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Article

Analysis of the Financial and Non-Financial Indicators of the Beer Sector: Italy and Spain

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Abstract: A study analyzed financial statements in the beer sectors of Italy and Spain during 2019–2021 using compositional data analysis (CoDa) to gauge pre- and post-pandemic financial health and aid sector-level decision-making. Geometric averages were employed to mitigate statistical issues, offering more accurate insights than arithmetic averages. The exploratory, quantitative methodology calculated key financial ratios and profitability metrics. Results indicated satisfactory short-term solvency. Returns and margins remained subpar despite pandemic policies. Geometric averages proved essential in portraying sector health accurately, underscoring the need for their use in classic brewing sector ratios. The study also showcased CoDa's efficacy in diagnosing sectoral financial health for informed decision-making. Furthermore, a web analysis revealed varying transparency levels in communicating non-financial indicators, with Spain excelling in waste, water, and energy disclosures, while Italy prioritized energy and waste with less transparency.

Keywords: compositional data (CoDa); financial statement analysis; financial ratios; accounting ratios; financial indicators; non-financial indicators

1. Introduction

Accounting ratios are an analytical tool that provides information for diagnosing the financial health of companies, facilitates strategic decision-making, allows investment risk assessment, and predicts critical variables on the present and future of companies [1].

Although the methodology of using classical accounting ratios does not present problems in the study of the financial status of an individual company, in diagnostic studies of the financial health of a sector it has been questioned from different fronts, providing until recently mostly partial and ad-hoc solutions [2–10]. The analysis of accounting ratios based on compositional data (hereafter CoDa) presents a unitary methodology whose validity of results has already been extensively corroborated [11–14] and that allows performing sectoral financial statement analysis reliably with any statistical method.

Although the CoDa methodology emerged in the fields of geology and chemistry at the end of the last century to study the relative importance of the components of chemical analysis, it was extended to all scientific fields that analyze ratios, including the economic, business and social fields [15,16]. Its application to the analysis of accounting ratios is more recent [7,17–26]. Far from being a methodological show-off, the CoDa methodology of ratio analysis gives substantially different results whenever it has been compared to the traditional one [7,17,20,22–24]. This article presents the simplest case of sectoral compositional analysis, calculating average ratios representative of a sector. In this particular problem, the CoDa methodology applies geometric rather than arithmetic averages [11,12,14,23,25,26]. The geometric average operation is compatible with the ratio operation, as both highlight the relative differences between accounting figures and not their absolute values as the arithmetic average does. Furthermore, the conclusions when applying the geometric average do not

change when permuting the numerator and denominator of the ratio as is sometimes done (for instance when using the ratio of liabilities over assets as a measure of indebtedness and the ratio of assets over liabilities as a measure of solvency).

The sector analyzed is the brewing sector (NACE 1105) which was one of the most severely touched by the COVID-19 pandemic, whose containment measures and restrictions to the tourism activity resulted in a dramatic drop in beer consumption which endangered financial sustainability. We compare the Spanish and Italian financial statements for 2019, 2020, and 2021, thus covering pre- and post-pandemic data. Besides financial indicators we analyze the transparency levels in communicating non-financial indicators and notably sustainability indicators, which are also key to the sector. With this purpose we analyze the breweries' web pages. For the objective of knowing the financial health of the brewing sector pre-pandemic and post-pandemic in the two countries analyzed, the methodology used is quantitative, through compositional data with information and indicators constructed thanks to the SABI and AIDA accounting databases respectively, which endorse the sample under study from the two countries. The methodology used to determine the web transparency of non-financial information is exploratory, analyzing each of the websites of the representative companies of the brewing sector in the two countries. Following the introduction, the review of the literature, the methodology, the discussion of the results and the conclusions are presented.

2. Literature Review

The craft beer industry is growing, more beers are in offer with a greater diversity of labels and flavors, and artisans undertake various formations to serve the markets [27,28]. At the same time, several global conglomerates of industrial brewers have emerged due to significant acquisitions and mergers [29].

In Italy, the market is dominated by five large brewing companies (Heineken Italia, Birra Peroni, Birra Castello, Carlsberg Italia, and Birra Forst). More than 90% of the market in Spain is concentrated in four large groups: Mahou, Damm, Heineken, and Hijos de Rivera (Estrella Galicia). It should be noted that market concentration by large companies homogenizes product offerings and opens up opportunities for new brewers who emphasize authenticity [30]. According to Alfaro (2022) [31], the coexistence of two different types of companies in the beer market (craft and macro breweries) results in the coexistence of two other models, macro breweries with large production volumes and craft companies with uncertainty regarding their profitability, with simultaneous high entry and exit rates [32,33].

At the same time, the sector's growth derives from different consumption patterns worldwide [33]. According to Alfeo et al. (2019) [34], the organizational models that characterize the beer industry are linked to an agricultural identity of the territory and local ingredients to brew beers facilitate the profitability of the sector and product diversification [35–40].

In Europe, the brewing map has changed in the last thirty years, with the absorption and concentration of traditional industries and more artisanal companies [29,41], along with a boom of microbreweries [42,43]. In addition, a brewing wave has spread to different countries, mainly in continental Europe [44].

The Spanish brewing industry ranked third in beer consumption and fourth in beer production among EU countries in 2021, and despite its per capita consumption, it ranks 11th in beer production worldwide. Moreover, the brewing sector in Spain represents 1.4% of GDP, with craft companies distributed unevenly throughout the country. It is, therefore, a sector that is of particular interest to analyze in terms of financial statements.

The expansion of companies in the brewing sector can be explained by policies to support small entrepreneurs in Spain and Italy [45,46]; although many are small companies with less than ten employees, born of artisan entrepreneurship, employment in local economies and development in local supply chains, in addition to tourism [29].

In 2020, the pandemic directly affected the brewing sector worldwide, beer sales fell across the board, and beer was marketed differently, changing the distribution process and even packaging [47].

On the other hand, the drop in tourism due to the pandemic impacted the brewing sector, as draught beer sales declined due to the closure of bars, restaurants, and related sectors [47,48]. In addition, the beverage of choice in social contexts declined in consumption during COVID-19 because of the aforementioned significant restrictions in the on-trade and related sectors. Large companies were more resilient during the pandemic because of their greater access to the food distribution channel [49–51].

Subsequently, in January 2022, when all restrictions were lifted, companies in the sector expected an accelerated recovery of the economy. However, such recovery has not yet arrived in 2023 due to the reduction of tax incentives, the necessary repayment of loans, increased inflation, decreased investments, the conflict between Ukraine and Russia, high energy and barley prices, difficulties in supply chains and further reduction of margins, especially in the artisanal sector [50,51]. On the other hand, the pandemic has left a reminder of changes in customer behaviors, marketing, distribution, and promotion methods [51–55], evidencing the necessary investigation of the sector's financial statements.

On the other hand, the literature contemplates the interest of the craft brewing sector in achieving economic and social benefits, and for this, margins and profitability must be positive for the survival of the sector [55]. Thus, the brewing sector bets on economic and social benefits, although the chances of survival depend on return on assets (ROA), and the literature indicates that such returns are irregular since there coexist companies that operate with high levels of performance and others with losses, especially small ones, which choose not to increase production, to remain local, with products of recognized quality and diversity [56].

Regarding the sustainability of the sector, this article dialogues with the emerging studies of the Spanish academic community on social and environmental accounting [57] and with other research that studies the brewing sector and its intensive use of water and energy, with large volumes of wastewater and solid waste and significant carbon emissions. This environmental problem makes it necessary to reflect on small-scale production and the process of "greening" in the brewing industry [39,58–60]. Notably, companies in the brewing industry are willing to make many tangible efforts to address sustainability challenges [60].

3. Methods

The CoDa methodology started to be used in geology and chemistry, focusing its interest on the relative importance of the chemical parts of the rock or substance [11]. It is currently applied in accounting since it is associated with relative magnitudes expressed as ratios, making analyzing financial statements a natural field of application.

In this section, we present how the ratios will be used for the analysis of the financial statements of the brewing sector in Italy and Spain in the period 2019–2021, using the CoDa compositional data methodology [11,14,24].

Specifically, the classic ratios under study will be constructed using geometric averages of each accounting figure to determine the financial indicators that will allow us to diagnose the sector's health in the period under study and for the two countries analyzed. The need to use geometric averages to calculate sector ratios has already been explained by other authors [21,23,25,26]. In constructing the ratios, we consider the relative importance of the accounting figure. The CoDa methodology, using compositional data, which pursues the same objective, analyzes the relative importance of the accounting figures with geometric averages. In other words, when constructing the sectoral norms, the relative importance of the accounting figures must be considered and not the absolute importance, which is what the arithmetic averages do.

Thus, the CoDa methodology uses geometric averages in the calculation of financial ratios since the geometric average is the one that is compatible with the ratio. In contrast, the arithmetic average is not compatible with the ratio operation. Still, it is compatible with the difference operation, according to the theory of measurement, of great statistical importance, as a branch of analysis and geometry that investigates the measures and the functions consistent with them [61]. Thus, one of the

pillars of the CoDa methodology, which studies the differences between magnitudes in relative terms, is geometric averages.

Let us look at a simple example of the compatibility of ratios with the geometric average and not with the arithmetic average. The ratio between 81 and 27 ($81/27=3$) is the same as the ratio between 27 and 9 ($27/9=3$), indicating that 27 is the center between 9 and 81 in relative terms. Accordingly, the geometric average between 9, 27, and 81 is 27 and is calculated as the cube root of the product $9 \times 27 \times 81$. In contrast, the arithmetic average between 9, 27, and 81 is 39, closer to the most considerable absolute value, 81.

Saus-Sala et al. [25] highlight an additional property of geometric averages in sectoral accounting statement analysis: the ratio of two geometric averages equals the geometric average of the ratios of the two accounting figures involved. The arithmetic average does not have this property. The calculation of the arithmetic averages of the accounting figures, first at the sector level and then the classic financial ratios on these averages, may contradict the results of the calculation of the traditional ratios first for each company and then the arithmetic average of these ratios.

Table 1 shows, with an example of three fictitious companies, this divergence between calculating the ratio x_1/x_2 between the arithmetic averages and the arithmetic average of the ratios and the coincidence between calculating the ratio between the geometric averages and the geometric average of the ratios. Moreover, the divergence between calculating the ratio between the arithmetic averages and the arithmetic average of the ratios can be sizeable, as in the example, in which one of the two solutions is larger than 1 implying that, in general, the accounting figure x_1 exceeds x_2 and the other less than one, meaning that in general the accounting figure x_1 is exceeded by x_2 . The three values of the ratios in the example, 1, $1/3$, and 3, clearly show that they are symmetrical around unity, a reality that only comes to light with geometric averages. To say that one accounting figure is equal to 3 times the second is the same as saying that the second is $1/3$ of the first. On the contrary, the arithmetic average is larger than one, closer to the ratio with higher absolute value, 3.

Table 1 also shows what happens when the numerator and denominator of the ratio are permuted. This is relatively common. For example, some researchers use the solvency ratio (assets over liabilities) and some the indebtedness ratio (liabilities over assets), hoping that this decision will not change the results. Unfortunately, however, with arithmetic averages it does change them. We observe here that with the geometric averages referred to x_2/x_1 , the results are again consistent and indicate the equality between x_1 and x_2 in average terms. The property that the geometric average of the inverse is the inverse of the geometric average is fulfilled, a property that is again not satisfied with the arithmetic average. According to the arithmetic average of the ratio x_1/x_2 , x_1 exceeds x_2 on average, and according to the arithmetic average of the ratio x_2/x_1 , x_2 exceeds x_1 on average, which cannot be simultaneously correct.

Table 1. Arithmetic and geometric average divergence and their ratios for the accounting figures x_1 and x_2 .

	x_1	x_2	x_1/x_2	x_2/x_1
Company 1	27	27	1	1
Company 2	81	243	$1/3$	3
Company 3	9	3	3	$1/3$
Arithmetic average of the accounting figures	39	91		
Geometric average of the accounting figures	27	27		
Geometric average of ratios			1	1
Ratio between geometric averages			1	1
Arithmetic average of ratios			1.44444	1.44444
Ratio between arithmetic averages			0.42857	2.33333

The ratios used for the analysis of financial statements of the brewing sector in Italy and Spain in the period 2019-2021 were constructed with different accounting figures without negative values [22]. The positive accounting figures of the financial statements used were the following five: x_1 : non-

current assets; x_2 : current assets; x_3 : current liabilities; x_4 : operating income; and x_5 : operating expenses (Table 2). The data were extracted from the SABI database in Spain and the AIDA database in Italy in March 2023, according to the following filters: active companies, commercial, with NACE code 1105 brewing, with website, and with data from 2019 to 2021, since data from 2022 were not yet available in SABI and AIDA respectively. Sample sizes were 66 (Italy, 2019), 66 (Italy, 2020), 72 (Italy, 2021), 27 (Spain, 2019), 27 (Spain, 2020), 27 (Spain, 2021).

The values of accounting figures equal to zero are not of relative importance, and it does not make sense to calculate financial ratios, nor is it possible to calculate geometric averages. The compositional data analysis methodology has advanced tools for the imputation of zeros [62] included in the CoDaPack program [63]. This computer program specializes in CoDa analysis, is of free distribution (available at <https://ima.udg.edu/codapack/>) and has menu-driven operation. In the analyzed dataset there were no zeros.

Table 2. Geometric averages of the accounting figures.

	Spain			Italy		
	2019	2020	2021	2019	2020	2021
x_1	0,2501	0,2241	0,1943	0,1485	0,2027	0,1978
x_2	0,1527	0,1470	0,1361	0,1697	0,1878	0,1950
x_3	0,1113	0,1057	0,0971	0,1164	0,1082	0,1229
x_4	0,2436	0,2500	0,2817	0,2805	0,2349	0,2404
x_5	0,2423	0,2732	0,2909	0,2849	0,2664	0,2439

The sectoral ratios under study are constructed with the geometric averages calculated with the CoDaPack program [63] (Table 2). The short-term solvency ratio is used to evaluate the brewery sector's capacity to meet its short-term obligations and debts:

$$\text{Short-term solvency} = \frac{x_2}{x_3}.$$

Another useful indicator is the proportion of current liabilities over assets, which shows to what extent the financial structure is dependent on short-term debts:

$$\text{Current liabilities over assets} = \frac{x_3}{(x_1 + x_2)}.$$

For analyzing profitability, margin, current-asset turnover, turnover and return on assets (ROA) are used. The latter can be decomposed into margin and turnover:

$$\text{Margin} = \frac{(x_4 - x_5)}{x_4},$$

$$\text{Current-asset turnover} = \frac{x_4}{x_2},$$

$$\text{Turnover} = \frac{x_4}{(x_1 + x_2)},$$

$$\text{ROA} = \frac{(x_4 - x_5)}{(x_1 + x_2)} = \text{Margin} \times \text{Turnover},$$

Besides, we consider asset structure as the proportion of fixed assets over total assets.

$$\text{Asset structure} = \frac{x_1}{(x_1 + x_2)}.$$

We explore the descriptive data referring to the web communication in March 2023 of non-financial indicators in the two countries since the analyzed academic literature demonstrates that the

sector is intensive in water and energy, with large volumes of waste, and intends to make efforts to preserve the environment [39,58–60].

For the collection of information, in March 2023, a double-entry Excel was prepared for each country, with the different non-financial indicators endorsed by the Global Reporting Initiative (GRI) and the companies in the sample of each country under study, to proceed with the web search. of the environmental, social and corporate governance information of each company. If this information was available, a 1 was written to the Excel matrix, and if the information was not available, a 0 was written to the matrix. Likewise, Cronbach's Alpha was calculated to ensure that the information was reliable and to present the results of the study.

Web communication indicates that Spanish companies provide more non-financial information, especially at the level of environmental indicators, although in social and corporate governance indicators, transparency is less. Regarding Italian companies, web communication of non-financial information is lower than that of Spanish companies, although web transparency follows the same pattern: first environmental information, followed by social and corporate governance.

Of the 25 non-financial indicators endorsed by the Global Reporting Initiative (GRI), the first six are environmental indicators, the next ten are social indicators and the last nine are corporate governance indicators (Table 3).

Table 3. Proportions of companies disclosing each of the non-financial indicators in Spain and Italy.

	Italy	Spain
1.Energy_consumption	14%	25%
2.Water_consumption	7%	27%
3.Polluting_emissions	6%	25%
4.Waste_generation	7%	25%
5.Waste_managed	11%	30%
6.Reused_waste	13%	30%
7.Workers	3%	23%
8.Diversity_gender_workers	3%	18%
9.Employment_stability	0%	3%
10.Absenteeism	1%	14%
11.Rotation_workers	0%	10%
12.Net_creation_work	0%	7%
13.Labor_Old	0%	10%
14.Training_workers	1%	18%
15.Regulation_customers	0%	11%
16.Payment_suppliers	0%	0%
17.Counselors	3%	14%
18.Independent_directors	0%	0%
19.Directors_in_CSR	1%	3%
20.Executive_commission	3%	14%
21.Audit_committee	0%	0%
22.Commission_appointments	1%	7%
23.Council_meetings	0%	7%
24.Remuneration_total_board	1%	0%
25.Diversity_gender_council	0%	3%

Table 4 shows the sectoral financial ratios for each country and year calculated from the geometric \bar{x} averages in Table 2.

Table 4. Ratios with geometric averages for the period 2019-2021 in the two countries.

	Spain			Italy		
	2019	2020	2021	2019	2020	2021
s. t. Solvency	1,3716	1,3902	1,4022	1,4586	1,7351	1,5870
Current liabilities over assets	0,2764	0,2849	0,2937	0,3657	0,2772	0,3129
Margin	0,0053	-0,0929	-0,0326	-0,0159	-0,1344	-0,0146
Current-asset turnover	1,5947	1,7006	2,0698	1,6524	1,2508	1,2327
Turnover	0,6046	0,6736	0,8525	0,8814	0,6016	0,6120
ROA	0,0032	-0,0626	-0,0278	-0,0140	-0,0809	-0,0089
Asset structure	0,6209	0,6039	0,5881	0,4666	0,5191	0,5035

Regarding the analysis of the short-term financial situation, the brewing sector in the two countries in the pre- and post-pandemic period 2010-2021 can meet its short-term payments, especially Italy, which is close to values of better short-term solvency. That is, companies can meet their short-term obligations and debts, assuming a good cash flow from operating activity, in the sense that its operating receipts exceed its operating payments. Current liabilities represent a reasonable proportion of the financial structure in both countries, and there is no visible trend over time in the current-liabilities-over-assets ratio.

The analysis of profitability reflects a low return on assets for companies in the brewing sector. In the case of Spain, the positive sign turned negative because of the pandemic, while Italy was already starting from negative figures before the pandemic, a situation that invites to generate strategic policies for this sector of activity, which despite having good operating revenues does not yield positive margins. On the other hand, in the Spanish case, the pandemic has left its mark on the sector, since in 2021 the profitability of 2019 was not recovered. When decomposing the return on assets between margin and turnover, it can be seen that the negative margin is almost always responsible for the bad results in both countries. The successive improvement in turnover and current-asset turnover in Spain has thus not contributed to improving profitability. In Italy both turnover ratios deteriorated in 2020 and failed to go back to pre-pandemic figures in 2021.

Asset structure does not exhibit a significant trend, but there are large differences between countries, Spain having a much larger proportion of fixed assets.

In summary, the short-term solvency of Spanish companies is acceptable, although it worsened in 2021 because of the pandemic. Italy presents better short-term solvency than Spain, especially in 2020 and 2021 during the pandemic. In terms of profitability, yields and margins are either negligible or negative and worsened in 2020, which is the main problem the sector is facing.

4. Discussion

This article highlights the reliable diagnosis of the analysis of the sector's financial statements using classical accounting ratios, with geometric averages, according to the CoDa methodology of compositional data [23,25,26]. It has sometimes been argued that the presence of zeros limits the CoDa methodology. Still, in classical ratio analysis, when an accounting figure is zero, it also poses problems since zero is not a relative magnitude, and the ratio cannot be calculated with a zero denominator. The CoDa methodology offers efficient zero imputation methods according to varied assumptions [62] that constitute an advantage in its use, although in our specific application no zeros were encountered.

The research offers a more accurate diagnosis of the financial health of the sector at the accounting and statistical level through a simple methodology that only involves a change in the way of calculating averages and which supports more reliable results for making decisions in the accounting and financial sphere, taking into account the relative and not the absolute differences between companies and without depending on the arbitrary decision of which accounting figure is introduced in the numerator and denominator of the ratio. The results reflect good short-term solvency in the two countries in the period under study. Yields are not good, and consequently,

margins are not good, despite the government policies derived from the pandemic, in line with the academic literature [56].

The investigation of web transparency of non-financial environmental information (indicators 1-6 of Table 3), social (indicators 7-16 of Table 3) and corporate governance (indicators 17-25 of Table 3), highlights differences in the two countries. Specific, web transparency of non-financial information is greater in Spanish companies, especially in environmental information on waste, water, and energy, according to order of priorities. Italian companies also provide this type of information but with smaller percentages of communication. Web communication on environmental indicators in Spain especially focuses on waste (30%), water (27%) and energy consumption (25%). In contrast, in Italy, it focuses on energy consumption (14%) and reused waste (13%).

At the social level of the ten indicators analyzed, the Spanish beer sector provides little information on indicators number 7 to 16, this information focuses on the number of workers, gender, and training of workers. Regarding information about suppliers, no company provides this information. In the case of the Italian beer sector, there is very little information at a social level, only 3% of companies detail the number of workers and gender diversity.

At the level of corporate governance, indicators from number 17 to 25 of the Spanish beer sector have little information, referring to directors (14%) and the executive council (14%). Regarding companies in the Italian brewing sector, the information is less, and the information related to the directors (3%) and the executive board (3%) stands out with respect to other corporate governance items.

Thus, web transparency at a non-financial level must improve in both countries, especially at the social and corporate governance levels. At an environmental level, companies in both countries communicate more information, although it is insufficient, since, in Spain, companies provide a low percentage of information on waste (30%), water (27%) and consumption. of energy (25%) and Italy also provides a low percentage of information on energy consumption (14%) and reused waste (13%).

In this article, the CoDa methodology has been applied to the simplest possible statistical analysis, which is the calculation of sectoral averages. This methodology offers great potential in other types of statistical analysis with sectoral data. Coenders and Arimany-Serrat [64] present an introduction to the topic that also includes the use of the CoDaPack program. It is often argued that sectors are rarely homogeneous, and in practice it is more useful to calculate the averages of accounting ratios in strategic groups of similar companies than in the sector as a whole. Each company can thus compare its ratios with the closest strategic group instead of the entire sector. Compositional cluster analysis is used for this purpose [23-26]. Another of the highlights of the CoDa methodology is the transformations by logarithms of ratios. Like ratios and geometric averages, logarithms also focus on the relative differences between accounting figures. In addition, logarithms solve some serious problems of classical ratios that affect more complex statistical analyses, such as nonlinearity, lack of symmetry or outliers [7,24]. Once the data have been transformed, statistical models such as linear regression and its various generalizations make it possible to test relationships between financial and non-financial variables [18,20,22].

5. Conclusions

This article shows that, to analyze the financial indicators of reference for a sector, such as the brewing industry, the accounting ratios should be calculated according to the geometric averages of accounting figures, supported by the statistics inherent to the CoDa methodology, which allows presenting results that better reflect the reality of the sector in the period under study.

Moreover, the diagnosis of the financial health of a sector is of considerable importance in a society in constant change and transformation, as in the pre- and post-pandemic period, so economic decisions must be based on methodologically reliable analyses.

In the case of the brewing sector in Italy and Spain in the pre- and post-COVID-19 period contemplated between 2019-2021 (due to the lack of 2022 data in the AIDA and SABI databases, respectively, at the time of the empirical study), a deterioration of the financial health marked by the presence of the pandemic is reflected, as supported by the academic literature [47-51].

The analysis of the short-term financial situation in the two countries in the period analyzed reflects that the sector has been able to meet the annual payments committed, especially in the case of Italy. Regarding the analysis of profitability, the brewery sector of the two countries reflects a low return on assets with negative margins caused not only by the effects of the pandemic and financial management that could be improved, as supported by the literature [56].

On the other hand, as far as non-financial indicators are concerned [39,58–60] the sector web communication must improve in the two countries. Environmental information stands out in non-financial transparency, although it can improve since, on average, Spain lacked 70% of environmental information and Italy lacked 80% of it in March 2023, at the level of web transparency. Regarding non-financial, social and corporate governance information, information is much scarcer both in Spain and in Italy. For the most part, the companies that are not legally obliged to provide this type of information but are intended to differentiate themselves in terms of interest in sustainability.

In addition, the Corporate Sustainability Reports Directive, approved in 2023, will force many more companies to provide this information and preparing for that scenario is a good option.

At an environmental level, the two countries emphasize the problem of waste, water and energy, although with different web transparency. A clear limitation of web exploration is having contemplated web transparency only in March 2023, therefore other web explorations would be required at different moments in time to assess whether the trend is to provide more information of this type in line with international standards.

The article would benefit from a longer period for the financial analysis in the two countries and from contemplating the different legislation of the two countries before the pandemic to better explain the low profitability and negative margins due to difficulties in the supply chain, tax incentives, loan repayment, and energy costs, among others [50,51]. In addition, another limitation of the article is that it only contemplates trading companies and fails to cover craft brewers that do not have a legal form of a corporation or limited company.

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References

1. Amat Salas, O. Caso práctico de utilización de ratios para la detección de fraudes contables. *Téc. contab. financiera* 2020, (33), 98–105.
2. Cowen, S. S.; Hoffer, J. A. Usefulness of financial ratios in a single industry. *J. Bus. Res.* 1982, 10(1), 103–118. [https://doi.org/10.1016/0148-2963\(82\)90020-0](https://doi.org/10.1016/0148-2963(82)90020-0)
3. Deakin, E. B. Distributions of financial accounting ratios: some empirical evidence. *Account. Rev.* 1976, 51(1), 90–96.
4. Ezzamel, M.; Mar-Molinero, C. The distributional properties of financial ratios in UK manufacturing companies. *J. Bus. Finance Account.* 1990, 17(1), 1–29. <https://doi.org/10.1111/j.1468-5957.1990.tb00547.x>
5. Frecka, T. J.; Hopwood, W. S. The effects of outliers on the cross-sectional distributional properties of financial ratios. *Account. Rev.* 1983, 58(1), 115–128.
6. Lev, B.; Sunder, S. Methodological issues in the use of financial ratios. *J. Account. Econ.* 1979, 1(3), 187–210.
7. Linares-Mustarós, S.; Farreras-Noguer, M.A.; Arimany-Serrat, N.; Coenders, G. New financial ratios based on the compositional data methodology. *Axioms* 2022, 11(12), 694.

8. Martikainen, T.; Perttunen, J.; Yli-Olli, P.; Gunasekaran, A. Financial ratio distribution irregularities: Implications for ratio classification. *Eur. J. Oper. Res.* 1995, 80(1), 34–44.
9. Mcleay, S.; Omar, A. The sensitivity of prediction models to the non-normality of bounded and unbounded financial ratios. *Br. Account. Rev.* 2000, 32(2), 213–230. <https://doi.org/10.1006/bare.1999.0120>
10. Watson, C.J. Multivariate distributional properties, outliers, and transformation of financial ratios. *The Account. Rev.* 1990, 65(3), 682–695.
11. Aitchison, J. *The statistical analysis of compositional data*. Monographs on statistics and applied probability. London, UK: Chapman and Hall. 1986.
12. Egozcue, J. J.; Pawlowsky-Glahn, V. Compositional data: the sample space and its structure. *TEST* 2019, 28(3), 599–638. <https://doi.org/10.1007/s11749-019-00670-6>
13. Greenacre, M. Compositional data analysis. *Annu. Rev. Stat. its Appl.* 2021, 8, 271–299.
14. Pawlowsky-Glahn, V.; Egozcue, J.J.; Tolosana-Delgado, R. *Modeling and analysis of compositional data*. Chichester, UK: Wiley. 2015.
15. Coenders, G.; Ferrer-Rosell, B. Compositional data analysis in tourism. Review and future directions. *Tourism Anal.* 2020, 25(1), 153–168. <https://doi.org/10.3727/108354220X15758301241594>
16. Martinez-Garcia, A.; Horrach-Rosselló, P.; Mulet-Forteza, C. Mapping the intellectual and conceptual structure of research on CoDa in the 'Social Sciences' scientific domain. A bibliometric overview. *J. Geochem. Explor.* 2023, 252, 107273. <https://doi.org/10.1016/j.gexplo.2023.107273>
17. Arimany-Serrat, N.; Farreras-Noguer, M.Á.; Coenders, G. New developments in financial statement analysis. Liquidity in the winery sector. *Account.* 2022, 8, 355–366. <http://dx.doi.org/10.5267/j.ac.2021.10.002>.
18. Arimany-Serrat, N.; Farreras-Noguer, A.; Coenders, G. Financial resilience of Spanish wineries during the COVID-19 lockdown. *Int. J. Wine Bus. Res.* 2023. DOI: 10.1108/IJWBR-03-2022-0012
19. Carreras-Simó, M.; Coenders, G. Principal component analysis of financial statements. A compositional approach. *Rev. Mét. Cuantit. Econ. Empres.* 2020, 29, 18–37. <http://dx.doi.org/10.46661/revmetodoscuanteconempresa.3580>
20. Carreras Simó, M.; Coenders, G. The relationship between asset and capital structure: a compositional approach with panel vector autoregressive models. *Quant. Financ. Econ.* 2021, 5(4), 571–590. <https://doi.org/10.3934/QFE.2021025>
21. Coenders, G. Application aux ratios financiers. *Données de composition*. 2023, Paris, FR: Société Française de Statistique/Éditions TECHNIP.
22. Creixans-Tenas, J.; Coenders, G.; Arimany-Serrat, N. Corporate social responsibility and financial profile of Spanish private hospitals. *Heliyon* 2019, 5(10), e02623. <https://doi.org/10.1016/j.heliyon.2019.e02623>
23. Jofre-Campuzano, P.; Coenders, G. Compositional classification of financial statement profiles: The weighted case. *J. Risk Finan. Manag.* 2022, 15(12), 546.
24. Linares-Mustarós, S.; Coenders, G.; Vives-Mestres, M. Financial performance and distress profiles. From classification according to financial ratios to compositional classification. *Adv. Account.* 2018, 40, 1–10.
25. Saus-Sala, E.; Farreras-Noguer, M.Á.; Arimany-Serrat, N.; Coenders, G. Compositional DuPont analysis. A visual tool for strategic financial performance assessment. In Filzmoser, P., Hron, K., Martín-Fernández, J.A., Palarea-Albaladejo, J. (Eds.), *Advances in compositional data analysis*, (pp. 189–206). Cham, CH: Springer. 2021.
26. Saus-Sala, E.; Farreras-Noguer, M.Á.; Arimany-Serrat, N.; Coenders, G. Análisis de las empresas de turismo rural en Cataluña y Galicia: rentabilidad económica y solvencia 2014 – 2018. *Cuad. del CIMBAGE* 2023, 25(1), 33–54. [https://doi.org/10.56503/CIMBAGE/Vol.1/Nro.25\(2023\)p.33-54](https://doi.org/10.56503/CIMBAGE/Vol.1/Nro.25(2023)p.33-54)
27. Danson, M.; Galloway, L.; Cabras, I.; Beatty, T. Microbrewing and entrepreneurship: The origins, development and integration of real ale breweries in the UK. *Int. J. Entrep. Innov.* 2015, 16(2), 135–144.
28. Esposti, R.; Fastigi, M.; Viganò, E. Italian craft beer revolution: do spatial factors matter?. *J. Small Bus. Enterp. Dev.* 2017, 24(3), 503–527. <https://doi.org/10.1108/JSBED-12-2016-0191>
29. Cabras, I.; Higgins, D. Beer, brewing, and business history. *Bus. Hist.* 2016, 58(5), 609–624. <https://doi.org/10.1080/00076791.2015.1122713>
30. Carroll, G. R. Concentration and specialization: Dynamics of niche width in populations of organizations. *Am. J. Sociol.* 1985, 90, 1262–1283. <https://doi.org/10.1086/228210>
31. Alfaro, M. Beer leaders against craft brewers: will Goliath end up defeating David in the US? *Appl. Econ.* 2022, 54(5), 554–567. <https://doi.org/10.1080/00036846.2021.1967278>
32. Tremblay, V.J.; Iwasaki, N.; Tremblay, C.H. The dynamics of industry concentration for US micro and macro brewers. *Rev. Ind. Organ.* 2005, 26(3), 307–324. <https://doi.org/10.1007/s11151-004-8114-9>
33. Garavaglia, C.; Swinnen, J. *Economics of the Craft Beer Revolution: A Comparative International Perspective*. In Garavaglia, C., Swinnen, J. (eds), *Economic Perspectives on Craft Beer. A Revolution in the Global Beer Industry* (pp. 3–51). Palgrave Macmillan. 2018. [10.1007/978-3-319-58235-1_1]. Springer.

34. Alfeo, V.; Todaro, A.; Migliore, G.; Borsellino, V.; Schimmenti, E. Microbreweries, brewpubs and beerfirms in the Sicilian craft beer industry. *Int. J. Wine Bus. Res.* 2019, 32(1), 122-138. <https://doi.org/10.1108/IJWBR-01-2019-0005>

35. Donadini, G.; Porretta, S. Uncovering patterns of consumers' interest for beer: a case study with craft beers. *Food Res. Int.* 2017, 91, 183-198. <https://doi.org/10.1016/j.foodres.2016.11.043>

36. Wesson, T.; Figueiredo, J.N. The importance of focus to market: A study of microbrewery performance. *J. Bus. Ventur.* 2001, 16(4), 377-403. [https://doi.org/10.1016/S0883-9026\(99\)00049-X](https://doi.org/10.1016/S0883-9026(99)00049-X)

37. Weiss, B. Configuring the authentic value of real food: farm-to-fork, snout-to-tail, and local food movements. *Am. Ethnol.* 2012, 39(3), 614-626. <https://doi.org/10.1111/j.1548-1425.2012.01384.x>

38. Gatrell, J.; Reid, N.; Steiger, T. L. Branding spaces: Place, region, sustainability and the American craft beer industry. *Appl. Geogr.* 2018, 90, 360-370.

39. Duarte Alonso, A.; Bressan, A.; Sakellarios, N. A resource based approach in the context of the emerging craft brewing industry. *Eur. Bus. Rev.* 2016, 28(5), 560-582. <https://doi.org/10.1108/EBR-12-2015-0176>

40. Garavaglia, C. The Emergence of Italian Craft Breweries and the Development of Their Local Identity. In: Hoalst-Pullen, N., Patterson, M. (eds). *The Geography of Beer: Culture and Economics* (pp.135-147). Springer, Cham. 2020. https://doi.org/10.1007/978-3-030-41654-6_11

41. Hasman, J.; Hána, D.; Materna, K. Regional brands produced beyond the region: An analysis of beer brands from recently closed breweries in Europe. *Morav. Geogr. Rep.* 2021, 29(3), 168-183.

42. Schnell, S.M.; Reese, J.F. Microbreweries as tools of local identity. *J. Cult. Geogr.* 2003, 21(1), 45-69. <https://doi.org/10.1080/08873630309478266>

43. Swinnen, J. Beer consumption and trade in an era of economic growth and globalization. *Choices* 2017, 32(3), 1-6. <http://dx.doi.org/10.22004/ag.econ.263133>

44. Wojtyra, B. How and why did craft breweries 'revolutionise the beer market? The case of Poland. *Morav. Geogr. Rep.* 2020, 28(2), 81-97. <https://doi.org/10.2478/mgr-2020-0007>

45. Cabras, I. Beer on! The Evolution of Micro- and Craft Brewing in the UK. In: Garavaglia, C., Swinnen, J. (eds) *Economic Perspectives on Craft Beer* (pp. 373-396). Palgrave Macmillan, Cham. 2018. https://doi.org/10.1007/978-3-319-58235-1_14

46. Garavaglia, C.; Borgoni, R. The local dimension of legitimization: An empirical analysis of firms' entry in the Italian craft beer market. *Regional Studies*, 2022, 1-15. DOI: 10.1080/00343404.2022.2078491

47. Pitts, E.R.; Witrick, K. Brewery packaging in a post-COVID economy within the United States. *Beverages* 2021, 7(1), 14. <https://doi.org/10.3390/beverages7010014>

48. Yang, Y.; Liu, H.B.; Chen, X. COVID-19 and restaurant demand: early effects of the pandemic and stay-at-home orders. *Int. J. Contemp. Hosp. Manage.* 2020, 13(12), 3809-3834. <http://dx.doi.org/10.1108/IJCHM-06-2020-0504>

49. Laguna, L.; Fiszman, S.; Puerta, P.; Chaya, C.; Tárrega, A. The impact of COVID-19 lockdown on food priorities. Results from a preliminary study using social media and an online survey with Spanish consumers. *Food Qual. Prefer.* 2020, 86, 104028.

50. Cabras, I.; Shakina, E.; Waehnning, N.; Sohns, F.; Bosworth, G. Brewing at the time of COVID: the impact of the pandemic crisis on UK craft breweries and its implications for the sector and local economies. *Reg. Stud.* 2023, 1-17. DOI: 10.1080/00343404.2023.2170343

51. Gordon-Wilson, S. An exploration of the substitutions of British pub consumers during the COVID-19 crisis. *Int. J. Hosp. Manag.* 2021, 96, 102998.

52. Nissen, C.T.N.; Bangerter, N.B.; Tran, L.; Bobke, M.T.; Awwad, M. Disinfectant shortage: A multicountry comparison of breweries and distilleries responses to the covid19 pandemic. Paper presented at the Proceedings of the 5th NA International Conference on Industrial Engineering and Operations Management, Detroit, Michigan, USA. Conference Paper retrieved from <http://www.ieomsociety.org/detroit2020/papers/77.pdf>

53. Brewer, P.; Sebby, A. G. The effect of online restaurant menus on consumers' purchase intentions during the COVID-19 pandemic. *Int. J. Hosp. Manag.* 2021, 94, 102777. <https://doi.org/10.1016/j.ijhm.2020.102777>

54. Enz, C.; Škodová-Parmová, D. Importance of digital communication channels for tourism providers in holiday regions. *Deturope* 2020, 12(2), 140-165.

55. Erhardt, N.; Martin-Rios, C.; Bolton, J.; Luth, M. Doing well by creating economic value through social values among craft beer breweries: A case study in responsible innovation and growth. *Sustainability* 2022, 14(5), 2826. <https://doi.org/10.3390/su14052826>

56. Bernetti, I.; Sottini, V. A.; Cipollaro, M.; Menghini, S. A survey on the performance of the Italian brewing companies. *Ital. Rev. Agric. Econ.* 2020, 75(1), 37-50. <https://doi.org/10.13128/rea-11741>

57. Alvarez-Etxeberria, I.; Heras-Saizarbitoria, I.; Boiral, O. Investigación académica sobre memorias de sostenibilidad: una revisión sistemática de la literatura en español: Academic Research on Sustainability Reporting: A Systematic Review of the Spanish Literature. *Rev. Contab.-Span. Account. Rev.* 2023, 26(1), 59-78.

58. Hoalst-Pullen, N.; Patterson, M.; Mattord, R.; Vest, M. Sustainability Trends in the Regional Craft Beer Industry. In: Patterson, M., Hoalst-Pullen, N. (eds) *The Geography of Beer: Regions, Environment, and Societies* (pp. 109-116). Springer, Dordrecht. 2014. https://doi.org/10.1007/978-94-007-7787-3_11
59. Sozen, E.; Rahman, I.; O'Neill, M. Craft breweries' environmental proactivity: an upper echelons perspective. *Int. J. Wine Bus. Res.* 2022, 34(2), 237-256. <https://doi.org/10.1108/IJWBR-02-2021-0013>
60. Ness, B. Beyond the pale (ale): An exploration of the sustainability priorities and innovative measures in the craft beer sector. *Sustainability* 2018, 10(11), 4108. <https://doi.org/10.3390/su10114108>
61. Stevens, S.S. On the theory of scales of measurement. *Science* 1946, 103, 677-680.
62. Martín-Fernández, J.A.; Hron, K.; Templ, M.; Filzmoser, P.; Palarea-Albaladejo, J. Model-based replacement of rounded zeros in compositional data: classical and robust approaches. *Comput. Stat. Data Anal.* 2012, 56(9), 2688-2704. <https://doi.org/10.1016/j.csda.2012.02.012>
63. Thió-Henestrosa, S.; Martín-Fernández, J.A. Dealing with compositional data: The freeware CoDaPack. *Math. Geol.* 2005, 37(7), 773-793. <https://doi.org/10.1007/s11004-005-7379-3>
64. Coenders, G.; Arimany-Serrat, N. Accounting statement analysis at industry level. A gentle introduction to the compositional approach. *arXiv* 2023, 2305.16842. <https://arxiv.org/abs/2305.16842>

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