

A Work Project, presented as part of the requirements for the Award of a Master's degree in
Finance from the Nova School of Business and Economics

Private Equity Investment Committee Paper on BA Glass –
Deep Dive on Financial Modeling

CAETANA MENDES DE ALMEIDA

Work project carried out under the supervision of:

Luís Mota Duarte

20/01/2023

Abstract

This investment committee paper consists of an investment proposal for a leveraged buyout on BA Glass, one of the largest European manufacturers of glass packaging for the food and beverage sectors, with international presence and an extensive portfolio. The project was elaborated by students from the Master's in Finance at Nova SBE which is intended to be used for academic purposes only. The group sought to determine how to best structure an LBO acquisition of BA Glass and what returns it may deliver. Afterwards, a deep dive into the financial modeling of BA Glass is made.

Keywords

Glass packaging producer; energy crisis; leverage buyout; trading comparables; past transactions; returns; due diligences; exit strategies

Acknowledgments

We would like to express our full gratitude to Professor Luís Mota Duarte, our project advisor, as well as to Professor Fábio Santos, our project supervisor, for all the support provided over the course of the last months. To BA Glass and all the people we came across with, to Nova SBE and all the faculty staff and to our friends and families for supporting us and contributing to positive outcomes.

This work used infrastructure and resources funded by Fundação para a Ciência e a Tecnologia (UID/ECO/00124/2013, UID/ECO/00124/2019 and Social Sciences DataLab, Project 22209), POR Lisboa (LISBOA-01-0145-FEDER-007722 and Social Sciences DataLab, Project 22209) and POR Norte (Social Sciences DataLab, Project 22209).

A walk-through BA Glass investment committee paper

Founded in 1912 under the name "Barbosa e Almeida" and dedicated solely to the commercialization of glass bottles, BA Glass now employs over 3990 people throughout five plants in the Iberian Peninsula, one in Germany, two in Poland, and four in Southeast Europe, as well as more than 30 warehouses that promote product closeness to the client (appendix 1.1). BA Glass expansion is primarily due to the numerous acquisitions it has made in the past, particularly in the last ten years. In fact, the most recent ones occurred in 2016 with the acquisition of the German plant of Warta Glass, and the Yioula Group in 2017 consisting of four plants in south-eastern Europe (SEE): two in Bulgaria, one in Romania, and one in Greece.

The group's yearly production is over 10 Bn glass containers (equivalent to more than 2,4 tons of glass) with distribution in more than 70 countries worldwide. The company's product portfolio is divided into four different categories, including Wine, Beer, Food & Others¹. In addition, BA Glass constantly innovates its products while introducing new ones to meet the demand of its end users, namely bottlers and fillers, and to compete with fierce peers.

Even if the degree of competition in this industry is high, BA Glass can distinguish itself from its closest competitors by leveraging some **competitive advantages** based on its **capacity installed, consistent service excellence, contract terms, and product quality**. Indeed, some of BA Glass clients' testimonials affirm that "Having BA Glass as a supplier is an advantage for [them] as it is able to deliver several different product lines, in large quantities and at different points." or also that "Among [their] suppliers, BA is the one with the best service. [They] have never had lead-time problems with BA."

¹ The segment *Other* includes spirits, soft drinks, olive oil and the pure line

Regarding the company's financial position, one can say that BA Glass has shown resilience and has proven to be financially stable within its lifetime. When we look at how the company performed over the last five years (2017-2021), we can clearly see that it has positively progressed, with sales reaching their peak in 2021 (over € 1Bn). The latter was the result of two major factors: a rapid market recovery from the pandemic, and a shift in consumer behavior towards choosing glass (rather than plastic, for example).

However, not everything went as smoothly as the sales recovery. The year 2021 was marked by the possibility (later proven to be real) of war between Russia and Ukraine. This insecurity, which will be discussed further in the paper, resulted in an increase in energy prices, which severely impacted BA Glass's margins. In fact, EBITDA margin fell by 10 p.p. from 2020 to 2021 (34% vs. 24%). It is important to recognize that, with the exception of rare events such as 2021, these margins are sustainable in the glass sector, owing to the industry's demand for high levels of CAPEX. The main driver of the decrease in BA Glass' margin was the increase in raw materials of 51% from 2020 to 2021, which were a reflection of both the inflationary production costs and energy prices. In response to the world's current inflation and energy crisis, BA is investing heavily in reducing costs and increasing productive capacity across all plants (new furnaces, digital acceleration programs, etc.). Despite the fact that the company has suffered during the past year, as mentioned before, the Group still has enough liquidity to face potential negative financial market movements. In fact, on the one hand, there is an overall decrease in Net Debt from 2017 to 2020 (-16% CAGR). On the other, the company's EBITDA increased (8% CAGR) over the last five years. In the end, this resulted in a Net Debt/EBITDA ratio of 1,6x, providing insurance to the company and its investors.

If we take a closer look into the company's income statement, we can infer that, while energy costs had a significant impact on the company's profits, this impact was

mitigated by BA Glass' organic and inorganic strategies. To begin with, BA Glass reached € 1Bn in sales in 2021, with the Iberian division contributing the most (c. 54% in 2021), followed by SSE and Central Europe. It is worth to mention that, even though BA Glass felt the effects of Covid-19 in 2020, it never lost its resilience as contract sales continued to grow (appendix 2.1). If we investigate sales by segments, in 2021 Food accounted for 35% of these, followed by Beer (26%) and Wine (18%). Despite losing 5% share of sales in the past five years (2017-2021), the wine segment experienced an increase from 2020 to 2021 with the reopening of the HORECA channel. In contrast, the Beer and Food segments have clearly increased from 2017 to 2021, 18% and 17%, respectively.

One can think of sales growth coming from two fronts: organic and inorganic. On one hand, BA Glass' revenues grew organically over time due to investments made to diversify its portfolio and increase its plants' efficiency. On the other, BA also grew inorganically due to investments made to support the increasing demand and the growing number of customers, such as the integration of new plants (since 2016: acquisition of Yioula and HNG).

Regarding operating costs, the main one is related to energy consumption, specifically electricity and natural gas, which represents one of the largest cost drivers given that BA Glass operates in an energy-intensive industry. BA Glass has focused on continuous efficiency improvements through product mix diversification, cost optimization, and investments in innovation and new furnace technology to reduce these costs. Nonetheless, as it was already explained, raw material costs increased 51% from 2020 to 2021 as a result of an increase in geopolitical tensions between Russia and the rest of Europe. Following this, supplies and external services are the second largest cost driver, increasing 9% in the past year and accounting for 22% of total operating costs.

Finally, one can infer from BA Glass' Balance Sheet that its business model requires large PP&E investments, which can serve as collaterals for its own financial debt. The acquisition of Yioula and HNG in 2017 required BA to raise debt and increase its PP&E by 61%. Nonetheless, over the last five years, BA Glass has reduced its net debt by € 300M, demonstrating the company's ability to regain financial stability. BA Glass' networking capital has been positive over the years, but in 2021 it turned negative for two reasons: (i) due to a significant increase in trade payables, which is explained first by both the inflation and the Russian conflict, and second by BA Glass being able to negotiate better terms with suppliers and thus increase its days in payables, and (ii) accounts receivable remaining stable from 2020 to 2021. As previously stated, BA Glass has a strong cash flow generation, consequently reflected in its CCC that has been decreasing and has become negative. As a result, while the energy crisis had an impact on BA Glass' financials, the company was able to overcome this difficult period. In addition, market trends for the glass packaging industry also indicate some level of confidence in the sector's prospects, which is also one other positive thing.

The glass packaging industry is gaining a lot of popularity since it is considered an attractive choice for consumers. To begin with, glass is the only eternally recyclable material, as well as the healthiest and safest. Furthermore, glass can preserve food and drinks without affecting their original features, and it prevents dangerous compounds from entering packaged items. These characteristics, aligned with the fact that sustainability concerns are emerging among customers, have made glass the best packaging solution according to 90% of consumers analyzed in a McKinsey study. That said, the global glass packaging market is forecasted to grow at 1,4% per year until 2026, with most regions around the globe anticipating considerable growth. Latin America, Australasia, the Middle East and Africa, and Western Europe are the regions that are

primarily responsible for this significant growth (appendix 3.1). The main growth drivers responsible for this expected increase include the rising levels of concern for recyclable and sustainable packaging, as well as the decision to use glass as the preferred material for premium products across all regions as demand for premium and super-premium products is rising.

Given that Europe accounts for 38% of the worldwide market for glass packaging and that BA Glass has 12 production plants in this region, mostly in Portugal, Spain, Poland, and Bulgaria, the company is particularly well positioned in the industry. The European addressable market is made up of 99% of the segments Food and Beverages, which are projected to grow by 8,25% and 6,78%, respectively, through 2026. Currently, BA Glass is focused on these two segments: while Food has a growing trend of transparency in food packaging and clean labeling, and benefits from the reusability and long-term preservation characteristics, in the Beverages segment, premiumization trends have played a role in selecting glass packaging for various beverage categories and, internationally, the beverage sector is being driven by an increase in alcoholic drinks consumption and production. Western Europe is currently the largest market for the Food Segment, and Middle East & Africa is the region where it is predicted to develop faster in the future, with a CAGR of 3,4% in volume. Due to the presence of numerous beverage manufacturing companies, a growing population, and increased investment by the region's leading players, Asia Pacific currently has the largest market in the beverage segment, while Australasia has the highest CAGR, with a volume growth rate of 3,9% per year over the forecasted period.

Notwithstanding, BA Glass still has opportunities to explore different markets, particularly in the Beauty & Personal Care and Pharmaceutical divisions, the fastest-growing segments during the following five years. The Beauty & Personal Care segment

is expected to grow at a CAGR of 3,2% in volume, showing growing trends due to the increasing demand from the premium cosmetics segment (especially in the skincare and color cosmetics segments), which prioritizes greater aesthetics composed by glass containers. The largest market in this segment is now Asia Pacific, while Western Europe is expected to have the highest CAGR of 5,7% over the estimated period. Technological innovations are the key trend gaining popularity in the pharmaceutical glass packaging market, expected to increase at a CAGR of 8% in value. While nowadays North America dominates this segment due to its technical innovation and strong demand for pharmaceutical products, Asia Pacific is anticipated to grow at the fastest rate due to its large population and rising prevalence of chronic diseases.

Although it is a competitive industry, BA Glass has been able to maintain an outstanding market positioning among its main peers. As one can observe in appendix 3.2, it was the only company able to increase sales in the challenging year of 2021, demonstrating its strong resilience to economic fluctuations. Furthermore, the company exhibits outstanding performance in the EBITDA Margin, being the one with the highest value in 2019 and 2020, of 32,5% and 34,9%, significantly higher than its competitors, and the second-best in 2021, with a margin of 24%, however, being expected that the company will be able to re-establish its historical margins.

Despite the positive market trends, as already mentioned, this industry is being affected by the substantial increase in energy costs. Both the covid-19 pandemic and the conflict with Russia triggered an energy crisis that has been felt around the globe and is of particular concern for energy-dependent industries. The pandemic in 2020 had an influence on demand and pricing, with historic lows reached in the summer of 2020. Governments reacted strongly, and demand for practically everything began to rebound swiftly, with results being visible by the end of 2020. Energy supply was impacted by

both the economic recovery and a decline in investments in the generation of some green deal-related energy. These imbalances in energy demand and supply began to have an influence on energy costs, with a steady but regular increase until the summer of 2021. Natural gas prices rose unexpectedly in the autumn due to low stock levels in Europe, geopolitical concerns with Russia, and divestment from fossil fuels and nuclear energy. The new energy price reality reached its maximum in the 4th quarter, registering € 311/MWh, a significant increase from its normal range of €40 to €60 (appendix 4.1). Nonetheless, the European Commission has put in place a plan to manage the risks associated with natural gas scarcity and price increases. Some of the European Commission's intervention activities include collecting € 140Bn in profits from energy companies who benefit from the war in Ukraine and distributing them to people and businesses with high energy costs or imposing a 10% mandated cut in energy consumption. Additionally, Europe has already been searching for a new energy supplier and in June 2022 it already imported more natural gas from the USA via ships than it did from Russia via pipeline (appendix 4.2). Following the same rational, BA Glass also had to adjust its operations. As previously mentioned, the glass packaging industry is known for being a heavy energy consumer, as natural gas is the primary energy source used in the glassmaking process. This said, BA Glass did some extra efforts in 2021 to become more energy efficient and decreased natural gas consumption per ton produced by 2%. Also, in 2021 a third photovoltaic park was built on the roof of one of its production facilities, increasing therefore BA's capacity to produce renewable energy for self-consumption. In any case, even if it is generally challenging to make precise predictions, Europe and the rest of the world are overall convinced that the energy crisis has reached its peak (appendix 4.3). This logically gives companies like BA Glass some confidence,

since it suggests that the worst may be over. This said, it is not irrational to believe that now is the right time to make an investment in the glass packaging industry.

BA Glass' financial performance, market position, growth opportunities, M&A track record, and management team are the key factors that will lead to a successful investment. First of all, as previously mentioned, the company has an exceptional financial performance, composed by negative cash conversion cycle, a leverageable balance sheet with a large fixed asset base that can be held as collateral, and a strong and predictable cash flow generation, allowing for M&A activity. In line with its financial performance, BA has a strong market positioning, since it has been the leader in EBITDA Margin, is present in 7 European countries with 12 production plants, and has more than 100 years of history, having a high knowledge and expertise on the industry. Additionally, the market has attractive potential opportunities due to the growing demand for premium and sustainable packaging overall, and the company can explore new locations and segments, such as the pharmaceutical and the Beauty & Personal care segments, which can enable portfolio diversification, high potential growth, and higher margins. Furthermore, BA Glass has made 5 large acquisitions since 1999, focused on global expansion and margin optimization, that were successfully integrated into the company. Lastly, one of the company's strongest assets is its strong management team, constituted by a management board with high experience and deep knowledge in the glass industry, and supported by the BA Glass Academy, which trains employees to deal with new challenges of automatization and digitalization of BA processes.

Leveraging the attributes mentioned, the company still has room for value creation strategies, such as internationalization, portfolio diversification, and operating efficiencies, that can optimize investors' returns on this investment.

Internationalization, through horizontal integration, will solidify BA Glass' market positioning in Europe, enabling it to enter in new locations and to reach current clients' subsidiaries that are operating in regions where the business is not yet established. The main objective is to expand towards countries that have a higher income and superior growth prospects for the packaging market. Portfolio Diversification will enable BA Glass to explore different market segments and units and take advantage of the pre-established know-how, client base, and business model of the acquired company. The Beauty & Personal Care segment presents one of the highest CAGR for the period between 2021 and 2026, of 3,2%. Entering in this new market would imply higher margins for BA Glass given that cosmetic products offer greater profitability. Due to its presence in Europe, mainly in countries where BA is not present, and to its Beauty & Personal Care segment, Zignago has emerged as a strong candidate to satisfy both strategies among potential targets. Zignago is a leading glass manufacturer in Italy, with geographical presence in France, Poland and US, which offers conventional and customized bottles for perfumery and cosmetic segment (~20% of revenues), and jars and bottles for the food and beverage segments. By purchasing Zignago, BA Glass will increase revenues (appendix 5.1), leverage from various synergies, and subsequently, lower its operating costs while strengthening its negotiation power with its suppliers (appendix 5.2). Zignago is predicted to have a significantly lower EBITDA in 2022 when compared with its historical levels, and thus a normalized EBITDA was used (an average of the years 2021 and 2022) and multiplied by a multiple of 6.8x, lower than the industry average due to normalization. Therefore, Zignago will be purchased for € 717M.

Although BA Glass has managed to constantly become more efficient within the last years, having a continuous decrease in energy consumption, which represents 44% of BA production costs, there are still operational improvements the company can make.

Since one ton of cullet consumes less energy than one ton of virgin raw material glass, the company aims to have the maximum cullet utilization ratio feasible. By vertically integrating a glass recycler, BA will secure a premium source of cullet supply, a scarce commodity in this industry. Among the potential targets, Eurovetro has shown to be a strong candidate. First off, Eurovetro is present in Italy, one of the countries in Europe that is now facing the most legislative pressure to create a circular economy. As a result, Italy's packaged glass recycling rate is greater than the average for Europe (79% vs. 75%). Also, in addition to its installed yearly capacity of 550k tons, Eurovetro is also strategically well-positioned to supply the proposed purchase, Zignago. As a North Italian glass recycler that does on-site pick-ups, collects, sorts, and processes glass waste, Eurovetro will be acquired for € 37M (entry multiple of 7.3x) and will enable superior cullet supply in terms of quantity and quality. This will, in turn, represent significant raw materials cost savings, since cullet costs decrease by 8% through vertical sourcing (appendix 5.3) and higher utilization rate of cullet reduces energy expenses (appendix 5.4).

Several assumptions were made to build the business model for our investment committee paper. As we all know, the main issue during the development of this paper was the energy crisis because it was believed that it would have a significant impact on our analysis - which will be further detailed later in the financial modeling chapter. As a result, in addition to using Bloomberg's predictions, we decided to estimate three different case scenarios: the pessimistic scenario, the base scenario - the one we believe is most likely to occur, and finally the optimistic scenario - the one in which the war ends by 2024 and thus has no long-term impact on the financials. This being said, one can be more confident about the results found since the analysis considers three different case scenarios. In each one of these scenarios, four distinct variables will change, which will

also impact the EBITDA margins of our work: revenue growth rate, client's price sensitiveness, natural gas prices, and level of synergies – which will be further detailed in our analysis.

Other assumptions had to be made during our research – cullet usage rate and cullet price are two examples. After making all the required assumptions that may have an impact on our study and after considering the next five years for BA Glass, we began to evaluate the company.

Several methods were used to evaluate BA Glass to the greatest extent possible. The first employed technique was looking at trading comparables, which required a selection of companies with similar profiles to BA (the *Peer Group*). The companies picked were O-I Glass, Vidrala, Vetropack, Gerresheimer AG and Vitro. Using platforms like Bloomberg and Reuters, it was possible to examine each of these companies in terms of both enterprise value to EBITDA and price to earnings ratios (current and from the previous ten years). Continuously, past transactions within the glass packaging industry were also considered. All these transactions took place between 2015 and 2020 and some even include BA Glass and its closest peers, either as the target or as the acquirer (appendix 6.1). Additionally, a discounted cash flow (DCF) method was also performed, considering (1) BA Glass' expected future cash flows; (2) a weighted average cost of capital and (3) a growth rate. At the end, all the multiples were studied but only those matching the most perfectionist approaches were chosen, yielding an average of 7,3x by the examination of the peer group's EV/EBITDA ratios (current and last 10 years), as well as prior transactions. A multiple of 7,3x corresponds to an enterprise value of € 2,4Bn for BA Glass.

To invest in BA Glass, the proposed structure is to do it by using a mix of debt and equity. In fact, a leverage buyout model was designed, where the investor will leverage

enough debt to buy not only BA Glass but Zignago Vetro too. Given the circumstances in which the glass industry finds itself (in a recession, as a result of the energy crisis), BA Glass will be acquired following a payment structure that includes 60% of adjusted EBITDA in 2021, 20% of EBITDA in 2022, and 20% of EBITDA in 2023. This way and considering that 60% of the value is based on an adjusted EBITDA, 40% of the payment is dependent on future performance in order to avoid overvaluation, which could significantly harm investors.

In the end, uses of funds will amount to c. € 3,1Bn, which corresponds to (1) the acquisition of BA Glass for € 2,3Bn (~68%); (2) the acquisition of Zignago for € 717M (~23%) and (3) the remaining 9% will be used to pay fees and the extra funds requested to cover first-years interest costs, which are € 333M. Considering the investments needed and the free cash flow generation in the future, the capital structure of the company will be composed by 56% of debt and 44% of equity. As can be seen in appendix 6.2, ordinary equity is assumed to be 0,5x EBITDA, which represents 6% of total sources. In order to align incentives, the management team will invest € 14M, which corresponds to 10% of the ordinary equity, while institutional investors will contribute with the rest. Finally, the remaining amount that is needed will be allocated to the subordinated loan, which has a hurdle rate of 8%.

From the 56% that is financed with debt, 44% is allocated to senior debt and the remaining to subordinated debt. Term Loan B and C have both bullet payments, have terms of 6 and 7 years respectively, and correspond to 1,5x and 2,0x BA Glass EBITDA. The mezzanine, in turn, also has a bullet payment, a term of 10 years and corresponds to 1,0x BA Glass EBITDA. Then, term loans D and E will be leveraged in 2022 to pay for Zignago. Term loan D has amortization payments and a maturity of 5 years, and term loan E has a bullet payment and a maturity of 6 years (appendix 6.3). The interest rates

of the credit lines correspond to the yields of corporate bonds with a BBB rating, depending in each maturity. The credit rating assigned for the purpose of this project was determined using the internal rating employed by one of the major Portuguese credit institutions, with whom BA Glass has a long-standing relationship.

Five years after first initiating the investment, in 2026, the exit will take place. Assuming an exit multiple equal to the entry one (7,3x), the company's EV at exit will be equal to € 5,1Bn (EBITDA '26 = € 0,7Bn). After the repayment of all the debt, the company will have an Equity Value of € 4,1Bn to distribute among investors.

The total equity value generation of € 3Bn from '21 to '26 is divided into four different components (see appendix 7.1):

- (1) Revenue Growth of c. € 1,0Bn that generates value surplus of 33% in relation to the total equity value creation. This driver is divided between the organic and inorganic growth representing each of them 78% and 22% respectively.
- (2) EBITDA Margin Expansion of c. € 1,2Bn (including synergies), leading to 38% of total equity value creation.
- (3) Deleverage of c. € 760M achieved by high cash generation contributes for 25% of total equity value creation
- (4) Multiple Arbitrage is attained through the acquisition of Zignago with a multiple lower than BA Glass (6.8x vs. 7.3x), representing 3% of total equity value generation

The proceeds of € 4,1Bn are distributed among (a) institutional investors and (b) the management team in the following structure:

- (a) In 2021 and 2022, institutional investors invested € 1,4Bn, which will be multiplied by 2,8x five years later (in 2026), resulting in proceeds of € 3,8Bn and an IRR 24,2%.
- (b) Management will see its investment of € 14M be multiplied by 15,9x five years later, resulting in proceeds of € 228M and an IRR of 73,9%

The results of a sensitivity analysis performed with the entry and exit multiples as inputs are generally encouraging. In fact, even in a more pessimist scenario, with an entry multiple of 8,3x and an exit multiple of 6,3x, institutional investors are expected to multiply its investment by 2,02x, representing an IRR of 15,8%. In opposition, in the best scenario where the entry multiple is 6,3x and the exit multiple is 8,3x, institutional investors are expected to multiply its investment by 4,0x, representing an IRR of 34,2%. These findings demonstrate the significant certainty of favourable returns when investing in BA Glass.

Notwithstanding, it is essential to evaluate the latter without the forecasted horizontal integration of Zignago Vetro. In fact, through the acquisition returns analysis (appendix 7.2), one can see that for the institutional investors, the acquisition of Zignago contributes to an increase of 3 p.p of IRR and an increase in money multiple of 0,24x over the holding period. For the management team, this acquisition allows managers to increase IRR from 59% to 74% and money multiple from 10,09x to 15,93x. This analysis confirms that Zignago contributes positively to returns and to the equity value creation of the company. Nevertheless, it is important to note that the returns are also quite favorable organically, with the investment allowing for an IRR of 21% and a MM of 2.57x for investors without the need of acquisitions.

In addition, the impact that each of the four assumptions considered on the business plan have on the investors' IRR was assessed (appendix 7.3). This analysis concluded that revenue growth and natural gas prices are the most critical assumptions to evaluate in the Due Diligence process due to its high negative impact on the IRR.

Before completing the transaction, BA Glass must go through a process that will involve risk and compliance check. There are at three main areas of concern: overestimation of revenues, natural gas costs and finally access to cullet. Besides that, other risks need to be taken into consideration such as legal and operational risks.

To begin with the overestimation of revenues – since it has a large impact on estimated returns a more in-depth analysis of the end-market price and volume should be conducted, i.e., *ReD Associates* studies customers' behavior and how it relates to a company's sales. Aside from that, an assessment of Zignago's contracts with its clients should be performed in order to quantify precisely Zignago's contribution to BA Glass' sales, as well as the possible challenges posed by new competitors in Zignago's territory.

Secondly, the concern about the natural gas costs; BA Glass most dependent and expensive resource is natural gas. Given the inherent volatility of gas prices, BA Glass' ability to become less dependent on natural gas should be considered. In fact, we should investigate the implications of the pessimistic scenario, the additional CAPEX needed (I.e., additional hybrid furnaces and photovoltaic parks) to counter it, as well as necessary hedging strategies. The underestimation of CAPEX needs and potential fines arising from BA Glass emissions being above the expected are two concerns that are also presented in the operational and legal due diligences, respectively. To mitigate the risks mentioned previously, one should deeply analyze CAPEX regarding the rebuilding of furnaces and product development, as well as keeping a close eye on potential changes regarding CO₂ emissions allowances in Europe.

Lastly, the concern about the access to cullet, which is an asset for BA Glass since production using recycled glass reduces the need for natural gas. Natural gas price, as stated above, is quite volatile and therefore the possibility of an additional cullet plant should be investigated. Furthermore, since cullet is a commodity, in addition to studying the impact of additional cullet treatment facilities, the sensitivity of cullet to price changes should also be studied.

After determining how to best structure an LBO acquisition of BA Glass and what returns it may deliver, as well as the most critical areas of concern before finishing the transaction, it was necessary to study BA Glass' exit options. In fact, several exit strategies were considered, but only three were chosen to further being developed: strategic sale, secondary buyout, and IPO.

To begin, the secondary buyout would involve selling BA Glass to a Private Equity firm. This is typically a less risky and faster method of completing the transaction, which may result in faster liquidity. This type of transaction allows the company to avoid the regulatory requirements that come with an initial public offering (IPO). Furthermore, given the increasing PE activity in 2021 (AUM of \$ 6.3Tn) and prior transactions demonstrating PEs' significant interest in the glass packaging business, there are few expected challenges in locating possible financial buyers. Indeed, Sun Capital Partners and CVC are two potential secondary buyers as both have previously expressed interest in investing in glass packaging manufacturing companies. For instance, in December 2019 Sun Capital Partners acquired Allied Glass company through an LBO and in 2017 CVC participated with BA Glass in the Anchor Glass acquisition.

In addition, there is also the possibility of exiting through a trade sale. This would imply selling BA Glass to a strategic buyer, usually included in the target's industry. Since M&A transactions are significantly common in the glass packaging industry, a

strategic sale is usually the most common way of exit. Furthermore, the acquirer would also benefit from synergies created by BA Glass' acquisition. However, given the excessive industry concentration, one should be aware of potential red flags raised by competition authorities. To conclude, Verallia and Ardagh Group are the two potential buyers for this strategic sale, as both would greatly benefit from a consolidation of their current positions in the Eastern European market. For instance, Verallia recently bought Allied Glass from Sun Capital Partners private equity firm.

Finally, BA Glass could also be sold through an IPO. The latter implies that BA Glass shares would be sold and traded publicly. In order to do so, it is expected the company to be listed on the American stock exchange Nasdaq. Since BA Glass intends to expand globally, this market was chosen over the Portuguese market (PSI 20). Furthermore, this decision allows the company to reach a broader range of investors (size of US stock market vs size of Portuguese stock market), as well as serve as an advertisement for the company, which improves its credibility. Although this strategy has several advantages for BA Glass (e.g., increased investor exposure, increased company prestige and credibility), it has also a higher degree of return uncertainty because it is dependent on market conditions.

Considering everything previously mentioned, from the three exit options discussed, both the secondary buyout and the strategic sale appear to be preferable when compared to an IPO, with the strategic buyer representing a potentially higher exit price

Deep dive on financial modeling

This part of the paper explores the discussion of how the financial model is linked to the business plan and how we constructed the assumptions/estimates in a context of limited information and uncertainty. As already mentioned, several assumptions were made in order to build the business model for our investment committee paper. As we all know, the main issue during the development of this paper was the energy crisis because it was believed that it would have a significant on our analysis. Other assumptions had to be made during our research – cullet usage rate and cullet price are two examples. Across this chapter, we will go through all of the assumptions made in our financial model to build this business model.

First and foremost, we forecasted our company's revenues. The expected sales were calculated taking into account the expected increase in volume sold, which is dependent on the (i) weighted growth rate of each region's GDP and urban population, (ii) price, which is highly correlated with the increase in end-market prices in each region, and (iii) finally on BA's ability to pass on some of its cost increases to its clients' prices, which had an impact on our calculations– the latter was calculated by multiplying the change in raw materials costs by 55%, which we assumed to be how much of the increase in raw materials prices can BA Glass can pass on to its client's price. At first it seems easy, but when we start entering into the details of how we arrived at the volume of each region and the price, the story is completely different.

Let's start with the volume – in order to estimate the expected increase in volume in the specific regions, it was assumed that there were three growth drivers:

1. Real GDP growth rate
2. Urban Population growth rate
3. Increasing Glass Trends

Using the data available in Euromonitor about the volume of glass containers produced in the past years, we used solver to perform a goal-maximizing formula that would explain the change in volume of the glass packaging in the past by using the pre-determined growth drivers (not including the 'Increasing Glass Trends'). The coefficients obtained were applied to the future, using the data available of expected real GDP in the future, available in IMF, and in the future urban population, available in Euromonitor. It was assumed that these coefficients would be maintained stable in the future and across regions. Additionally, it was assumed that the increase in glass packaging trends would represent an addition of 1 p.p. to the determined value.

As a result of this methodology, some results were obtained; in fact, we see that the increase in urban population has shown to be the driver with the greatest impact, with a coefficient of 0.49, while the increase in real GDP has a coefficient of 0.2. While BA Glass' volume increased on average 0.4% per year in the past, we predict that BA Glass' volume will increase on average 1.6% per year between 2022 and 2026 using the methodology described above. Western Europe is the region with the highest expected annual growth rate (1.7%) among the regions where BA is present.

Regarding the methodology to arrive to the price – in order to estimate the expected increase in price in the specific regions, it was evaluated the relationship

between the increase in the glass packaging price and the increase in each end-market products' price, specifically to each region. A pattern in the ratio between both prices in the past was founded and applied to the forecasted prices of the end-market products, founded in Statista, resulting in an expected price growth per year, accordingly to the end-market and region in specific. Although there is some cost passage capacity inherent in the increase in end-market products, it was estimated that BA Glass could pass on an additional 55% of the cost increase it faces to the price it charges its clients, due to the numerous competitive advantages described in the report, primarily the clients' high switching costs and the partnership relationship between BA and its clients.

As a result of applying this methodology to the price, the obtained ratios show a **consistent path over the past years** and differ significantly between segments, with the average Beer ratio being 0.4x and the average Spirits ratio being 0.07x. While BA Glass's price increased by 4% on average from 2020 to 2021, it is expected to increase by 25% the following year, owing to the significant impact of the war. Central Europe is the region where BA is present where the price is expected to rise the most in percentage terms per year.

After considering the methodology for volume, price, and results, we calculated the revenues of our business model for the next five years and arrived at a total revenue of 1,9 billion euros by 2026.

After explaining our business model's assumptions that led to the estimated revenues, we move on to the operating costs. To begin, it is clear that the primary cost of BA Glass is the cost of raw materials and consumables. To estimate the future raw materials and consumables expense, we divided it into three categories:

(1) Natural Gas; In order to arrive at the final natural gas consumption in this first caption, three different inputs were required. To arrive at the final value, both historical and predicted estimation were used for each of the three inputs. The number of tons of glass produced is the first input used. For this one, we used the values from the BA Glass Annual Report, and for the forecasted, we estimated the tons of glass produced based on our revenue growth rate. The amount of natural gas consumed per ton of glass produced was the second input. For this one, we also went to the Annual Report to get the historical values, and to get the forecasted values, we used an estimation based on an average of the last 5 years' growth rate (-2%).

Finally, the price of Dutch TTF Natural Gas was used to calculate the final value of the natural gas expense. In the instance of gas prices, rather than assuming that they will rise at the same rate as in the past, we checked the Bloomberg estimates.

(2) Electricity; Our second driver for the raw materials and consumables is electricity. For this one, the assumptions were almost the same with some additional changes. To begin with, tons of glass produced was also used in order to arrive to the electricity and the same methodology as the number of tons of glass produced for gas, was used. The second input was the electricity consumption per ton of glass produced, for which both historical and forecasted data were used – For example, historical values were

taken from the Annual Report of BA Glass, and forecasted values were calculated using an average of the last 5 years' growth rate (i.e., 3%).

The third input was the renewable share (vs. non-renewable share), and we assumed a 2% annual growth rate for the future. We created the fourth input, which is renewable energy from self-production. Essentially, we assumed that each photovoltaic park produces 10% of a plant's electricity and that total electricity is divided equally among the 12 plants, and we also assumed that one additional photovoltaic park will be built every two years beginning in 2022. Finally, the fifth element was the price of electricity, which we divided into two categories: non-renewable electricity, for which we used only the forecasted values (computed using the natural gas price growth rates) for our business plan, and renewable energy, which was forecasted using an average of the last four years (excluding the 2021 outlier) of the price of electricity (values in the Annual Report).

(3) Cullet and Other costs (including CO2 emissions); Our third and last input, concerns the cullet and other costs. For this input, tons of glass produced were also taken into consideration, then the second driver was the cullet consumption – in which we considered historically the values from BA Glass' Annual Report and the forecasted was estimated through a cullet usage rate and the quantity of raw materials used per ton of glass produced.

The third driver was the price of cullet, from which we picked the historical values from Eurostat, and for the forecasted we estimated through an average of the last years growth rate (i.e., 3%). Finally, we decided to calculate a cost savings driver, which is derived from the increasing usage of cullet. Basically, the energy savings are going to represent 0,25% for 1% increase in the cullet usage rate (source was research gate).

This energy savings will be used to calculate the savings from electricity and natural gas, in order to arrive to the cost savings: (i) electricity savings which represent the share of electricity in total energy consumption times the energy savings and (ii) natural gas savings, which represent the share of natural gas in total energy consumption times the energy savings.

With all of this being said, from 2023 onwards, raw material costs are expected to progressively decrease due to BA Glass increasingly becoming more efficient, through efforts to (1) increase cullet usage rate and (2) grow renewable energy production for own consumption. These two measures will in turn reduce energy costs and expenditures associated with CO2 emissions.

Regarding synergies that have emerged from the acquisitions of Zignago, for our business model we assumed a reduction of 2% in raw materials, which is a consequence from a higher bargaining power and increasing supplier network ; then synergies which represent a 2% reduction, regarding Supplies & External services will also emerge due to improvements in logistics and transportation costs as well as warehouse storage efficiencies (since geographies of both players overlap in CE).

Therefore, with this being said, we arrived to an estimation of the total operating costs of 1,3 Billion of euros in 2026 (Table B – Operating costs forecasted).

Across our business model, we arrived at the result that BA Glass more than doubles its EBITDA. Besides the reasoning already explained above, other factors led to this doubling EBITDA, and therefore, a higher FCF:

To begin with, the total EBITDA of the combined group rises at a CAGR of 23% from FY21 to FY26 while EBITDA margin increases from 24% to 36%. The latter is

mainly driven by the strong margins achieved in the premium Beauty & Personal Care segment which is estimated to have a CAGR of 4,6% from FY22 to FY26. In this case, we decided that we wanted to acquire a company, that not only was presented in a different geography than BA glass, in order to expand internationally, but also that presented a new segment for BA Glass diversify its portfolio.

Secondly, we assumed that BA will be able to exploit synergies at an inventory level. This is due to their growing ability to optimize logistics, warehouses, and safety stocks that we assumed that the company will be able to reach it, given its ability to convert cash more quickly while also enhancing inventory liquidity. Thirdly, regarding capex, the maintenance capex is expected to increase as a percentage of tons produced through the holding period and it refers to yearly capex spending to maintain machinery. We decided to postpone the investment by one year, which will be compensated in the following periods. Until 2022, expansion capex is a result of the massive investment activities made to scale growth. From 2022 onwards, expansion investments are mainly attributable to efforts to become carbon free, which we assumed that will be new furnaces and warehouses and photovoltaics park.

In the end, the company progressively increases its FCF from 2022 to 2026, reaching € 361M.

Given our current situation of war and high inflation, we decided that it would be better to create different scenarios in order to better understand how dependent our company is mainly from natural gas, and its ability to pass on the cost to its clients.

Hence, considering the difficulty of creating precise forecasts, two additional scenarios were explored in addition to the base case that was taken into account throughout the work that was carried out, a pessimistic scenario and an optimistic one. In each one of the

three scenarios, four distinct variables will change, which will also impact the EBITDA margins of our work:

- (i) Revenue growth rate
- (ii) Client's price sensitiveness
- (iii) Natural gas prices
- (iv) Level of synergies

The changes that we assumed that will happen regarding the 4 variables in both the pessimistic and optimistic scenario are:

- (i) Revenue growth rate: We assumed that the revenue growth rate i.e., volume growth rate * price growth rate, will increase/decrease by 1,5% given the impact that it will have of the overall economy. In the worst scenario the EBITDA is reduced by 2,2 p.p., which makes this a critical area to focus when making future business decisions.
- (ii) Client's price sensitiveness: BA Glass is able to pass an additional percentage of the increase it faces in costs to the price it charges to its clients, due to its numerous competitive advantages. We assumed that in the pessimistic scenario, instead of being able to pass 55% of the increase in its costs, the company is only able to pass 50%. The latter has a negative impact on the EBITDA Margin, measured in 0,1 p.p.

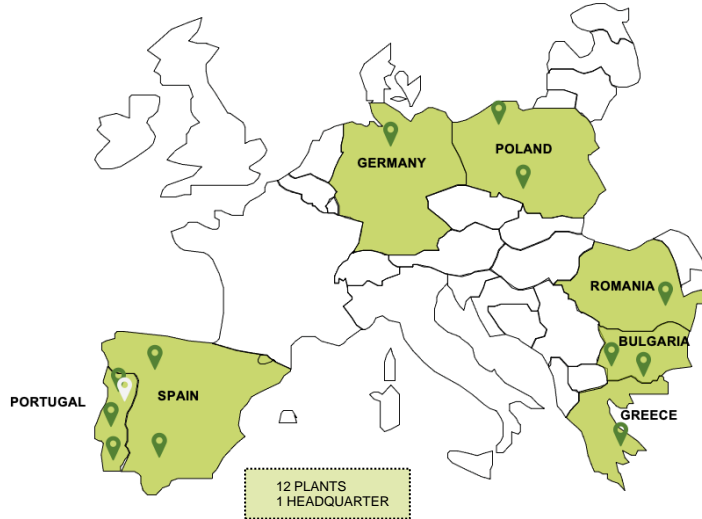
- (iii) Natural Gas price: We assumed that we will have an increase or decrease (+/- 15%) in natural gas prices. In this case, the impact on the EBITDA Margin due to changes in natural gas prices is quite significant. In the pessimistic scenario the margin decreases by 1,2 p.p, so the business should keep working to lessen its reliance on this raw material

- (iv) Level of synergies: This analysis is to evaluate the effect of Zignago Vetro's acquisition on improving current BA Glass operations: COGS and Supplies and external services in Central Europe. The impact on the EBITDA Margin dependent on the pessimistic scenario is minimal (0,1 p.p) which means that this item is not critical when defining the integration plan of both companies.

In conclusion, given the context of limited information and uncertainty, it is critical to have established three different scenarios for our analysis. Those scenarios gave us an idea of how our company will perform over time and what precautions we should take to avoid the pessimistic scenario. All assumptions were carefully chosen in order to deepen our analysis and make the case study interesting. We moved on to the next chapter, which is the valuation, after establishing all of the assumptions and the three scenarios.

Appendix

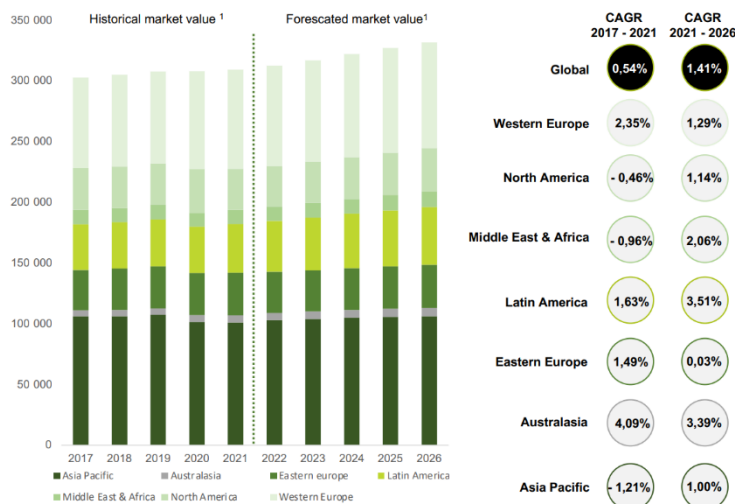
Appendix 1.1: BA Glass geographical presence



Appendix 2.1: Historical Sales from Contract

In millions of Euros	2017H	2018H	2019H	2020H	2021H
Iberia	446	459	508	517	548
YoY Growth in %	-3%	3%	11%	2%	6%
CE	152	173	184	175	183
YoY Growth in %	26%	14%	6%	-5%	5%
SSE	206	223	232	239	286
YoY Growth in %	N/A	8%	4%	3%	19%
Sales from contracts	804	854	923	931	1 016

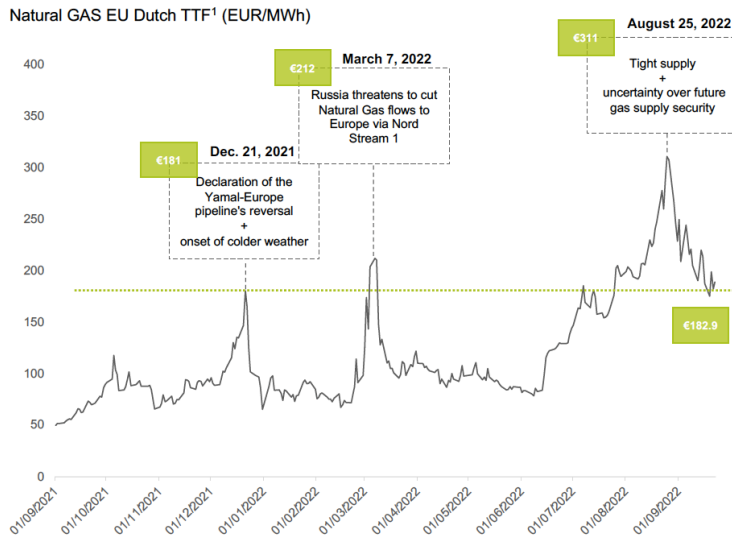
Appendix 3.1: Global Packaging Market by region



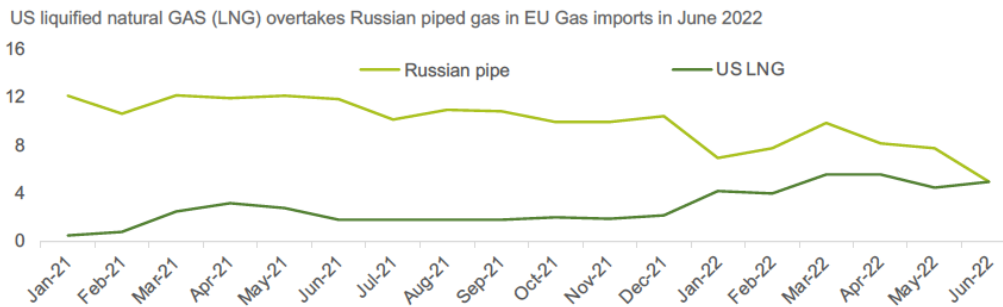
Appendix 3.2: Competitive Landscape

Company	Sales (\$,M)			EBITDA Margin			Net Debt/ EBITDA			CCC			PRODUCT PORTFOLIO		
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021	Beverages	Food	Pharma
CI	5 977	5 343 ▼	5 377 ▲	8,2%	17,8% ▲	15,7% ▼	3,2x	4,0x ▲	3,6x ▼	14	19 ▲	14 ▼	X	X	X
vetropack	643	619 ▼	755 ▲	23,0%	25,1% ▲	19,7% ▼	-0,5x	-0,4x ▲	-0,6x ▼	104	111 ▲	94 ▼	X	X	X
verallia	2 586	2 536 ▼	2 674 ▲	21,3%	23,4% ▲	24,3% ▲	2,7x	1,3x ▼	1,3x ▼	15	-6 ▼	-13 ▼	X	X	
victrola	1 011	989 ▼	1 085 ▲	25,9%	19,6% ▼	16,3% ▼	0,9x	0,4x ▼	0,1x ▼	66	56 ▲	31 ▼	X	X	
BA	932	941 ▲	1 035 ▲	32,5%	34,9% ▲	24,0% ▼	1,8x	1,2x ▼	1,6x ▲	55	44 ▲	-1 ▼	X	X	

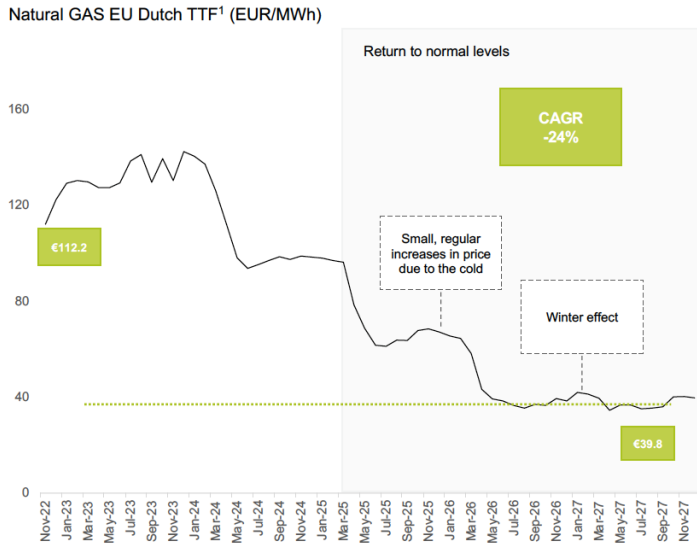
Appendix 4.1: Historical prices for natural gas EU Dutch TTF (EUR/MWh)



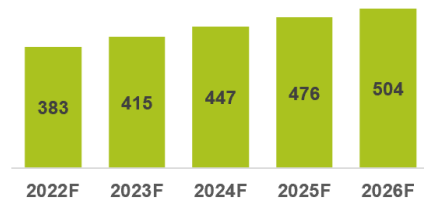
Appendix 4.2: EU imports of gas



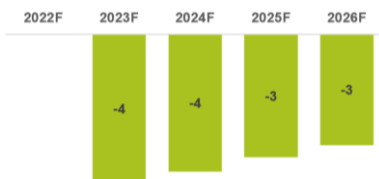
Appendix 4.3: Forecast of prices for natural gas EU Dutch TTF (EUR/MWh)



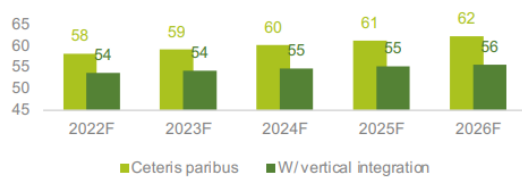
Appendix 5.1 Revenues from Horizontal Expansion (Millions of Euros)



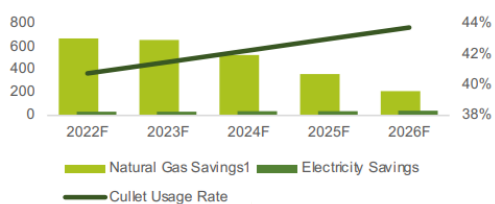
Appendix 5.2. Operational Cost Savings from Horizontal Expansion (Millions of Euros)



Appendix 5.3. Estimated Cost of Cullet (Millions of Euros)



Appendix 5.4. Estimated Energy Savings (Thousands of Euros)



Appendix 6.1: Past transactions in the glass manufacturing industry

Year	Currency	Target Name	Acquirer Name	EV	EV/EBITDA	Status	Average
2020	USD	Verallia	BW Gestão de Investimentos	5 959	9,8x	Completed	7,3x
2019	USD	NFNV	O-I	167	4,2x	Completed	7,3x
2018	EUR	Santos Barosa	Vidrala	253	7,7x	Completed	7,3x
2017	USD	Anchor Glass	BA Glass, CVC	1 040	7,3x	Completed	7,3x
2017	EUR	Drujba Glassworks AD	BA Vidro SA	188	5,2x	Completed	7,3x
2015	EUR	Encirc	Vidrala	409	6,8x	Completed	7,3x
2015	EUR	Verallia	Apollo Global Management	2 950	7,4x	Completed	7,3x
2015	USD	Centor US	Gerresheimer	725	9,8x	Completed	7,3x

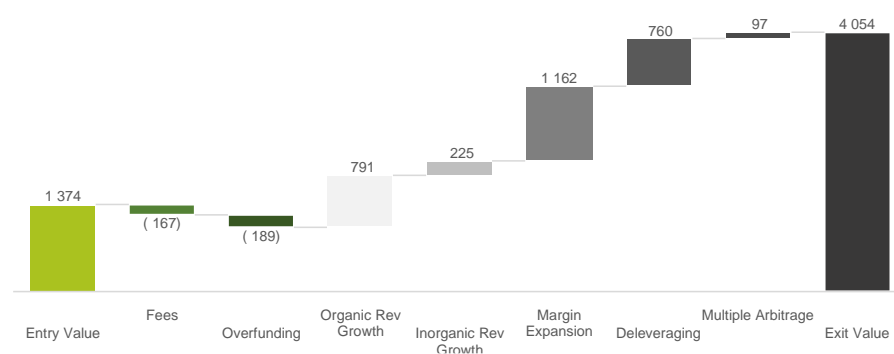
Appendix 6.2: Sources and Uses of Funds

Total Sources				Total Uses	
BA GLASS - 2021					
	€M	x EBITDA	%	€M	
Senior debt					
Term Loan A	0	0,0x	0%	EBITDA 2021*	288
Term Loan B	432	1,5x	19%	Multiple	7,3x
Term Loan C	575	2,0x	25%	Enterprise Value 2 094	
Subordinated debt					
Mezzanine	288	1,0x	12%	Total Fees	3,2% 68
Total Debt (BA Glass)	1 295	4,5x	56%	Due Diligence Fees	1,0% 21
				Advisory Fees	1,0% 21
				Banking Fees	2,0% 26
BA GLASS					
Fixed Return Instrument	883	3,1x	38%	Overfunding ¹	159
Ordinary Equity	143	0,5x	6%		
Institutional Investor	129				
Sweet Equity	14	10,0%			
Total Equity	1 027	3,6x	44%		
Total sources BA Glass	2 321	8,1x	100%	Total Uses	2 321
ZIGNAGO - 2022					
	€M	x EBITDA	%	€M	
Senior debt					
Term Loan D	158	1,5x	21%	EBITDA 2022 (normalized)	105
Term Loan E	264	2,5x	34%	Multiple	6,8x
Total Debt (Zignago)	422	4,0x	55%	Enterprise Value 717	
ZIGNAGO VETRO					
Fixed Return Instrument	348	3,3x	45%	Total Fees	3% 23
				Due Diligence Fees	1,0% 7
				Advisory Fees	1,0% 7
				Banking Fees	2,0% 8
				Overfunding ¹	30
Total sources Zignago	770	7,3x	100%	Total Uses Zignago	770

Appendix 6.3: Capital Structure – senior and subordinated debt

Capital Structure	Term (Years)	Amort.	x EBITDA	Amount	Interest rate
Senior debt					
Term Loan A	5	Amort	0,0x	0	7,04%
Term Loan B	6	Bullet	0,5x	143	7,11%
Term Loan C	7	Bullet	1,8x	516	7,21%
Term Loan D (Recap)	5	Amort	1,0x	105	7,04%
Term Loan E (Recap)	6	Bullet	2,5x	264	7,11%
Subordinated Debt					
Mezzanine	10	Bullet	2,5x	717	8,2% (PIK 5%)

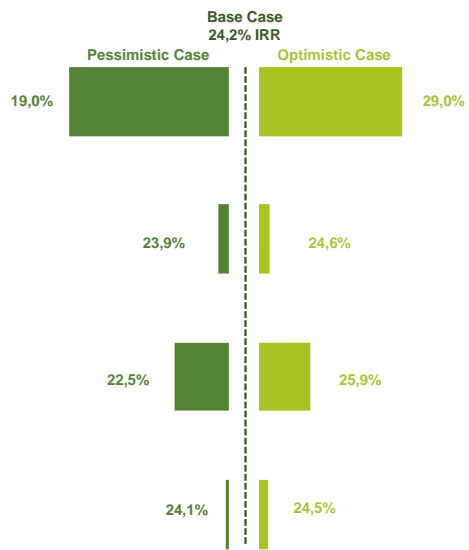
Appendix 7.1: Value Creation drivers



Appendix 7.2: Acquisition return analysis

		w/ Zignago	w/o Zignago
Institutional Investors	IRR	24%	21%
	MM	2,81x	2,57x
Management	IRR	74%	59%
	MM	15,93x	10,09x

Appendix 7.3: IRR sensitivity analysis



Bibliography

Ashford, Kate. "What Is an IPO?" Forbes. Forbes Magazine, September 22, 2022.

<https://www.forbes.com/advisor/investing/initial-public-offering-ipo/>.

"Associados." AIVE. <https://aive.pt/associados/>.

"Benefits of Glass Packaging." Benefits of Glass Packaging - Glass Packaging Institute.

<https://www.gpi.org/benefits-of-glass-packaging>.

Cazalaa, Guillaume, Wesley Hayes, and Paul Morgan. "Private Equity Exit Excellence:

Getting the Story Right." McKinsey & Company. McKinsey & Company,

September 16, 2020. [https://www.mckinsey.com/industries/private-equity-and-](https://www.mckinsey.com/industries/private-equity-and-principal-investors/our-insights/private-equity-exit-excellence-getting-the-story-right)

[principal-investors/our-insights/private-equity-exit-excellence-getting-the-story-right](https://www.mckinsey.com/industries/private-equity-and-principal-investors/our-insights/private-equity-exit-excellence-getting-the-story-right).

Feber, David, Anna Granskog, Oskar Lingqvist, and Daniel Nordigården.

"Sustainability in Packaging: Inside the Minds of US Consumers." McKinsey & Company. McKinsey & Company, October 21, 2020.

<https://www.mckinsey.com/industries/paper-forest-products-and-packaging/our-insights/sustainability-in-packaging-inside-the-minds-of-us-consumers>.

"Glass Packaging Market Report, Growth (2022 - 27): Industry Share." Glass

Packaging Market Report, Growth (2022 - 27) | Industry Share, n.d.

<https://www.mordorintelligence.com/industry-reports/glass-packaging-market>.

“Impact of Glass Cullet on the Consumption of Energy and Environment in ...,” n.d.

https://www.researchgate.net/profile/Ana-Pilipovic-2/publication/260320028_Impact_of_Glass_Cullet_on_the_Consumption_of_Energy_and_Environment_in_the_Production_of_Glass_Packaging_Material/links/546df5de0cf2bc99c2150534/Impact-of-Glass-Cullet-on-the-Consumption-of-Energy-and-Environment-in-the-Production-of-Glass-Packaging-Material.pdf.

“Increasing Use of Glass in Food and Pharmaceutical Packaging Driving Market Growth.” Packaging Strategies RSS. Packaging Strategies, September 2, 2016.

<https://www.packagingstrategies.com/articles/89084-increasing-use-of-glass-in-food-and-pharmaceutical-packaging-driving-market-growth>.

“Industry Data.” FEVE, July 26, 2022. <https://feve.org/glass-industry/data/>.

Manayiti, Obey Martin. “Why Clearlake and Other PE Firms Are Investing in Packaging Providers.” PE Hub, March 23, 2022. <https://www.pehub.com/why-clearlake-and-other-pe-firms-are-investing-in-packaging-providers/>.

Meredith, Sam. “EU Strikes Gas Deal with the U.S. as It Seeks to Cut Its Reliance on Russia.” CNBC. CNBC, March 25, 2022. <https://www.cnbc.com/2022/03/25/eu-strikes-gas-deal-with-the-us-as-it-seeks-to-cut-its-reliance-on-russia.html>.

“New Hierarchical Production Planning Design for Glass Container Industry,” n.d.

“Nord Stream 1: How Russia Is Cutting Gas Supplies to Europe.” BBC News. BBC, September 29, 2022. <https://www.bbc.com/news/world-europe-60131520>.

Panzarino , Helene. “Pros and Cons of Exiting Your Business with a Trade Sale,”

March 26, 2016. <https://www.dummies.com/article/business-careers-money/business/financing/pros-and-cons-of-exiting-your-business-with-a-trade-sale-138629/>.

“Pharmaceutical Glass Packaging Market Analysis, Size and Trends Global Forecast to 2022-2030.” The Business Research Company, n.d.

<https://www.thebusinessresearchcompany.com/report/pharmaceutical-glass-packaging-global-market-report>.

“Pharmaceutical Glass Packaging Market to Show Global Growth of 6%.” European Pharmaceutical Review, October 5, 2018.

<https://www.europeanpharmaceuticalreview.com/news/79823/glass-packaging-market-global-growth-report/>.

“Private Company Exit Strategies - PWC,” n.d.

https://www.pwc.com/hu/hu/assets/pdf/pwc_private_company_exit_strategies.pdf

.

Published by Statista Research Department, and Aug 1. “Italy: Recycling Rate of Glass Packaging Waste 2014-2021.” Statista, August 1, 2022.

<https://www.statista.com/statistics/910793/recycling-rate-of-glass-packaging-waste-in-italy/>.

ReportLinker. “Glass Manufacturing Global Market Report 2022.” GlobeNewswire News Room. ReportLinker, September 15, 2022.

<https://www.globenewswire.com/news-release/2022/09/15/2516747/0/en/Glass-Manufacturing-Global-Market-Report-2022.html>.

SEARA.com. Reports - BA Glass, n.d. <https://www.baglass.com/en/reports.php>.

“Secondary Buyouts - the Ins and Outs.” PitchBook, n.d.

<https://pitchbook.com/news/articles/secondary-buyouts-the-ins-and-outs>.

Suspiro, Ana. “Armazenamento Cheio e Queda De Procura Tornaram o Gás Mais Barato e Dispensam Teto Ibérico No Preço Da Luz.” Observador. Observador, October 19, 2022. <https://observador.pt/2022/10/19/armazenamento-cheio-e-queda-de-procura-tornaram-o-gas-mais-barato-e-dispensam-teto-iberico-no-preco-da-luz/>.

Wakefield, Faith. “Top 25 Recycling Facts and Statistics for 2022.” EcoWatch.

EcoWatch, November 30, 2022. <https://www.ecowatch.com/recycling-stats.html>.

