Journal of Mathematical Finance, 2026, 16(3), 165-196
https://www.scirp.org/journal/jmf
ISSN Online: 2162-2442
ISSN Print: 2162-2434

The Widespread Wrong-Calculation and Wrong-Use of Central Financial Ratios

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How to cite this paper: Schøler, F. (2026) The Widespread Wrong-Calculation and Wrong-Use of Central Financial Ratios. *Journal of Mathematical Finance*, **16**, 165-196.
https://doi.org/10.4236/jmf.2026.163009

Received: June 23, 2026
Accepted: August 25, 2026
Published: August 28, 2026

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Abstract

Financial return ratios are often miscalculated in textbooks and practice because denominators are frequently based on **ending balance sheet values** rather than taking the average of the capital base. While this may not distort simple intra-firm or intra-industry comparisons, it leads to a flawed understanding of profitability measures and can produce **misleading conclusions** when ratios are used for investment analysis, valuation, or cost-of-equity benchmarking. We document the extent of this problem by examining **112 accounting and finance textbooks**, extending prior work by Mankin and Jewell [1]. Using major global beer industry firms, we illustrate how different denominator conventions materially affect return ratios and their alignment with stock returns and implied cost of equity. Our findings show that denominator choice significantly influences assessments of performance and value creation. We argue that accounting standard setters could reduce confusion by providing **clear, prescribed definitions** for key financial ratios in management commentary for instance regulated in IFRS 18, and thereby improving financial literacy and preventing systematic misinterpretation.

Keywords

Financial Analysis, Financial Ratios, Financial Reporting and Disclosure

1. Introduction

The development of financial return ratios over recent decades has mainly focused on which accounting items to include. Typically, the numerator comes from the income statement and the denominator from the balance sheet, but exact entries vary widely (e.g., net income, EBIT, EBITDA for numerator; total assets, total invested capital, equity for denominator). By definition, the return ratios pair a flow

number (numerator) with a stock number (denominator), raising the question of whether to use beginning, ending, or average stock numbers in the denominator—a detail which is often overlooked, since most focus is on the incorporated content. Consequently, our focus is not on which accounting items to include, but on the practical implementation of the denominator—whether one should use beginning, average, ending, or other balance sheet measures.

Return ratios serve multiple purposes in financial analyses: comparing performance over time, benchmarking against industry peers, evaluating against financial targets like cost of capital, and supporting valuation models such as EVA and Residual Income. If ratios are used narrowly (e.g., for year-by-year self-comparison or for relative industry comparisons) ending balance sheet numbers may be acceptable since all the ratios more or less use the same capital base. In contrast, they fail in absolute interpretation across financial targets due to the income appearance in both numerator and denominator, and since the ending numbers do not reflect the capital base during the period where the income is earned. Thus, we consider use of ending numbers in return ratios a misuse.

However, one leading international accounting textbook used at my university applies ending balance sheet numbers for Return on Equity aka ROE and Return on Assets aka ROA whereby it introduces a shortcut to financial ratio calculation that many accountants agree at best is misleading, and at worst explains why many students may never understand why their ratios lead to false results. A 2014 study by Mankin and Jewell [1] found only 29 of 70 textbooks recommended average stock numbers for ROA (for ROE the numbers were 20 out of 60), and recent editions of the textbooks show no change.

Notably, some authors like Penman [2] and Koller *et al.* [3] present real-world examples using both average and beginning-based ROE, which highlights the significance of denominator choice. Motivated by this, we collected accounting data from leading companies in the beer industry, and we aim in our study to examine and explain the differences between differently defined denominators, and thus we seek to prevent wrong-use, helping readers to avoid misleading accounting information in broader contexts.

***Research Question*: *Despite broad consensus favouring average balances should be used in denominators, hard empirical evidence remains scarce. Many accounting practitioners use ending balances, which potentially leads to erroneous conclusions. How can this procedure be changed to improve general financial ratio accuracy and interpretation*?**

The reminder of the paper is organised in the following way: In Section 2, we present some relevant theoretical literature and history for the financial return ratios and their use in accounting and finance. In Section 3, we present relevant practical evidence by use of the beer industry as an illustrative case which challenge the definitions and use of return ratios. We compare and discuss the results, and in Section 4 we put our findings into an accounting context showing suggested derived perspectives for improved accounting regulation to eliminate

wrong-use of return ratios (primarily ROE); and finally, we conclude the paper in Section 5.

2. The Theoretical Evidence-Literature

2.1. Theoretical Basis for Financial Ratios

Ratios, historically and now

When operating profit is related to different capital amounts, *i.e.*, considered relatively rather than in absolute terms, this return ratio is referred to as profitability ratio. ***ROA*** represents the profitability ratio of all capital employed in the business, regardless of whether the financing is through equity, debt, or both, while ***ROE*** refers to the profitability of the equity employed in the business.

Horrigan made a thorough update on the historical development of financial ratios in [4], and he found that while the first useful financial ratios, like the current ratio, evolved in the 1890s' credit analyses since commercial banks had begun requesting financial statements for lending purposes. However, according to [4] it was not until during World War I that Alexander Wall compiled a large sample of financial statements for comparison of different financial ratios across industry and geographical location. Simultaneously, the DuPont Company began a more comprehensive use of financial ratios in the linking of investment ratios, profit margin ratios, and capital turnover ratios that according to [4] was introduced by Donaldson Brown based on ideas originally from Alfred Marshall (Macmillan and Co., Ltd., 1892).

In a revised edition of "How to evaluate Financial Statements", Wall introduce different financial ratios in [5], and among these the "Net Profits to Net Worth Ratio", *i.e.* return on equity (ROE). He sees the ratio as a practical test of the effectiveness of management since it measures the return that the company, *i.e.* management, has earned for its capital. In this accounting for stewardship [5] uses ending balance sheet numbers in his examples, and apparently, he does not present further reflections on the denominator. [6] found several early studies inspired by the DuPont investment analysis ratios model including "Net Profits to Net Worth", and he made detailed analyses on the petroleum industry financials from 1948 to 1957; but regrettably, he did not address the denominator issue neither.

In his early textbook on financial statement analysis, primarily for students at Copenhagen Business School, Jensen in [7] presents structured arguments on why average numbers should be used in denominator for the financial ratios ROE and ROA. According to pages 81 and 82 in [7], profitability is measured by comparing (operating) profit with (total) capital, thereby giving an indication of how the capital is earning returns, but these figures cannot be found and compared directly as they appear in the periodic income statement respectively in the balance sheet. He is probably not the first to present the logic, but he states that considering capital as it appears on the liability side of the balance sheet at the end of a given accounting period, the operating surplus for the accounting period will be included. Un-

fortunately, this has only arisen during the past accounting period, and it is therefore theoretically incorrect to include all of this when determining the capital that is part of profitability calculations. As a practical solution Jensen on page 82 in [7] suggests that one could include half of the operating surplus in the capital, since the operating surplus has arisen gradually; but if turnover does not occur evenly, caused by the company being subject to seasonal fluctuations or similar factors, it must however be regarded as incorrect to consider the operating surplus as having arisen gradually. Consequently, [7] finds that one must therefore go the other way and make average calculations of the invested capital. For example, if one assumes that the periodic profit calculation is prepared quarterly, one must, based on the monthly trial balances, supplement the accounting with monthly calculations of the invested capital, so that on this basis it becomes possible to make average calculations of the real invested capital during the accounting period. If the periodic return calculation is prepared monthly, the capital can be calculated as an average of the invested capital at the beginning and end of the month; and likewise quarterly and yearly. Additionally, the approach eliminates the inaccuracies in calculations that could occur if one bases them on the capital amounts at a single point in time, which can be random.

[8] confirms this point of view on determining the denominator, emphasising on page 95 that the average of beginning and ending numbers is *simply the best*, and clearly should be the preferred one. [9] presents a similar approach stating on page 64 that for ROA, total assets (in denominator) are calculated as the equally weighted average of the opening and the closing total asset figure for the fiscal period and likewise for ROE. And where seasonal patterns occur, a moving average based on quarterly data, or even monthly data if available, may be preferred.

In real life, discrete return, *i.e.* that all income is earned at the very ending of a financial year is usually quite improbable, although it to some degree can be seen in some industries—for instance children's toys, where the majority of sales to consumers (and income) is often recognised just before Christmas and not before ending November (Black Friday). Similar might be seen for companies having activities connected to public services that have strong budgets year by year. However, in most business the income seems to be spread out through the hole financial year although not necessary evenly. [2] clarifies this on page 157 elaborating on the ROE-denominator, by stating that the denominator should be a proxy of the weighted average of book values during the financial year, and he finds that unless there are large share issues or stock repurchases near the beginning or end of a year, the average will most often be a good fit. Further, [10] finds that when comparing income statement numbers to balance sheet numbers, averaging the balance sheet numbers preserves the matching principle, since the balance sheet numbers are measured at a point in time, while the average proxies the average size in the same period as the income is earned. For shorter periods, like a month or a fiscal quarter, this might not matter much, but for longer periods, like a full financial year, it does.

[3] and [11] follow a slightly different approach, since they simply show calculations using both beginning and average numbers in denominator—and without further comments! Thus, they leave it to the reader to decide if beginning or average should be the preferred denominator, since they simply disregard ending numbers as a possibility. Concerning the latter, [12] was refreshingly honest in his textbook when he argued in favour of using ending numbers, since he found that partly it provides 5 observations when analysing 5 years of historical financial statements, and not only 4 observations, and partly, and maybe most important: it is the easiest.

Quite recently, [13] found it opportune (on page 147) to assert that "there is consensus among analysts that the average equity provides the basis for most meaningful analysis, but there are those who believe that beginning equity is the most important measure, since this is the equity base on which the earnings are generated". As we see it, the last is as such correct in the beginning of a company's financial year but for the last part of the year the capital basis will most likely have changed since the company has generated income during the whole year, and thus the income during the first months will most certainly have contributed to the income generating process during the last months. Consequently, since income is continuously generated during the financial year, the best and most appropriate capital basis must also reflect the financial year, and thus the most suitable is to use average numbers as proxy for the capital size during the financial year.

***How are ratios taught in education*?**

Our presentation of financial ratios so far contrasts how financial ratio definitions are presented and taught in a great variety of textbooks. In an article on problems in financial ratio education, which among other things covers ratio definitions of ROE (and ROA), [1] presents evidence that using ending numbers in the denominator is most common. They examined a large number of business textbooks covering accounting, finance, management, marketing and financial statement analysis, and they identified a sample of 77 textbooks that included a clearly defined chapter, section or appendix on financial ratios.

For our purpose here we updated and extended the original sample of 77 textbooks with another 35 textbooks from our collection of inspection copies received randomly from different large publishers before they switched to only providing e-books as inspection copies. The criterion for including a textbook was that it should include detailed financial return ratio definitions and the decisive question is subsequently whether the denominator is defined as the average of beginning and ending balance sheet numbers, or not. The complete list of all 112 commonly used textbooks including sections dealing with financial ratios can be found in **Table S1**.

From these 112 commonly used textbooks we present in **Table 1** statistics on the denominator issue in the definitions and associated comments for the two probably most used financial ratios, ROE in **Table 1(A)** and ROA in **Table 1(B)**. First, we reproduce the highlights from Table 12A in [1] from which can be seen

that out of the 77 textbooks distributed into four topic categories in the original sample, the ROE was defined in 60 textbooks, and 40 (or 66.7 percent) used ending numbers in denominator while 20 used average numbers (in some cases supplemented with beginning numbers). Second, we include data from our additional 35 textbooks which leaves us with a total sample of 112 textbooks of which 95 include definition and comments on ROE. And of these 95 textbooks 53 (or 55.8 percent) used ending numbers in denominator. Based on our previous discussion, this is the same as concluding that only 44.2 percent of the books presenting the financial ratio ROE are doing it properly—and even in the topic categories Accounting and Financial Statement Analysis only 40 out of 59 (or 67.8 percent) are doing it properly.

In Table 1(B), the corresponding statistics for ROA are presented, and it seems that the "success-rates" here are only slightly better since only 29 out of 70 (or 41.4 percent) use average numbers in denominator in original study, while 51 out of 105 (or 48.6 percent) use average numbers in denominator in the extended study. Similarly, in the topic categories Accounting and Financial Statement Analysis only 49 out of 66 (or 74.2 percent) are using properly denominators.

Table 1. Textbook statistics for the two probably most used financial ratios, Return On Equity (ROE) and Return On Assets (ROA). (A) Return On Equity (ROE), (B) Return On Assets (ROA).

(A)

Original study content	Accounting	Finance	Management	Financial Statement Analysis	Total	Percent
Net Income/Equity	6	21	11	2	40	66.7%
Net Income/Average Equity	15	2	0	3	20	33.3%
Textbooks with defined ratio in original Mankin & Jewell study	21	23	11	5	60	100.0%
Total textbooks in original Mankin & Jewell study	31	27	13	6	77	-
Extended study (defined ratios)	**Accounting**	**Finance**	**Management**	**Financial Statement Analysis**	**Total**	**Percent**
Net Income/Equity	6	21	11	2	40	42.1%
Net Income/Average Equity	15	2	0	3	20	21.1%
Additional Net Income/Equity	11	1	1	0	13	13.7%
Additional Net Income/Average Equity	14	0	0	8	22	23.2%
Textbooks with defined ratio	46	24	12	13	95	100.0%
Total textbooks using Ending Equity	17	22	12	2	53	55.8%
Total textbooks using Average Equity[1]	29	2	0	11	42	44.2%
Total number of textbooks extended study	56	28	14	14	112	-

1: Or eventually supplemented with Beginning-but definitely not using Ending.

(B)						
Original study content	**Accounting**	**Finance**	**Management**	**Financial Statement Analysis**	**Total**	**Percent**
Net Income/Assets	4	23	12	2	41	58.6%
Net Income/Average Assets	24	2	0	3	29	41.4%
Textbooks with defined ratio in original Mankin & Jewell study	28	25	12	5	70	100.0%
Total textbooks in original Mankin & Jewell study	31	27	13	6	77	-
Extended study (defined ratios)	**Accounting**	**Finance**	**Management**	**Financial Statement Analysis**	**Total**	**Percent**
Net Income/Assets	4	23	12	2	41	39.0%
Net Income/Average Assets	24	2	0	3	29	27.6%
Additional Net Income/Assets	11	1	1	0	13	12.4%
Additional Net Income/Average Assets	14	0	0	8	22	21.0%
Total number of textbooks	53	26	13	13	105	100.0%
Total textbooks using Ending Assets	15	24	13	2	54	51.4%
Total textbooks using Average Assets[1]	38	2	0	11	51	48.6%
Total number of textbooks extended study	56	28	14	14	112	-

1: Or eventually supplemented with Beginning-but definitely not using Ending.

2.2. Investor's Perspective

According to IASB's conceptual accounting framework from 1989 and until 2011 the primary user of annual reports was the investor, and since 2011 the investor is considered one of the most central users out of several users of financial reporting [14]. Consequently, accounting regulation focus on his need for information as it is determined in Section 1.3 in [14] and in paragraph 8 in [15] (referring to Section 1.2 in [14] which it extends).

Following [16] accounting information is expected to uncover two investor needs—*informativeness* that concerns relevant and reliable information for evaluation of future cash flows, and *stewardship* that conveys if management has acted in the stockholders' interests, and thus if the company has generated a return at an acceptable level in past period. Feltham-Ohlson and their residual income model framework in [17] establish a link between accounting and valuation using beginning numbers. Basic equation is $RI_t = (ROE_t - r_e) \times E_{t-1}$ stating that the residual income in time t is defined by ROE in time t less cost-of-equity capital in time t times equity value beginning time t. Thus, when a company's ROE is larger than it's r_e the RI is positive, and the company adds value. For this to make sense,

the two measures compared must be comparable. Since the r_e most appropriately is calculated over the time span from t_0 to t_1, we must insist that ROE is also calculated over that time span, thus appropriately using an average denominator value for the calculation of ROE. Alternatively, one could use beginning values for both measures, insisting to follow the discrete valuation in the [17] setting closely.

According to for instance [18], capital market-based definitions on returns, r_e, centre on two different approaches, reflecting the return generating process, which we thus accordingly could call *discrete* $r_e = (P_1 + D_1 - P_0)/P_0$, respectively *continuously* $r_e = \ln(P_1 + D_1) - \ln(P_0)$, where D_1 is received dividend on stock at time 1 while P_1 and P_0 are the prices on stock at time 1 respectively time 0. The *discrete* calculation reflects a one-period return, eventually yearly, and the time $t = 1$ is thus the very last day in the period, while time $t = 0$ is the beginning of the first day. In contrast, the *continuously* compounded calculation is a more realistic setting, since it reflects that the price P changes continuously from time 0 until time 1 including an eventual dividend payment, like [18] advocates. As an alternative to using natural logarithm, one could proxy the *continuously* compounded return by the average return, $r_e = [P_1 - P_0 + D_1]/[(P_0 + P_1)/2]$, which makes the return directly comparable with an accounting-based return on average equity.

Following [19], a market is effective in semi-strong form when all publicly available information is reflected in the stock price, and thus financial and accounting return are compatible. The return on company investment over some period is consequently in effect the same if only accounting information is the only information available to the market, since using accounting information or market information should lead to same return, if the accounting-based ROE is calculated using average numbers in denominator.

3. Practical Evidence—Beer Industry as Illustrative Case

3.1. Short on Beer Industry—Real World Example

For illustrative purposes we look at just one industry, breweries. The advantage of this choice is that beer in essence is a simple product as the result of fermentation using the malt of barley and other grains, flavoured with hops, and has been made in the same way for thousands of years. More recently, brewers differentiate their products through branding, and by adding different substances and ingredients, allowing them to obtain higher prices and thus earn higher profits. The best-known brands provide reassurance to consumers, since the taste and quality will be the same over time and across countries, and thus also follow any brand-associated lifestyle. The brewing industry consists of many small (local) producers, and a few large ones supplying standard beers to an international market. By concentrating production and setting up sophisticated distribution facilities, the big brewer can enjoy significant economies of scale. Inspired by the Top-20 list made by Affan Mir dating March 2023 we have chosen to use 16 of the largest companies measured by volume of output (beer) where we were able to access full public available financial data as an illustrative industry case, see **Table 2**.

Table 2. 16 largest beer breweries and companies in the world (in **Table S2**).

Company name	Country	Revenue 2022 in billion USD[6)]	Volume output in hectoliters (2022)[7)]	Financial Year	Accounting Regime	Accounting numbers in size and currency
Anheuser-Busch Inbev	Belgium	57.78	518.0	2022	IFRS	Mio USD
Heineken	Netherlands	37.60	256.9	2022	IFRS	Mio EUR
Diageo	UK	20.57	23.9	2021/22[1)]	IFRS	Mio GBP
Asahi Group	Japan	19.22	59.3	2022	IFRS	Mia YEN
Kirin Holdings	Japan	15.20	24.4	2022	IFRS	Mia YEN
Molson Coors	USA	10.70	82.3	2022	US	Mio USD
Carlsberg	Denmark	10.20	102.4	2022	IFRS	Mio DKK
Constellation Brands	USA	9.56	33.2	2022/23[2)]	US	Mio USD
China Resources Beer	China	5.13	122.2	2022	IFRS	Mio RMB
Tsingtao	China	4.86	79.6	2022	CAS[3)]	Mio RMB
Efes Beverage Group	Türkiye	4.70	34.0	2022	TFRS[4)]	Mio TRL
Compania Cervecerias Unidas	Chile	3.40	17.6	2022	IFRS	Mia CLP
Boston Beer Company	USA	2.09	9.6*	2022	US	Mio USD
HiteJinro[5)]	South Korea	1.92	5.5	2022	IFRS	Mia WON
Royal Unibrew	Denmark	1.60	4.8	2022	IFRS	Mio DKK
Olvi plc	Finland	0.63	5.2	2022	IFRS	Mio EUR

1) June 30, 2022, 2) February 28, 2023, 3) China's Accounting Standards for Business Enterprises, 4) Turkish Accounting/Financial Reporting Standards, 5) HiteJinro: The numbers are provided from the ORBIS-database, since we did not succeed in finding the company's annual report., 6) Revenue 2022 from the article "Top 20 Beer Companies in the World" by Affan Mir, March 30, 2023, found on Yahoo Finance., 7) Volume 2022 found in the article "The 40 Biggest Beer Companies in the World in 2023" by Vinepair staff (http://www.vinepair.com/). Note*: 8183th Barrels sold-converted to million hectolitres.

In **Table S2**, all relevant collected accounting information from the 16 companies covering the five years 2020 to 2024 is shown accompanied by relevant market information necessary for calculation of return ratios using different denominator choices as well as market-based return ratios and implied cost-of-equity capital in the beer industry. As can be seen, some of the companies report for a financial year that is different from the calendar year, and not all companies use same accounting practice. However, for our purpose her we suggest that those differences should be of minor concern.

Except for health regulations that apply to all food and drink producers, the production of beer is not regulated. However, the brewing industry does face restrictions on the sale of beer since it is an alcoholic beverage, and in most countries licensing laws limit the outlets that can stock it, while the sale of alcoholic beverages might even be banned in Muslim countries. The production of standard beers is quite capital-intensive, which suggest focus on the economies of scale since key

inputs besides huge plant-costs are relatively small and consequently the products have low variable unit costs for raw materials and packaging, which make it difficult (*i.e.* expensive) to enter the industry.

3.2. Beer Industry Financial Ratios and Market

Risk adjusted Cost-of-Equity capital

Reflecting the globalisation for the industry, we estimate the cost-of-equity capital, r_e, taking a global perspective. Every company origins in a country in some region, like Anheuscher Busch from Belgium in Europe, and traditionally this is also where the main owners originate for which reason we also take a continental perspective. However, it might be most correct if our analysis is based on an ownership group that reflect a mix of investors from Europe, North America, and Far East Asia since this would suggest the reality for potential alternative portfolio investment decisions. We use CAPM for a simple and realistic estimate of cost-of-equity capital using different regional risk-free interests, r_F, and equity risk premia, ERP, as well as Damodaran's unlevered industry beta list and calculate an intermediate and unlevered cost-of-equity capital.

To arrive at individual company cost-of-equity capital estimates year-by-year, we convert the unlevered beta, β_U, to a levered beta, β_L, by use of accounting data from Table S2 and the following logic: $\beta_L = \beta_U(1 + ((1 - \text{marginal tax rate}) \times \text{Debt/Equity}))$. Thus, our use of CAPM can be expressed as follows: $r_e = r_F + \beta_L \times \text{ERP}$.

In Table 3(A), we present in (a) the necessary and relevant data (assumptions) for implied CAPM-estimation of cost-of-equity capital for the beer industry companies (year by year and looking forward) on global basis and regionally where each company's primary relations (markets and investors) are located.

Table 3. (A) Calculation of levered CAPM based Cost-of-Equity-Capital on Global and Continent basis for the largest beer breweries and companies in the World[i)], (a) Relevant assumptions collected for the use of CAPM for the beer industry, (b) Individual Levered company calculations of implied cost-of-equity capital-Global and Continental (regional). (B) Comparison of Accounting Return on Equity using average, beginning and ending numbers in denominator for the largest beer breweries and companies in the World[*)]. (C) Comparison of Market return on stocks based on prices three and four months after financial year end for the largest beer breweries and companies in the World[*)].

(A)

(a)

Basis for CAPM input	Continent (region)	2020		2021		2022		2023		2024	
		rF	ERP*)	rF	ERP	rF	ERP	rF	ERP	rF	ERP
20-year treasury bond	US	0.02010	0.04720	0.01544	0.04240	0.03043	0.05940	0.04165	0.04600	0.04535	0.04330
15-year German gov. bond	EU	0.02000	0.05830	0.01875	0.06000	0.02021	0.06000	0.03000	0.06000	0.02625	0.06000
10-year government bond	Chinese mainland	0.03186	0.03980	0.02970	0.05520	0.02800	0.03570	0.02710	0.04800	0.02120	0.04210

Continued

10-year government bond	Hong Kong (China)	0.01105	0.04780	0.01235	0.05130	0.01737	0.05820	0.02505	0.05870	0.03382	0.05340
10-year government bond	Japan	−0.00001	0.02790	0.00073	0.05090	0.00312	0.02370	0.00551	0.02130	0.00848	0.01870
Equal mix FarEastAsia gov.bond	FEA	0.01430	0.03850	0.01426	0.05247	0.01616	0.03920	0.01922	0.04267	0.02116	0.03807
Average global gov.bond	Global	0.01813	0.04800	0.01615	0.05162	0.02227	0.05287	0.03029	0.04956	0.03092	0.04712
Global Beta Unlevered	Global	0.610		0.720		0.880		0.910		0.510	

*) Found at cnbc.com; Kroll.com's page on cost of capital inputs (from 3.9.25); and on investing.com. Beta's were found on Damodaran, stern.nyu.edu from the Alcoholic and Soft drink industries.

(b)

Company name	Country	2020*)		2021		2022		2023		2024	
		COC Glob.	COC Cont.	COC Glob.	COC Cont.	COC Glob.	COC Cont.	COC Glob.	COC Cont.	COC Glob.	COC Cont.
Anheuser-Busch Inbev	Belgium[1)]	0.0761	0.0904	0.0830	0.0965	0.1047	0.1138	0.1038	0.1190	0.0684	0.0740
Heineken	Netherlands[1)]	0.0752	0.0893	0.0789	0.0917	0.0936	0.1011	0.0990	0.1132	0.0675	0.0729
Diageo	UK[1)]	0.0834	0.0993	0.0936	0.1088	0.1131	0.1233	0.1335	0.1549	0.0871	0.0978
Asahi Group	Japan[3)]	0.0734	0.0586	0.0793	0.0784	0.0981	0.0724	0.0963	0.0761	0.0650	0.0487
Kirin Holdings	Japan[3)]	0.0612	0.0489	0.0703	0.0693	0.0887	0.0654	0.0947	0.0747	0.0646	0.0483
Molson Coors	USA[2)]	0.0628	0.0640	0.0692	0.0590	0.0860	0.1020	0.0913	0.0983	0.0635	0.0753
Carlsberg	Denmark[1)]	0.0588	0.0694	0.0648	0.0753	0.0891	0.0960	0.1067	0.1225	0.0722	0.0788
Constellation Brands	USA[2)]	0.0650	0.0678	0.0777	0.0660	0.1192	0.1394	0.1176	0.1227	0.0840	0.0941
China Resources Beer	China[3)]	0.0476	0.0380	0.0535	0.0522	0.0704	0.0519	0.0805	0.0625	0.0561	0.0415
Tsingtao	China[3)]	0.0475	0.0379	0.0534	0.0522	0.0689	0.0508	0.0755	0.0581	0.0550	0.0406
Efes Beverage Group	Türkiye[1)]	0.0569	0.0671	0.0636	0.0739	0.0864	0.0930	0.0946	0.1079	0.0624	0.0663
Compania Cervecerias Unidas	Chile[2)]	0.0550	0.0576	0.0639	0.0547	0.1076	0.1263	0.1139	0.1193	0.0736	0.0845
Boston Beer Company	USA[2)]	0.0490	0.0516	0.0549	0.0473	0.0705	0.0846	0.0767	0.0847	0.0556	0.0680
HiteJinro	South Korea[3)]	0.0581	0.0464	0.0651	0.0640	0.0831	0.0613	0.0865	0.0676	0.0617	0.0461
Royal Unibrew	Denmark[1)]	0.0633	0.0749	0.0851	0.0988	0.1040	0.1130	0.1150	0.1326	0.0720	0.0786
Olvi plc	Finland[1)]	0.0477	0.0560	0.0536	0.0623	0.0692	0.0735	0.0762	0.0855	0.0556	0.0576

*) Cost of implied equity capital, COC, is calculated from $r_e = r_F + \beta_L \times \text{ERP}$; and $\beta_L = \beta_U (1 + ((1 - \text{marg.tax rate}) \times \text{Debt/Equity}))$; r_F is risk free return; ERP is Equity Risk Premium; β is beta Levered and Unlevered; and marginal tax rate, Debt and Equity are found in annual reports, see Table S2. 1) European Union continent (region), 2) United States continent (region), 3) Far East Asia continent (region), i) Measured by Volume output in liters (2022).

(B)

Company name	Country	Accounting Regime	Accounting numbers in size and currency	Revenue (this year) 2022	Revenue (last year) 2021	Comparison of comparables 2020			
						ROE (AVG)	ROE (BEG)	ROE (END)	COC Glob.
Anheuser-Busch Inbev	Belgium	IFRS	Mio USD	57,786	54,304	0.0270	0.0260	0.0281	0.0761
Heineken	Netherlands	IFRS	Mio EUR	28,719	21,941	−0.0056	−0.0051	−0.0061	0.0752
Diageo	UK	IFRS	Mio GBP	15,452	12,733	0.1564	0.1432	0.1723	0.0834
Asahi Group	Japan	IFRS	Mia YEN	2511	2237	0.0670	0.0742	0.0610	0.0734
Kirin Holdings	Japan	IFRS	Mia YEN	1989	1822	0.0890	0.0870	0.0911	0.0612
Molson Coors	USA	US	Mio USD	10,701	10,280	−0.0719	−0.0692	−0.0749	0.0628
Carlsberg	Denmark	IFRS	Mio DKK	70,265	60,097	0.1523	0.1479	0.1570	0.0588
Constellation Brands	USA	US	Mio USD	9453	8821	0.1539	0.1629	0.1459	0.0650
China Resources Beer	China	IFRS	Mio RMB	35,263	33,387	0.1021	0.1061	0.0984	0.0476
Tsingtao	China	CAS[1)]	Mio RMB	32,172	30,167	0.1127	0.1169	0.1089	0.0475
Efes Beverage Group	Türkiye	TFRS[2)]	Mio TRL	90,504	39,284	0.0588	0.0596	0.0581	0.0569
Compania Cervecerias Unidas	Chile	IFRS	Mia CLP	2711	1515	0.0759	0.0750	0.0768	0.0550
Boston Beer Company	USA	US	Mio USD	2090	2058	0.2269	0.2610	0.2006	0.0490
HiteJinro	South Korea	IFRS	Mia WON	2484	2192	0.0823	0.0840	0.0807	0.0581
Royal Unibrew	Denmark	IFRS	Mio DKK	11,487	8746	0.3721	0.3856	0.3595	0.0633
Olvi plc	Finland	IFRS	Mio EUR	584	462	0.1538	0.1550	0.1526	0.0477

Company name	Country	Accounting Regime	Accounting numbers in size and currency	Revenue (this year) 2022	Revenue (last year) 2021	Comparison of comparables 2021			
						ROE (AVG)	ROE (BEG)	ROE (END)	COC Glob.
Anheuser-Busch Inbev	Belgium	IFRS	Mio USD	57,786	54,304	0.0775	0.0780	0.0771	0.0830
Heineken	Netherlands	IFRS	Mio EUR	28,719	21,941	0.2074	0.2456	0.1794	0.0789
Diageo	UK	IFRS	Mio GBP	15,452	12,733	0.3269	0.3316	0.3224	0.0936
Asahi Group	Japan	IFRS	Mia YEN	2511	2237	0.0939	0.1013	0.0874	0.0793
Kirin Holdings	Japan	IFRS	Mia YEN	1989	1822	0.0610	0.0624	0.0596	0.0703
Molson Coors	USA	US	Mio USD	10,701	10,280	0.0767	0.0799	0.0738	0.0692
Carlsberg	Denmark	IFRS	Mio DKK	70,265	60,097	0.1739	0.1847	0.1643	0.0648
Constellation Brands	USA	US	Mio USD	9453	8821	0.0001	0.0001	0.0001	0.0777
China Resources Beer	China	IFRS	Mio RMB	35,263	33,387	0.2006	0.2158	0.1874	0.0535
Tsingtao	China	CAS[1)]	Mio RMB	32,172	30,167	0.1442	0.1524	0.1368	0.0534

Continued

Efes Beverage Group	Türkiye	TFRS[2)]	Mio TRL	90,504	39,284	0.0736	0.0946	0.0602	0.0636
Compania Cervecerias Unidas	Chile	IFRS	Mia CLP	2711	1515	0.1546	0.1555	0.1537	0.0639
Boston Beer Company	USA	US	Mio USD	2090	2058	0.0150	0.0153	0.0148	0.0549
HiteJinro	South Korea	IFRS	Mia WON	2484	2192	0.0661	0.0668	0.0654	0.0651
Royal Unibrew	Denmark	IFRS	Mio DKK	11,487	8746	0.3890	0.3896	0.3884	0.0851
Olvi plc	Finland	IFRS	Mio EUR	584	462	0.1711	0.1805	0.1626	0.0536

Company name	Country	Accounting Regime	Accounting numbers in size and currency	Revenue (this year) 2022	Revenue (last year) 2021	Comparison of comparables 2022			
						ROE (AVG)	ROE (BEG)	ROE (END)	COC Glob.
Anheuser-Busch Inbev	Belgium	IFRS	Mio USD	57,786	54,304	0.0929	0.0958	0.0901	0.1047
Heineken	Netherlands	IFRS	Mio EUR	28,719	21,941	0.1460	0.1543	0.1386	0.0936
Diageo	UK	IFRS	Mio GBP	15,452	12,733	0.4368	0.5079	0.3831	0.1131
Asahi Group	Japan	IFRS	Mia YEN	2511	2237	0.0825	0.0896	0.0764	0.0981
Kirin Holdings	Japan	IFRS	Mia YEN	1989	1822	0.1198	0.1253	0.1147	0.0887
Molson Coors	USA	US	Mio USD	10,701	10,280	−0.0140	−0.0136	−0.0144	0.0860
Carlsberg	Denmark	IFRS	Mio DKK	70,265	60,097	0.0026	0.0022	0.0031	0.0891
Constellation Brands	USA	US	Mio USD	9453	8821	−0.0037	−0.0032	−0.0044	0.1192
China Resources Beer	China	IFRS	Mio RMB	35,263	33,387	0.1687	0.1776	0.1607	0.0704
Tsingtao	China	CAS[1)]	Mio RMB	32,172	30,167	0.1520	0.1599	0.1448	0.0689
Efes Beverage Group	Türkiye	TFRS[2)]	Mio TRL	90,504	39,284	0.1260	0.1536	0.1068	0.0864
Compania Cervecerias Unidas	Chile	IFRS	Mia CLP	2711	1515	0.0947	0.0951	0.0944	0.1076
Boston Beer Company	USA	US	Mio USD	2090	2058	0.0656	0.0684	0.0630	0.0705
HiteJinro	South Korea	IFRS	Mia WON	2484	2192	0.0771	0.0794	0.0750	0.0831
Royal Unibrew	Denmark	IFRS	Mio DKK	11,487	8746	0.3508	0.4461	0.2891	0.1040
Olvi plc	Finland	IFRS	Mio EUR	584	462	0.0259	0.0252	0.0266	0.0692

Company name	Country	Accounting Regime	Accounting numbers in size and currency	Revenue (this year) 2022	Revenue (last year) 2021	Comparison of comparables 2023			
						ROE (AVG)	ROE (BEG)	ROE (END)	COC Glob.
Anheuser-Busch Inbev	Belgium	IFRS	Mio USD	57,786	54,304	0.0779	0.0818	0.0744	0.1038
Heineken	Netherlands	IFRS	Mio EUR	28,719	21,941	0.1074	0.1095	0.1054	0.0990
Diageo	UK	IFRS	Mio GBP	15,452	12,733	0.3858	0.3891	0.3825	0.1335
Asahi Group	Japan	IFRS	Mia YEN	2511	2237	0.0733	0.0805	0.0673	0.0963

Continued

Kirin Holdings	Japan	IFRS	Mia YEN	1989	1822	0.1123	0.1200	0.1055	0.0947
Molson Coors	USA	US	Mio USD	10,701	10,280	0.0727	0.0741	0.0713	0.0913
Carlsberg	Denmark	IFRS	Mio DKK	70,265	60,097	−1.3156	−1.1456	−1.5448	0.1067
Constellation Brands	USA	US	Mio USD	9453	8821	0.1878	0.2021	0.1754	0.1176
China Resources Beer	China	IFRS	Mio RMB	35,263	33,387	0.1703	0.1926	0.1526	0.0805
Tsingtao	China	CAS[1)]	Mio RMB	32,172	30,167	0.1595	0.1655	0.1539	0.0755
Efes Beverage Group	Türkiye	TFRS[2)]	Mio TRL	90,504	39,284	0.2535	0.2490	0.2583	0.0946
Compania Cervecerias Unidas	Chile	IFRS	Mia CLP	2711	1515	0.0854	0.0825	0.0885	0.1139
Boston Beer Company	USA	US	Mio USD	2090	2058	0.0711	0.0714	0.0708	0.0767
HiteJinro	South Korea	IFRS	Mia WON	2484	2192	0.0316	0.0307	0.0325	0.0865
Royal Unibrew	Denmark	IFRS	Mio DKK	11,487	8746	0.2008	0.2123	0.1905	0.1150
Olvi plc	Finland	IFRS	Mio EUR	584	462	0.1349	0.1367	0.1331	0.0762

Company name	Country	Accounting Regime	Accounting numbers in size and currency	Revenue (this year) 2022	Revenue (last year) 2021	Comparison of comparables 2024			
						ROE (AVG)	ROE (BEG)	ROE (END)	COC Glob.
Anheuser-Busch Inbev	Belgium	IFRS	Mio USD	57,786	54,304	0.0818	0.0800	0.0836	0.0684
Heineken	Netherlands	IFRS	Mio EUR	28,719	21,941	0.0514	0.0509	0.0518	0.0675
Diageo	UK	IFRS	Mio GBP	15,452	12,733	0.3504	0.3558	0.3452	0.0871
Asahi Group	Japan	IFRS	Mia YEN	2511	2237	0.0752	0.0784	0.0722	0.0650
Kirin Holdings	Japan	IFRS	Mia YEN	1989	1822	0.0580	0.0602	0.0559	0.0646
Molson Coors	USA	US	Mio USD	10,701	10,280	0.0867	0.0863	0.0871	0.0635
Carlsberg	Denmark	IFRS	Mio DKK	70,265	60,097	0.3642	0.3986	0.3353	0.0722
Constellation Brands	USA	US	Mio USD	9453	8821	−0.0036	−0.0031	−0.0044	0.0840
China Resources Beer	China	IFRS	Mio RMB	35,263	33,387	0.1364	0.1393	0.1337	0.0561
Tsingtao	China	CAS[1)]	Mio RMB	32,172	30,167	0.1546	0.1590	0.1504	0.0550
Efes Beverage Group	Türkiye	TFRS[2)]	Mio TRL	90,504	39,284	0.1558	0.1797	0.1375	0.0624
Compania Cervecerias Unidas	Chile	IFRS	Mia CLP	2711	1515	0.1176	0.1323	0.1058	0.0736
Boston Beer Company	USA	US	Mio USD	2090	2058	0.0602	0.0557	0.0655	0.0556
HiteJinro	South Korea	IFRS	Mia WON	2484	2192	0.0863	0.0876	0.0851	0.0617
Royal Unibrew	Denmark	IFRS	Mio DKK	11,487	8746	0.2409	0.2547	0.2285	0.0720
Olvi plc	Finland	IFRS	Mio EUR	584	462	0.2015	0.2143	0.1902	0.0556

1) China's Accounting Standards for Business Enterprises, 2) Turkish Accounting/Financial Reporting Standards, *) Measured by Volume output in liters (2022).

(C)

Company name	Country	Accounting Regime	Accounting numbers in size and currency	Revenue (this year) 2022	Revenue (last year) 2021	Comparison of comparables 2020			
						r_e (3 mths)	r_e (4 mths)	COC Glob.	ROE (AVG)
Anheuser-Busch Inbev	Belgium	IFRS	Mio USD	57,786	54,304	0.3028	0.3575	0.0761	0.0270
Heineken	Netherlands	IFRS	Mio EUR	28,719	21,941	0.0967	0.1624	0.0752	−0.0056
Diageo	UK	IFRS	Mio GBP	15,452	12,733	−0.2036	−0.2090	0.0834	0.1564
Asahi Group	Japan	IFRS	Mia YEN	2511	2237	0.3034	0.2187	0.0734	0.0670
Kirin Holdings	Japan	IFRS	Mia YEN	1989	1822	0.0204	0.0158	0.0612	0.0890
Molson Coors	USA	US	Mio USD	10,701	10,280	0.3123	0.3312	0.0628	−0.0719
Carlsberg	Denmark	IFRS	Mio DKK	70,265	60,097	0.2632	0.2590	0.0588	0.1523
Constellation Brands	USA	US	Mio USD	9453	8821	0.3420	0.3048	0.0650	0.1539
China Resources Beer	China	IFRS	Mio RMB	35,263	33,387	n.a.	n.a.	0.0476	0.1021
Tsingtao	China	CAS[1)]	Mio RMB	32,172	30,167	0.5732	0.4200	0.0475	0.1127
Efes Beverage Group	Türkiye	TFRS[2)]	Mio TRL	90,504	39,284	0.2044	0.2361	0.0569	0.0588
Compania Cervecerias Unidas	Chile	IFRS	Mia CLP	2711	1515	0.0767	0.0892	0.0550	0.0759
Boston Beer Company	USA	US	Mio USD	2090	2058	1.1884	0.9584	0.0490	0.2269
HiteJinro	South Korea	IFRS	Mia WON	2484	2192	0.5227	0.1631	0.0581	0.0823
Royal Unibrew	Denmark	IFRS	Mio DKK	11,487	8746	0.3206	0.3755	0.0633	0.3721
Olvi plc	Finland	IFRS	Mio EUR	584	462	0.3104	0.3368	0.0477	0.1538

Company name	Country	Accounting Regime	Accounting numbers in size and currency	Revenue (this year) 2022	Revenue (last year) 2021	Comparison of comparables 2021			
						r_e (3 mths)	r_e (4 mths)	COC Glob.	ROE (AVG)
Anheuser-Busch Inbev	Belgium	IFRS	Mio USD	57,786	54,304	0.0186	−0.0514	0.0830	0.0775
Heineken	Netherlands	IFRS	Mio EUR	28,719	21,941	−0.0555	−0.0912	0.0789	0.2074
Diageo	UK	IFRS	Mio GBP	15,452	12,733	0.3273	0.3930	0.0936	0.3269
Asahi Group	Japan	IFRS	Mia YEN	2511	2237	−0.0224	0.0838	0.0793	0.0939
Kirin Holdings	Japan	IFRS	Mia YEN	1989	1822	−0.1160	−0.0452	0.0703	0.0610
Molson Coors	USA	US	Mio USD	10,701	10,280	0.0542	−0.0035	0.0692	0.0767
Carlsberg	Denmark	IFRS	Mio DKK	70,265	60,097	−0.1269	−0.1473	0.0648	0.1739
Constellation Brands	USA	US	Mio USD	9453	8821	0.0374	0.0109	0.0777	0.0001
China Resources Beer	China	IFRS	Mio RMB	35,263	33,387	n.a.	n.a.	0.0535	0.2006
Tsingtao	China	CAS[1)]	Mio RMB	32,172	30,167	−0.0714	−0.0614	0.0534	0.1442

Continued

Efes Beverage Group	Türkiye	TFRS[2)]	Mio TRL	90,504	39,284	0.2391	0.2393	0.0636	0.0736
Compania Cervecerias Unidas	Chile	IFRS	Mia CLP	2711	1515	−0.0703	−0.1375	0.0639	0.1546
Boston Beer Company	USA	US	Mio USD	2090	2058	−1.1331	−1.1768	0.0549	0.0150
HiteJinro	South Korea	IFRS	Mia WON	2484	2192	−0.2165	−0.1233	0.0651	0.0661
Royal Unibrew	Denmark	IFRS	Mio DKK	11,487	8746	−0.0267	−0.1847	0.0851	0.3890
Olvi plc	Finland	IFRS	Mio EUR	584	462	−0.2750	−0.4714	0.0536	0.1711

Company name	Country	Accounting Regime	Accounting numbers in size and currency	Revenue (this year) 2022	Revenue (last year) 2021	Comparison of comparables 2022			
						r_e (3 mths)	r_e (4 mths)	COC Glob.	ROE (AVG)
Anheuser-Busch Inbev	Belgium	IFRS	Mio USD	57,786	54,304	0.1308	0.0732	0.1047	0.0929
Heineken	Netherlands	IFRS	Mio EUR	28,719	21,941	0.1845	0.1628	0.0936	0.1460
Diageo	UK	IFRS	Mio GBP	15,452	12,733	0.0707	0.0107	0.1131	0.4368
Asahi Group	Japan	IFRS	Mia YEN	2511	2237	0.1206	0.0958	0.0981	0.0825
Kirin Holdings	Japan	IFRS	Mia YEN	1989	1822	0.1642	0.1769	0.0887	0.1198
Molson Coors	USA	US	Mio USD	10,701	10,280	−0.0181	0.1064	0.0860	−0.0140
Carlsberg	Denmark	IFRS	Mio DKK	70,265	60,097	0.2764	0.2347	0.0891	0.0026
Constellation Brands	USA	US	Mio USD	9453	8821	0.0040	0.0686	0.1192	−0.0037
China Resources Beer	China	IFRS	Mio RMB	35,263	33,387	n.a.	n.a.	0.0704	0.1687
Tsingtao	China	CAS[1)]	Mio RMB	32,172	30,167	0.3222	0.2647	0.0689	0.1520
Efes Beverage Group	Türkiye	TFRS[2)]	Mio TRL	90,504	39,284	0.8736	0.7538	0.0864	0.1260
Compania Cervecerias Unidas	Chile	IFRS	Mia CLP	2711	1515	0.0512	0.1569	0.1076	0.0947
Boston Beer Company	USA	US	Mio USD	2090	2058	−0.1671	−0.1664	0.0705	0.0656
HiteJinro	South Korea	IFRS	Mia WON	2484	2192	−0.3859	−0.4302	0.0831	0.0771
Royal Unibrew	Denmark	IFRS	Mio DKK	11,487	8746	−0.0322	0.0064	0.1040	0.3508
Olvi plc	Finland	IFRS	Mio EUR	584	462	−0.1279	−0.0153	0.0692	0.0259

Company name	Country	Accounting Regime	Accounting numbers in size and currency	Revenue (this year) 2022	Revenue (last year) 2021	Comparison of comparables 2023			
						r_e (3 mths)	r_e (4 mths)	COC Glob.	ROE (AVG)
Anheuser-Busch Inbev	Belgium	IFRS	Mio USD	57,786	54,304	−0.0685	−0.0367	0.1038	0.0779
Heineken	Netherlands	IFRS	Mio EUR	28,719	21,941	−0.1062	−0.1244	0.0990	0.1074
Diageo	UK	IFRS	Mio GBP	15,452	12,733	−0.1993	−0.1222	0.1335	0.3858
Asahi Group	Japan	IFRS	Mia YEN	2511	2237	0.1455	0.0511	0.0963	0.0733

Continued

Kirin Holdings	Japan	IFRS	Mia YEN	1989	1822	0.0299	0.0670	0.0947	0.1123
Molson Coors	USA	US	Mio USD	10,701	10,280	0.6318	0.3828	0.0913	0.0727
Carlsberg	Denmark	IFRS	Mio DKK	70,265	60,097	−0.0828	−0.1327	0.1067	−1.3156
Constellation Brands	USA	US	Mio USD	9453	8821	0.0421	0.0566	0.1176	0.1878
China Resources Beer	China	IFRS	Mio RMB	35,263	33,387	−0.4468	−0.5573	0.0805	0.1703
Tsingtao	China	CAS[1)]	Mio RMB	32,172	30,167	−0.3906	−0.3173	0.0755	0.1595
Efes Beverage Group	Türkiye	TFRS[2)]	Mio TRL	90,504	39,284	0.8678	1.0652	0.0946	0.2535
Compania Cervecerias Unidas	Chile	IFRS	Mia CLP	2711	1515	−0.0508	−0.1123	0.1139	0.0854
Boston Beer Company	USA	US	Mio USD	2090	2058	−0.0767	−0.1314	0.0767	0.0711
HiteJinro	South Korea	IFRS	Mia WON	2484	2192	−0.0317	−0.0077	0.0865	0.0316
Royal Unibrew	Denmark	IFRS	Mio DKK	11,487	8746	−0.2383	−0.1071	0.1150	0.2008
Olvi plc	Finland	IFRS	Mio EUR	584	462	0.0760	0.0594	0.0762	0.1349

Company name	Country	Accounting Regime	Accounting numbers in size and currency	Revenue (this year) 2022	Revenue (last year) 2021	Comparison of comparables 2024			
						r_e (3 mths)	r_e (4 mths)	COC Glob.	ROE (AVG)
Anheuser-Busch Inbev	Belgium	IFRS	Mio USD	57,786	54,304	0.0231	0.0401	0.0684	0.0818
Heineken	Netherlands	IFRS	Mio EUR	28,719	21,941	−0.0962	−0.0786	0.0675	0.0514
Diageo	UK	IFRS	Mio GBP	15,452	12,733	−0.1237	−0.2266	0.0871	0.3504
Asahi Group	Japan	IFRS	Mia YEN	2511	2237	0.0481	0.1108	0.0650	0.0752
Kirin Holdings	Japan	IFRS	Mia YEN	1989	1822	0.0201	−0.0347	0.0646	0.0580
Molson Coors	USA	US	Mio USD	10,701	10,280	−0.0710	0.0350	0.0635	0.0867
Carlsberg	Denmark	IFRS	Mio DKK	70,265	60,097	−0.0329	−0.0124	0.0722	0.3642
Constellation Brands	USA	US	Mio USD	9453	8821	−0.3191	−0.4012	0.0840	−0.0036
China Resources Beer	China	IFRS	Mio RMB	35,263	33,387	−0.0750	0.0740	0.0561	0.1364
Tsingtao	China	CAS[1)]	Mio RMB	32,172	30,167	0.1182	0.0465	0.0550	0.1546
Efes Beverage Group	Türkiye	TFRS[2)]	Mio TRL	90,504	39,284	0.0888	−0.1341	0.0624	0.1558
Compania Cervecerias Unidas	Chile	IFRS	Mia CLP	2711	1515	0.2133	0.2105	0.0736	0.1176
Boston Beer Company	USA	US	Mio USD	2090	2058	−0.2426	−0.1246	0.0556	0.0602
HiteJinro	South Korea	IFRS	Mia WON	2484	2192	−0.0655	−0.0647	0.0617	0.0863
Royal Unibrew	Denmark	IFRS	Mio DKK	11,487	8746	0.1868	−0.0086	0.0720	0.2409
Olvi plc	Finland	IFRS	Mio EUR	584	462	0.1324	0.1417	0.0556	0.2015

1) China's Accounting Standards for Business Enterprises, 2) Turkish Accounting/Financial Reporting Standards, *) Measured by Volume output in liters (2022).

In (b) the individual levered company calculations of simple and yet realistic implied risk adjusted cost-of-equity capital are presented following the necessary CAPM assumptions. The table convey quite different results ranging from 0.0379 (for Tsingtao, Regional) in 2020 to 0.1549 (for Diageo, Regional) in 2023. This large difference is partly due to changes in year-by-year levels since average regional r_e in 2020 was 0.0636 while it was 0.1000 in 2023. But Tsingtao remains the company with smallest cost-of-equity capital through all years, while Diageo has the largest cost-of-equity capital all years.

Accounting

Table 3(B) shows ROE numbers of financial ratios calculated using beginning (ROE_{BEG}), average (ROE_{AVG}), and ending (ROE_{END}) balance sheet numbers in denominator and illustrates the differences due to different denominators in the beer industry and cost-of-equity capital for comparison taking a stewardship approach.

The most common definition of ROE use net profit as nominator in the income statement, which is what we present in **Table 3(B)**, but an eventual use of the Feltham-Ohlson valuation framework calls for using comprehensive income as nominator due to their clean surplus requirements[1]. For companies experiencing steady growth in equity from beginning to ending by roughly the size of the net profit, ROE based on beginning numbers denominator should be larger than ROE based on average numbers, which again should be larger than ROE based on ending numbers. For comparison, **Table 3(B)** includes cost-of-equity cost global, and in total over the five years' data sets *i.e.* 16 × 5 = 80 sets of data, the companies' return ratios are smaller than the cost of capital, reflecting that the companies destroy value in 27 (or 34 percent) of the cases. The observable difference between beginning and average, respective between average and ending is typically up to 3.5 percent points for the largest differences, and thus as such in general not irrelevant. And in some cases where accounting ROE is close to the implied cost-of-equity capital, r_e, the choice of denominator will be decisive for management.

Finance

Since the annual reports are not published until some time after the end of the accounting financial year, the corresponding finance year is shifted some weeks. In some research focusing on comparing accounting and financing year return, a delay of three or four months has been practiced as proxies for the financial year in the market, see for instance [20] and [21].

Table 3(C) shows comparable stock-market based financial return ratios from largest companies in the beer industry using methodology from Xie (measuring financial return between two financial year end dates plus three months as in [21]) and Sloan (measuring financial return between two financial year end dates plus four months as in [20]), which ensures time for the companies to finish the annual reports. For comparison, cost-of-equity capital in beer industry and accounting

[1]Eventual use of comprehensive income instead of net profit would lead to 24 cases of ROE_{AVG} smaller than cost-of-equity capital instead of 27 cases.

ROE_{AVG} are repeated from Table 3(A) and Table 3(B). As can be seen, some years have been difficult generally in the stock market, where many companies show returns below implied cost-of-equity capital and maybe even negative returns.

In total, the stock returns are lower than implied cost-of-equity capital in 47 (or 61 percent) cases of the 77 in total, reflecting an industry struggling especially the last few years. Especially the COVID19 pandemic period seems to entail quite pessimistic market perspectives in 2021. Further, in most years the return after four months is on average and individually slightly smaller than the return after three months since we only saw increase in 29 (or 37.7 percent) out of 77 cases. The difference between shifting three and four months reflect differences in observed financial yearly performance, but since there during later years has been a tendency towards finalising the annual reports increasingly earlier, the three-months shifting is probably the most correct proxy for comparisons now. We might also have used the return-year between consecutive two annual report announcement dates and a few days after and thus using first date when the accounting information seems to be absorbed in the stock price, *i.e.* when price-volatility and volume traded is back on pre-announcement date level, which may have shown a slightly more precise reflexion of the stock-market financial year.

However, the exact results are not the main point here, but rather that we compare what is comparable and as we suggested earlier, consensus is that average denominator best reflect return for a period, ROE_{AVG}, which we compare year-by-year with three months delayed realised financial return in market, r_e (Xie), and a global CAPM-based implied cost-of-equity capital (Global). Following our earlier findings, we see implied cost-of-equity capital larger than both ROE and r_e in 18 (or 23.4 percent) cases of the 77 cases in total, which reflect that many companies destroy value. In contrast to this, we find 21 (or 27.5 percent) out of the 77 cases that show both accounting-return and market-return larger than implied cost-of-equity capital.

Generally, we observe quite large dispersion in the beer industry which may not be the case in other industries, but for illustrative purposes we see no reason to question that the pattern could be similar in other industries.

4. Perspectives for Accounting Regulation

4.1. Practical Support

Financial (statement) analyses are often circumstantial, and thus the denominator issue might not be felt so important. But for a proper comparison with a relevant benchmark, it is important, and it should be handled correctly to avoid misunderstandings and incorrect results in the financial analyses.

We saw in Table 1 that only a minority (44.2 percent) of textbooks use average numbers in denominator when calculating ROE. However, for non-accounting textbooks, the proportion is much smaller (2 out of 36 cases, or 5.6 percent). Since it is unrealistic that everybody takes a Master in Accounting or Financial Statement Analysis, where the probability of getting it right is higher (67.8 percent

from Table 1), it should be considered to address the main accounting users more directly by implementing mandatory correct guidance in accounting regulation, and thus force the correct setting and provide everybody to prepare and use it correct and thus prevent misuse and misunderstandings.

For our beer industry the data in Table 3(B) shows that in 63 out of 77 cases (which corresponds to 78.8 percent) ROE_{AVG} is larger than ROE_{END}. Thus, a false use of ROE_{END} would provide a too small ROE for a comparison to for instance cost-of-equity capital, which is not appropriate. Likewise, falsely using results when ROE_{END} ratios are larger than ROE_{AVG} is exactly as inappropriate.

Further, in 2021 where cost-of-equity capital is estimated at 6.36 percent, for Efes Beverage Group, Türkiye, we have ROE_{AVG} 7.36 percent (and ROE_{BEG} at 9.46 percent), and ROE_{END} at 6.02 percent, and thus the correct calculated ROE would show positive residual income. Decisions should not be made by chance, but rather on thorough analyses where only comparable results are compared, and not for instance using ending number that would lead to a negative residual income. To ensure largest possible probability that exactly this will happen, prescribing investor a user-friendly exact practical definition of ROE would be a good solution. For our beer industry numbers, we see differences between ROE_{BEG} and ROE_{AVG}, respectively ROE_{END} and ROE_{AVG} up to 3.8 percent points, and although it is only for Efes Beverage Group in 2021 a decision based on the size of residual income would be directly affected by denominator choice, we only know that because we made all the calculations.

In accordance with [10], the accounting support for using average numbers can be established through adapting the well-known matching principle. But the matching principle is currently being out-phased from accounting regulation because it reflects an income statement focused view (revenue-expense orientated) on accounting which contrasts with the present mainstream balance sheet focused accounting view (asset-liability orientated) practiced by IASB (and FASB) during the last few decades, see also for instance [22]. A stringent use of the asset-liability orientated view on accounting reporting give rise to severe challenges in relation to accounting information's *informativeness* roll for the accounting user. [23] argued that operating income should be calculated on the basis of matching of expenses in the period incurred or with the products and services for which revenues have been recognised. The central argument for preserving this matching of operating expenses is that current operating net earnings provides the natural starting point for forecasting future operating net operating net earnings and future cash flows. However, although the latest revision of IAS 1 (*i.e.* introduction of IFRS 18 in [24] vs. former [15]) takes this aspect into some consideration, the denominator issue remains untouched.

Since accounting is complex and for many quite complicated, and when many non-accountants "only" take a relatively short introductory course on financial analysis, the overall aim for accounting regulators, like IASB and EU, should be to ensure that the content becomes as usable as possible (and in every respect as

accurate as possible)—accounting numbers presented in annual reports including key figures should reflect the economic realities as best as possible, *i.e.* showing a fair, true, and faithful presentation, so that the accounting user gets the best possible information for his own use. This calls for the use of averages in denominator, ideally in all textbooks including introduction to financial ratios, since such ratios can then unproblematically be compared with financial figures, for example investors' return on investment for company stocks.

Consequently, one way of preventing wrong-use and at same time encourage right use could be if IASB's accounting regulation prescriptions were more supportive for financial ratios rather than leaving it completely to company management to decide which information to present and how (in accordance with the section Notes in [24]). This is a remarkably contrast to many other parts of the accounting disclosure prescribed in the IFRSs, and it could be considered a flaw that [24] does not prescribe at least some financial ratios (including precise definitions) that would be considered relevant for most accounting users' performance evaluation.

4.2. Accounting Prescriptions for Financial Ratios in Annual Reports

Accounting prescriptions for financial ratios in annual reports for companies in EU-countries follow EU directives and EU regulations. The description of regulations can be found in Article 288 of the Treaty on the Functioning of the European Union, TFEU (former Art. 249 in TEC). According to this, the EU institutions adopt regulations, directives, decisions, recommendations and opinions that have legal validity in the listed order: A ***regulation*** is binding in its entity and directly applicable in all EU member states. Unlike this a ***directive*** needs to be transposed into national law in each member state, leaving choice of form and methods to the national authorities.

The scope of Article 5 in the EU Accounting Directive, [25], includes public and private limited liability companies as well as partnerships and limited partnerships where the fully liable members are constituted either as public or as private limited liability companies, and where members of partnerships in fact have limited liability for the partnership's obligations because that liability is limited by other companies. Although the Directive excludes not-for-profit companies, it includes almost all companies. However, the Directive includes no prescriptions on financial ratios, and thus also no guidance. The Directive contains requirements on financial statements' content and definitions, on accounting items' recognition, measurement and presentation, and it is implemented in national accounting law and regulation in all EU member countries [25]. Further, and parallel, all listed companies in the EU are required to follow the prescriptions in the international financial reporting standards (as approved by the EU) due to EU Regulation No 1606/2002 on the application of international accounting standards [26].

Denmark as an EU member state has legislated in accordance with the EU di-

rective and supplemented with special Danish regulation that government and parliament think should be part of the Danish Financial Act [27], which governs the preparation and presentation of financial statements for companies in Denmark.

The Danish Financial Act divides companies into 4 categories, A, B, C and D, by size of turnover, total assets, and number of employees [27]. Very small businesses (sole proprietors) would normally be in category A, and the largest businesses in category C while listed companies are in category D, and the logic is that the higher the category, the higher are the reporting requirements. Among the different requirements that medium sized and larger companies face, *i.e.* companies in category C and D, are prescriptions in accordance with Danish Financial Act paragraph 101 to present a five-year overview containing central accounting items, and some financial ratios that the company finds relevant for the company [27] that are defined and calculated in accordance with current Chartered Financial Analyst-guidance in [28]. Unfortunately, CFA present so many different financial ratios to choose among that it is almost too much, but they are persistent in using average denominator numbers from balance sheets where relevant, for instance ROE. Because of EU-regulation in [26] Danish listed companies apply IFRS (as approved by EU), and thus many paragraphs in Danish Financial Act [27] are superseded by prescriptions in the standards; but not paragraph 101.

Lately we see introduction of standard IFRS 18 prescribing presentation and disclosure in financial statements and effective from 1 January 2027 in [24], which presents a clearly defined operating profit and clear prescriptions of how different parts of net accounting profit items must be presented in the income statement. In the section "Notes", IFRS 18 prescribes identification (paragraphs 117 - 120) and disclosure (paragraphs 121 - 125) of subtotals as management defined performance measures. A such is defined in paragraph 117 as "a subtotal of income and expenses" and it is further elaborated on in IFRS 18 Appendix B, paragraphs B113-B142, where especially paragraphs B116 and B117 are of interest. In paragraph B116.c IFRS 18 states that "financial ratios (for example ROA) are not management defined performance measures" because they are not subtotals of income and expenses. In contrast, it is in paragraph B117 established that a management defined performance measure could be part, *i.e.* nominator or denominator, of a financial ratio. See eventually [24] for further details.

The standard focus on the more specific demands related to details on management and their responsibilities in providing information to stakeholders and thus the disclosure on identification, definition and choice of adequate performance measures, but although the standard does not address the definition of financial ratios, like ROE, the standard can be expected to provide more transparency and comparability in nominator and can be seen as a kind of revival for the matching principle.

Unfortunately, the standard does not address the denominator issue which is neither mentioned in accounting framework nor in current accounting standards,

and thus no prescriptions. And thus, little guidance–and no guidance on denominator either.

However, following the Danish prescriptions in [27], it would be easy to add requirements on financial ratios to the existing EU regulation for a listed company (IFRS approved by EU), stating that companies must present central financial ratios in accordance with [28] (eventually approved by EU), like ROE and ROA or ROIC together with other relevant common financial ratios presented in [28]. This could be done either by urging IASB to add appropriate prescriptions in IFRS 18 ([24]) or by adding this prescription to EU's regulation 1606/2002 as an amendment to Article 3 ([26]).

Another possibility could be to add the requirements or some of them to the Accounting Directive [25] to ensure that mandatory prescription of certain financial ratios would be included in all EU member states' accounting prescriptions, eventually formulated so that companies that the directive define as small (in Article 3, and like Danish categories A and B in [27]) could be exempted.

5. Concluding Remarks

In general, we see strong and convincing arguments and support for preferring use of average balance sheet numbers in denominator, although we also see arguments in favour of different positions. Consequently, looking forward this must lead to seeing that it is better from the beginning to learn a useful definition that holds in all sorts of use in financial analysis, rather than just a quick and dirty one, that can mislead one later, like using ending balance sheet values in denominator for instance when calculating ROE for comparison with r_e. If one only attends a smaller financial analysis course once, one will probably be best off learning and mastering financial ratios for broader and more practical use and thus learn to use averages from the start. In other words, we should help the accounting user without an MBA in accounting; and at least try to ensure the same starting point for a discussion on a company's performance.

Since definition and calculation of financial ratios is not an exact science, it is so much more important that key players, like IASB and EU, support "common-knowledge" based guidelines for concrete use and definitions of ratios as presented by for instance CFA. Precise return definitions and detailed calculation guidance in financial accounting regulation prescriptions, for instance in management commentary, could ensure that calculated returns are always meaningful expressions ready and useful for all sorts of use in financial analysis.

Ultimately, the choice of denominator depends on both the specific analysis goals, the availability of data, and the context in which the financial ratio, for instance the ROE, is being used. Analysts may choose the method that best aligns with their objectives and the information they want to convey. However, keep in mind that different approaches may yield different ROE values, but the overall interpretation remains consistent: a higher ROE indicates better profitability relative to shareholders' equity.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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Appendix

Table S1: Extended 2014—article list of contributing textbooks (totalling 112).

Table S2: Beer Industry—relevant numbers for the 16 largest companies in the industry.

Table S1. List of all contributing textbooks in extended Mankin & Jewell study (total of 112)[1)].

Part of Mankin & Jewell's original study	AUTHORS	A/F/M/FSA[2)]	TEXT BOOK TITLE	DATE	PUBLISHER
Yes	Ainsworth	A	Introduction to Accounting: An Integrated Approach, 6th ed.	2011	McGraw-Hill
No	Alexander, Britton, Jorissen, Hoogendoorn, VanMaerik	A	International Financial Reporting and Analysis, 7th ed.	2017	Cengage
No	Alexander, Nobes	A	Financial Accounting. An International Introduction, 6th ed.	2016	Pearson
Yes	Alrecht, Stice, Stice	A	Financial Accounting, 10th ed.	2008	Cengage
Yes	Anthony, Hawkins, Merchant	A	Accounting: Text and Cases, 12th ed.	2007	McGraw-Hill
No	Atrill, McLaney	A	Accounting and Finance for non-Specialists, 11th ed.	2019	Pearson
No	Beaver	A	Financial Reporting, 3rd ed.	1998	Prentice-Hall
No	Birt, Chalmers, Maloney, Brooks, Oliver	A	Accounting. Business Reporting for Decision Making, 5th ed.	2014	Wiley
Yes	Breitner, Anthony	A	Core Concepts of Accounting, 10th ed.	2006	Prentice-Hall
Yes	Brewer, Garrison, Noreen	A	Introduction to Managerial Accounting, 4th ed.	2008	McGraw-Hill
No	Carey, Knowles, Towers-Clark	A	Accounting a Smart Approach, 1st ed.	2011	Oxford
No	Collins, McKeith	A	Financial Accounting and Reporting, 1st ed.	2010	McGraw-Hill
No	Cotter	A	Advanced Financial Reporting: A complete Guide to IFRS, 1st ed.	2012	Prentice-Hall
Yes	Edmonds, Edmonds, Olds, McNair, Ysay, Schneider, Milam	A	Fundamental Financial and Managerial Accounting, 1st ed.	2007	McGraw-Hill
No	Elliott, Elliott	A	Financial Accounting and Reporting, 9th ed.	2019	Pearson
Yes	Harrison, Horngren, Thomas	A	Financial Accounting, 8th ed.	2010	Prentice-Hall
Yes	Hartgraves, Morse, Davis	A	Managerial Accounting, 5th ed.	2009	Cambridge Business

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Yes	Horngren, Harrison, Oliver	A	Accounting, 8th ed.	2009	Prentice-Hall
Yes	Horngren, Harrison, Oliver	A	Financial and Managerial Accounting, 2nd ed.	2009	Prentice-Hall
Yes	Ingran, Albright	A	Financial Accounting, 6th ed.	2007	Cengage
Yes	Kieso, Weygandt, Warfield	A	Intermediate Accounting, 12th ed.	2008	Wiley
Yes	Kimmel	A	Financial Accounting: Tools for Business Decision Making, 5th ed.	2009	Wiley
Yes	King, Lembke, Smith	A	Financial Accounting: A Decision-Making Approach	2001	Wiley
No	Kothari, Barone	A	Advanced Financial Accounting: An International Approach, 1st ed.	2011	Pearson
Yes	Libby, Libby, Short	A	Financial Accounting, 5th ed.	2007	McGraw-Hill
Yes	Marshall, McManus, Viele	A	Accounting: What the Numbers Mean, 7th ed.	2007	McGraw-Hill
No	Miller-Nobles, Mattison, Matsumura	A	Horngren's Financial & Managerial Accounting. The Financial Chapters, 6th ed.	2018	Pearson
Yes	Needles, Powers	A	Financial Accounting, 10th ed.	2009	Cengage
Yes	Needles, Powers, Crosson	A	Principles of Accounting, 11th ed.	2011	Cengage
Yes	Nikolai, Bazlay, Jones	A	Intermediate Accounting, 11th ed.	2010	Cengage
No	O'Regan	A	Financial Information Analysis, 2nd ed.	2006	Wiley
Yes	Porter, Norton	A	Financial Accounting: Impact on decision Makers, 6th ed.	2010	Cengage
Yes	Porter, Norton	A	Using Financial Accounting Information: The Alternatives to Debits & Credits, 6th ed.	2010	Cengage
No	Pratt	A	Financial Accounting in Economic context, 8th ed.	2011	Wiley
No	Radebaugh, Gray, Black	A	International Accounting and Multinational Enterprises	2006	Wiley
Yes	Reeve, Warren, Duchac	A	Accounting: Using Excel for Success	2011	Cengage
Yes	Rich, Jones, Hietger, Mowen, Hansen	A	Cornerstones of Financial & Managerial Accounting, 1st ed.	2009	Cengage
No	Schroeder, Clas, Cathey	A	Financial Accounting, Theory and Analysis, 10th ed.	2011	Wiley
No	Scott	A	Accounting for Business, 2nd ed.	2016	Oxford
No	Smith	A	Introductory Financial Accounting and Reporting	2010	McGraw-Hill

Continued

No	Spiceland, Thomas, Herrmann	A	Financial Accounting, 5th ed.	2019	McGraw-Hill
Yes	Stice, Stice, Skousen	A	Intermediate Accounting, 17th ed.	2010	Cengage
Yes	Stickney, Weil, Schipper, Francis	A	Financial Accounting, An Introduction to Concepts, Methods, and Uses, 13th ed.	2010	Cengage
No	Stolowy, Ding, Paugam	A	Financial Accounting and Reporting, 6th ed.	2020	Cengage
No	Sutton	A	Corporate Financial Accounting and Reporting, 2nd ed.	2004	Pearson
No	Tapira	A	Understanding Financial Statements. A Journalist's Guide, 1st ed.	2004	Marion Street Press
No	Thomas, Tietz, Suwardy, Koh, Harrison, Horngren	A	Financial Accounting. International Financial Reporting Standards, 12th ed.	2023	Pearson
No	Thomas, Ward	A	Introduction to Financial Accounting, 9th ed.	2019	McGraw-Hill
Yes	Warren	A	Survey of Accounting	2011	Cengage
Yes	Warren, Reeve, Duchac	A	Financial and Managerial Accounting, 10th ed.	2009	Cengage
Yes	Weygandt, Kiese, Kimmel	A	Accounting Principles, 8th ed.	2008	Wiley
Yes	Weygandt, Kiese, Kimmel	A	Financial Accounting, 7th ed.	2010	Wiley
No	Weygandt, Kimmel, Kiese	A	Accounting Principles. IFRS version, 1st ed.	2019	Wiley
Yes	Wild, Larson, Chiapetta	A	Fundamental Accounting Principles, 18th ed.	2007	McGraw-Hill
Yes	Williams, Haka, Bettner, Carcello	A	Financial and Managerial Accounting, 15th ed.	2010	McGraw-Hill
No	Young, Cohen	A	Corporate Financial Reporting and Analysis, 3rd ed.	2013	Wiley
Yes	Berk, DeMarzo	F	Corporate Finance: The Core	2009	Prentice-Hall
Yes	Berk, DeMarzo, Harford	F	Fundamentals of Corporate Finance	2009	Prentice-Hall
Yes	Besley, Brigham	F	Essentials of Managerial Finance, 14th ed.	2008	Cengage
Yes	Block, Hirt	F	Fundamentals of Investment Management, 9th ed.	2008	McGraw-Hill
Yes	Block, Hirt, Danielson	F	Foundations of Financial Management, 13th ed.	2009	McGraw-Hill
Yes	Bodie	F	Essentials of Investments, 8th ed.	2010	McGraw-Hill

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Yes	Booth, Cleary	F	Introduction to Corporate Finance, Canadian ed.	2008	Wiley
Yes	Brealey, Meyers, Allen	F	Principles of Corporate Finance, 10th ed.	2011	McGraw-Hill
Yes	Brigham, Daves	F	Intermediate Financial Management, 10th ed.	2010	Cengage
Yes	Brigham, Erhardt	F	Financial Management: Theory and Practice, 12th ed.	2008	Cengage
Yes	Brigham, Houston	F	Fundamentals of Financial Management, 12th ed.	2009	Cengage
Yes	Brooks	F	Financial Management: Core Concepts	2010	Prentice-Hall
Yes	Cornett, Adair, Nofsinger	F	Finance: Application and Theory, 1st ed.	2009	McGraw-Hill
Yes	Gallagher	F	Financial Management, 5th ed.	2009	Textbook Media
Yes	Gitman, Joehnk	F	Fundamentals of Investing, 10th ed.	2008	Prentice-Hall
Yes	Graham, Smart, Megginson	F	Corporate Finance, 3rd ed.	2010	Cengage
Yes	Hawawini, Viallet	F	Finance for Executives: Managing for Value Creation, 3rd ed.	2007	Cengage
Yes	Hirschey, Nofsinger	F	Investments, 2nd ed.	2010	McGraw-Hill
Yes	Jordan, Miller	F	Fundamentals of Investments, 5th ed.	2009	McGraw-Hill
Yes	Keown, Martin, Petty	F	Foundations of Finance, 7th ed.	2011	Prentice-Hall
Yes	Lasher	F	Practical Financial Management, 6th ed.	2011	Cengage
Yes	Mayo	F	Investments: An Introduction, 10th ed.	2008	Cengage
Yes	Megginson, Smart	F	Introduction to Corporate Finance, 2nd ed.	2009	Cengage
Yes	Melischer, Norton	F	Introduction to Finance: Markets, Investments, and Financial Management, 13th ed.	2008	Wiley
Yes	Ross, Westerfield, Jaffe	F	Corporate Finance, 9th ed.	2010	McGraw-Hill
Yes	Ross, Westerfield, Jordan	F	Essentials of Corporate Finance, 7th ed.	2011	McGraw-Hill
No	Van Horne	F	Financial Management and Policy, 10th ed.	1995	Prentice-Hall
Yes	Werner, Stoner	F	Modern Financial Managing: Continuity and Change, 3rd ed.	2010	Textbook Media
No	Damodaran	FSA	Investment Valuation, 3rd ed.	2012	Wiley
Yes	Easton, McAnally, Fairfield, Zhang, Halsey	FSA	Financial Statement Analysis & Valuation, 2nd ed.	2010	Cambridge Business
No	Foster	FSA	Financial Statement Analysis, 2nd ed.	1986	Prentice-Hall

Continued

Yes	Fraser, Ormisston	FSA	Understanding Financial Statements, 9th ed.	2007	Prentice-Hall
Yes	Gibson	FSA	Financial Reporting & Analysis, 12th ed.	2011	Cengage
No	Koller, Goedhart, Wessels	FSA	Corporate Valuation, 5th ed.	2010	McKinsey
No	Lundholm, Sloan	FSA	Equity valuation and analysis, 2nd ed.	2007	McGraw-Hill
Yes	Palepu, Healy	FSA	Business Analysis & Valuation, 4th ed.	2008	Cengage
No	Penman	FSA	Financial Statement Analysis and Security Valuation, 5th ed.	2013	McGraw-Hill
No	Plenborg, Petersen, Kinserdal	FSA	Financial Statement Analysis, 1st ed.	2017	Fagbokforlaget
No	Pratt	FSA	Valuing a Business, 6th ed.	2022	McGraw-Hill
No	Wahlen, Baginski, Bradshaw	FSA	Financial Reporting, Financial Statement Analysis, and Valuation, 7th ed.	2008	Cengage
Yes	White, Sondhi, Fried	FSA	The Analysis and Use of Financial Statements	2003	Wiley
Yes	Wild, Subramanyam, Halsey	FSA	Financial Statement Analysis, 9th ed.	2007	McGraw-Hill
Yes	Bamford, West	M	Strategic Management: Value Creation, Sustainability, and Performance, 1st ed.	2010	Cengage
Yes	Barney, Hesterly	M	Strategic Management and Competitive Advantage, 3rd ed.	2010	Prentice-Hall
Yes	Coulter	M	Strategic Management in Action, 5th ed.	2010	Prentice-Hall
Yes	David	M	Strategic Management: Concepts and Cases, 13th ed.	2011	Prentice-Hall
Yes	de Kluyver	M	Strategy: A View from the Top	2009	Prentice-Hall
Yes	Dess, Lumpkin, Eisner	M	Strategic Management: Creating Competitive Advantages, 5th ed.	2010	McGraw-Hill
Yes	Gamble, Thompson	M	Essentials of Strategic Management, 2nd ed.	2011	McGraw-Hill
Yes	Grant	M	Contemporary Strategy Analysis, 7th ed.	2010	Wiley
Yes	Harrison, St. John	M	Foundations in Strategic Management	2010	Cengage
Yes	Kerin, Peterson	M	Strategic Management Problems: Cases and Comments, 11th ed.	2007	Pearson
No	Kotler	M	Marketing Management, 11th ed.	2003	Prentice-Hall
Yes	Peter, Donnelly	M	Marketing Management: Knowledge and Skills, 8th ed.	2007	McGraw-Hill
Yes	Thompson, Strickland, Gamble	M	Crafting and Executing Strategy: The Quest for Competitive Advantage, 16th ed.	2008	McGraw-Hill
Yes	Wheelen, Hunger	M	Strategic Management and Business Policy: Achieving Sustainability, 12th ed.	2010	Prentice-Hall

1) All extra textbooks were found in my office. I have always been open for receiving free inspection copies, and occasionally at a cost if needed. 2) Accounting/Finance/Management or Marketing/Financial Statement Analyses.

Table S2. 16 largest beer breweries and companies in the World basic accounting and market information.

Company name	Country	Revenue 2022 in billion USD[6]	Volume output in hectoliters (2022)[7]	Financial Year	Accounting Regime	Accounting numbers in size and currency	Numbers from annual report (in annual report currency)					
							Net profit/income	Equity (total - incl minority)	Interestbearing Debt	Marginal (or nominal) tax rate	Dividends - Payment during year	Comprehensive earnings
							2019	2019	2019	2019	2019	2019
Anheuser-Busch Inbev	Belgium	57.78	518.0	2022	IFRS	Mio USD	10,414	84,553	102,974	0.277	-5,179	10,912
Heineken	Netherlands	37.60	256.9	2022	IFRS	Mio EUR	2,374	17,311	17,052	0.292	-1,221	2,560
Diageo	UK	20.57	23.9	2021/22[1]	IFRS	Mio GBP	3,337	10,156	11,277	0.206	-1,737	3,624
Asahi Group	Japan	19.22	59.3	2022	IFRS	Mia YEN	141	1,248	943	0.284	-49	150
Kirin Holdings	Japan	15.20	24.4	2022	IFRS	Mia YEN	81	1,147	531	0.303	-65	79
Molson Coors	USA	10.70	82.3	2022	US	Mio USD	246	13,673	9,031	0.244	-424	309
Carlsberg	Denmark	10.20	102.4	2022	IFRS	Mio DKK	7,477	46,034	18,776	0.218	-3,591	10,141
Constellation Brands	USA	9.56	33.2	2022/23[2]	US	Mio USD	21	12,474	12,185	0.215	-50	112
China Resources Beer	China	5.13	122.2	2022	IFRS	Mio RMB	1,310	19,727	511	0.205	-494	1,311
Tsingtao	China	4.86	79.6	2022	CAS[3]	Mio RMB	1,929	19,913	37	0.293	-711	1,926
Efes Beverage Group	Turkey	4.70	34.0	2022	TFRS[4]	Mio TRL	1,309	24,386	9,010	0.333	-450	3,508
Compania Cervecerias Unidas	Chile	3.40	17.6	2022	IFRS	Mia CLP	146	1,443	297	0.215	-218	160
Boston Beer Company	USA	2.09	9.6	2022	US	Mio USD	110	736	59	0.238	0	110
HiteJinro[5]	South Korea	1.92	5.5	2022	IFRS	Mia WON	-42	1,033	660	0.298	-56	-42
Royal Unibrew	Denmark	1.60	4.8	2022	IFRS	Mio DKK	1,140	3,107	2,776	0.218	-538	1,157
Olvi plc	Finland	0.63	5.2	2022	IFRS	Mio EUR	42	264	4	0.211	-19	45

Note:
8,183 th Barrels sold - converted to million hectolitres.

1) June 30, 2022
2) February 28, 2023
3) China's Accounting Standards for Business Enterprises
4) Turkish Accounting/Financial Reporting Standards
5) HiteJinro: The numbers are provided from the ORBIS-database, since we did not succeed in finding the company's annual report.
6) Revenue 2022 from the article "Top 20 Beer Companies in the World" by Affan Mir, March 30, 2023, found on Yahoo Finance.
7) Volume 2022 found in the article "The 40 Biggest Beer Companies in the World in 2023" by Vinepair staff (www.vinepair.com).

Net profit/income	Equity (total - incl minority)	Interestbearing Debt	Marginal (or nominal) tax rate	Dividends - Payment during year	Comprehensive earnings	Net profit/income	Equity (total - incl minority)	Interestbearing Debt	Marginal (or nominal) tax rate	Dividends - Payment during year	Comprehensive earnings	Net profit/income	Equity (total - incl minority)	Interestbearing Debt	Marginal (or nominal) tax rate	Dividends - Payment during year	Comprehensive earnings
2020	2020	2020	2020	2020	2020	2021	2021	2021	2021	2021	2021	2022	2022	2022	2022	2022	2022
2,202	78,351	98,599	0.221	-1,923	-7,901	6,114	79,340	88,777	0.286	-2,251	2,233	7,597	84,278	79,909	0.186	-2,553	6,283
-88	14,392	18,196	0.250	-825	-2,104	3,535	19,700	16,873	0.196	-802	4,875	3,039	21,920	16,377	0.287	-1,103	3,341
1,454	8,440	13,246	0.217	-1,763	1,290	2,799	8,682	12,109	0.222	-1,718	1,934	4,410	11,511	14,137	0.225	-2,381	4,678
93	1,518	1,824	0.262	-46	148	154	1,759	1,596	0.230	-54	296	158	2,063	1,765	0.263	-56	362
100	1,096	643	0.198	-70	92	68	1,148	763	0.313	-65	117	144	1,253	713	0.249	-66	220
-946	12,621	8,214	0.193	-125	-949	1,009	13,664	7,155	0.186	-148	1,170	-187	12,915	6,541	0.271	-329	-388
6,808	43,362	21,263	0.208	-3,898	-701	8,009	48,756	19,162	0.212	-3,686	11,684	108	34,722	19,326	0.217	-4,431	-3,964
2,032	13,929	10,442	0.201	0	1,952	1	12,048	10,417	0.240	-573	-79	-39	8,734	12,461	0.240	-588	430
2,094	21,274	200	0.304	561	2,108	4,590	24,489	131	0.261	-1,284	4,499	4,350	27,077	1,212	0.213	-1,742	4,382
2,327	21,368	116	0.282	-793	2,354	3,256	23,794	113	0.273	-1,111	3,216	3,805	26,272	98	0.240	-1,576	3,786
1,453	25,014	11,508	0.295	-604	1,856	2,367	39,332	17,451	0.378	-2,211	15,994	6,041	56,582	33,117	0.353	-1,450	18,164
108	1,409	482	0.247	-102	55	219	1,426	560	0.274	-66	334	136	1,436	1,362	0.120	-158	131
192	957	67	0.214	0	193	15	983	61	0.320	0	15	67	1,069	54	0.264	0	67
87	1,074	561	0.299	-49	87	72	1,096	500	0.305	-52	72	87	1,161	500	0.285	-56	87
1,198	3,332	2,274	0.204	-600	1,179	1,298	3,342	3,622	0.212	-657	1,310	1,491	5,158	4,674	0.165	692	1,519
41	268	4	0.240	-21	26	48	298	3	0.183	-23	54	8	282	4	0.387	-25	9

Net profit/income	Equity (total - incl minority)	Interestbearing Debt	Marginal (or nominal) tax rate	Dividends - Payment during year	Comprehensive earnings	Net profit/income	Equity (total - incl minority)	Interestbearing Debt	Marginal (or nominal) tax rate	Dividends - Payment during year	Comprehensive earnings	Information relating to financial markets (in annual report currency)					
												Financial Year End Date					
2023	2023	2023	2023	2023	2023	2024	2024	2024	2024	2024	2024	2019	2020	2021	2022	2023	2024
6,891	92,676	78,150	0.252	-2,952	10,767	7,416	88,700	72,169	0.311	-3,178	-1,396	31.12.19	31.12.20	31.12.21	31.12.22	31.12.23	31.12.24
2,401	22,789	18,232	0.345	-1,350	1,942	1,161	22,402	17,049	0.312	-1,206	786	31.12.19	31.12.20	31.12.21	31.12.22	31.12.23	31.12.24
4,479	11,709	19,582	0.230	-2,188	3,997	4,166	12,070	21,017	0.232	-2,364	3,681	30.06.19	30.06.20	30.06.21	30.06.22	30.06.23	30.06.24
166	2,466	1,668	0.314	-58	461	193	2,674	1,544	0.276	-66	307	31.12.19	31.12.20	31.12.21	31.12.22	31.12.23	31.12.24
150	1,426	801	0.237	-71	262	86	1,534	1,000	0.386	-73	158	31.12.19	31.12.20	31.12.21	31.12.22	31.12.23	31.12.24
956	13,407	6,202	0.236	-355	1,047	1,158	13,284	6,126	0.230	-369	915	31.12.19	31.12.20	31.12.21	31.12.22	31.12.23	31.12.24
-39,777	25,749	22,351	0.200	-4,844	-1,221	10,263	30,612	27,357	0.198	-4,977	13,514	31.12.19	31.12.20	31.12.21	31.12.22	31.12.23	31.12.24
1,765	10,065	11,879	0.206	-654	2,130	-31	7,135	11,498	0.250	-1,115	732	28.02.20	28.02.21	28.02.22	28.02.23	28.02.24	28.02.25
5,214	34,174	5,285	0.263	-1,914	5,223	4,759	35,585	2,299	0.284	-3,369	4,767	31.12.19	31.12.20	31.12.21	31.12.22	31.12.23	31.12.24
4,348	28,255	63	0.243	-2,456	4,343	4,492	29,860	68	0.236	-2,728	4,420	31.12.19	31.12.20	31.12.21	31.12.22	31.12.23	31.12.24
33,542	129,878	68,381	0.191	-2,244	4,867	23,345	169,767	69,460	0.247	-3,002	-14,641	31.12.19	31.12.20	31.12.21	31.12.22	31.12.23	31.12.24
118	1,337	1,341	0.148	-66	-4	177	1,673	1,390	0.067	-82	393	31.12.19	31.12.20	31.12.21	31.12.22	31.12.23	31.12.24
76	1,078	45	0.304	0	76	60	916	36	0.319	0	59	31.12.19	31.12.20	31.12.21	31.12.22	31.12.23	31.12.24
36	1,095	436	0.381	-66	36	96	1,127	422	0.246	-66	96	31.12.19	31.12.20	31.12.21	31.12.22	31.12.23	31.12.24
1,095	5,748	6,483	0.221	-720	1,047	1,464	6,408	5,799	0.215	-726	1,363	31.12.19	31.12.20	31.12.21	31.12.22	31.12.23	31.12.24
39	289	7	0.291	-25	34	62	326	11	0.235	-25	61	31.12.19	31.12.20	31.12.21	31.12.22	31.12.23	31.12.24

Price per share on Financial Year End Date + 3 Months						Price per share on Financial Year End Date + 4 Months						Dividend-payments - per Financal Year End Date					
2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024
40.47	53.73	54.26	61.33	56.46	56.92	41.88	58.83	55.40	59.10	56.16	57.60	1.05	0.48	0.51	0.81	0.86	1.06
69.85	75.90	71.10	84.55	74.80	66.90	71.10	82.60	74.70	86.95	75.55	68.80	1.04	0.70	0.96	1.23	1.04	1.17
33.33	26.50	36.06	37.97	30.34	26.03	31.65	24.99	36.32	35.98	31.07	23.99	0.69	0.70	0.73	0.77	0.78	0.82
1,170.00	1,555.00	1,487.00	1,641.33	1,860.67	1,912.00	1,246.67	1,521.67	1,621.00	1,747.67	1,801.67	1,972.50	29.73	33.62	36.32	37.65	40.32	48.68
2,137.50	2,120.50	1,829.00	2,096.00	2,098.00	2,077.50	2,078.50	2,050.50	1,900.50	2,209.00	2,300.50	2,159.00	61.15	59.31	59.31	61.69	63.06	63.06
39.01	51.15	53.38	51.68	67.25	60.87	41.01	54.95	54.14	59.48	57.26	57.53	2.16	0.62	0.74	29.96	1.77	1.91
769.80	974.60	830.00	1,063.00	943.10	876.80	858.60	1,085.50	908.40	1,117.50	943.20	895.80	26.96	28.47	31.25	35.41	35.78	36.05
172.70	239.72	245.47	242.97	250.23	178.29	174.95	233.89	233.06	246.13	257.28	168.68	3.40	3.39	3.48	3.19	3.58	4.05
n.a.	n.a.	n.a.	45.65	29.20	26.15	n.a.	n.a.	n.a.	42.95	24.60	25.55	n.a.	n.a.	n.a.	0.00	0.94	0.76
39.55	68.90	62.30	85.70	53.80	56.00	47.15	70.50	64.45	83.70	56.75	54.90	1.26	1.85	0.28	4.19	4.55	4.87
1.72	2.11	2.68	6.42	15.29	16.71	1.84	2.33	2.96	6.29	18.25	15.96	0.00	0.00	0.00	0.00	0.00	0.00
5,870.10	6,318.00	5,889.00	6,120.00	5,817.00	7,200.00	6,000.00	6,540.00	5,700.00	6,590.00	5,890.00	7,270.00	20.07	0.00	78.17	0.00	0.00	0.00
367.56	1,206.28	388.47	328.70	304.42	238.84	466.51	1,216.49	375.00	317.51	278.41	245.80	0.00	0.00	0.00	0.00	0.00	0.00
10,050	16,950	13,650	9,280	8,990	8,420	13,550	15,950	14,100	9,170	9,100	8,530	0.00	0.00	0.00	0.00	0.00	0.00
490.30	663.40	632.40	598.00	456.70	550.50	527.00	755.00	614.20	603.80	528.00	523.50	12.20	13.50	14.35	14.50	0.00	15.00
36.60	48.70	35.65	29.90	30.80	33.70	38.50	52.70	31.55	29.60	29.95	33.05	1.22	1.34	1.47	1.46	1.46	1.58