing industry in 2019- (dimensionless). Data source: Damodaran (2020 and 2021).

Notes: the values are the basic valuation multiples statistics for the European brewing industry trailing the 2019 and 2020 valuation dates.

The results shown in Table 2 summarise the changes within each multiple, the trailing annual change (20/19), the trailing 2020 vs forward 2020 multiple (20/FW20) and the forward annual change (FW21/FW20). Changes are shown in both the median and for the total industry (total). Due to a lack of available data, forward multiples are only shown for the P/E ratio.

Table 2: Year-on-year changes in valuation multiples for the European brewing industry

Multiple	**20/19**		**20/FW20**		**FW21/FW20**	
	median	**total**	**median**	**total**	**median**	**total**
P/E	2.13%	9.32%	31.83%	10.82%	18.87%	28.32%
EV/EBIT	19.93%	24.99%	n.a.			
EV/EBITDA	28.66%	21.51%				
P/S	33.23%	-6.72%				
EV/S	15.47%	-5.77%				
P/BV	31.77%	7.04%				
EV/IC	-2.93%	2.40%				

Notes: the table summarise the changes within selected valuation multiples, the trailing annual change (20/19), the trailing 2020 vs forward 2020 multiple (20/FW20) and the forward annual change (FW21/FW20). Changes are shown in both the median and for the total industry (total).

We can see from Table 2 that most multiples increased year-on-year. The median changed more significantly when compared to the aggregate industry-wide multiple. The lowest level of changes were observed in the trailing P/E ratio and especially the EV/IC ratio.

3.3 Public vs private – differences in valuation

The results presented in Table 3 contain an estimate of the "private company discount" based on a comparison of the valuation multiples of privately owned Czech breweries and publicly traded European breweries. The calculations were made for both the industry median and the aggregate values for the whole industry.

Table 3: Estimation of private company discount

	2019 median	2019 total	2020 median	2020 total	FW20 median	FW20 total	FW21 median	FW21 total
P/E	40.63%	-19.77%	46.56%	-25.38%	20.99%	-18.89%	38.16%	2.51%
EV/EBIT	15.22%	-22.35%	41.51%	-26.02%	n.a.			
EV/EBITDA	22.20%	-17.21%	36.36%	-9.09%				
P/S	53.45%	-85.63%	59.97%	-99.26%				
EV/S	59.22%	-13.35%	66.35%	-23.84%				
P/BV	60.98%	-72.65%	70.74%	-63.25%				
EV/IC	26.98%	-207.25%	39.76%	-171.68%				

Notes: the table contains an estimate of the private company discount derived from data on the valuation multiples of privately owned Czech breweries (Figure 1) and publicly traded European breweries (Figure 2). The calculations were made for both the industry median and for the aggregated values for the whole industry.

We need to comment on the negative values of discount as reported in the "total" column of Table 3. The problem with the calculation of the industry multiple as an aggregate industry value is that it behaves in a similar way to a weighted average, i.e., the companies with the highest market capitalisation have the largest impact on the resultant value of the variable. In the case of the Czech brewing industry, one entity – Plzeňský Prazdroj – represents more than 70% of the total market capitalisation of the industry (98% of the market capitalisation is represented by the top 6 companies). This company has significantly higher than average profitability and has growth in excess of the industry as a whole, with a lower cost of capital due to its size and opportunities for diversification. As a consequence, the relative valuation ratios of this company exceed those of the publicly traded European companies, the result is that the values in the 'total' column are negative. For this reason, we do not consider the expression of the multiple at the aggregate industry level to be appropriate for an estimation of the private company discount.

The results presented in Table 3 show the two key findings of our research. First, they confirm the existence of a private company discount and provide a summary of its size for 2019 and 2020

(including forward values for the PE ratio) for different valuation multiples. Secondly, they show that there is a significant difference between the industry market capitalisation multiple and the median multiple. This suggests that the application of a private company discount, calculated using the median, will not be appropriate for companies that, although not publicly traded, are comparable to publicly traded companies in terms of size, opportunities for diversification, etc.

The results in Table 3 also show that the smallest difference between the multiples of privately held and publicly traded companies is in the forward P/E, the EV/EBIT, EV/EBITDA and EV/IC ratios. Multiples based on sales or book value show the highest deviation. Furthermore, it can be seen that the private company discount has increased year-on-year for all of the multiples used in the comparison.

4 Robustness Analysis

In this section, to examine the robustness of our results, we perform two robustness checks. First, in our data sample, Plzeňský Prazdroj accounts for more than 70% of the market capitalisation of the industry. Therefore, we recalculate the estimated private company discount from Table 3 with the exclusion of Plzeňský Prazdroj. The results are available in Table 4. This exercise will help us to compare whether and how the valuation multiples have changed. Secondly, we use realized market transactions, a common approach used to calculate private company discounts in similarly focused studies. More detail is provided in Table 5 below. This data is not as detailed or market-specific, but should provide a framework to support our results.

Table 4: Estimate of private company discount with the exclusion of Plzeňský Prazdroj

	2019	2019	2020	2020	FW20	FW20	FW21	FW21
	median	total	median	total	median	total	median	total
P/E	41.36%	-43.02%	47.67%	-48.69%	21.69%	-41.58%	39.61%	-37.91%
EV/EBIT	18.37%	-51.97%	42.58%	-166.03%	n.a.			
EV/EBITDA	23.13%	5.28%	36.57%	9.18%				
P/S	55.74%	-5.99%	61.88%	-16.23%				
EV/S	59.81%	43.80%	67.85%	40.92%				
P/BV	60.99%	39.46%	70.90%	47.62%				
EV/IC	33.42%	-5.81%	41.71%	8.57%				

Notes: the table contains an estimate of the private company discount derived from data on valuation multiples of Czech privately held breweries (Figure 1), with the exclusion of the Plzeňský Prazdroj brewery, and publicly traded European breweries (Figure 2). Plzeňský Prazdroj was excluded from the sample as it is the largest brewery and its financial results affect the values for the multiples of the whole industry. The calculations were made for both the industry median and the aggregated values for the whole industry.

The results in Table 4 show, on one hand, that excluding the most important company in the industry significantly changes the amount of private company discount when expressed as a "total". However, we did not recommend this approach to calculating the multiple in the previous section. In contrast, the median values in Table 4 do not show any significant changes in comparison to Table 3, and it can be seen that are stable even after the exclusion of such a significant entity.

Next, we focused on an evaluation of our results in the context of realized market transactions. Although we have not obtained the available data for market transactions directly from European breweries, we at least have data on the general development of transaction multiples as well as on the development of multiples for the beverage sector (all geographically undifferentiated).

In Table 5, we provide the transaction P/E ratios for the acquisition of publicly traded companies (Public PE), privately held companies (Private PE), and the P/E ratio of the S&P 500 index for comparison.

Table 5: Valuation multiples of acquisitions (PE dimensionless)

Year	Public PE	Private PE	S&P 500 PE	Private company discount
2011	22.5	13.8	12.8	38.67%
2012	21.3	19.7	13.5	7.51%
2013	22.0	16.4	17.0	25.45%
2014	26.5	16.5	16.8	37.74%
2015	22.9	17.6	17.5	23.14%
2016	23.4	18.5	18.7	20.94%
2017	26.9	16.6	21.6	38.29%
2018	22.9	14.3	16.3	37.55%
2019	17.5	14.4	21.0	17.71%
2020	19.8	25.3	27.8	-27.78%

Data source: FactSet Mergerstat (2021)

Notes: the table shows P/E ratios of acquisitional transactions made in the market between 2011 and 2020 for both publicly traded and privately held companies.

The data in Table 5 shows that all valuation multiples, for both public and private companies (and also for the S&P 500 index), increased between 2019 and 2020, with a significant increase of 75% for privately held companies. These results confirm our finding that valuation multiples have also mostly increased for privately held Czech breweries (mainly in terms of the whole industry). Furthermore, Table 5 shows that between 2011 and 2021 the average "private company discount" was 27.45%, it dropped to 17.71% in 2019 and even became negative in 2020, which had not happened in any of

the previous years in the period under consideration. However, it may be misleading to consider this negative discount without knowing the details of the specific transactions. Table 5 also confirms the existence of a private company discount – however, the values shown, without further geographic or information about sectors, differ from the values calculated for privately held Czech breweries. For the beverage sector, we obtained transactional PE multiples, without the private vs. public differentiation, of 16.7 in 2019 and 20.9 in 2018.

The data presented in this chapter basically confirms our findings related to the impact of the COVID-19 pandemic on valuation multiples (they increased). They also confirm that it is better to use the median of all values for such a concentrated industry sector rather than an aggregate industry multiple. The existence of a private company discount was also confirmed by data from real transactions, but this did not hold for privately held companies that are comparable to publicly traded companies in terms of their size, opportunities for diversification, etc.

Conclusions

Our results confirm the presence of a private company discount using data from the Czech brewing industry. In 2019, based on our calculations, the private company discount (based on median values) in the Czech brewing industry ranged from 15% to 61%, depending on the chosen valuation multiple. In 2020, the discount ranged from 36% to 71%. The most stable and also the lowest values for the discount were recorded for the EV/EBITDA ratio (22–36 %) and the forward PE ratio (21–38 %). Our findings are consistent with previous research (see section 2) but it always depends on the type of multiple used. The year-on-year increase in all the types of multiples considered shows that the market value of the companies has declined much less than the profits/sales (the benchmark variable in general). This may indicate that the decline in earnings was perceived to be temporary with the expectation of an early return to pre-pandemic levels.

We also found that there was a significant difference between the multiple related to the entire market capitalization of the industry and the median multiple. This suggests that the application of a private company discount, calculated using the median, will not be appropriate for companies that, although not publicly traded, are more comparable to publicly traded companies in terms of size, opportunities for diversification, etc. Thus, it is necessary to differentiate the size of the private company discount in relation to the relevant multiple.

Our results provide more detailed data on differences with respect to ownership structure, but also provide information for practical use with respect to the estimation of multiples for the valuation of

privately held brewing companies. Given the limitations in our data, it only applies to a specific industry in a specific country, it would be interesting to carry out an examination of a more extensive dataset in the same way as our study. This would also be beneficial in estimating the effects of the support measures that were later introduced by policymakers.

References

Atems, B. and J. Yimga, 2021. Quantifying the impact of the COVID-19 pandemic on US airline stock prices. Journal of Air Transport Management 97, no. 102141. DOI: https://doi.org/10.1016/j.jairtraman.2021.102141.

Bessler, W. et al., 2021. The global financial crisis and stock market migrations: An analysis of family and non-family firms in Germany. International Review of Financial Analysis 74, no. 101692. DOI: https://doi.org/10.1016/j.irfa.2021.101692.

Boogaerts, T. et al., 2022. Evaluating the impact of COVID-19 countermeasures on alcohol consumption through wastewater-based epidemiology: A case study in Belgium. Environment International 170, no. 107559. DOI: https://doi.org/10.1016/j.envint.2022.107559.

Claessens, S., H. Tong and I. Z. Huertas, 2011. Did the Euro Crisis Affect Non-Financial Firm Stock Prices Through a Financial or Trade Channel? IMF Working Papers 2011 (227), 1-40. DOI: https://doi.org/10.5089/9781463904951.001.

Copeland, T. E., T. Koller and J. Murrin. 1994. Stanovení hodnoty firem. Praha: Victoria Publishing. ISBN 80-85605-41-4.

Czech Beer and Malt Association, 2022. Basic facts (Základní fakta in Czech) [Online]. Available at: https://ceske-pivo.cz/zakladni-fakta [Accessed 8 November 2022].

Czech National Bank, 2022. ARAD database: Bank interest rates on CZK-denominated loans by Czech non-financial corporations -– new business. [Online]. Available at: https://www.cnb.cz/cnb/STAT.ARADY_PKG.PARAMETRY_SESTAVY?p_sestuid=58843&p_strid=AAABAA&p_lang=EN. [Accessed 10 October 2022].

Damodaran, A., 2012. Investment valuation: Tools and techniques for determining the value of any asset. 3rd Edition. Hoboken, New Jersey: Wiley. ISBN 978-1-118-01152-2.

Damodaran, A., 2020. Globalcompfirms. [Online]. Available at: http://people.stern.nyu.edu/

adamodar/pc/datasets/globalcompfirms2020.xlsx. [Accessed: 20 October 2022].

Damodaran, A., 2021. Globalcompfirms. [Online]. Available at: http://people.stern.nyu.edu/

adamodar/pc/datasets/globalcompfirms2021.xlsx. [Accessed: 20 October 2022].

De Bondt, W. F. M., and Thaler, R. (1985). Does the Stock Market Overreact? The Journal of Finance, 40(3), 793–805. Doi:10.1111/j.1540-6261.1985.tb05004.x

Ding, H., H. Fan and S. Lin, 2022. COVID-19, firm exposure, and firm value: A tale of two lockdowns. China Economic Review 71, no. 101721. DOI: https://doi.org/10.1016/j.chieco.2021.101721.

Drábek, M., 2022. Relative Valuation of Private Held Companies: Valuation Multiples in the Czech Brewing Industry. Journal of Business Valuation and Economic Loss Analysis 17 (1), 65-100. DOI: https://doi.org/10.1515/jbvela-2021-0023.

Draper, P. and K. Paudyal, 2006. Acquisitions: Private versus Public. European Financial Management 12 (1), 57-80. DOI: https://doi.org/10.1111/j.1354-7798.2006.00310.x.

Duff & Phelps, 2017. Valuation Handbook: International Guide to Cost of Capital. Hoboken, New Jersey: John Wiley & Sons, Inc. ISBN 978-1-119-36672-0.

Elnathan, D., I. Gavious and S. Hauser, 2010. An analysis of private versus public firm valuations and the contribution of financial experts. The International Journal of Accounting 45 (4), 387-412. DOI: https://doi.org/10.1016/j.intacc.2010.09.001.

EVS, 2016. European Valuation Standards. Brussels: TEGoVA. Available also at: https://www.tegova.org/data/bin/a5738793c0c61b_EVS_2016.pdf. [Accessed 4 October 2022].

FactSet Mergerstat, 2021. Mergerstat review. Portland: Business Valuation Resources, LLC. ISBN 978-1-62150-225-8.

Goetz, S., 2021. Public versus Private: New Insights into the Private Company Discount. Journal of Business Valuation and Economic Loss Analysis 16 (1), 15-40. DOI: https://doi.org/10.1515/jbvela-2020-0027.

Gordon-Wilson, S., 2021. An exploration of the substitutions of British pub consumers during the COVID-19 crisis. International Journal of Hospitality Management 96, no. 102998. DOI: https://doi.org/10.1016/j.ijhm.2021.102998.

Heyden, K. J. and T. Heyden, 2021. Market reactions to the arrival and containment of COVID-19: An event study. Finance Research Letters 38, no. 101745. DOI: https://doi.org/10.1016/j.frl.2020.101745.

IVS, 2017. International Valuation Standards. London: IVS Council. Available also at: https://www.ivsonline.org/. [Accessed 4 October 2022].

Klein, C. and M. Scheibel, 2012. The Private Company Discount from a European Perspective: An Analysis Based on the Acquisition Approach for Comparable Transactions of European Target Companies. The Journal of Private Equity 16 (1), 74-82. DOI: https://doi.org/10.3905/jpe.2012.16.1.074.

Koeplin, J., A. Sarin,and A. C. Shapiro, 2005. The Private Company Discount. Journal of Applied Corporate Finance 12 (4), 94-101. DOI: https://doi.org/10.1111/j.1745-6622.2000.tb00022.x.

Koeplin, J., Sarin, A., & Shapiro, A. C. (2000). THE PRIVATE COMPANY DISCOUNT. Journal of Applied Corporate Finance, 12(4), 94–101. Doi:10.1111/j.1745-6622.2000.tb00022.x

Koller, T., M. Goedhart and D. Wessels, 2020. Valuation: measuring and managing the value of companies. Hoboken, New Jersey: Wiley. ISBN: 978-1-119-61088-5.

Maneenop, S. and S. Kotcharin, 2020. The impacts of COVID-19 on the global airline industry: An event study approach. Journal of Air Transport Management 89, no. 101920. DOI: https://doi.org/10.1016/j.jairtraman.2020.101920.

Paglia, J. and M. Harjoto, 2010. The Discount for Lack of Marketability in Privately Owned Companies: A Multiples Approach. Journal of Business Valuation and Economic Loss Analysis 5 (1), no. 5. DOI: https://doi.org/10.2202/1932-9156.1089.

Poretti, C. and C. Y. Heo, 2022. COVID-19 and firm value drivers in the tourism industry. Annals of Tourism Research 95, no. 103433. DOI: https://doi.org/10.1016/j.annals.2022.103433.

Rizvi, S. K. A, L. Yarovaya, N. Mirza and B. Naqvi, 2022. The impact of COVID-19 on the valuations of non-financial European firms. Heliyon 8 (6), no. e09486. DOI: https://doi.org/10.1016/j.heliyon.2022.e09486.

Sharma, A. and J. L. Nicolau, 2020. An open market valuation of the effects of COVID-19 on the travel and tourism industry. Annals of Tourism Research 83, no. 102990. DOI: https://doi.org/10.1016/j.annals.2020.102990.

Appendix

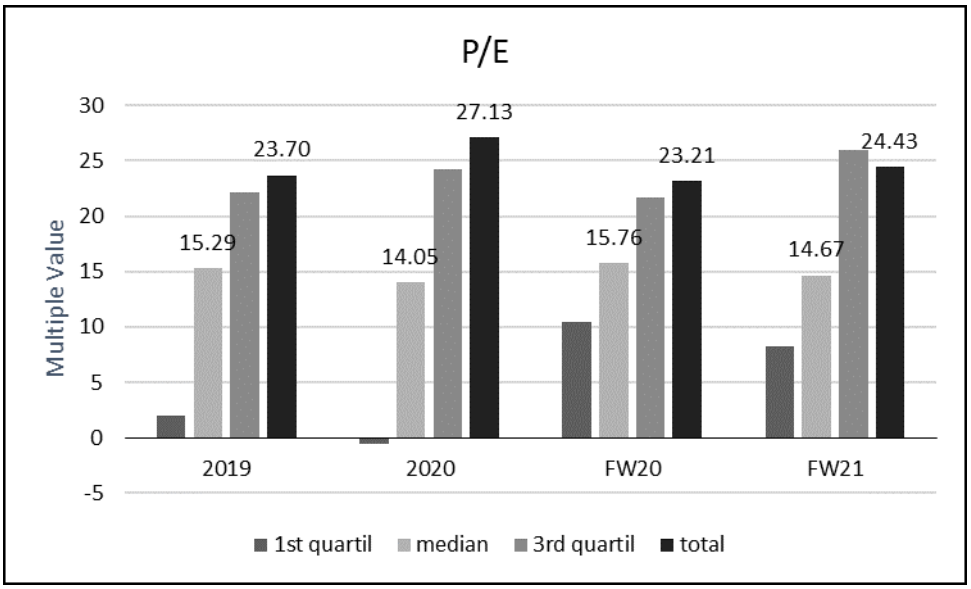

Figure A 1: P/E ratio of the Czech brewing industry in 2019 and 2020 (dimensionless)

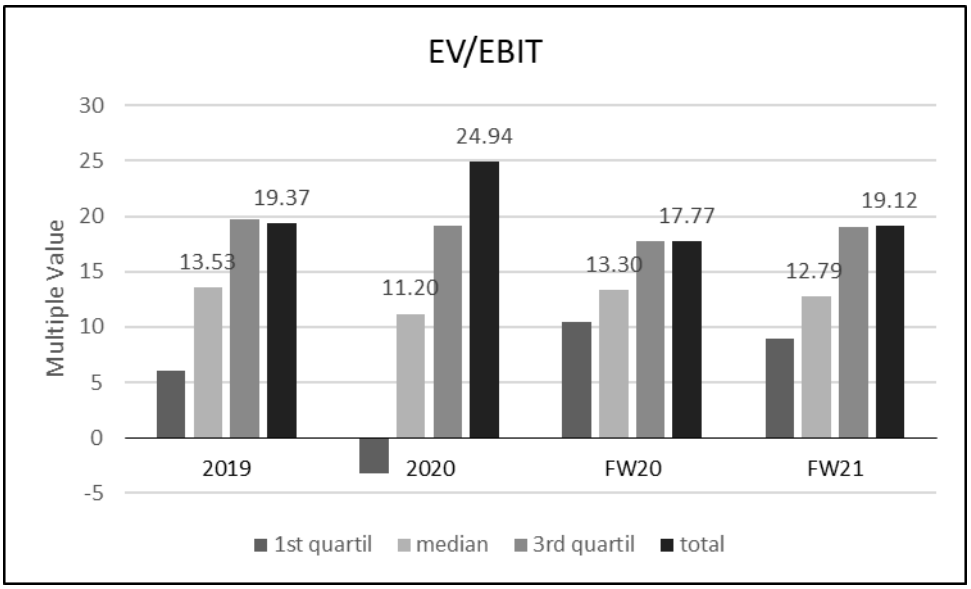

Figure A 2: EV/EBIT ratio of the Czech brewing industry in 2019 and 2020 (dimensionless)

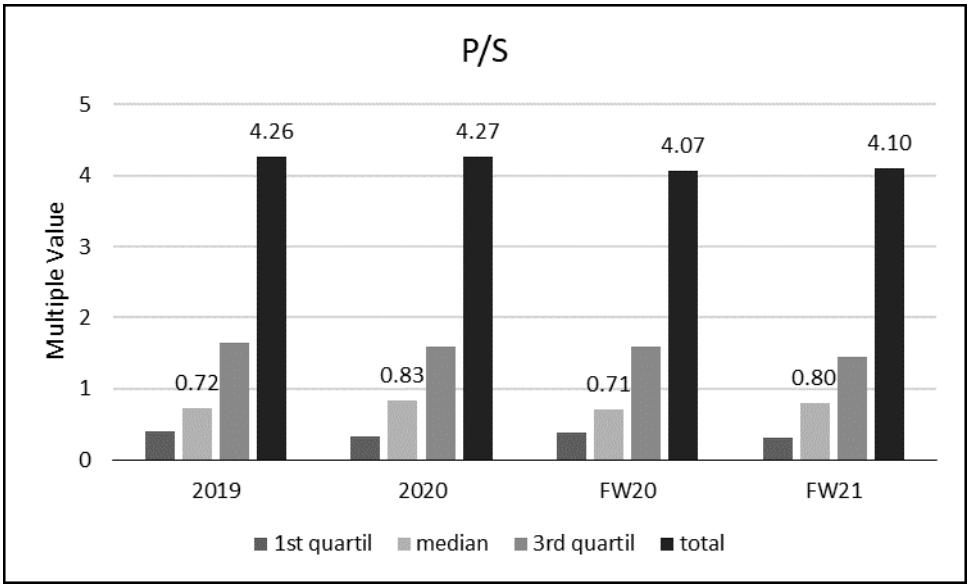

Figure A 3: P/S ratio of the Czech brewing industry in 2019 and 2020 (dimensionless)

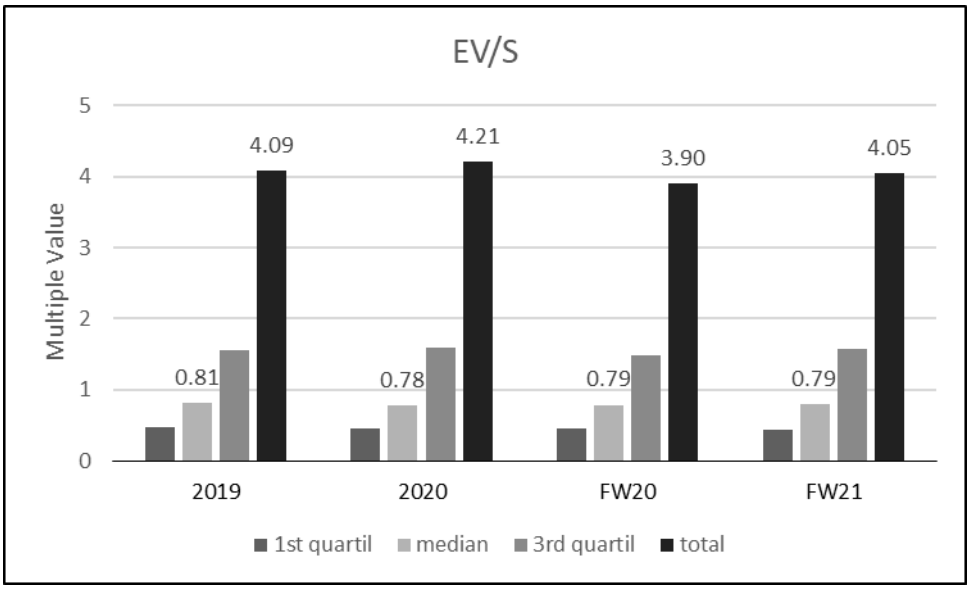

Figure A 4: EV/S ratio of the Czech brewing industry in 2019 and 2020 (dimensionless)

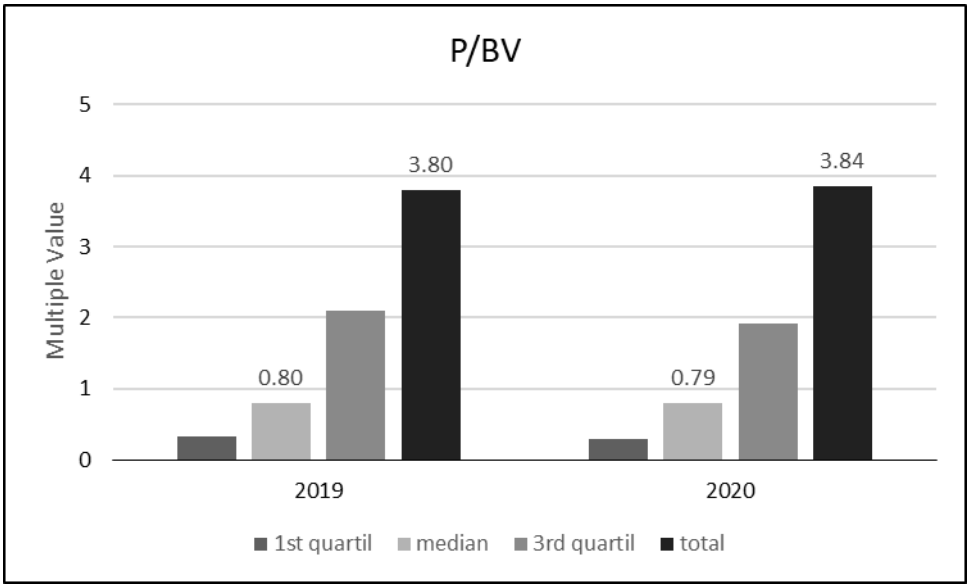

Figure A 5: P/BV ratio of the Czech brewing industry in 2019 and 2020 (dimensionless)

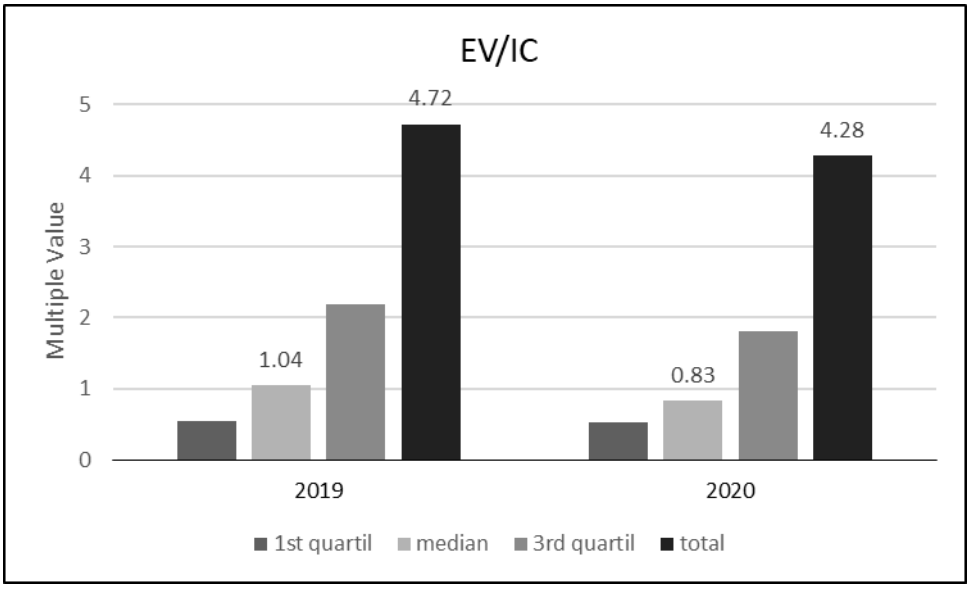

Figure A 6: EV/IC ratio of the Czech brewing industry in 2019 and 2020 (dimensionless)