LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

MASTER OF SCIENCE IN FINANCE

MASTERS FINAL WORK PROJECT

EQUITY RESEARCH: CARLSBERG A/S

Catarina Novais Simões Pereira

October 2019

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SUPERVISION:
PROFESSOR CLARA PATRÍCIA COSTA RAPOSO

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Abstract

This report contains a detailed Equity Valuation of Carlsberg A/S, based on the company's historical performance of the last five years as well as all the public information that was available until 8th July 2019 that I consider relevant for my analysis and forecasts. Any further event is not reflected on this valuation. Also, this report was developed according to the CFA's institute format and guidance. It starts with a description of the company's business, which includes a brief history of Carlsberg and a detailed explanation of the company's main operating regions (Eastern Europe, Western Europe and Asia), focusing on the dominant brands, markets and also on the level of volumes and revenue generated in each region. This initial chapter also introduces Carlsberg's main strategies, corporate governance organization and shareholders structure.

Additionally, this report presents a summary of the actual industry's scenario, approaching the current situation in terms of competitive environment, recent trends and future growth perspectives.

After developing the proper analysis and future estimates for the projected period, three valuation models were applied to the company: Adjusted Present Value, Dividend Discount Model and Relative Valuation through multiples, with all the associated variables computed by me. APV was considered the primary model, with a target price of DKK 1206, reaching an upside potential of 32,87%, compared to the closing price of 8th July 2019, DKK 908. This valuation lead to a STRONG BUY final recommendation, considering the medium risk assessment that I assumed based on the uncertainty that consolidation and "premiumisation" brings to the company.

Acknowledgements

Delivering this project marks the end of one of the happiest and most important times of my life. I would like to sincerely thank everyone who, directly or indirectly, was part of this journey.

To my supervisor Professor Clara Raposo, thank you for your guidance and availability throughout this project.

To Joana Pina and Ana Bastos, life at ISEG wouldn’t be so nice without you. Thanks for the late-night studying sessions and for the never-ending group projects we did together, from which resulted a friendship for life.

I could not forget to mention a very special friend, Sophia Gazdic, who made my exchange semester unforgettable and with whom I have the best memories with.

To my friends from Católica Lisbon (Ana, Catarina, Barbara, Inês, Juliana and Justine), and to my childhood friends Hugo and Raquel, thanks for being the best friends I could ask for. It is such a good feeling to see us reaching this stage. I am very proud of us!

The deepest thank you goes to my parents for the effort they made to give me the best education, especially to my dad. I am deeply grateful for your constant support.

Finally, to the most important people in my life: Glória, José Pedro, Rita, Tiago and Marta. Thank you for the unconditional love. You are more than a family for me.

Thank you all!

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Master in Finance

CARLSBERG A/S

STRONG BUY

Medium Risk

October 2019

CARL-B: Premium push and expansion beyond Europe

1. Research Snapshot

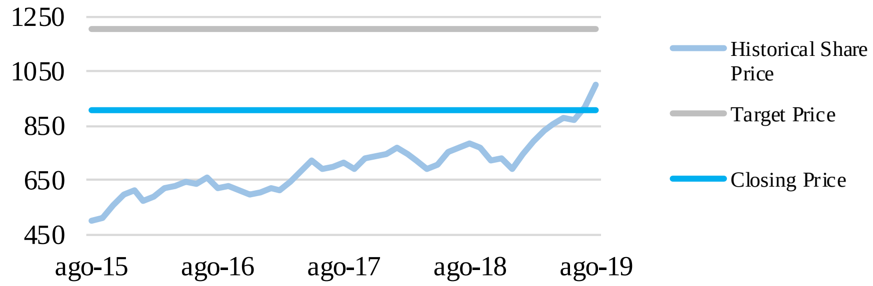
(July 2019 Price Target of DKK 1 206; 32,87% upside potential; medium risk; Final Recommendation: STRONG BUY)

Table 1: Author's Risk Assessment
Sourece: Author

Low	Medium	High

My risk assessment estimates a medium risk for CARL-B

Figure 1: Historical Share Price in DKK
Source: Thomson Reuters



STRONG BUY is my final recommendation for Carlsberg A/S (CARL-B) with a target price of DKK 1 206, reaching an upside potential of 32,87% compared to the closing price of DKK 908 on 8th July 2019, associated with a medium-risk assessment and using the Adjusted Present Value. The Relative Valuation methodology also led to the same recommendation, with a target price of DKK 1199. Therefore, Carlsberg A/S is currently undervalued.

Premiumisation: Beer is the most consumed alcoholic drink by far in any part of the globe, but standard beer - economy lager - actually lacks future growth potential. Therefore, the future of Carlsberg relies on the growth of premium and crafted types of beer.

Threat of European markets: Eastern Europe has been barely affected by countries' political instability and legislative restrictions on alcohol consumption, while Western Europe has become a very saturated market. Therefore, the following years require Carlsberg to enter into new markets, reducing the group's exposure to the risks of Europe. This lack of regional diversification leaves the Carlsberg Group behind its main direct competitors: Heineken and AB InBev.

Consolidation: The top five brewers nowadays detain more than 50% of the global market. Thus, it is essential for Carlsberg to constantly

Table 2: Valuation Output
Source: Author

Price Target by Method	DKK
APV	1 206
Multiples	
EV/EBITDA	1 199
P/B	1 157
EV/EBIT	1 359

look for new acquisitions for not to be left behind the rivals. This is now the main priority of the Group.

2. Business Description

The Carlsberg Group (CRL-B) is a Danish international brewer with global presence. Headquartered in Copenhagen, Denmark, Carlsberg is sold across 150 markets, offering more than 500 products from beer and cider to soft drinks. With a net revenue of DKK 5 309 million in 2018, Carlsberg is one of the largest breweries in the world, mainly owned by the Carlsberg Foundation.

Carlsberg is traded as CARL-B at Nasdaq Copenhagen. The flagship brand of the company is the Carlsberg beer, but it also commercializes well-known brands such as Tuborg, Somersby cider and Grimbergen.

History

Carlsberg A/S was established in 1847 by Jacob Christian Jacobsen. The name of the company, Carlsberg, results from a link between the name of its founder's son, Carl, and "bjerg", the Danish word for hill.

J.C. Jacobsen was a Danish Industrialist who was motivated to brew the best beer in the world, having a special interest to study and improve brewing methods, focusing on innovation to develop a high-quality product, which is still the motto of Carlsberg Group nowadays. He established the first Carlsberg brewery in Valdy, on the outskirts of Copenhagen, Denmark. The first brew was finished on November 1847 and rapidly became very popular in the country. Later, in 1868, Carlsberg exported the first barrel to Edinburgh, Scotland.

On 1875, the Carlsberg Laboratory was found to carry on scientific research, resulting in many discoveries, such as the pH unit to measure the acidity or alkalinity of a substance and a method for cultivating pure yeast, which were both revolutionary to the beer industry. On the following year, the Carlsberg Foundation was established to take over the laboratory's management as well as the company itself.

In 1966, Carlsberg products were brewed for the first-time outside Denmark, under an overseas license which was given to the Photos Photiades Breweries in Cyprus and, since then, the company started to establish breweries in other countries across the world, such as in Malawi in 1968 and in Malaysia in 1972.

Furthermore, Carlsberg Breweries merged under the name of United Breweries A/S with its direct and biggest competitor in Denmark, Tuborg Breweries, in 1970 in order to strength its domestic market position, but also to boost sales abroad. Later on, The United Breweries A/S became Carlsberg A/S and its main brands were already being sold in many European capitals on the 80s. By this time, 70% of Carlsberg sales were outside Denmark.

The following years were marked by countless investments in international markets, starting with the acquisition of 83% of Hannen Brauerei (German brewery) in 1988 and afterwards the acquisition of Tetley in the UK and Unicer, the largest brewery in Portugal.

Table 3:Carlsberg's history chronology:

1847 - Carlsberg Breweries was established

↓

1868 - Carlsberg exported the first barrel to Edinburgh

↓

1875 - The Carlsberg Laboratory was established

↓

1876 - The Carlsberg Foundation was founded

↓

1966 - Carlsberg prducts were produced for the first time outside Denmark, in Cyprus

↓

1970 - Carlsberg Breweries merged with Tuborg Breweries

↓

1980 - By this decade, 70% of Carlsberg sales were outside Denmark

Source: The Author

Moreover, the Asian market was a particularly good market for Carlsberg, mainly in regions like Singapore, Malaysia and Hong Kong, due to the construction of a new brewery in Thailand, which also led to the introduction of the Carlsberg beer in China and Sri Lanka.
At the beginning of the XXI century, the company decided to reinforce its expansion through a joint ventured with Orkla's, providing market leadership in Norway and Sweden, but also a collaboration agreement with the Scottish & Newcastle brewery on activities in Eastern Europe. Besides that, Carlsberg also became a market leader in Switzerland with the acquisition of Feldschlösschen.
A few years later, Carlsberg got full control of the Russian and Baltic breweries, including Baltika Breweries, and has also turned out to be on the top 2-5 companies in Vietnam, Thailand and Laos. This exponential growth and expansion made Carlsberg the number 4 brewery in the world. By this time, it had over 40 000 employees in more than 150 markets, with 100 000 000 bottles sold per day, leading the company to change its name to Carlsberg Group.

Brands

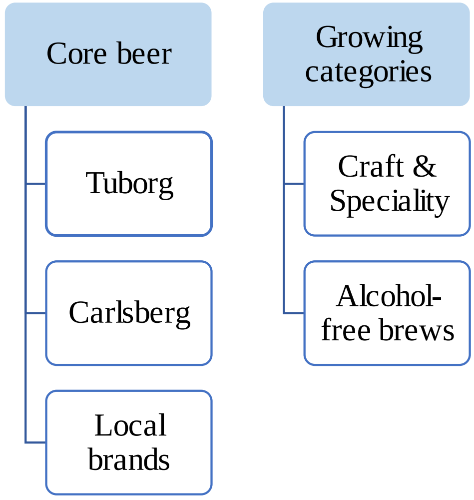
Carlsberg has a diverse portfolio with more than 500 brands, being divided in two main categories: the core beer and the growing categories.
The core beer contains the two main international brands Tuborg and Carlsberg, which had a volume growth of 10% and 5% in 2018, respectively, but also, the strong local power brands that prevail in each country domestic market. Examples of this are the Super Bock in Portugal, Okocim in Poland and Baltika in Russia. The Core Beer category represented 93% of beer volumes and 87% of net revenue in 2018.
"The growing categories" is divided into Craft & Speciality and Alcohol-Free brews. It represented 7% of own beer volumes and 13% of net revenue in 2018. The Craft & Speciality volumes grew 26% in 2018, mainly due to a 49% growth of 1664 Blanc and 14% of Grimbergen.

Regions/Markets – Asia, Eastern Europe, Western Europe

Carlsberg currently has numerous subsidiaries, partnerships and breweries around the world, counting with 41 000 employees. As a result, the activity of the company is divided in three main business regions: Eastern Europe, Western Europe and Asia. Each of them has their own Regional President and commercialize different products besides Carlsberg international brands. Moreover, around 75% of Carlsberg volumes are sold in these regions and no national market has a higher weight than 16% on total Group Volumes.

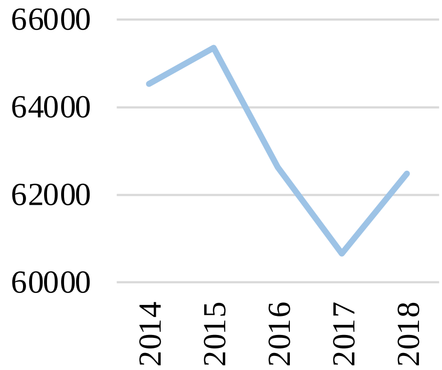
Western Europe: Carlsberg was founded in Western Europe (Denmark) and took his first steps as an international company by entering in many countries across Western Europe. Therefore, this

Table 4: Company's product categories:



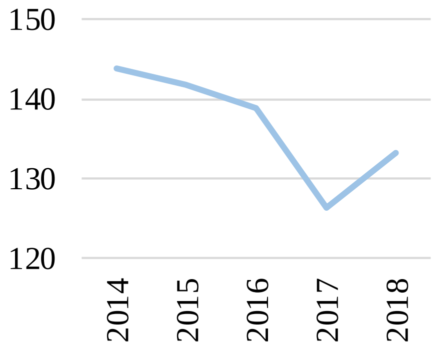
Source: Carlsberg A/S 2018 Annual Report, The Author

Figure 2:Net Revenue (in million DKK)



Source: Company Data, The Author

Figure 3:Carlsberg Volumes (in million hectoliters)



Source: Company Data, The Author

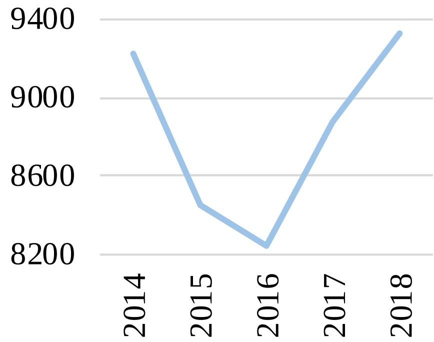
region currently contains 18 countries, from Nordics to Baltics and Mediterranean's. This is not only Carlsberg's largest region, but also the one in which the company is the second market leader. It even holds the first position in central and northern countries. Carlsberg has its largest market shares in Denmark (54%), Portugal (47%) and Switzerland (40%), and has been losing relevance in the UK, where volumes sold declined by 3%, although this market has been growing slightly.

Western Europe is also the region that generates more revenue. 58% of the Group net revenue is created there, with a nominal value of DKK 36 151 million in 2018 and 3% organic growth. In terms of volumes, Western Europe represents 47% of Group total volumes (62,4 million hl), with 3,6% organic growth compared to 2017.

Regarding operating profit before exceptional items, which was the financial indicator with the highest growth (7%), it led to a nominal value of DKK 5 425 million and represented 50% of total operating profit in 2018, along with a 15% operating margin.

In general terms, this region verified an improvement on its margins and a considerable growth in profit, mainly boosted by top-line growth of local power brands, but also due to small changes on consumer's preferences for craft & speciality products such as Grimbergen, 1664 Blanc and Brooklyn, plus alcohol-free brews.

Figure 4:Operating profit (in million DKK)



Source: Company Data, The Author

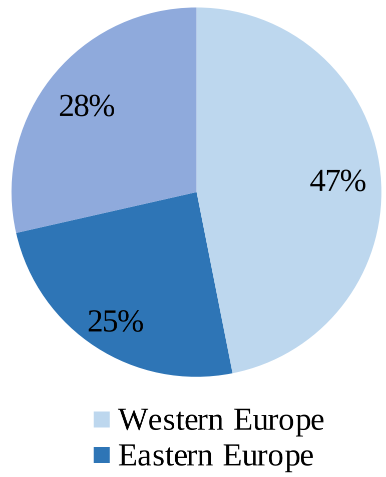
Asia: Although this region only includes eleven countries, it is the one with the highest growth. Additionally, Carlsberg comes on the first position in seven markets, such as Laos, Nepal and Hong Kong.

Asia contributes to 17% of Carlsberg Group net revenue, with an organic growth of 13,3% compared to 2017, adding up to DKK 15 530 million. This strong performance is pointed out to be mainly because of an increase in price/mix as a result of premiumisation, accompanied by a growth trend not only in international core brands (Tuborg and Carlsberg), but also in 1664 Blanc, although local power brands still contribute to 50% of Asian volumes sold.

Carlsberg volumes reached 38 million hl, more 8,6% than in 2017. While Non-beer beverages had an extraordinary growth of 11,65% in volumes, beer grew 8,3% in 2018. Asia accounts for 24% of total Group volumes in 2018.

Regarding operating profit before special items, which had the highest growth among all regions (15,8%), it overtook a nominal value of DKK 3 164 million, representing 21% of Carlsberg operating profit. Finally, the operating margin declined by 40bp to 20,4%.

Figure 5: Total Volumes per region (FY2018)

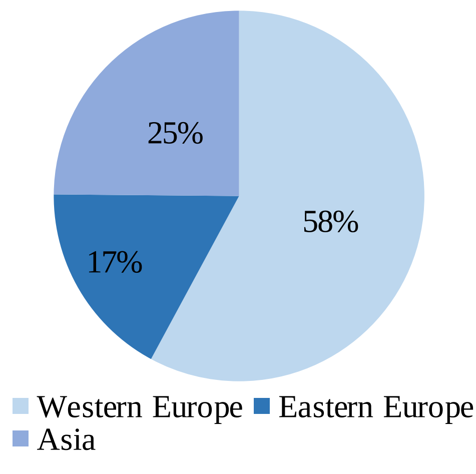


Source: Carlsberg A/S 2018 Annual Report

Eastern Europe is the smallest region for Carlsberg, counting with only five countries, although Carlsberg leads all markets in this region. The group occupies an especially good position in Ukraine and Russia, with 65% and 20% volume share, respectively.

Although smaller, Eastern Europe shares the same percentage on Group volumes as Asia (24%), which grew 3,1% compared to 2017, reaching

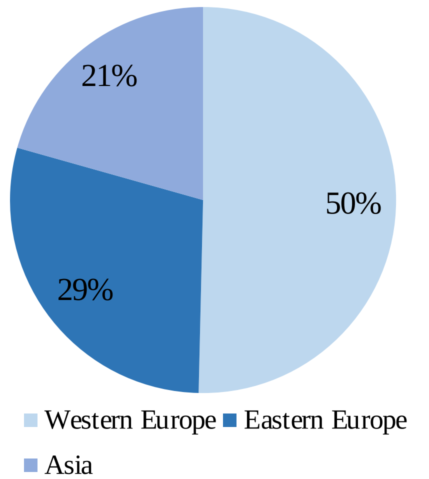
Figure 6: Net Revenue per region (FY2018)



Source: Carlsberg A/S 2018 Annual Report

32.7 million hl. Apart from this, the volumes of non-beer beverages grew more 5% than beers in this region, which evidences premiumisation and non-alcohol preferences of consumers. On what concerns to the net revenue, it totals a nominal value of DKK 10 780 million and represents 25% of group total net revenue in 2018. Not lagging behind other regions, Eastern Europe showed great improvements with 9,3% organic growth in this indicator. Lastly, the operating profit overtook DKK 2 thousand million and contributed to 21% of Carlsberg total operating profit with two digits organic growth of 11,3%, whereas operating margin improved by 30bp to 20,6%.

Figure 7: Operating Profit per region (FY2018)



Source: Carlsberg A/S 2018 Annual Report

Company Strategies

Carlsberg launched in 2016 a strategy program entitled "SAIL'22" with the purpose of making it a more successful, professional and attractive company by setting four key priorities:

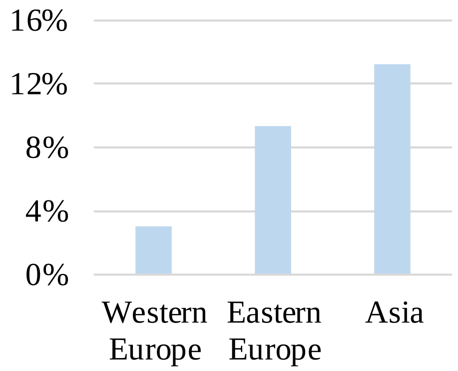
Strengthen the core: This strategy is mainly focused on revitalizing core beers by improving and constantly renovate brand fundamentals of both international and local brands in terms of packaging, taste and communication. Is also includes the "Funding the Journey program", which aims to improve costs and efficiency across total business as well as provide funding for the strategies, by attaining an optimal balance between market share, gross profit after logistics margin and operating profit. This program ended in 2018 and achieved benefits around DKK 3bn, above the expected DKK 1.5bn.

Position for growth: Carlsberg is giving priority for an adaptation to recent consumer trends. Consumers have shown preferences for healthier and more sophisticated products. Therefore, the company believes its success starts from offering healthier alternatives by investing and developing a Craft & Speciality global portfolio, as well as more alcohol-free brews. These products permit values for gross profit/hl exceeding the average of beer market. Secondly, the current growth of non-alcohol and crafted beers is three times higher than the average beer market. With this strategy, Carlsberg aims to strength its position and target big cities in new geographies.

Create a winning culture: The company incentives a strong team-based and high-performance behaviour among employees and wants to improve this spirit. This concept is known as "Triple A" (Alignment - Accountability – Action).

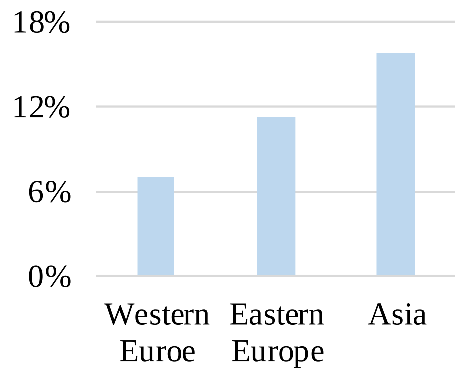
Deliver Value for shareholders: Carlsberg set goals on diverse performance indicators: increase organic growth in operating profit, improve ROIC (Return on invested capital) and optimise capital allocation to deliver better results to shareholders. For instance, Carlsberg target a dividend pay-out ratio of 50%.

Figure 8: Net Revenue organic growth (FY2018)



Source: Carlsberg A/S 2018 Annual Report

Figure 9: Operating profit organic growth (FY2018)

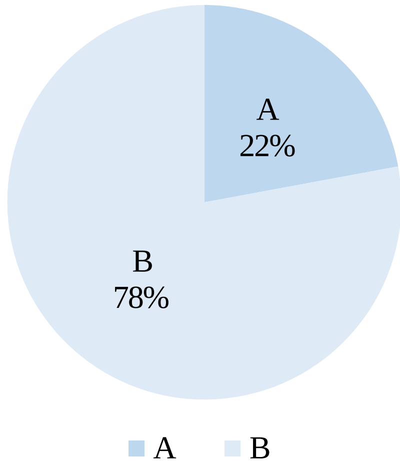


Source: Carlsberg A/S 2018 Annual Report

Shareholders' Structure

Carlsberg A/S is listed on Nasdaq Copenhagen with a total of 152 556 806 shares in 2018. The company has two distinctive share's classes that mostly differ in terms of voting power. Share A carries 20 voting rights, while share B carries 2 votes and is entitled to a preferential dividend. From around 40 000 registered shareholders, the Carlsberg Foundation is the largest one with 30% of social capital and 75% of the votes. It owns a total of 46 263 972 shares, from which around 70% are type A shares. None of the remaining shareholders own more than 5% of the company's social capital, with the exception of Massachussets Financial Services Company, who owns around 6%. Secondly, Carlsberg shares are mostly held by American investors, with 38% of the shares, whereas both Denmark and UK hold 16% of investors.

Figure 10: Share Classes (in percentage of total shares)



Source: Carlsberg A/S 2018 Annual Report, The Author

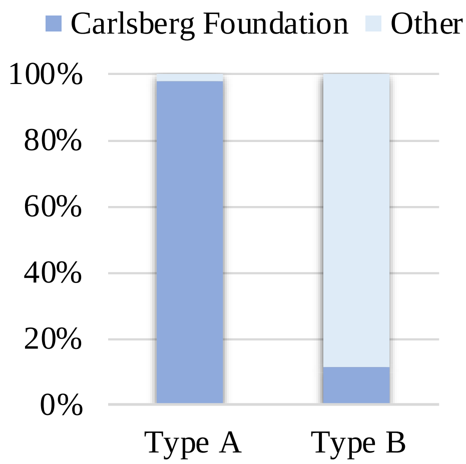
3. Management and Corporate Governance

Carlsberg Group governance framework aims to reduce risks and promote a good governance at different areas, from human resources to customers and society in general. In order to do so, Carlsberg complies with the Danish Companies Act, the EU Market Abuse Regulation, etc. as the basis of its corporate governance.

The Supervisory Board is responsible for overseeing if the Executive Committee is following the strategies and business procedures established. In what concerns to the governance structure, it includes three Board Commilttees: An Audit Committee, a Nomination Committee and a Remuneration Committee to assist the decisions of the Board. The Supervisory Board is currently composed by a total of 14 members, 9 of them elected by the General Meeting and the remaining 5 members elected by the employees for a term of one year and four years, respectively. Some of them have to be affiliated to the Carlsberg Foundation, while others have strong backgrounds in finance or international business to ensure that the decisions taken by the company are well considered. The re-election of the members is admissible.

The Executive Committee, that comprises both the CEO and the CFO plus a group of Vice-Presidents, is hired by the Supervisory Board and is in charge of driving the Group's strategic plans.

Figure 11: Shares' Ownership Split

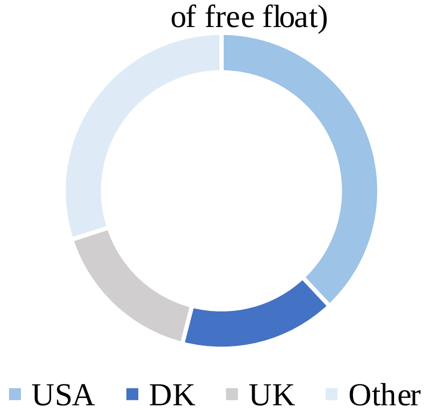


Source: Carlsberg A/S 2018 Annual Report, The Author

Sustainability and Social Responsibility

In order to promote sustainability, Carlsberg created "Together Towards Zero", a program that prioritizes action on four crucial points: Zero Carbon Footprint, Zero Water Waste, Zero irresponsible drinking and Zero accidents. Carlsberg has been implementing measures that aim to reduce the carbon emissions as well as water usage by 2030, among others.

Figure 12: Shareholders geographic split (in percentage of free float)



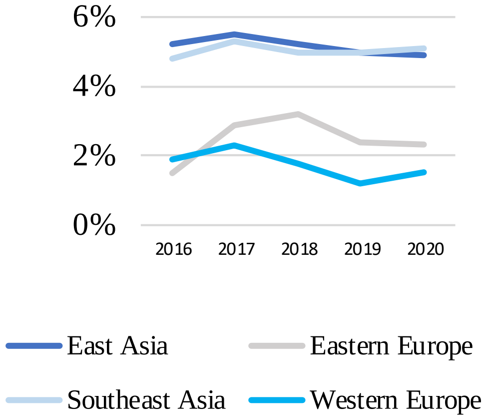
Source: Carlsberg A/S 2018 Annual Report

4. Industry Overview and Competitive Positioning

Economic Overview

In general, the global economy has been facing a challenging scenario during the last five years, with the world real GDP growth skirting 3-4%. In 2018, the global economy grew 3,6% and the IMF forecasts on the World Economic Outlook suggest this trend will remain present in the following years. While "emerging markets and developing economies" will keep its constant growth rates close to 5%, the "advanced economies" have not been showing favourable prospects, with a real GDP growth decelerating from 2,2% in 2018 to 1,6% in 2024, according to IMF forecasts. After a strong growth of 2,3% in 2017, Western Europe will be marked by a slowdown in real GDP growth in the next years due to political uncertainties caused by Brexit and trade conflicts, which are felt a little bit all over the world. Eastern Europe is facing a dissimilar situation, reversing from a very weak period of growth to a 3,2% real GDP growth in 2018. The divergent pattern between these regions will persist from 2018 onwards. In addition, the recent emerging markets in which Carlsberg is showing up extremely good results in terms of growth, India and China, have seen a slight deceleration in their real GDP evolution.

Figure 13: Real GDP Growth

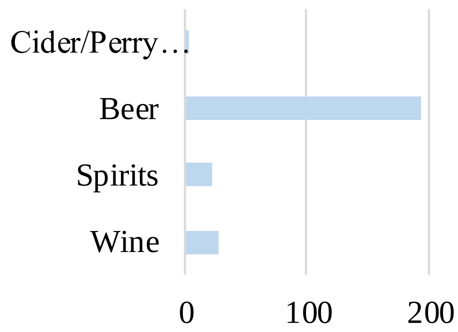


Source: IMF World Economic Outlook Forecasts April 2019

Industry Overview

Carlsberg A/S produces and markets beer at an international level, but also some other beverages such as soft drinks, water and wine. However, as the brewing activity is responsible for 99% of sales generated by Carlsberg, the company is included in the Alcoholic drinks industry, which is sub-divided into Wine, Spirits, Beer and Cider, Pery & Rice Wine. Beer is the largest segment of this market, accounting for 64% of the 293.888 million litres of alcoholic drinks sold in 2018. It always has been the most consumed alcoholic beverage in any part of the globe, but has an especially high share in America, in which it represented more than 50% of the volumes sold in 2016.

Figure 14: Consumption (in billion litres) in 2016

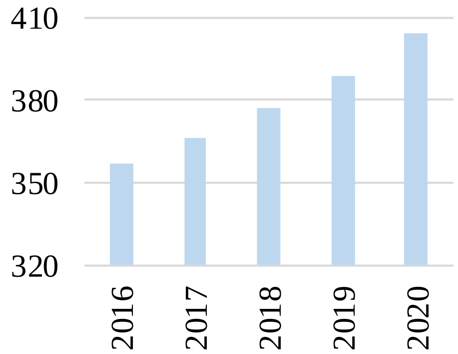


Source: Statista, Alcoholic Beverages Worldwide 2018

Global Beer Market

The Beer market generated a revenue of US$ 570.173,6m in 2018 with 188.127,53 million litres sold. Despite this positive panorama, it has been facing a period of stagnation since 2014, having reached a negative growth scenario in terms of volumes sold in 2016 and 2017. Moreover, it only grew 0,2% in 2018 and forecasts suggest this market is expected to keep a volume growth below 1% until 2023. In terms of revenue, the global condition is more favourable with a 4,1% CAGR in the period between 2010-2018, which is expected to reach USD$ 684.711 million in 2023 with a 3,4% CAGR and having a growth pick of 4,1% in 2020. The worldwide beer production has also reached 1,95 billion hectolitres in 2017, more 4,8% than in 2010.

Figure 15: Worldwide Beer Revenue (in million USD)



Source: Statista, Consumer Market Outlook 2019

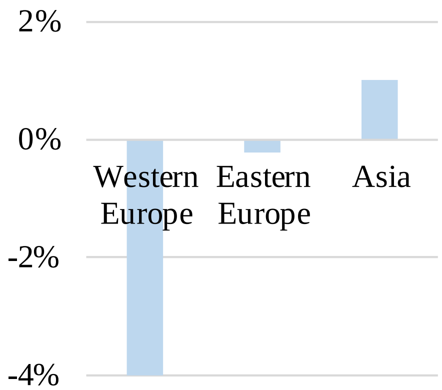
Categories and Trends

Beer is an alcoholic drink usually brewed from malt, sugar, hops and water and fermented with yeast. From this productive process, there can be distinguished five different types of beer: lager, dark beer, stout and non/low alcohol beer. Globally, the general situation of stagnation in this market is pointed out to be driven by a volume decline exclusively in economy lager, which is the most consumed category by large margin. Although the others have been growing lately, they still don't have a relevant weight in the global beer market. Stout presents the greatest performance in terms of growth, followed by non/low alcohol beer and premium lager. They grew 6%, 4,2% and 4% in 2016, respectively, while dark beer and flavoured/mixed lager revealed a weaker performance with growth rates close to 2% in the same year. The standard lager controls by far the beer category with 92% of the volume shares in 2016, being mid-priced lager the most successful in this family. Therefore, despite being declining, its global dominance is not yet under real threat, but it lacks future growth potential compared to the remaining categories.

Flavoured/mixed lager has an important role in keeping lager sales both in Eastern and Western Europe. The idea is that the sweetness of this product boosts consumption by attracting females and Millennials to this category, which has seen volumes stagnate. It expects an absolute volume growth of 120 million litres in Eastern Europe and 150 million litres in Western Europe in the period between 2016-2021.

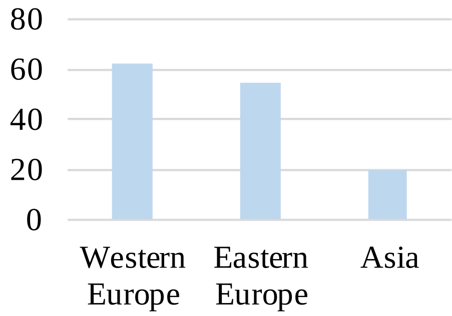
Non/low alcohol beer steadily outperforms total beer growth by ascending to 5% in 2016. It holds a very small fragment of the overall market by accounting for less than 2% of total volumes but will be the fastest growing category until 2021. It is in Middle East and Africa and in Western Europe where this product seems to be more successful, with an estimated 300 million litres volume growth in both regions until 2021. With a year-over-year volume growth rounding 5% in the period between 2012-2016, Dark beer saw its global volumes grow from 6000 million litres in 2012 to almost 8000 in 2016, mostly generated by a rise in craft beer. This product has been especially popular in Asia Pacific and US. Cider/Perry is also commercialized by many brewing companies and shows its better performance in Eastern Europe with an incredible growth of 29% in 2016, followed by Australasia where it grew 50 million litres in absolute terms. Generally, the following years will be marked by the same category trends. It will be premium lager contributing the most to total beer volumes growth, offset by a decline in economy lager.

Figure 16: Volumes Historic CAGR



Source: Passport, Beer Global Overview 2017

Figure 17: Regional Beer Consumption per capita (in litres, 2017)



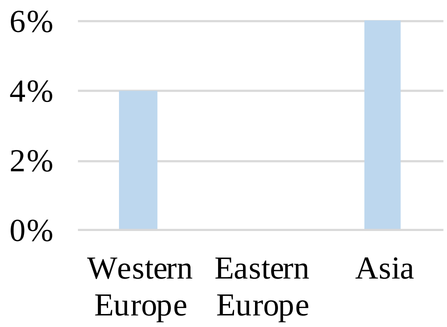
Source: Passport, Beer Global Overview 2017

Regional Overview

Beer Industry patterns varies in terms of growth perspectives, dominant companies and brands as well as influencing factors from one region to another. Therefore, it is developed a general analysis of the regions in which Carlsberg operates:

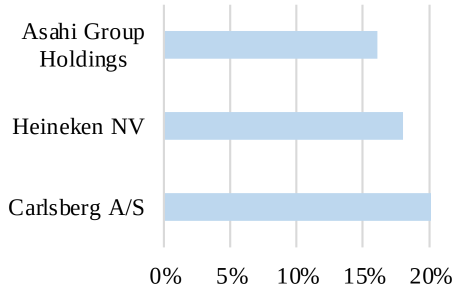
Eastern Europe: This segment has the particularity of having the lowest historic CAGR, -4%, contrasted by one of the highest per capita consumption, only behind Australasia and North America. Growth volumes were negative throughout the period between 2012-2017 and it is expected to stagnate at a 0% CAGR until 2022. This picture is mostly due to a decline in mid-priced lager, which dominated this market by taking 97% of total consumption in 2017. This region has been barely affected by countries political instability as well as legislative restrictions to reduce health risks related to excessive alcohol

Figure 18: Volume CAGR per region for 2017-2022



Source: Passport, Beer Global Overview 2017 consumption. Nevertheless, this fact can also provide growth opportunities for premium lager and non-alcoholic beers in Eastern Europe. This region also presents the highest off-trade (hypermarkets, supermarkets, convenience stores, etc.) volume share, with 82% of volumes being sold through this channel. Carlsberg, Heineken and Asahi are the main players in this market, holding 56% of volume shares in 2017, while the market top brand Baltika belongs to Carlsberg.

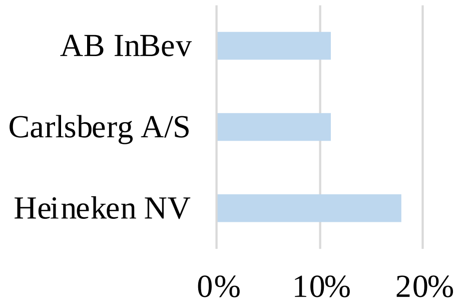
Figure 19: Top 3 companies market share in Eastern Europe (FY2017)



Source: Passport, Beer in Eastern Europe 2018

Western Europe: Historically, this region CAGR was slightly below 0%. Consumption was above 50 million litres per capita in 2017 as countries have a solid tradition of drinking beer, but it lacks future potential for the standard type of beer (lager). Maturity, saturation and competition from rival categories are limiting volume growth for lager, however an increasing demand for premium products will lead to a scenario of growth until 2022, at a 4% CAGR. Also, there is some uncertainty in this market since it seems very sensitive to possible a recession in Eurozone, which may impact beer consumption. Volumes are still high, although consumers trend to drink less but more sophisticated beer is making Western Europe a challenging market and especially convenient for products like premium lager and non/low alcohol beer. Heineken has been the top brewer in this region so far, along with the fact that the top five brewers account for at least 70% of total volumes sold in most of the countries, with the exception of Germany. As in other regions, off-trade is the main via of commercialization, accounting to 60% of sales in 2016.

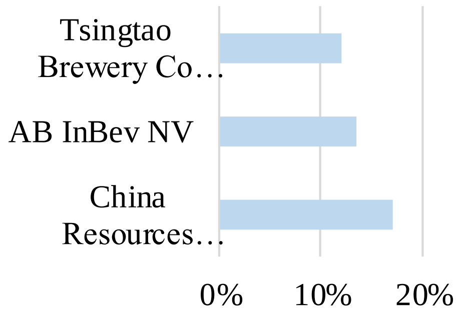
Figure 20: Top 3 companies' market share in Western Europe (FY2017)



Source: Passport, Beer in Eastern Europe 2018

Asia Pacific: Two different scenarios are verified in this region: on one hand, leading markets like China and Japan saw their volume sales decline as a consequence of agressive price increases. Although these two markets are very saturated, they accounted to nearly 80% of total beer consumption of this region in 2017. On the other hand, Southeast Asia is verifying significant increases in sales, which is the outcome of having very young populations who love to drink beer when socialising plus the fact that their disposable income has seen considerable rises. Despite very low per capita consumption, which is below 20 million litres, it is the most promising region by recording the highest beer consumption in 2017 in absolute values. The historic CAGR of Asia Pacific is nearly 0%, but this value is expected to increase, at a 6% CAGR for the period 2017-2022. The largest 4 brewers detained 50% of total volumes sold in this market in 2017 and the leading international brands such as Carlsberg, Heineken and AB InBev are expected to reach even higher volume shares until 2022. Asia Pacific is also the region where on-trade (bars, restaurants, etc.) is more common, corresponding to 47% of total sales in 2016.

Figure 21: Top 3 companies' market share in Asia (FY2017)



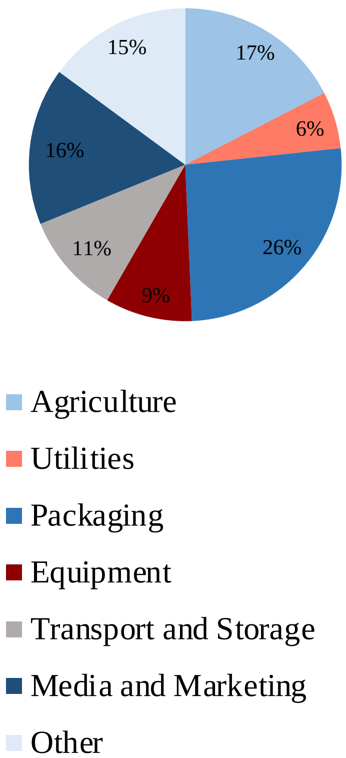
Source: Passport, Beer in Asia 2018

Supply Analysis

The supply side of beer industry mainly incorporates the following goods and services sectors: utilities, raw materials, transport and storage, media and marketing, packaging and equipment and other industrial activities. Only in European Union, brewer's spending's on these sectors was nearly €20bn in 2014. Packaging is the sector with the highest weight among them, followed by agriculture and then media and marketing.

The packaging industry represents about 30% of total supply purchases, from which almost half goes for glass bottles. It has been the most-used packaging material (44,2%), although metal cans and kegs shares are still significant (accounting for 24,7% and 20,7% of all packaging purchases, respectively). The glass production destined to beer industry packaging has been rising, accounting to 20% of overall market and is expected to grow with a CAGR of 4,5%, being supported by an increase in craft and value-added beers' consumption, which are currently packed with this material. Also, the principal agricultural product serving the beer industry is barley, which demand is basically generated to serve the beer market.

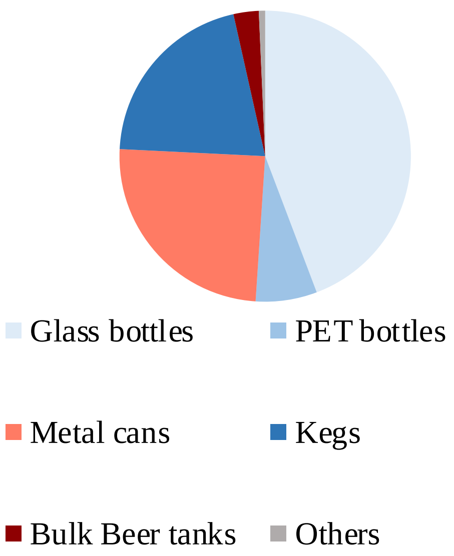
Figure 22: Purchases by supplying sector
(in percentage of total purchases)



Source: Brewers of Europe 2016

Competitive Analysis - Market share: Carlsberg is included in the top 10 brewing groups globally. If combined, these leading companies have a market share of nearly 60%. During last years, through numerous acquisitions and investments in emerging markets, these companies have even seen their combined market share increase. The leading company in this market is the Belgian AB InBev, which has reached a slice of 28% of total volumes sold in 2017. The acquisition of SAB Miller by AB InBev has also noticeably improved the leading of this company and therefore it verified the largest volume share increase in 2016. Molson Coors and Asahi, which are on 5th and 6th place, respectively, have also verified significant achievements in terms of volume share, due to some recent acquisitions. Heineken, the Dutch company in the second position, proceeded with the acquisition of Kirin's operations in Brazil in 2017, which was a key strategy to strength its position in one of the most successful beer markets. Carlsberg comes on the 4th place with a corresponding market share of 6%. It is considered one of the strongest players with a global presence, along with Heineken and AB InBev. However, both in terms of production volumes and sales, Carlsberg is still behind these two direct competitors. In terms of sales, AB InBev and Heineken are six and almost three times bigger than Carlsberg, respectively.

Figure 23:Packaging materials Purchases by type



Source: Brewers of Europe 2016

SWOT

Strengths

Strong position: Carlsberg is the world's 3rd largest brewer with a global presence, with a 6% volume share and businesses in more than 150 countries. With a long history of 172 years, the group is market leader in Eastern Europe and the 2nd biggest brewer group in Western Europe, having built a strong reputation and credibility in the market, which helps the company to conduct a brilliant future.

Product portfolio: A spectrum of more than 500 brands allows Carlsberg to cover diverse preferences. This fact shows the company's incredible ability to adapt itself to new market trends with innovative products, which is an essential competitive advantage.

Action towards Sustainability: The Together Towards Zero ambitious programme aims to act on climate change, water scarcity and public health issues. New procedures are being developed by the company, such as the New Snap Pack, which reduces plastic usage through glue technology. These types of commitments will make improvements both in terms of performance and efficiency. It makes the company more innovative, which leads to better results in the future, as well as attract new investors.

M&A: Carlsberg acquired the Olympic Brewery in Greece in February 2018 and increased its ownership of Super Bock Group in Portugal on December of the same year, which are strategic movements that the company has been taking to maintain its dimension in the Industry. This takes a crucial role for the company not to be left behind its rivals.

SAIL 22: Expansion program launched with the purpose of reversing the financial performance of recent years and focus on revitalisation of the company to drive future growth and value until 2022.

Weaknesses

Weak geographic dispersion: Carlsberg operations' have always been concentrated in European markets (62% in 2017); therefore, it lacks presence in potential regions such as North and Latin America and has relatively low activities in Australasia and MEA, while Heineken and AB InBev are better geographically balanced.

Competitiveness with Heineken: Direct competition between the two companies, not only across many European countries, but also in recent investments in the same Asian markets. Furthermore, the companies share a common interest on the premium lager segment, which puts them in a direct competitiveness scenario once again.

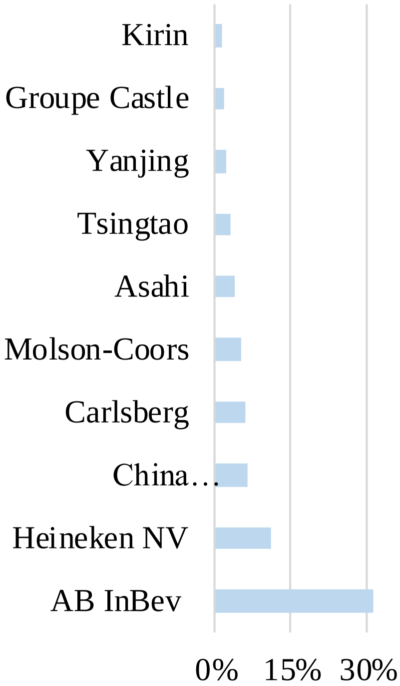
Dependence on lager brands: International and local lager brands represent by far the biggest proportion of volumes sold by the company. The lager categories are currently in decay, which threats the future growth of Carlsberg if it doesn't properly adapt its products in terms of premiumisation.

Opportunities

Growing demand: Beer, in global terms, is expected to grow its demand, although with variations in the future dominant categories. Therefore, as long as Carlsberg goes along recent market tendencies, it will benefit from positive results that premium categories can provide.

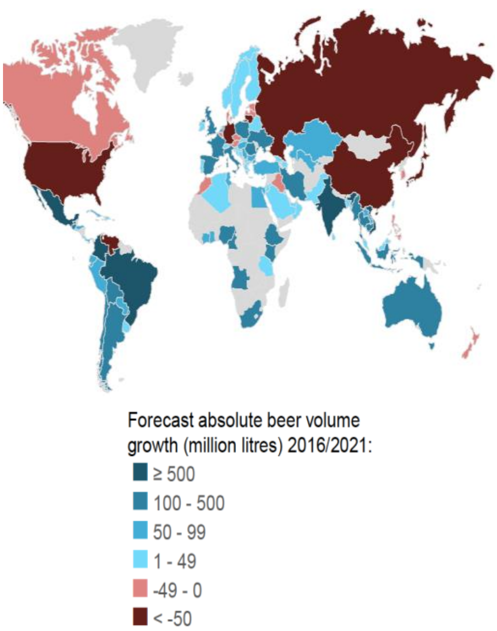
Asia Pacific: With a 13% CAGR over 2012-2017, Asia Pacific verified the highest sales growth globally and still offers a lot of potential to keep growing. Acquisitions in this region will allow Carlsberg to compensate the challenging situation found in Europe and drive company's growth.

Figure 24: Global Top 10 Companies Market Share (FY2017)



Source: Statista, Alcoholic Beverages Worldwide 2018

Figure 25: Forecast absolute beer volume growth (in million litres) 2016-2021:



Source: Passport, Beer Global Overview 2017

Consolidation: The leading five brewers increased their volume share in seven percentage points since 2012, reaching 55% in 2017. Consequently, top brewers now have even more control over the global beer market.

Cider: This category is foreseen to outperform the beer market in the period until 2022. Carlsberg is in a perfect position to benefit from the growth expected in cider, mainly due to its brand Somersby, which is leading cider sales in most markets and was ranked 4th globally in 2017. Cider should be a key priority to generate value as it also provides better margins.

Threats

Health consciousness: Consumers are deviating from mainstream beer to other categories. If Carlsberg does not react fast enough by launching new products, it will see a decrease in revenue at first.

Government Laws: Governments efforts to reduce alcohol consumption by implementing legislative restrictions may highly affect beer sales.

Russia's impact: Carlsberg has suffered severely from Russia's worsening economic situation, as this country accounted for 19% of total volumes in 2017, being the company's second largest national market, only behind china.

Raw materials costs: The performance and results of Carlsberg are sensitive to price fluctuations in raw materials. For instance, the price of barley increased in 2018, which can have a major impact on margins if Carlsberg fails to do the proper hedging.

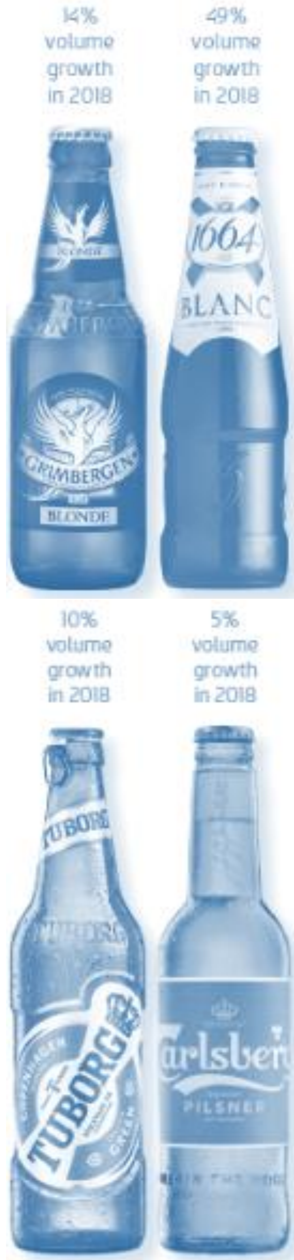
Porter's five forces

Rivalry between competitors (HIGH): Top players presence in the beer market is very solid and hard to compete with. They are capable to promote their main brands and ensure brand loyalty. Additionally, as product homogeneity is high in this industry and customers have a wide range of products available with low changing costs, it turns difficult for a firm to differentiate itself from its competitors and to increase its market share.

Threat of new entrants (MEDIUM): High profit margins make the beer market attractive to new investors. However, this market requires a lot of specific assets that oblige significant initial costs. Additionally, the already existing breweries have established strong brand loyalty, which reduces customers willingness to purchase products from new breweries and consequently difficult new entries in the market as the new players can't benefit so easily from economies of scale as well as have better accesses to supply or distribution channels.

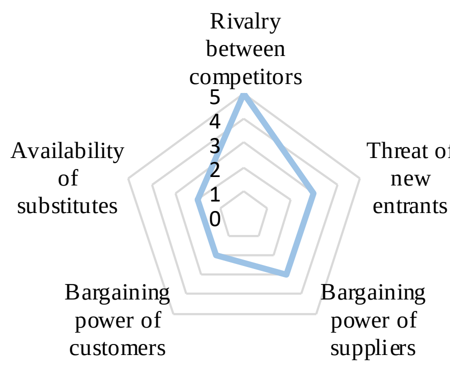
Bargaining Power of Suppliers (MEDIUM): The quality of the final product is very dependent on the quality of the supply. Therefore, top players in this market try to integrate more stages of the production process in their firms so that they can have more control on supply. Moreover, as there are no substitutes for raw materials and given their influence on the quality of beer, firms are more sensitive to supplier's

Figure 26: Carlsberg Top Brands volume growth (FY2018):



Source: Carlsberg A/S 2018 Annual Report

Figure 27: Porter's 5 forces



Source: Personal Analysis

power and the same goes for packaging materials and transportation channels.

Bargaining Power of Customers (LOW): The ability to switch brands due to low changing costs is the principal power of consumers. On the other hand, as on-trade is the dominant commercialization channel and one individual consumer doesn't have impact on a firm revenue, consumers bargaining power is relatively low.

Availability of substitutes (LOW): the direct substitutes for beer are other alcoholic beverages such as wine and spirits, which are less consumed as they are more expensive. Additionally, there is a traditional preference for drinking beer in many cultures and increasing health concerns are shifting consumption to low-alcohol beverages and soft drinks.

5 – Investment Summary

The final recommendation for Carlsberg A/S is a STRONG BUY with a target price of DKK 1206, reaching an upside potential of 32,87% compared to the closing price of DKK 908 on 8th July 2019, associated with a medium-risk assessment and using the Adjusted Present Value method. The Relative Valuation methodology also led to the same recommendation, with a target price of DKK 1199. Therefore, Carlsberg A/S is currently undervalued. Additionally, it was also applied a second absolute valuation methodology: Dividend Discount model (DDM). However, the result obtained with this method doesn't seem reliable since it does not consider any alternative form that Carlsberg can use to distribute results to its shareholders, as it is the case of Share Repurchases. From now on, when the Group resolves to distribute an extra amount to shareholders, it will do it by implementing specific share buy-back programs. Since it is difficult to predict when these programs are going to happen and by what amount, they could not be included in DDM and consequently the result obtained is far below what it was supposed to be. To conclude, only the APV and the Relative Valuation approach were used to take final conclusions, being APV the primary model.

Company risks and potentials

Carlsberg missed the latest consolidation wave, which has been the most recent priority of the world's beer giants as these groups are primarily focused on using their increased market share to negotiate better deals for commodities and advertising with suppliers. On one hand, Carlsberg has succeeded in cutting costs and improving profit, which are the main priorities of the program "SAIL 22", but it hasn't gone yet along the consolidation trend. Still, with the successful results from the "Funding the journey program", that came to an end in 2018 with benefits above expectations, now the Carlsberg Group have funds to expand activities and will finally start looking for new merger opportunities in new markets. So, although a bit delayed, Carlsberg will not be left behind its rivals.

Table 5: Price target by method

Price Target by Method	DKK
APV	1 206
Multiples	
EV/EBIT	1 199
P/B	1 157
EV/EBIT	1 359

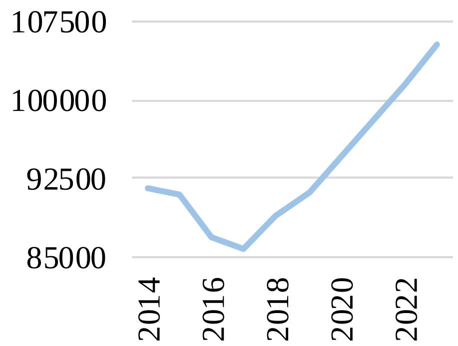
Source: The Author

Table 6: APV Valuation

EV Unlevered	192 644
PV(ITS)	5 664
Enterprise Value	198 308
Net Debt (-)	19 093
Minority Interests (-)	2 587
Associates (+)	4 692
Equity Value	181 320
Number of shares	150 291 702
Price at 8th July 2019	908
Price Target	1 206
Upside Potential	32,87%

Source: The Author

Figure 28: Revenue (in million DKK)



Source: Company Data, The Author

On the other hand, the following years will be marked by a new tendency, premiumisation, as consumers are increasingly searching for sophisticated products. Carlsberg is profiting from this trend, since it has been developing a strong Craft & Speciality portfolio at a global level. The group is already leading the cider market in Europe with the brand "Somersby", which occupies the first position in many markets. As cider is expected to outperform the beer market in the future, Carlsberg has a crucial competitive advantage to benefit to the good results that this category can provide.

To conclude, Carlsberg now reunites the exact conditions to grow and succeed in the beer market, firstly because it achieved a constant cash flow generation that will prevail in the next period, allowing the group to normalize its debt situation and consequently respond to recent tendencies: consolidation and premiumisation.

However, it is essential to pay attention to the main risks that Carlsberg has always been exposed: Currency and Commodities risks, although the company has implemented specific plans to mitigate them. Also, the value of price target is highly conditioned to the growth rate assumed for the Terminal Period since it accounts to nearly 85% of Enterprise Value and, as it can be easily noticed in the sensitivity analysis, small variations on terminal value result in huge differences on price target, which means the valuation of CARL-B is quite dependent to changes in this variable.

6-Valuation

On this chapter, it is going to be detailed the assumptions behind the most relevant items forecasted, the variables inputted in the models, plus some brief descriptions.

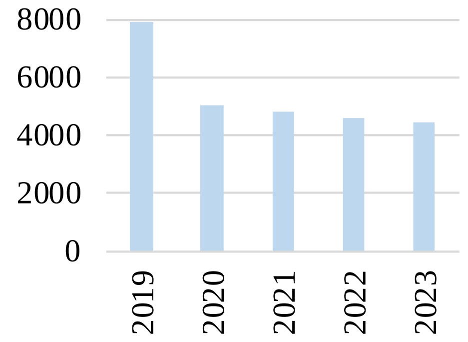
Net Revenue

For this item, forecasts were made separately for each segment (Eastern Europe, Western Europe, Asia and Not Allocated). Rather than directly forecasting the nominal value for the net revenue in each region, it was projected based on values for the selling price (deducted from excise duties) and for beer volumes in the period 2019-2023.

- Beer Volumes: Forecasted considering beer volumes in 2018 and average growth of the last five years.
- Selling Price (Deducted from Excise Duties): Obtained as the net revenue divided by beer volumes for the period 2014-2018. For the projected period, this item was estimated considering the selling price in 2018 and its growth trend based on the last five years.

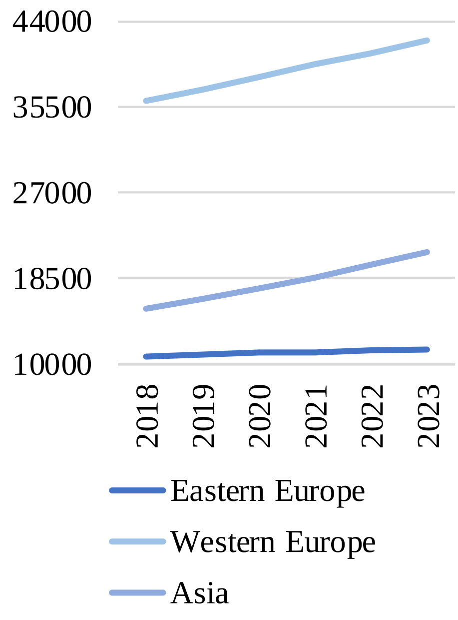
Globally, Net Revenue is projected to grow with a CAGR of 3,6% in the projected period 2019-2023. Although Carlsberg missed the consolidation wave, it is expected to recover and go along this trend in

Figure 29: Estimated Free Cash Flow (in million DKK)



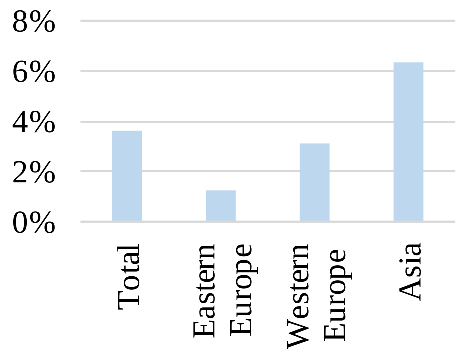
Source: The Author

Figure 30: Estimated Net Revenue per region (in million DKK)



Source: The Author

Figure 31: Estimated Net Revenue CAGR per region (2018-2023)



Source: The Author

the following years to boost revenue. Asia is the segment which expects the greatest growth, followed by Western and Eastern Europe.

Eastern Europe: This region presents the weakest performance in terms of growth. With an estimated CAGR of 1,27% in the forecasted period, Carlsberg will smoothly outperform the market in this region. The share on total net revenue will decay 1,9%, from 17,25% in 2018 to 15,34% in 2023. Eastern Europe not only takes the weakest performance in terms of beer volumes growth, but also presents the lowest selling price (deducted from excise duties) as it is heavily affected by high taxes imposed on alcohol consumption and by the poor economic situation lived in this region.

Western Europe: This is the most mature region. Therefore, it is the one which offers the smallest margin for lager beer growth. With a CAGR of 3,12% in the forecasted period, Carlsberg will outperform the market since the company is starting to be very well succeeded in cider and other premium categories in this region, as it is the case of Somersby, which is the cider market leader in many Western European markets. However, the share of this region on Carlsberg's total Net Revenue will see a slight decrease, from 57,84% in 2018 to 56,34% in 2023, which goes in accordance with Carlsberg's expansion to new markets, becoming less dependent of Europe. In terms of prices, it is not expected to happen any noticeable evolution because this mature market does not offer margin for that.

Asia: With a CAGR of 5,6% in the period between 2014-2018 and a projected CAGR of 6,36%, Carlsberg visibly outperforms the market in this region. Asia is where there is more margin to increase prices, which has been the main driver of net revenue growth as consumers are willing to pay higher prices to consume crafted and premium beers. Asia increased its weight on Carlsberg total Net Revenue by 3,41% in the forecasted period, starting with 24,85% in 2018 and reaching 28,26% in 2023.

More detailed data regarding Net Revenue Forecasts can be consulted on the appendix 5.

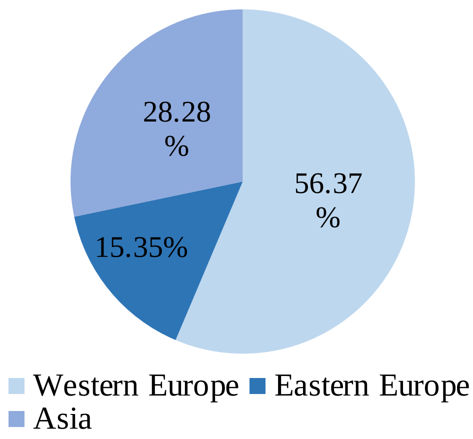
Cost of Sales

Including items such as cost of materials, direct staff costs, indirect production overheads and purchased finished goods, cost of sales performed as a steady percentage of net revenue in the last historical five years. It went from 50,73% of net revenue in 2014 to 50,05% in 2018. Therefore, the forecasted value for this item was estimated based on the average value of this percentage in the historical period, 50,39%. The same logic was applied to Sales and Distribution Expenses, and to Administrative Expenses.

Depreciation and Amortization

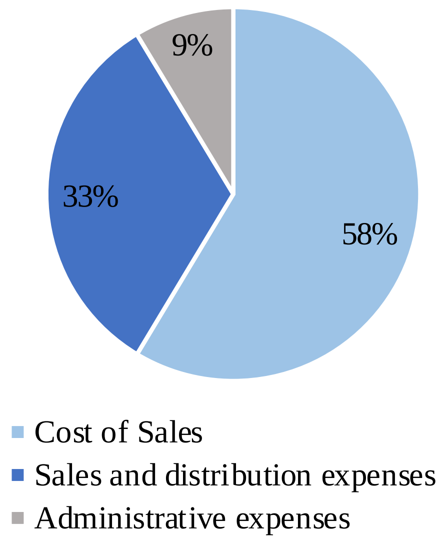
For the PP&E, the percentage of Depreciation on Gross PP&E was constant in the historical period. Therefore, first of all, it was forecasted the value for the Gross PP&E based on the average year-over-year

Figure 32: Net revenue share per region (2023F)



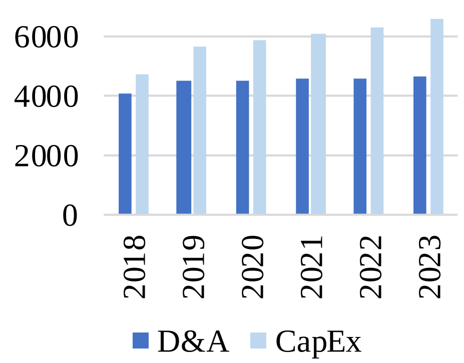
Source: The Author

Figure 33: Estimated Cost Structure (in percentage of total costs)



Source: The Author

Figure 34: D&A and CapEx Forecasts



Source: The Author

growth of this item and then it was applied the historical average percentage of Depreciation/Gross PP&E ratio to estimate the amount of depreciation for each year. The same method was used to forecast D&A of Intangible Assets.

CapEx

This item results from the sum of capital expenditures of Intangible Assets and Property, Plant & Equipment. However, their Capital Expenditures were estimated through different ways:

- Intangible Assets: This item includes goodwill, brands and other intangibles. Since rises in net revenue basically happen with the expansion of activities through acquisition of new breweries and brands, intangible assets are assumed to evolve through the item "brands". Therefore, intangible assets were estimated to grow with the same CAGR as the net revenue in the forecasted period, 3,66%, adjusted to the weighted average of "brands" on total intangible assets in the historical period. As the amount added to this item every year is supposed to reflect the Capex subtracted by Depreciation and Amortisation, the D&A was deducted to this amount, obtaining the value of the CapEx. This methodology was used to better reproduce the investments expected in emergent markets.
- Property, Plant & Equipment: The CapEx for this item was directly forecasted, as it is assumed to evolve in accordance with the average year-over-year growth verified in the historical period.

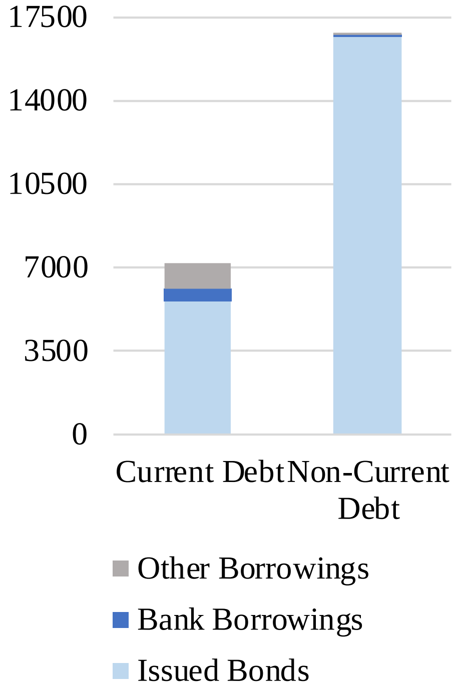
Borrowings

It is relevant to mention that Carlsberg's borrowings mainly consist in Issued Bonds, while Bank Borrowings and Other Borrowings only represent a small portion of this item. Therefore, the total borrowings for 2019 were forecasted based on the nominal value of 2018, adding Bonds issued and deducting Repayments of Bonds that occurred during this year. Also, Carlsberg wants to keep its target Net Interest-Bearing Debt/EBITDA bellow 2, which was achieved in 2016, and kept decreasing since then, reaching its lowest and best result in 2018, 1,29. To maintain this target, Carlsberg is assumed to keep total Borrowings at the same level in the following years, since the company is starting to consistently generate more cash, which is part of the program "SAIL 22".

Dividend Policy and Share Repurchases

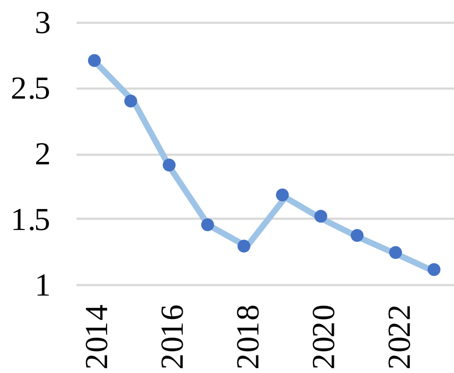
Although Carlsberg's pay-out ratio hadn't been regular during past years, the company defined a new policy for this issue in 2016, which is also part of the program "SAIL 22". Carlsberg increased Dividends Per Share (DPS) from DKK 10 in 2016 to DKK 16 in 2017 and then to DKK 18 in 2018, which results from a target pay-out ratio of 50% of

Figure 35: Carlsberg's Debt Structure



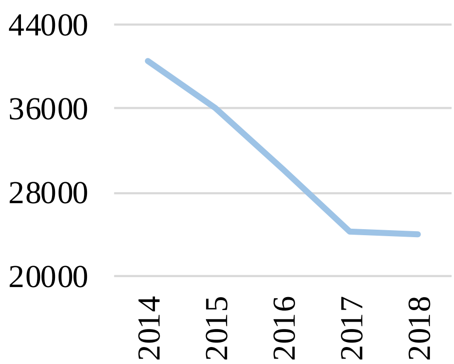
Source: Carlsberg A/S 2018 Annual Report, The Author

Figure 36: Leverage ratio (NIBD/EBITDA)



Source: The Author

Figure 37: Historical Period Debt (in million DKK)



Source: Carlsberg A/S 2018 Annual Report, The Author

net profit. Using this assumption, it is expected a slight increase in DPS in the forecasted period, reaching DKK 20 in 2023.
In addition, Carlsberg also decided to distribute to its shareholders any extra amount surpassing the pay-out target of 50% through share repurchases, rather than dividends. As a result, the company implemented a share-buyback program for 2019, in which 2 223 708 CARL B shares were repurchased until the 5th July of this year. Therefore, the number of shares outstanding were deducted by this amount and it was also created a new item in the Balance Sheet, Treasury Stock, with the DKK amount distributed to shareholders under this process, DKK 1 893 664 075.

Terminal Value

The Terminal Value is presumed to grow along with inflation. The inflation rates for each region (Eastern Europe, Western Europe and Asia) were taken from IMF forecasts for the period between 2019-2023. Based on these values, it was computed an average, adjusted to the weight of each region in Carlsberg's total business. Finally, it was obtained a growth rate of 2%.

Terminal Value Computations
Source: The Author

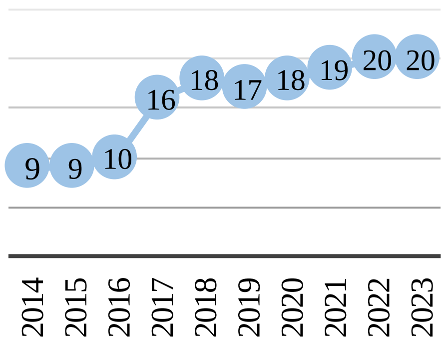
Region	Inflation Rate	Weight on Total Revenue
Eastern Europe	3,30%	15,34%
Western Europe	1,90%	56,34%
Asia	3,4%	28,26%
Terminal Value growth	2%	

Adjusted Present Value

In 2014 Carlsberg's CEO manifested that the company would be focused in reducing debt and return to a good debt situation. Since then, Carlsberg's debt-to-equity ratio in market values decreased around 17%, from 36,16% in 2014 to 19,4% in 2018. In harmony with the values forecasted for Borrowings, the debt will keep at the same level in the next five years, since values of Net Interest-Bearing Debt/EBITDA are supposed to decrease and maintained below 2. It has been one of the main priorities of the company. This way, the debt will not grow in line with the company value and taking all these facts into account, it is simpler and more appropriate to use the Adjusted Present Value method. It values the company as if it was all equity-financed and then adds any value created by the company's use of debt.

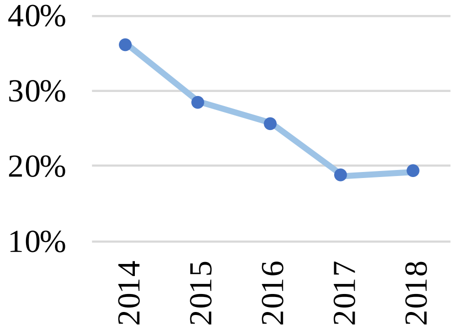
$$Adjusted\ Present\ Value = Enterprise\ Value\ as\ if\ the\ company\ was\ all\ equity\ financed + Present\ value\ of\ tax\ shields$$

Figure 38: Dividends Per Share (in DKK)



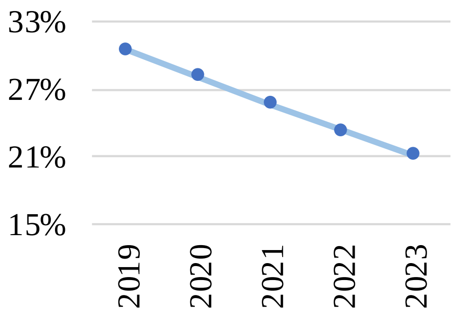
Source: Company Data, The Author

Figure 39: Historic Debt to Equity Ratio (using Market Values)



Source: Company Data, The Author

Figure 40: Estimated Debt to Equity Ratio (using Book Values)



Source: The Author

Unlevered Cost of Equity – Assumptions

Firstly, it was estimated the unlevered cost of equity, k_u , to discount the projected free cash flows, obtaining the Unlevered Enterprise Value. As the company's debt is not growing along with the business, the debt-to-equity relation will not remain constant and consequently the value of interest tax shields will be closer to the value of the forecasted debt, rather than operating assets. ($k_{txa} = k_d$). Therefore, the following formula was used to compute k_u:

$$k_u = \frac{D(1-T)}{D(1-T)+E}k_d + \frac{E}{D(1-T)+E}k_e$$

Cost of Equity, $\boldsymbol{k_e}$, was computed using the Capital Asset Pricing Model (CAPM), which contains three variables: Risk-free rate (R_f), Beta (β) and the Market Risk Premium (MRP), obtaining 4,74%.

The **risk-free rate** used is the Denmark 10-Year Bond Yield because Carlsberg is headquartered in Copenhagen and its statements are presented in Danish Krone (DKK). This value was taken from Thomson Reuters on 8th July 2019, -0,291%. Also, the Country Risk Premium wasn't included since it is zero for Denmark.

Regarding the **Beta**, it was firstly computed the Unadjusted Beta (raw historical Beta) with a linear regression between the OMX Copenhagen 25 Index (OMXC25) and Carlsberg A/S type B shares, using the monthly returns from the last five years. Then, it was calculated the Adjusted Beta as it more accurately predicts a future Beta, with the following formula:

$$Adjusted\ Beta = \frac{2}{3}Unadjusted\ Beta + \frac{1}{3} \times 1$$

The values obtained for the Unadjusted and for the Adjusted Beta are 0,77 and 0,84, respectively. From these values, we can conclude that Carlsberg A/S stock has less risk compared to OMXC25, measured in terms of volatility.

The value used for **Market Risk Premium** was taken from Aswath Damodaran's calculations in January 2019, 5,96%.

Cost of Debt, $\boldsymbol{k_d}$, which corresponds to the ratio between financial expenses and Total Borrowings of the previous year, has showed a slight improvement in 2017. Therefore, it seems reasonable to keep the ratio of 2018 in the projected period since it is the most updated, 4,46%.

The **corporate tax rate, *T*,** was obtained dividing income tax paid by profit before tax. This ratio was computed for the last 10 years. After eliminating outliers, such as years with negative net profit, the corporate tax rate was assumed to be the historical average, 25,24%.

Table 7: CAPM assumptions

Cost of Equity, $\boldsymbol{k_e}$	4,74%
Risk-Free Rate, $\boldsymbol{R_f}$	0,29%
Adjusted Beta, $\boldsymbol{\beta}$	0,84
Country Risk Premium, *CRP*	0%
Market Risk Premium, *MRP*	5,96%

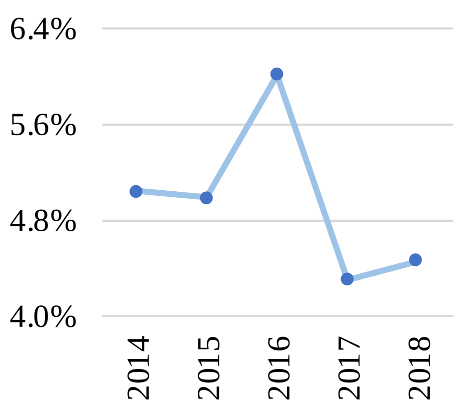
Source: The Author

Table 8: Unlevered Cost of Equity

Cost of Debt, $\boldsymbol{k_d}$	**4,46%**
Tax Rate, T	25,24%
Unlevered Cost of Equity	**4,71%**

Source: The Author

Figure 41: Cost of Debt



Source: Company Data, The Author

After all these items being estimated, The Unlevered Enterprise Value was finally obtained by discounting the FCFF of each year by the Unlevered Cost of Equity and the Terminal Value, under a perpetuity.

Present Value of Tax Shields

Interest payments on debt are a tax-deductible expense, so taking on debt acts as tax shields as it reduces the taxable income. Therefore, the following formula was used to obtain Interest Tax Shields:

$$Interest\ Tax\ Shields_n = Total\ Debt_{n-1} \times k_d \times Tax\ Rate$$

For the Terminal Value, it was not assumed any growth rate because the total debt amount will keep at the same level, which was defined for the company. Therefore, a constant amount of DKK 241 million was obtained for this item. Lastly, the ITS's were discounted by the cost of debt, which is once again related with the assumption that $k_{txa} = k_d$ rather than $k_{txa} = k_w$, and the terminal value was discounted as a perpetuity.

By adding the Present Value of Interest Tax Shields to the Unlevered Enterprise Value, the Enterprise Value was obtained, valued on 198 308 million DKK, from which Net Debt and Minor Interests were deducted and Associates were added, resulting in a DKK million 181 320 Equity Value. The present value for both the projected period and for the perpetuity, through the APV method, are DKK million 28 081 and DKK million 171 179, respectively, which evidences that price target is quite dependent on terminal value.

A target price of DKK 1 206 was reached dividing Equity Value by the 150 291 702 shares outstanding, resulting in an upside potential of 32,87%.

Relative Valuation Approach

To sustain and complement the results reached with APV method, it was also made a relative valuation through multiples. The EV/EBITDA suggests a target price of DKK 1199, leading to an upside potential of 32,09% (0,78% lower than APV), considering the closing price of 8th July 2019, DKK 908. Once again, there is evidence that Carlsberg A/S is currently undervalued, which leads to a strong buy recommendation. The EV/EBIT and P/B (Price to Book Value) multiples were also applied. With the EV/EBIT, it was obtained a target price of DKK 1359 (upside potential of 46,66%), while P/B led to a price target of DKK 1157 (upside potential of 27,45%).

In what regards the comparable companies, it was selected the five which better fit Carlsberg A/S in terms of size, profitability and solvency, from the peers identified by Thomson Reuters. Using measures such as Market Cap, ROE, Interest Coverage Ratio, EBITDA Margin and Long-Term Debt to Capital, the following peers were

Table 9: Multiple: EV/EBITDA

Peer	EV/EBITDA 2019
Heineken NV	12,56
Coca Cola HBC AG	10,90
Anheuser Busch Inbev NV	11,48
Pernod Ricard S.A.	17,51
Diageo PLC	18,19
Rémy Cointreau AS	21,57
Davide Campari Milano SpA	22,06

Source: Thomson Reuters

Table 10: EV/EBITDA Output

CARL-B EBITDA 2019F	DKK million 13 206
Average Peers EV/EBITDA	16,32
EV by Peers Estimate	DKK million 197 248
Price target	DKK 1 199
Upside Potential	32,09%

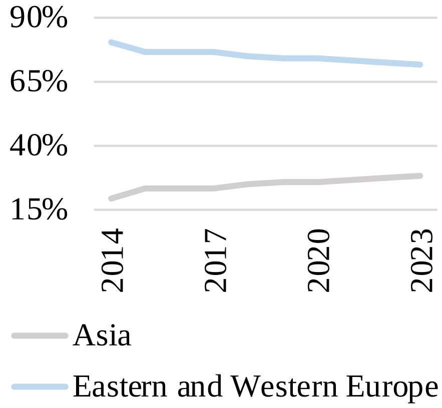
Source: The Author

selected: Heineken NV, Coca Cola HBC AG, Anheuser Busch Inbev NV, Pernod Ricard S.A. and Davide Campari Milano SpA. Not all these companies operate in brewer's segment: the last two are included in Distillers & Wineries, while Cola-Cola HBC AG operate in the non-alcoholic beverages' segment. From this peer group, a weighted average of their multiples for 2019 was calculated, attributing a higher weight to Heineken, Coca-Cola and Davide Campari (65%) since these companies are the most similar to Carlsberg in the selected measures. More data regarding Relative Valuation can be consulted in appendix 8.

7 - Financial Analysis

Western Europe has always been by large margin the strongest segment of Carlsberg in terms of revenues. Despite the positive evolution verified in Asia, these regions are quite far to be at the same level. However, it is one of the main strategies of the company to reduce its dependence on Europe in general, which is noticed when the percentage of revenue generated in Eastern and Western Europe together will decrease 3,4% until 2023. In 2014, Asia was the smallest segment of Carlsberg only with 19,36% of net revenue. This situation started to reverse in 2015 and by maintaining this trend in the following years, the overall result is an 8,9% improvement in the share of this region, which became the second largest, with 28,26% of net revenue generated there in 2023. In contrast, Eastern Europe will see its weight on net revenue decrease from 21,86% in 2014 to 15,34% in 2023, while Western Europe will keep the number one segment for Carlsberg, with 56,34%.

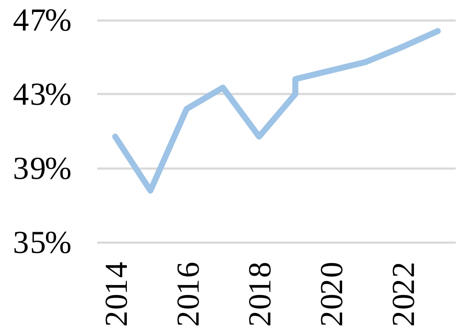
Figure 42: Net Revenue Share



Source: The Author

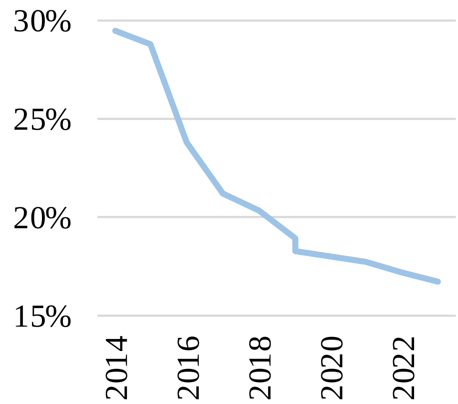
Regarding **capital structure**, Equity and Debt weights have varied in different proportions. In the case of Equity weight, it stabilized around 40% in the historical period and is expected to slightly increase year over year in the projected period until it reaches 45,24% in 2023. This variation reflects the good performance of Carlsberg, with the net income growing from DKK 5 145 million in 2018 to DKK 6 220 million in 2023, combined with a fixed pay-out ratio of 50%. These facts will impact Equity through Retained Earnings. On the other hand, Debt weight has showed a constant decrease year after year, which was a primary result of the deleveraging phenomenon that occurred in the historical period, and then a stabilization of debt level from 2017 onwards. Briefly, Debt weight went from 29,48% in 2014 to 16,3% in 2023, with a special deleveraging occurring in 2016.

Figure 43: Equity Weight



Source: The Author

Figure 44: Debt Weight



Source: The Author

Carlsberg's liquidity, although its poor performance during the 2014-2016 period, in which both current and quick ratios decreased significantly, from 65,23% to 52,45% and from 49,06% to 39,59%, respectively, it will see a huge reverse in this scenario in the following years. This improvement is mainly boosted by the cash generated each year: from 2017 afterwards, Carlsberg will show positive net cash flow with an average of around DKK 1400 million generated every year, apart from 2019, due to the amount spent on the share-buyback program, together with the repayment of a € 750 million bond. This trend of generating more cash is also one of the priorities evidenced in the strategy "SAIL 22", along with the company will reach a current ratio of 79,61% in 2023.

For the company's **profitability,** there is a continuous stabilization of all margin ratios until 2023F: 50% for gross margin, 20% for EBITDA margin, 13% for EBIT margin and 8% for net profit margin mainly because Carlsberg is assumed to keep not only the Cost of Sales, but also some other operating expenses (distribution expenses and administrative expenses) constant at the same proportion of sales, as the company did in the historical period. A vaguely different behaviour is verified for ROA and ROE, whom showed some small variations in the historical period, although they expect higher and constant values for the next years: around 5% for ROA and around 10% for ROE, respectively, due to an increase of net income. Finally, DPS will see benefits from the recent Dividend Policy implemented, which was already mentioned and detailed in chapter 6. DPS jumped from DKK 10 in 2016 to DKK 16 in 2017 and will grow up to DKK 20 until 2023. EPS had also seen a notorious growth last year to DKK 34,80 due both to the impact of the share-buyback program (reducing the number of shares outstanding) and to the net income growth. EPS will keep growing up to DKK 41,39 in 2023.

8 – Investment Risks

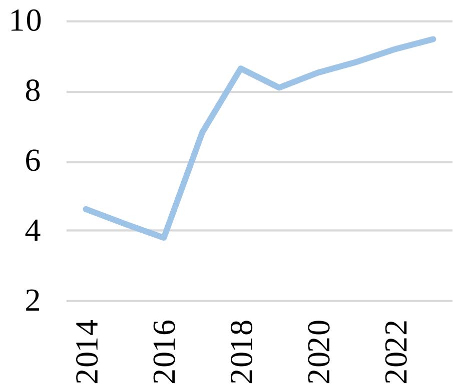
Economic and Market Risks:

Currency Risk (EMR1): The Group's activity mainly takes place outside Denmark and in currencies other than DKK. Unfavourable Exchange rate fluctuations is one of the major risks the company is exposed, which can have a huge impact on income statement. Carlsberg is exposed to currency risks both when it buys or sells in currencies other than the local functional currencies and in order to be protected from that, the Group had defined to hedge 70%-90% of future cash flows on a four-quarter rolling basis.

Commodities Price Risk (EMR2): The brewing activity is very sensitive to commodity price increases, particularly to variations in the price of cans (aluminium), malt (barley) and energy. Barley and malt saw specifically price increases due to the poor harvest after the warm summer of 2018. Carlsberg aims to achieve stable and predictable prices in the medium term for these materials, with fixed-price purchase agreements in local currencies with suppliers. For example, it is part of the group policy to fix the prices of 70% of malt (barley) purchases for a given year no later than at the third quarter of the previous year.

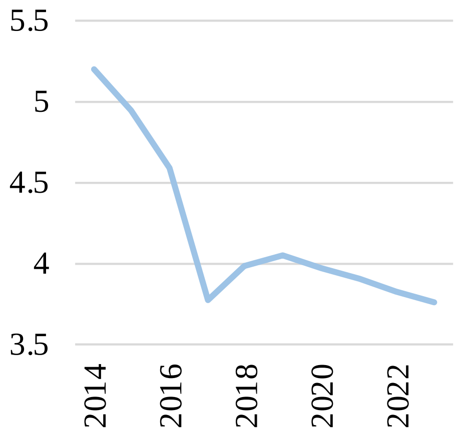
Political and Economic Instability (EMR3): Considered one of the principal risks since 2017. Adverse economic conditions may result in reduced consumer demand and a higher price sensitivity on the

Figure 45: Interest Coverage Ratio



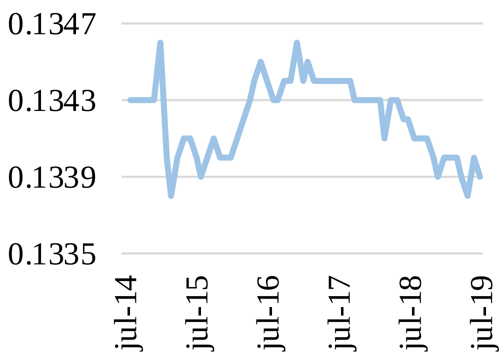
Source: The Author

Figure 46: Debt to EBITDA



Source: The Author

Figure 47: DKK/EUR exchange rate



Source: Thomson Reuters

consumers' side, while major social or political changes may disrupt sales and operations. Political and economic instability may also lead to adverse exchange rate fluctuations, increased credit risk, insolvency of suppliers, impairment of goodwill or brands.

Strategic Risks:

Industry Consolidation (SR1): Considered as one of the highest risks since 2016, consolidation within the beer Industry has created bigger players with increased scale in the market. Although strong local market positions remain key to creating value, consolidation created stronger competitors with increased financial strength and bargaining power, potentially impacting on the Carlsberg Group's ability to compete.

Legal and Regulatory changes (SR2): Carlsberg operations in many markets, particularly in Western Europe, can be heavily affected by new regulations on alcoholic drinks. Governmental efforts to reduce alcohol consumption by implementing new restrictions on products availability and by increasing taxes and duties on beer can put the level of sales at risk. Environmental regulations to control pollution levels can also reduce efficiency along the production process and increase costs. To manage these risks, Carlsberg implemented the program "Together Towards Zero", in which it aims to reduce Carlsberg environmental footprint in an efficient way and promote conscious drinking among consumers.

Change in Consumer's Preferences (SR3): Consumers are deviating from mainstream beer to healthier and more sophisticated products. There is a special preference for "Craft & Speciality" and alcohol-free beers. If Carlsberg does not rapidly follow this trend by adjusting the products, it can suffer a high impact on revenues. In 2016, the Group established the strategy "SAIL 22", with a specific "Position for growth" plan that starts from offering healthier alternatives with a "Craft & Speciality" global portfolio to diminish this risk.

Compliance Risks:

Legal and Regulatory Compliance (CR1): Includes competition law and data protection compliance as well as non-compliance with anti-bribery & corruption regulations. Failure to comply with regulations and Group policies may lead to fines, claims and brand damage. Competition law is a real and growing risk.

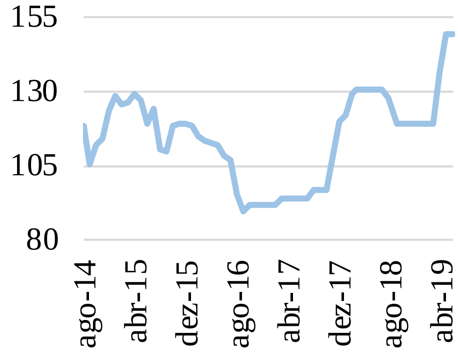
Operational Risks:

Partnerships Risk (OP1): Carlsberg cooperates with partners in several markets. The strength of the relationships with different partners, and in some cases the risk of partnership disagreement, may affect the company ability to manage the growth of the business.

Suppliers increasing Power (OP2): Consolidation trends are taking place also on the supplying side. The suppliers bargaining power is another risk that should be mitigated. Adverse variations in the price of raw materials can damage competitiveness within the business and difficult the delivery of results, increasing the risk of margin pressure.

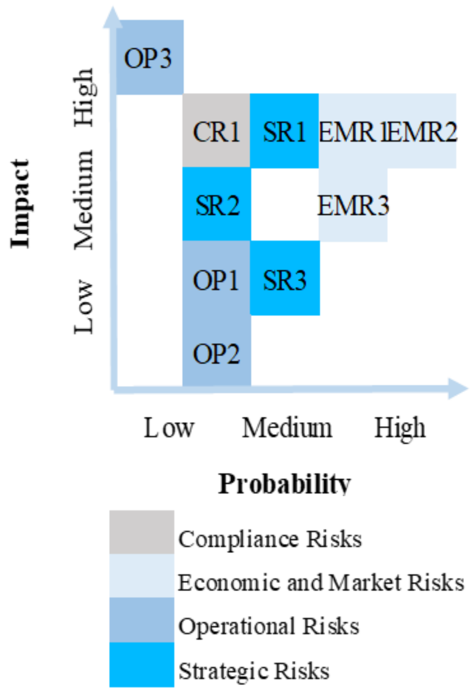
Cyber and IT Security (OP3): Nowadays, the business activity of a company relies on technology to work successfully and the impact of

Figure 48: Barley Monthly Price: USD per metric ton



Source: Index Mundi

Table 11: Risk Matrix



Source: The Author Analysis

cyber security breaches are becoming too costly to be ignored. Therefore, Carlsberg has a growing interest to protect itself from any lost files, system or website corruption or even loss of intellectual property. The Group's resistance to these threats became one of the principal risks to mitigate.

Risks to Price target

A sensitivity analysis was developed to examine the influence of some specific risk variables on CARL-B final target price. It was analysed the impact of changes on the following decisive APV method inputs: Unlevered Cost of Equity, Terminal Value growth, Cost of Debt and Cost of Equity.

As it was mentioned in Chapter 6 (Valuation), the value of price target is highly conditioned to the growth rate assumed for the Terminal Period since it accounts to nearly 85% of Enterprise Value. Additionally, the growth rate for TV was estimated in line with inflation rate forecasts suggested by IMF, but in the future, it cannot correspond exactly to those values. Therefore, it is relevant to understand the impact behind changes in terminal value growth. This sensitivity analysis is shown in table 13, together with the sensitiveness of Unlevered Cost of Equity.

Table 12: Recommendation system:

Level of Risk	SELL	REDUCE	HOLD	BUY	STRONG BUY
Medium Risk	-5%≤	>-5% & ≤5%	>5% & ≤15%	>15% & ≤30%	>30%

Table 13: Sensitivity Analysis for the Unlevered Cost of Equity and Terminal Value growth

		Terminal Value - Growth					
	1 206	1,25%	1,50%	1,75%	**2%**	2,25%	2,50%	2,75%
Ku	3,30%	1 635	1 852	2 138	2 535	3 120	4 071	5 887
	3,6%	1 424	1 585	1 788	2 056	2 423	2 956	3 803
	4,20%	1 130	1 228	1 346	1 490	1 672	1 906	2 222
	4,71%	961	1 030	1 111	**1 206**	1 322	1 463	1 640
	5,20%	839	891	950	1 019	1 099	1 194	1 308
	5,60%	760	802	849	903	965	1 037	1 122
	6%	694	729	768	811	860	917	982

As it can be easily noticed, any variation on terminal value have a significant impact on price target, especially when unlevered cost of equity is lower. Even variations of 0,25% result in huge differences in price target, most of the time nominal variations of at least one or two hundred DKK, which means CARL-B is quite sensitive to changes in terminal value. Also, we can find the lowest price targets when k_u is higher than 4,71%, which changes the final recommendation to a hold, reduce, or even a sell. Although not with the same impact, changes in both variables are always significantly reflected on price target.

Table 14: Sensitivity Analysis for the Cost of Debt and Cost of Equity

		Ke						
	1 206	3,7%	4,0%	4,2%	**4,74%**	4,8%	5,3%	5,5%
Kd	2,00%	2 252	1 918	1 746	1 405	1 377	1 172	1 107
	2,70%	2 110	1 809	1 652	1 337	1 311	1 119	1 057
	3,60%	1 957	1 692	1 551	1 265	1 241	1 064	1 006
	4,46%	1 832	1 595	1 468	**1 206**	1 185	1 020	965
	6,80%	1 564	1 385	1 287	1 077	1 059	922	876
	8,2%	1 438	1 284	1 198	1 013	997	873	831
	9,40%	1 345	1 209	1 132	964	949	835	797

As we can observe, keeping k_e constant at its level of 4,74%, the impact of changes in cost of debt bound the price target between DKK 964 and DKK 1405, and only an increase to 6,8% or more can change the final recommendation to a buy or a hold. On the other side, variations in cost of equity lead to bigger price ranges, from DKK 965 to DKK 1832, keeping k_d constant at 4,46%. Only when cost of equity increases to values above 4,8%, the investor should change its strategy to a hold. To conclude, in the worst-case scenario, which means a combination of high values both for k_d and k_e, the price target reaches a minimum value of DKK 797 (downside potential of 12,22%)

Appendices

Appendix 1: Statement of Financial Position

million DKK	Historical Statements					Projected Statements				
Assets	2014	2015	2016	2017	2018	2019F	2020F	2021F	2022F	2023F
Intangible Assets	82.409	72.920	76.736	67.793	66.868	67.798	68.740	69.696	70.665	71.647
Property, Plant and Equipment	29.173	26.678	25.810	24.325	25.394	25.586	25.958	26.520	27.282	28.258
Investments in associates and joint ventures	4.277	4.676	4.701	4.266	4.562	4.692	4.822	4.952	5.082	5.212
Receivables	2.130	1.854	1.071	952	1.097	1.097	1.097	1.097	1.097	1.097
Deferred Tax Assets	1.430	1.697	1.610	1.663	1.693	1.693	1.693	1.693	1.693	1.693
Total Non-current Assets	**119.419**	**107.825**	**109.928**	**98.999**	**99.614**	**100.866**	**102.310**	**103.957**	**105.819**	**107.907**
Inventories	4.293	3.817	3.963	3.834	4.435	4.166	4.319	4.477	4.640	4.809
Trade Receivables	6.851	5.729	5.485	4.611	5.084	5.615	5.821	6.034	6.254	6.482
Tax Receivables	196	324	278	181	213	213	213	213	213	213
Other Receivables	2.609	2.532	2.488	2.138	1.925	1.925	1.925	1.925	1.925	1.925
Prepayments	949	1.074	1.137	1.026	840	1.033	1.070	1.110	1.150	1.192
Cash and cash equivalents	2.418	3.131	3.502	3.462	5.589	2.703	4.259	5.763	7.211	8.601
Total current assets	**17.316**	**16.607**	**16.853**	**15.252**	**18.086**	**15.655**	**17.608**	**19.522**	**21.394**	**23.222**
Assets held for sale	723	469	125	-	-	-	-	-	-	-
Total Assets	**137.458**	**124.901**	**126.906**	**114.251**	**117.700**	**116.521**	**119.918**	**123.479**	**127.213**	**131.129**
Equity										
Share Capital	3.051	3.051	3.051	3.051	3.051	3.051	3.051	3.051	3.051	3.051
Reserves	-31.006	-35.447	-29.501	-33.483	-36.837	-36.837	-36.837	-36.837	-36.837	-36.837
Retained Earnings	80.392	75.885	77.261	77.362	79.088	83.532	86.280	89.146	92.131	95.239
Treasury Stock						-1.894	-1.894	-1.894	-1.894	-1.894
Equity, shareholders in Carlsberg A/S	**52.437**	**43.489**	**50.811**	**46.930**	**45.302**	**47.852**	**50.600**	**53.466**	**56.451**	**59.559**
Non-controlling interests	3.560	3.742	2.839	2.595	2.587	2.587	2.587	2.587	2.587	2.587
Total Equity	**55.997**	**47.231**	**53.650**	**49.525**	**47.889**	**50.439**	**53.187**	**56.053**	**59.038**	**62.146**
Liabilities										
Borrowings	38.690	31.479	21.137	23.340	16.750	19.734	19.734	19.734	19.734	19.734
Retirement benefit obligations and similar obligations	4.626	5.235	4.878	3.351	2.908	3.916	4.030	4.150	4.275	4.407
Deferred tax liabilities	7.147	5.924	6.250	5.601	5.659	5.659	5.659	5.659	5.659	5.659
Provisions	3.010	3.374	3.642	3.611	3.827	3.827	3.827	3.827	3.827	3.827
Other Liabilities	1.442	1.899	3.199	3.757	6.186	6.186	6.186	6.186	6.186	6.186
Total non-current liabilities	**54.915**	**47.911**	**39.106**	**39.660**	**35.330**	**39.322**	**39.436**	**39.556**	**39.681**	**39.813**
Borrowings	1.835	4.549	9.067	849	7.233	1.638	1.638	1.638	1.638	1.638
Trade Payables	12.048	12.260	13.497	13.474	16.199	13.874	14.342	14.851	15.404	16.008
Deposits on returnable packaging materials	2.034	1.819	1.681	1.576	1.583	1.783	1.848	1.916	1.985	2.058
Provisions	510	648	722	591	1.100	1.100	1.100	1.100	1.100	1.100
Tax Payables	796	601	935	931	878	878	878	878	878	878
Other Liabilities	9.323	9.794	8.233	7.645	7.488	7.488	7.488	7.488	7.488	7.488
Total current Liabilities	**26.546**	**29.671**	**34.135**	**25.066**	**34.481**	**26.760**	**27.294**	**27.870**	**28.494**	**29.170**
Liabilities associated with assets held for sale	-	88	15	-	-	-	-	-	-	-
Total Liabilities	**81.461**	**77.670**	**73.256**	**64.726**	**69.811**	**66.082**	**66.731**	**67.426**	**68.175**	**68.983**
Total equity and liabilities	**137.458**	**124.901**	**126.906**	**114.251**	**117.700**	**116.521**	**119.918**	**123.479**	**127.213**	**131.129**

Source: Company data, The Author Analysis

Appendix 2: Income Statement

	Historical Statements					Projected Statements				
DKK million	2014	2015	2016	2017	2018	2019F	2020F	2021F	2022F	2023F
Revenue	91.569	91.012	86.957	85.789	88.970	91.224	94.573	98.033	101.609	105.308
Excise Duties on beer and soft drinks	27.063	25.658	24.343	25.134	26.467	26.416	27.386	28.388	29.423	30.494
Net Revenue	**64.506**	**65.354**	**62.614**	**60.655**	**62.503**	**64.808**	**67.188**	**69.645**	**72.186**	**74.814**
Eastern Europe	14.100	10.963	10.205	10.925	10.780	10.943	11.095	11.234	11.363	11.479
Western Europe	37.762	39.000	37.597	35.716	36.151	37.305	38.481	39.681	40.904	42.150
Asia	12.491	15.339	14.666	13.944	15.530	16.518	17.570	18.688	19.877	21.142
Not allocated	153	52	146	70	42	42	42	42	42	42
Cost of Sales	32.725	33.429	31.195	30.447	31.283	32.657	33.856	35.094	36.375	37.699
Gross Profit	**31.781**	**31.925**	**31.419**	**30.208**	**31.220**	**32.151**	**33.332**	**34.551**	**35.811**	**37.115**
Sales and distribution expenses	18.695	19.158	18.476	17.144	17.474	18.668	19.353	20.061	20.793	21.550
Administrative expenses	4.633	4.909	5.220	4.563	4.615	4.917	5.098	5.284	5.477	5.676
Other operating activities, net	369	235	198	113	68	-	-	-	-	-
Share of profit after tax of associates and joint ventures	408	364	324	262	130	130	130	130	130	130
Operating profit before special items	**9.230**	**8.457**	**8.245**	**8.876**	**9.329**	**8.696**	**9.010**	**9.335**	**9.671**	**10.018**
Special items, net	1.353	8.659	251	4.565	88	-	-	-	-	-
Financial income	806	490	919	511	358	358	358	358	358	358
Financial expenses	1.997	2.021	2.166	1.299	1.080	1.071	954	954	954	954
Profit before tax	**6.686**	**- 1.733**	**6.747**	**3.523**	**8.519**	**7.983**	**8.414**	**8.739**	**9.075**	**9.422**
Income tax	1.748	849	2.392	1.458	2.386	2.015	2.123	2.205	2.290	2.378
Consolidated Profit	**4.938**	**- 2.582**	**4.355**	**2.065**	**6.133**	**5.969**	**6.291**	**6.534**	**6.785**	**7.044**
Non-controlling Interests	524	344	371	806	824	824	824	824	824	824
Shareholders in Carlsberg A/S (net profit)	4.414	- 2.926	3.984	1.259	5.309	5.145	5.467	5.710	5.961	6.220

Source: Company data, The Author Analysis

Appendix 3: Cash Flow Statement

	Historical Statements					Projected Statements				
million DKK	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Operating profit before special items	9.230	8.457	8.245	8.876	9.329	8.696	9.010	9.335	9.671	10.018
Depreciation and amortisation	4.103	4.674	4.742	4.581	4.064	4.510	4.541	4.572	4.603	4.635
Impairment losses	5	82	19	126	27	0	0	0	0	0
Operating profit before depreciation, amortisation and impairment losses	**13.338**	**13.213**	**13.006**	**13.583**	**13.420**	**13.206**	**13.551**	**13.907**	**14.274**	**14.653**
Other non-cash items	514	374	410	279	143	0	0	0	0	0
Change in trade working capital	177	1.284	1.021	848	1.908	2.581	137	166	199	238
Change in other working capital	682	561	1.126	388	52	0	0	0	0	0
Restructuring costs paid	397	586	407	364	238	0	0	0	0	0
Interest etc.received	224	232	190	156	153	358	358	358	358	358
Interest etc. paid	2.219	2.050	1.193	564	1.016	1.071	954	954	954	954
Income Tax paid	2.168	2.140	1.752	1.934	2.375	2.015	2.123	2.205	2.290	2.378
Cash flow from operating activities	**7.405**	**10.140**	**9.329**	**11.834**	**12.047**	**7.898**	**10.969**	**11.271**	**11.587**	**11.917**
Acquisition of property, plant and equipment and intangible assets	5.888	4.069	3.820	4.053	4.017	5.632	5.855	6.089	6.335	6.593
Disposal of property, pland and equipments and intangible assets	261	575	223	160	254	0	0	0	0	0
Change in on-trade loans	78	187	43	40	192	0	0	0	0	0
Total operational investments	**(5.549)**	**(3.307)**	**(3.554)**	**(3.853)**	**(3.955)**	**(5.632)**	**(5.855)**	**(6.089)**	**(6.335)**	**(6.593)**
Free operating cash flow	**1.856**	**6.833**	**5.775**	**7.981**	**8.092**	**2.266**	**5.114**	**5.182**	**5.252**	**5.324**
Acquisition and disposal of subsidiaries, net	1.681	33	1.969	268	974	0	0	0	0	0
Acquisition and disposal of associates and joint ventures, net	90	9	716	242	1.491	0	0	0	0	0
Acquisition and disposal of financial investments, net	25	29	5	10	3	0	0	0	0	0
Change in financial receivables	400	193	78	54	36	0	0	0	0	0
Share Repurchases		0	0	0	0	1.894	0	0	0	0
Dividens received	180	305	228	208	572	0	0	0	0	0
Total financial investments	**(1.166)**	**117**	**2.840**	**674**	**(1.926)**	**(1.894)**	**-**	**-**	**-**	**-**
Other investments in property, plant and equipment	20	81	20	0	10	0	0	0	0	0
Disposal of other property, pland and equipment	-	653	21	25	0	0	0	0	0	0
Total other activities	**(20)**	**572**	**1**	**25**	**10**	**-**	**-**	**-**	**-**	**-**
Cash flow from investing activities	**(6.735)**	**(2.618)**	**(713)**	**(3.154)**	**(5.871)**	**(7.526)**	**(5.855)**	**(6.089)**	**(6.335)**	**(6.593)**
Free cash flow	**670**	**7.522**	**8.616**	**8.680**	**6.176**	**372**	**5.114**	**5.182**	**5.252**	**5.324**
Shareholders in Carlsberg A/S	1.234	1.505	1.438	1.681	2.489	2.572	2.733	2.855	2.980	3.110
Non-controlling interests	663	513	1.015	740	1.186	824	824	824	824	824
External financing	82	4.557	6.752	5.239	123	0	0	0	0	0
Proceeds from loans and borrowings	0	0	0	0	0	2.984	0	0	0	0
Repayment of loans and borrowings	0	0	0	0	0	2.711	0	0	0	0
Cash-flow form financing activities	**(1.815)**	**(6.575)**	**(9.205)**	**(7.660)**	**(3.798)**	**(3.123)**	**(3.557)**	**(3.679)**	**(3.804)**	**(3.934)**
Net cahs flow	**(1.145)**	**947**	**(589)**	**1.020**	**2.378**	**(2.751)**	**1.556**	**1.504**	**1.448**	**1.390**
Cash and cash equivalents at 1 January	3.234	2.178	3.020	2.348	3.120	5.454	2.703	4.259	5.763	7.211
Foreign exchange adjustment of cash and cash equivalents	89	105	83	248	44	0	0	0	0	0
Cash and cash equivalents at 31 december	**2.178**	**3.020**	**2.348**	**3.120**	**5.454**	**2.703**	**4.259**	**5.763**	**7.211**	**8.601**

Source: Company data, The Author Analysis

Appendix 4: Key Financial Ratios

Key Financial Ratios	2014	2015	2016	2017	2018	2019F	2020F	2021F	2022F	2023F
Liquidity Ratios										
Current Ratio (x)	65,23%	55,97%	49,37%	60,85%	52,45%	58,50%	64,51%	70,05%	75,08%	79,61%
Quick Ratio (x)	49,06%	43,11%	37,76%	45,55%	39,59%	42,93%	48,69%	53,98%	58,80%	63,12%
Cash Ratio (x)	9,11%	10,55%	10,26%	13,81%	16,21%	10,10%	15,61%	20,68%	25,31%	29,48%
Efficiency Ratios										
Total Assets Turnover (x)	46,93%	49,82%	49,73%	50,30%	53,89%	55,34%	56,83%	57,23%	57,59%	57,92%
Accounts Receivable Turnover (x)	9,42	10,39	11,17	12,02	12,89	12,11	11,75	11,75	11,75	11,75
Colletion Period (days)	38,77	35,13	32,69	30,38	28,31	30,13	31,06	31,07	31,07	31,07
Inventory Turnover (x)	7,62	8,24	8,02	7,81	7,57	7,59	7,98	7,98	7,98	7,98
Days in Inventory (days)	47,88	44,28	45,52	46,74	48,24	48,07	45,74	45,74	45,75	45,75
Payables Turnover (x)	2,72	2,75	2,42	2,26	2,11	2,17	2,40	2,40	2,40	2,40
Payables Period (days)	134,38	132,71	150,69	161,66	173,11	168,06	152,10	151,81	151,80	152,07
Opetaing Cycle (days)	86,65	79,40	78,20	77,11	76,55	78,20	76,80	76,81	76,81	76,82
Cash Cycle (days)	-47,73	-53,30	-72,49	-84,55	-96,56	-89,86	-75,29	-75,00	-74,98	-75,25
Profitability Ratios										
Gross Profit Margin (%)	0,49	0,49	0,50	0,50	0,50	0,50	0,50	0,50	0,50	0,50
EBITDA Margin (%)	0,21	0,20	0,21	0,22	0,21	0,20	0,20	0,20	0,20	0,20
EBIT Margin (%)	0,14	0,13	0,13	0,15	0,15	0,13	0,13	0,13	0,13	0,13
Net Profit Margin (%)	0,07	-0,04	0,06	0,02	0,08	0,08	0,08	0,08	0,08	0,08
ROA (%)	0,03	-0,02	0,03	0,01	0,05	0,04	0,05	0,05	0,05	0,05
ROE (%)	0,08	-0,06	0,07	0,03	0,11	0,11	0,11	0,11	0,11	0,10
DPS	9	9	10	16	18	17	18	19	20	21
EPS (X)	28,93 -	19,18	26,11	8,25	34,80	34,23	36,37	37,99	39,66	41,39
Solvency Ratios										
Short and Long-Term Debt Ratio (%)	29,48%	28,85%	23,80%	21,17%	20,38%	18,34%	17,82%	17,31%	16,80%	16,30%
Long-term Debt Ratio (%)	28,15%	25,20%	16,66%	20,43%	14,23%	16,94%	16,46%	15,98%	15,51%	15,05%
Debt to Equity Ratio (x)	0,72	0,76	0,56	0,49	0,50	0,44	0,42	0,40	0,38	0,36
Equity Multiplier (x)	2,45	2,64	2,37	2,31	2,46	2,39	2,34	2,30	2,25	2,21
Debt to EBITDA	5,20	4,95	4,59	3,77	3,99	3,88	3,78	3,69	3,60	3,51
Interest Coverage Ratio (x)	4,62	4,18	3,81	6,83	8,64	8,12	9,44	9,78	10,13	10,50
Capital Structure										
Equity Weight	40,74%	37,81%	42,28%	43,35%	40,69%	41,82%	42,65%	43,53%	44,40%	45,25%
Debt Weight	29,48%	28,85%	23,80%	21,17%	20,38%	18,34%	17,82%	17,31%	16,80%	16,30%
Payout Ratio	31,11%	-46,92%	38,29%	193,88%	51,72%	50,00%	50,00%	50,00%	50,00%	50,00%

Source: Company data, The Author Analysis

Appendix 5: Net Revenue Forecast

Net Revenue

	Historical Statements					Projected Statements				
million DKK	2014	2015	2016	2017	2018	2019F	2020F	2021F	2022F	2023F
Net Revenue	64.506	65.354	62.614	60.655	62.503	64.808	67.188	69.645	72.186	74.814
Eastern Europe	14.100	10.963	10.205	10.925	10.780	10.943	11.095	11.234	11.363	11.479
Western Europe	37.762	39.000	37.597	35.716	36.151	37.305	38.481	39.681	40.904	42.150
Asia	12.491	15.339	14.666	13.944	15.530	16.518	17.570	18.688	19.877	21.142
Not allocated	153	52	146	70	42	42	42	42	42	42

Regional Share on Net Revenue

	Historical Statements					Projected Statements				
	2014	2015	2016	2017	2018	2019F	2020F	2021F	2022F	2023F
Eastern Europe	21,86%	16,77%	16,30%	18,01%	17,25%	16,89%	16,51%	16,13%	15,74%	15,34%
Western Europe	58,54%	59,68%	60,05%	58,88%	57,84%	57,56%	57,27%	56,98%	56,67%	56,34%
Asia	19,36%	23,47%	23,42%	22,99%	24,85%	25,49%	26,15%	26,83%	27,54%	28,26%

Volumes

	Historical Statements					Projected Statements					
(million hl)	2014	2015	2016	2017	2018	2019F	2020F	2021F	2022F	2023F	Projected CAGR
Eastern Europe	39,5	34	34,4	31,7	32,7	33,7	34,7	35,6	36,6	37,5	2,76%
Western Europe	65,8	66,4	64,7	60,6	62,4	64,2	66,1	68,0	69,9	71,8	2,86%
Asia	38,5	41,4	39,7	34	38	38,1	38,2	38,2	38,3	38,4	0,21%
Total	143,8	141,8	138,8	126,3	133,1	136,0	138,9	141,8	144,8	147,7	2,64%
				yoy growth		2,18%	2,14%	2,11%	2,07%	2,04%	

Average Selling Price

	Historical Statements					Projected Statements					
DKK	2014	2015	2016	2017	2018	2019F	2020F	2021F	2022F	2023F	Projected CAGR
Eastern Europe	357	322	297	345	330	325	320	315	311	306	-1,46%
Western Europe	574	587	581	589	579	581	582	584	585	587	0,25%
Asia	324	371	369	410	409	434	460	489	519	551	6,14%

Source: Company data, The Author Analysis

Appendix 6: Adjusted Present Value Computations

Free Cash Flow to the Firm

Free Cash Flow	2019F	2020F	2021F	2022F	2023F	TV
Net Revenue	64.808	67.188	69.645	72.186	74.814	
EBIT(1-T)	6.501	6.737	6.979	7.230	7.490	
Depreciation & Amortisation	4.510	4.541	4.572	4.603	4.635	
Changes in Net Working Capital	- 2.581	137	166	199	238	
CapEx	5.632	5.855	6.089	6.335	6.593	
FCFF	**7.960**	**5.285**	**5.296**	**5.300**	**5.294**	**5.400**

Adjusted Present Value Method

	2018	2019F	2020F	2021F	2022F	2023F	TV
FCFF		7.960	5.285	5.296	5.300	5.294	199.293
Total Borrowings	23.983	21.372	21.372	21.372	21.372	21.372	21.372
Interest Expense		1.071	954	954	954	954	954
ITS		270	241	241	241	241	241
PV(ITS)		**270**	**231**	**221**	**211**	**202**	**5.393**
PV (FCFF)		**7.960**	**5.048**	**4.831**	**4.616**	**4.404**	**165.786**

Cost of Debt	4,46%
Unlevered Cost of Equity	4,71%

Terminal Value	199.293

EV Unlevered	192.644
PV(ITS)	5.664
Enterprise Value	**198.308**
Net Debt	19.093
Minority Interests	2.587
Associates	4.692
Equity Value	**181.320**
Number of Shares	150.291.702
Price at 8th July 2019	908
Price Target	**1.206**
Upside Potential	32,87%

Source: The Author Analysis

Appendix 7: Dividend Discount Model

As it was mentioned in investment summary, Dividend Discount Model was only applied as a complementary model and it was not used to take any final conclusion. The target price obtained with this model does not match the results attained with the other methods, since it is not the most appropriated method for the cases in which a company does not distribute its results to shareholders only through dividends and there isn't any specific information (date and amount) about the distribution of results through a secondary method, such as share repurchases in the future.

We know, from the "SAIL 22" program, that Carlsberg will proceed with share buyback plans to distribute amounts above 50% of net income to shareholders, instead of using dividends. However, as we do not have any specific guidance about when and by what amount Carlsberg will proceed with this buyback programs in the projected period, they could not be reflected in this model, with the exception of 2019.

	2019F	2020F	2021F	2022F	2023F	TV
Dividends Per Share	29,7	18,2	19,0	19,8	20,7	21,1
PV of Dividends	29,7	17,4	17,3	17,3	17,2	639,1

Terminal Value - Perpetuity	769

Price on 8th July 2019	908
Price Target	738
Downside Potential	-18,73%

Source: The Author

The value of Dividends Per Share for 2019 refers to a Modified Dividend Per Share, that was calculated by adding the amount distributed through the share buyback program implemented in this year (DKK 1 893 664 075) and the 50% of net income that are paid as dividends (DKK 2 572 252 006), adjusted to the new number of shares outstanding.

As we can verify from a price target of DKK 738 (DKK 468 lower than APV), this model is far from catching the reality of the business that is reflected in the other models.

Appendix 8: Relative Valuation

Peers Information:

	Ticker/Exchange	Country	Industry	Beta	Currency
Carlberg A/S	CARL B/CPH	Denmark	Beverages - Brewers	0,84	DKK
Peer					
Heineken NV	HEIA/AEX	Netherlands	Beverages - Brewers	0,78	EUR
Coca Cola HBC AG	CCH.L/LSE	United Kingdom	Beverages - Non Alcoholic Beverages	0,78	GBP
Anheuser Busch Inbev NV	ABI/BRU	Belgium	Beverages - Brewers	1,24	EUR
Pernod Ricard S.A.	PERP/PAR	France	Beverages - Distillers & Wineries	0,63	EUR
Diageo PLC	DGE/LSE	United Kingdom	Beverages - Distillers & Wineries	0,77	GBP
Rémy Cointreau AS .	RCOP/PAR	France	Beverages - Distillers & Wineries	0,54	EUR
Davide Campari Milano SpA	CPRI/MIL	Italy	Beverages - Distillers & Wineries	0,43	EUR

Company	Market Cap (USD)	ROE	Interest Coverage Ratio	Long Term Debt to Capital	EBITDA Margin
Carlberg A/S	20.617.886.217	11,51%	16,1	23,30%	21,20%
Peers					
Heineken NV	65.004.601.202	13,56%	8,1	31,10%	24,40%
Coca Cola HBC AG	12.656.120.553	14,62%	15	41,40%	15%
Anheuser Busch Inbev NV	163.482.674.987	6,20%	4,3	31,30%	42,10%
Pernod Ricard S.A.	46.312.374.005	11,07%	6,7	58,10%	28,90%
Diageo PLC	95.931.506.471	34,52%	8,6	31,90%	34,60%
Rémy Cointreau AS .	7.306.793.604	11,23%	19,2	46,70%	25.7%
Davide Campari Milano SpA	10.907.399.697	14,43%	11,3	21,80%	15,20%

Source: Thomson Reuters on 8th July

Comparable Data:

	EV/EBITDA	EV/EBIT	Price/Book
Peer	2019	2019F	2019F
Heineken NV	12,56	17,75	3,68
Coca Cola HBC AG	10,90	16,10	4,31
Anheuser Busch Inbev NV	11,48	14,40	2,79
Pernod Ricard S.A.	17,51	19,15	2,66
Diageo PLC	18,19	20,15	8,69
Rémy Cointreau AS .	21,57	23,60	4,35
Davide Campari Milano SpA	22,06	25,28	4,08
Carlsberg A/S	11,17	15,95	2,93

Carlsberg's Enterprise Value and Price Target based on Comparable's Data:

million DKK	EV/EBITDA	EV/EBIT	Price/Book
Peer	2019F	2019F	2019F
Heineken NV	165.871	199.657	1.193
Coca Cola HBC AG	143.949	192.701	1.398
Anheuser Busch Inbev NV	151.609	182.179	905
Pernod Ricard S.A.	231.243	217.397	863
Davide Campari Milano SpA	291.331	305.921	1.323
Weighted Average	197.248	221.220	1.157

Source: The Author

Relativa Valuation Final Output:

EV/EBITDA	
Enterprise Value	197.248
Net Debt	19.093
Minority Interests	2.587
Associates	4.692
Equity Value	180.260
Number of Shares	150.291.702
Price at 8th July 2019	908
Price target	1.199
Upside Potential	32,09%

EV/EBIT	
Enterprise Value	221.220
Net Debt	19.093
Minority Interests	2.587
Associates	4.692
Equity Value	204.231
Number of Shares	150.291.702
Price at 8th July 2019	908
Price target	1.359
Upside Potential	49,66%

Price/Book	
Price at 8th July 2019	908
Price target	1.157
Upside Potential	27,45%

Source: The Author

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