

# Term Paper W.S. 22/23 –

## Applied Corporate Finance



**Company: Adidas**

**Industry: Textiles, Apparel & Luxury Goods**

**Authors:**

**Lenon Ferreira (ID-No. XXXXX):** Risk and Return; Payout Policy

**Student 2 (ID-No. XXXXX):** Corporate Governance and Shareholder Basis; Capital Structure; Valuation

### Main Results

Beta	0.81
Jensen's Alpha (p.a.) - 10 years of Data	5.17%
Cost of Equity (p.a.)	8.32%
Cost of Debt (p.a.)	1.91%
WACC (p.a.)	7.40%
EVA-Spread (5y. Avg.)	5.89%
Return on Capital Employed (5-y. Avg.)	14%
ROE (5y. Avg.)	21.29%
Total Cash Returned as % of FCFE (5-y. Agg.)	100.7%
Actual Debt Ratio	14.28%
Optimal Debt Ratio	20%
Share Prices (Valuation Day: 2022/11/22)	138.38€
Estimated Share Price	148.87€

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## 1. Introduction (Author: Lenon Ferreira)

Adidas was founded in 1949 in Herzogenaurach, Germany and has become one of the world's largest manufacturers of sports products, with a market value that has reached up to 50€ billion. The company employs 30,000 people and has a presence all over the world. The group is considered one of the most important in Germany and is a constituent of the DAX-Index, along with 39 other companies. Adidas is present as a sponsor of clubs and athletes and has been seeking to embed its brands in the minds of younger generations, with a primary focus on the Millennial, according to its newest strategy "own the game".

The present article aims to analyze the company's financial situation and performance and end with a full-valuation using data over a period up to 10 years. The examination begins with a presentation of the company, its corporate governance, as well as the composition of its shareholders, followed by an analysis of its performance and calculation of its cost of capital, mainly based on information from the market. In the next step, the analysis turns to the company's capital structure and its optimal composition. The work also assesses the amount of cash directed to its shareholders through dividends and buybacks, either through personal interpretation or based on numbers, econometric models, and the market, having the maximization of shareholder's wealth as compass. As Adidas does not provide information about its investments, the evaluation of those is done together with the evaluation of its pay-out policy through performance numbers such as ROE and EVA-Spread.

The date chosen for the evaluation is 22 Nov. 2022. Information about Adidas' balances comes mainly from Capital IQ or its annual reports. Concerning its shares buybacks, Adidas provides detailed information on its website for the period 2014 – 2022. Ex-Dividend and Announcement dates for dividends can be easily found in Refinitiv's database. Share prices used in the analysis are mostly from Yahoo-Finance or Refinitiv. Deeper details about the sources are given in the accompanying Excel-Sheet.

## 2. Adidas' Corporate Governance (Author: Student 2)

A company has several stakeholders: shareholders, the board of directors, society and employees with their respective objectives. However, each corporation has separated ownership, control and management. Ultimately the goal of all groups should be to maximize the companies value. As it is not clear what maximizing value means for each group, a competent corporate governance is necessary to mediate between all groups of interest and align all decisions accordingly to each group.

In Adidas case, this is trying to be solved by establishing a board of directors, consisting of six people and a supervisory board consisting of 16 people. In comparison to other countries, this system is typical in German companies whereas American companies often run a one-tier system consisting of typically more than the six people running the executive board. The executive board is elected by the supervisor board. Those elected, can be active in the position for not more than five years. After that, they can be re-elected. The average female quota of executive board directors in DAX 30 companies is 17%.<sup>1</sup> Thus, Adidas represents a typical DAX 30 company as its female quota is 1/6 (16.67%). Moreover, only one of six members of the executive board of Adidas has not been in a high position of the company or associated companies before. This is also a more European type of approach, as American companies often tend to hire externals for high positions that may have had more expertise in other

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<sup>1</sup>[https://www.odgersberndtson.com/media/10797/dax-report-2021\\_odgers-berndtson.pdf](https://www.odgersberndtson.com/media/10797/dax-report-2021_odgers-berndtson.pdf) S.12

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companies but do not have a strong relation to the company itself. The average time spend in the same company before being elected to the executive board is on average 11.2 years.<sup>2</sup> In Adidas case, the members of the executive board do not all have such a long history in the company, but most do in associated companies of Adidas (e.g. Puma). Another fact that is common in DAX 30 companies which can be seen in Adidas corporate governance is the background of executive board members. On average, a DAX 30 company elects persona who have a strong and diverse filed of experience in the market. In Adidas executive board, only one person did not have any background in the sports or textile industry. This person is currently the head of HR.<sup>3</sup>

As a member of the executive board can only be elected for five years, the average time a DAX 30 executive member is part of the board is only four years. In comparison, the average length of time directors are on the board in American companies is 7.4 years. This also shows the difference in corporate governance culture between German and American companies. One can argue that this favours a better corporate governance as members have more time and experience in the company, but one can also state that the German approach is safer to operational blindness as members must be re-elected after five years anyway.

Another crucial topic in regard to the corporate governance is compensation. In Adidas case, the executive board is being paid 41% of fixed salaries and another 59% of variable incentive payments to establish a “pay-to-performance” approach. This approach discourages unnecessary and uncalculated risk-taking by offering long-term incentives and stock holding.

After all, this approach of corporate governance is effective to find a compromise between management and shareholders. In addition to that, Adidas has a takeover defence score of 0.08 compared to 0.38 for direct competitors.<sup>4</sup> This implies that the company has little to none takeover-defences on its executive board. While this this can be seen as a threat to the company’s current management leaving it open to a potential takeover, it can also be argued that this circumstance encourages the management to perform even more future orientated and focused.

### **3. Shareholder Basis (Author: Student 2)**

Adidas has 191,430 million shares outstanding of which 56.88% are held by public investors and 43.11% by institutional investors. The largest owner is Blackrock with 5.07% of shares outstanding followed by Vanguard with 3.18% and Nns. Luxembourg with 3%. Only 0.55% of shares are held by activist investors with the largest group being the Royal London Asset Management Limited with 0.53%.<sup>5</sup> This can be explained by the critics that arise on Adidas activity in area of the world where there might not be the best of working conditions. Moreover, it can be argued that the sports industry in general might be combating climate change. This is not specific for Adidas, as many fashion brands are not owned by activist investors.

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<sup>2</sup>[https://www.odgersberndtson.com/media/10797/dax-report-2021\\_odgers-berndtson.pdf](https://www.odgersberndtson.com/media/10797/dax-report-2021_odgers-berndtson.pdf) S.15

<sup>3</sup>Adidas anual report p. 18

<sup>4</sup>Capital IQ

<sup>5</sup>Capital IQ/Ownership

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## 4. Risk and Return (Author: Lenon Ferreira)

The role of a company is to maximize the economic value of the capital invested by its shareholders. By investing in a company, investors expect an adequate return to the risk in their investments. The most common model in finance that exemplifies in a simple manner the trade-off between risk-return is the so-called Capital Asset Pricing Model (CAPM), which states that only systematic risk, expressed in the beta ( $\beta$ ) of a company, is to be rewarded.<sup>6</sup> Therefore, the expected excess return on a risky asset is defined to be linear to the excess return of the market corrected for the  $\beta$  of the company. In order to analyze the performance of Adidas and estimate its equity cost the mentioned model will be used.

### 4.1. Adidas' Systematic Risk and The Risk Free Rate of Return

As introduced at the beginning of this section, the CAPM model, used to evaluate performance and estimate the appropriate equity return, requires three components: risk-free rate of return ( $r_F$ ), company's  $\beta$ , and the market risk premium ( $R.P.$ ). At best the estimation of the components should be future-oriented, however, such a deed as well as the theoretical idea of a risk-free asset are unrealistic, since the future is uncertain and no asset is totally risk-free. The definition for an asset to be considered risk-free demands a certain and pre-determined cash-flow size; assets that come closest to this definition are the so-called zero-bonds of strong and advanced economies, such as Germany, the United States or any other zero-bond rated at the highest level of security by credit-rating companies as Moody's, Standard & Poor's and Fitch. For the present case the  $r_F$  was chosen using the geometric mean of a yield curve estimated using the Svensson method, for which the basis were the yields of German zero-bonds of various time to maturities at the valuation day, using a mix of 5, 10, 7, 15 and 30-year bonds. As an outcome an  $r_F$  of 2% p.a. was selected (See Fig.1).<sup>7</sup>

The market portfolio, according to the theory, should be well diversified and representative of the economy in which the analyzed company is inserted. Because Adidas is one of the members of the DAX, and the index holds the blue chips of the Germany economy using it as a proxy for the market portfolio is intuitive. It follows that the estimation of  $\beta_{Adidas}$  will have the fluctuation in the DAX return as benchmark. There are several methods for estimating the  $\beta$  of a company, here two of them are presented: the regression and the bottom-up methods. The regression  $\beta$  is estimated by OLS and it is mainly based on the past returns of Adidas' shares and how they fluctuated with the returns of the market portfolio. In this case, the estimation method has a strong assumption: the future will be as much as possible similar to the past and that the parameters of the model are constant over time. When the OLS assumptions are fulfilled, it yields the best linear unbiased estimator, and as the information set increases to infinity, the estimator converges to its true population value, i.e. not only the fulfilment of the assumptions is of crucial importance, but also the sample (information) size.<sup>8</sup> With this in mind, monthly returns between Jan. 2013 to Nov. 2022 were used in the estimation, accounting for 119 obs. With 95% confidence level  $\beta_{Adidas} \in [0.52; 1.04]$  with

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<sup>6</sup>The excess return of an asset is defined to be the amount it earns above the risk free rate  $r_i^{Ex} = r_i - r_F$ . In the case of the market, it is known as risk-premium.

<sup>7</sup>The geometric mean was actually 1.97% and was rounded up. For comparison: The newest issued 10-Year zero-bond were trading at a yield of 1.96% and the 15-year bond at 2.099%, hence, 2% is not unrealistic, but a matter of duration and can be achieved by mixing a portfolio with 70.60% of the 10-y-bond and the rest with the 15y with a duration of 10.49-years. For further discussion, see Excel-worksheet 3.1..

<sup>8</sup>Further assumptions are:  $\varepsilon^{i.i.d.} \mathcal{N}(0, \sigma)$ ; correct (linear) functional form, no perfect multi-collinearity, exogeneity of the regressors. Further discussion is found in the Excel-worksheet 3.2. and in the python file inside it.

$\mathbb{E}[\beta_{Adidas}] = 0.78$ . However, although all other OLS-assumptions are satisfied, a cumulative sum of squares test for structural breaks shows a rupture in the series around 2020 (See Fig.2). To obtain a clearer picture of Adidas' systematic risk, a bottom-up  $\beta$  was also computed, the method consisted in partitioning Adidas-business into segments and deriving its beta from active companies in each one of them, adjusting for Adidas-specific characteristics.<sup>9</sup> The results were an unlevered beta of 0.84 and a levered beta of 0.94 and the  $\beta$  chosen for Adidas is 0.81. Another result of relevance to the analysis is the  $R^2$  of the regression. Using the entire range mentioned above, 22.4% of the variation in Adidas' return can be explained by variations in the market, therefore 77.6% of Adidas' risk is inherent to the company. Importantly, if we limit ourselves to the period 01.11.2018 to 01.11.2022, Adidas' regression  $\mathbb{E}[\beta]$  rises to 0.8355, and its  $R^2$  to 28%, i.e. probably due to Pandemic, Adidas is faced with a higher risk from the market.

## 4.2. Adidas's Cost of Capital

Having estimated the company's  $\beta$ , and found an appropriate  $r_F$ , the next element needed to complete the CAPM model is to estimate a value for the market  $R.P.$ . One of the methods used is the calculation of the so-called implied risk premium. The advantage of this method is that, like the yield curve for the risk-free rate of return, it is future-oriented and it consists in finding the risk premium that produces the present value of the DAX given futures cash flow from the projected market growth. The difficulty in this process lies specifically in finding an appropriate value for the index growth for the next 5 years. The problem was solved by researching in Refinitiv's database an expected earnings growth rate for each one of the 40 companies in the index, and weighting the growth rates according to their market value, which yielded a growth rate 8.75% p.a. The long term growth rate is set to be the same as the risk-free rate of return. Given these information and an index level of 14422.35, the implied risk premium is 4.96% p.a. However, this result has to be adjusted to the markets where the company produces its cash-flows; Adidas had in 2021 37% of its net sales in the EMEA region, 24% in North America, 22% in China, 10% in Asia Pacific and 7% in Latin America. To adjust the implied premium risk to the reality of these regions, 10-year in euro denominated bonds from representative countries for each region were used, a default spread computed and added to the implied risk of the German market. Moreover, as the default spread is representative for debt instead of equity, a further adjustment was carried out by multiplying the default spread with the ratio of the volatility in the equity bond market of each country. Even in the North America (Canada) case whose bond-rating is the same as the German one, a default spread of 0.983% could be observed, which probably reflects the inflation difference between those two countries. After all adjustment, we computed a net-sales weighted (implied) risk-premium of 6.41% p.a.

Note that the implied risk premium is just one more piece of information that we got for a specific day. If it were calculated on another day or at another time, it would have been different. Since the risk premium is an independent and identically distributed random variable, to obtain a value consistent with the long-term valuation, its distribution has been estimated by bootstrapping. Bootstrap however assumes that the free rate of return and the adjustment according to net sales has been and will remain the same as computed for 2022. The implied risk premium was added to the set of observations as new piece of information about the distribution among all the others we had for the last 10 years. So, in a total of 15000 iterations, a sample with resampling has been taken from the historical values and an average computed, this allowed us to estimate

<sup>9</sup>See Excel-worksheet 3.3.. We tried to make the sample as representative as possible to the distribution of the net sales of Adidas.

a density (See Fig.2) and pick its mean as the expected value for the Risk-premium of Adidas, which is 0.626% monthly or 7.77% in annual terms.<sup>10</sup>

Putting together all the information computed so far allows us to calculate Adidas' cost of equity, which was estimated at 8.32% p.a. The cost of the company's debt was estimated at 3.257%, being this the yield of the longest bond brought to the market by the company, lasting until 2035/09/10. In order to calculate Adidas' weighted average cost of capital (WACC), the theoretical equity value of 34,050.61€ million, calculated along with the bottom up beta was used and the total value of its debt was taken from the balance sheet disclosed at 2021/12/31, being 5,331€ million. Given a tax rate of 27%, the weighted average cost of capital of adidas is estimated to be 8.32% p.a.

### 4.3. Valuation of Performance

One advantage of returning Adidas' excess return over the one of the market rather than the return itself is that the intercept of the regression line can be understood as the so-called Jensen's Alpha ( $\alpha_j$ ). Jensen's Alpha is the amount of the company's return above the value expected by the CAPM model, and can be interpreted as a measure of performance due to actions taken within the company. Limiting the analysis to the period 2013/01 – 2019/11 when the Corona Pandemic began, Adidas presents a  $\alpha_j \in [0.16\%; 2.97\%]$  per month with 95% probability, with  $\mathbb{E}[\alpha_j] = 1.563\%$ , in annual terms this accrues to surprising 18.76% (See Fig.4), the performance is the second best among its peers, losing only to Nike, whose management's monthly performance is 1.594% (19.13% in annualized terms) and can be considered Adidas' number 1 competitor. For each unit of systemic risk, Adidas obtained a 2.84% monthly excess return (Treynor's Measure) and 27.88% for each unit of volatility (Sharpe-Ratio). Not only did Adidas management perform surprisingly well, but its systemic risk was lower than the current one (0.70). Using the method proposed by Markowitz for optimal portfolio selection, in a world of only two shares (Adidas and the market), the optimal portfolio would be composed of 85.25% Adidas and 14.75% DAX, with a SR of 28% per month. As can be seen in Fig.4, Adidas performance beats the market by far. While the monthly mean return for Adidas was 2.14%, DAX and the peer-group return were only 0.7658% and 1.076% respectively.<sup>11</sup>

With the start of the pandemic Adidas' sales worsened dramatically, comparing the company's total sales at the end of 2020 with 2019, there is a drop of –22% and its operating margin fell from 11% to 4%, not fully recovering until the end of 2021.<sup>12</sup> Adidas motivates the drop due to the pandemic and trade tensions in China, which is of significant importance for the company's revenue. For comparison purposes, including the remaining data in the analysis, i.e. stretching the dataset to 2013/11 – 2022/11, the constitution of the tangential portfolio is only 38.04% Adidas and 61.96% DAX, Adidas Jensen's  $\mathbb{E}[\alpha_j] = 0.431\%$  per month and we cannot exclude under 5% significance level that Jensen's Alpha is actually zero. The shock to the company must have been so hard that it seems to have destroyed in three years almost all the value produced between 2013 – 2019 (See Figs. 5 and 6); its monthly mean return drops to 0.981% and their variance rise from 0.502% to 0.819%. For example, had an investor invested in Adidas at the beginning of 2013 and sold his investment at the end of 2019 the return achieved would have been 25.32% p.a.. Had the same investor invested at the

<sup>10</sup>The value was annualized using compounded values. By multiplication the value is 7.75%. For further details, see excel-sheet 3.4. and 3.5.

<sup>11</sup>The peer group is a portfolio equally weighted composed by Puma, Hugo Boss, LVMH, Inditex, Nike, Zalando, and Kering. The group is recommended by Refinitiv and belongs to the textil industry. All cited measures of performance can be found in the Excel-Worksheet 3.2.

<sup>12</sup>Figures are given in Excel-worksheet 5.3..

beginning of 2020 and sold his investment at the end of 2022, the avg. annual return would have been  $-34.53\%$ , and the performance would have been even worse had the investment occurred at the beginning of 2022.<sup>13</sup> Since the beginning of 2022 Adidas has lost 50% of its market value (See Fig.6). However, it should be noted that the year 2022 was not only difficult for Adidas, the two other big players in the German textile market, Puma and Zalando also had catastrophic results,  $-53.04\%$  and  $-60.75\%$  in their respective market values. Still, in cumulative terms over the last five years, none have had such negative results as Adidas. And there is no improvement foreseen for the state of the company, which besides disastrous numbers in China, has to deal with Keyne West's anti-Semitic statements and the cost of disinvestment in Russia.<sup>14</sup>

## 5. Capital Structure (Author: Student 2)

The debt to capital ratio is a crucial figure in the analysis of a corporation. Often shareholders' interests are heavily linked to the amount of debt a company has, since it tells investors how much capability for further future investments there is. Moreover, it can be argued that some companies only prospered in the last decade, because of the fact that historically low interest rates made it very attractive to acquire debt.<sup>15</sup> Adidas has a  $D/C$  ratio of  $14.54\%$ , with a debt of 8,027.20€ million and operating lease commitments of (discounted) 2,698.52€ million.<sup>16</sup> Whether this  $D/C$  ratio is not too low in comparison to its peer group and if there is a better perhaps optimal capital structure that can be determined, will be discussed in the following.

There are several possibilities to answer the question of a company's optimal capital structure. The most common method is the cost of capital approach. This approach assumes that corporations maximize their value by operating on the lowest WACC possible. It is calculated by assuming several different  $D/C$  ratios. With different  $D/C$  ratios, the beta as well as the Cost of Equity change and ultimately a different WACC is the outcome. The calculation is based on Adidas' actual EBIT of 2,167.60€ mm which is adjusted by the current year operating leases expenses and a tax rate of  $27\%$ .<sup>17</sup> This tax rate dynamically adjusts to the interest expenses. Applying different  $D/C$  ratios, Adidas has an optimal  $D/C$  ratio of  $20\%$ . It could be argued that this strongly depends on the current EBIT of the company, so the EBIT was changed twice: first  $-10\%$ , second  $+25\%$ . In the first case, the optimal  $D/C$  ratio was  $20\%$ , in the second case it went up to  $30\%$ .

The second way to find out the optimal  $D/C$  ratio is the enhanced cost of capital approach. This approach is similar to the cost of capital approach, but it is complemented by another variable: the bankruptcy cost. This is an essential point to consider in calculating the optimal  $D/C$  ratio, since the probability of insolvency also changes with a change in revenues. This possibility is considered here. Instead of EBIT, the EBITDA was used here. Three distress scenarios were developed and plotted like in the first approach. In all three scenarios, the optimum  $D/C$  ratio has remained at  $20\%$ . The main difference between these two approaches is the different WACC: as the ratio changes,

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<sup>13</sup>With "the end of 2022" we mean until the valuation day at 2022/11/22. Note that although 1 month was left until the end of the year, we discounted the return as a whole year.

<sup>14</sup>BBC tackles China and Keyne West's issue <https://www.bbc.com/news/business-63387607> and Yahoo Finance addresses the Russia-Problem <https://finance.yahoo.com/news/adidas-cuts-2022-outlook-161238780.html>.

<sup>15</sup><https://www.handelsblatt.com/finanzen/banken-versicherungen/banken/insolvenzen-die-angst-vor-zombiefirmen-waechst-4-gruende-warum-sie-gefaehrlich-sind/22625906.html>

<sup>16</sup>Excel sheet tab capital structure

<sup>17</sup>Excel sheet tab capital structure



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the WACC in the enhanced cost of capital approach is significantly higher and rises steeper than in the cost of capital approach. Nevertheless, it remains optimal at 20%. The third option to determine the optimal  $D/C$  ratio is the adjusted present value (APV approach). This approach starts by calculating the enterprise value excluding debt. After gradually calculating the debt, we consider the net effect on value by considering both the benefits and the costs of borrowing. After that, we see the enterprise value at the respective level of debt. At the point where the enterprise value is highest, the debt ratio is considered optimal. In this analysis, the following values were determined: Unlevered Value of Firm 55,908.50€ mm. Under the general assumption of bankruptcy cost being 25% of the enterprise value, the expected bankruptcy cost were calculated using these probabilities. This resulted in a optimal  $D/C$  ratio of 10%.<sup>18</sup>

The cost of capital approach, as well as the enhanced cost of capital approach, both determined an optimal  $D/C$  ratio of 20%. Whereas the outcome of the APV approach as 10%. An advantage of the cost of capital approach is that it is easier to calculate debt proportions, whereas with APV approach is more suitable for corporations that are evaluating the feasibility of adding an amount of debt. To ensure that these outcomes are aligned with the market an peer group standard, two regressions have also been calculated to calculate the optimal  $D/C$  ratio depending on a list of German companies and the peer group of Adidas. The optimal  $D/C$  ratio of 42.93%, which was calculated based on the peer group data, could be misleading. This is because the prediction also includes data from companies that have nowhere near the market capitalization or market share of Adidas, and so they could distort results, which is ultimately reflected in the  $R^2$  (only 11.87%).<sup>19</sup> The second regression calculated with the German listed firms data has an acceptable  $R^2$  of 0.72%, but the prediction of 36.11% should also be put in relation to the industry. Hardly any company has a higher  $D/C$  ratio than 50%. An expansion of the  $D/C$  ratio to over 50% is not justifiable in the market environment. After reviewing all arguments, the conclusion is that the  $D/C$  ratio should be raised to 20%.

There are several options to increase the  $D/C$  ratio. The first would be for the company to take on new debt to make buybacks. This is the more sensible option compared to financing new projects. The sporting goods market is a saturated market that thrives on new products rather than breakthrough inventions for everyone. Even if Adidas were to decide to invest in countries that are becoming more sports-savvy, such as countries where the middle class is growing, it would face the same challenges in the medium to long term that the market there would also be saturated. Adidas has taken on 3.5\$ billion in new debt, divided into four tranches that mature from March 2025 to March 2050. Interest rates range from 2.7% – 3.975%. This also shows that investing the money in new projects makes little sense for the company when new debt is relatively cheap. Adidas states this new debt is used for general corporate business purposes. The second option, that Adidas sells its assets, also amounts to distributing the excess money to shareholders. This can be counterproductive damage Adidas dominant position and the peer group.

## 6. Pay-out Policy (Author: Lenon Ferreira)

Dividends and share buybacks are the two means by which a company returns cash to its shareholders. According to the theory, in a perfect market there would be no difference between these two forms, since by repurchasing the own shares, the stock price

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<sup>18</sup>Excel sheet tab APV

<sup>19</sup>Excel sheet RAW data peer group

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increases and shareholders can make their own home-made dividends. As explained in the next section, in reality, there is a difference in the tax treatment according to how companies return cash to shareholders. The way and amount a company should return to its investors is dependent on its clientele, the efficiency of its projects and on the cash available to be paid out.

## 6.1. The Best Way to Return Excess Cash

When a company announces a dividend, investors who buy the share three days before its payment are still eligible to receive it, in this case price is said to be cum-dividend ( $P_{cum}$ ), after this period the price is called ex-dividend ( $P_{ex}$ ). Given that the present value of a stock is the discounted sum of all its future cash flows, the stock price should fall by the amount of dividend as soon as the stock enters the ex-dividend period creating a capital loss ( $CL$ ), i.e.  $P_{cum_{t-1}} - P_{ex_t} = CL_t = D_t$ . Nevertheless, this relationship does not account for differences in taxation between dividend and capital gains. The no-arbitrage assumption demands the relation  $CL_t(1 - \tau_g) = D_t(1 - \tau_d) \Leftrightarrow CL_t = D_t \frac{1 - \tau_d}{1 - \tau_g}$ , where  $\tau_i$  represents the tax-rates. Is this ratio lower (higher) than one, the tax on dividends (capital gains) is higher (lower) than on capital gains (dividends) and investors have a preference for share buybacks (dividends).

In order to determine the optimal way to return cash from the perspective of shareholders, we conducted a regression analysis of capital loss (CL) against dividends paid between 2000 and 2022. We defined  $P_{cum}$  and  $P_{ex}$  as the closing price one day before and the opening price on the first ex-dividend day of the stock. The results of our analysis indicate, with 95% confidence, that the ratio of  $\frac{1 - \tau_d}{1 - \tau_g}$  falls within the range of 0.15 to 0.86. It's important to note that the sample size of our regression analysis is limited to 22 observations, so this range should be interpreted with caution. Nonetheless, our findings suggest that Adidas shareholders have a preference for share buybacks, as 1€ paid in dividend is equivalent to a value  $\in [0.15\text{€}, 0.86\text{€}]$  in capital gains. This preference was consistent across all the other companies in our peer group.<sup>20</sup>

Adidas appears to be aware of this preference, and despite regularly paying dividends in the years from 2017 – 2021, with the exception of 2020 due to pandemic-related market uncertainties, 56.37% of the total amount returned was through share buybacks. Among its peers, only Nike has consistently used share buybacks as a means of returning excess cash to shareholders in the past 5 years, with 69.07% of its excess cash returned in aggregate values through buybacks.

## 6.2. Valuating the Amount Returned

In total, over the last 5 years (excluding 2022), Adidas returned an amount of 5,535.092€, where 2,414.72€ were dividends with an average yield of 1.05% p.a. and 3,120.37€ share buybacks. Its free cash flow to equity (FCFE) was calculated to be only 5,494€ and its net income 7,323€. In summary, Adidas had a dividend payout ratio of 43.63% of its net income, consistent with the company's internal expectations. However, the company returned 100.7% of its free cash flow, which indicates overpaying.<sup>21</sup>

To analyze the market's reaction to dividend payments and share buyback announcements in 2022, an event study was conducted where the estimated model includes the market (DAX) and a representative industry index (MSCI Textile & Apparel Europe) as

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<sup>20</sup>Note that we regressed the capital loss on the dividends in real values. The base year was chosen to be 2022. Further details are given in the Worksheet 5.1. as well as in the Python file for dividends. Information About Share-buybacks are found in the worksheet 5.5.

<sup>21</sup>All values are given in million. Further details in the worksheet 5.3.

independent variables and Adidas' return as the dependent variable, using 42 observations before the event window to estimate the parameters. Observing 5 business days during and after the event, an analysis of variance on the residua was conducted to infer whether the cumulative abnormal return (CAR) and the buy-and-hold abnormal return (BHAR) could be explained by the model or was related to the event. As for the Share buybacks, the market seems to have been indifferent to the company's share buyback initiation announcements (See Fig.10). The situation is quite different when analyzing the dividend announcement day for 2022, where Adidas' return presented a statistically significant return of 6.20% (See Fig.11) One possible explanation for this difference in abnormal returns on share buyback and dividend announcement days is that while share-buyback is an indication of how Adidas sees its situation, and buying its own shares can mean a self-evaluation not consistent with that of the market, the payment of a dividend is a signal to the market that the company will be able to bear these dividends in future times, since the value of the dividend paid tends to be constant. Another interpretation is the market's evaluation of Adidas' projects, which, having no innovation in sight, returns excess money to its investors and the market reacts positively.

Regarding the company's project performance, its return on equity in the last 5 years averaged 21.29%, higher than the companies analyzed, which had an aggregate avg. return on equity of 20.94%. The company's EVA-spread had its highest value in 2018, reaching 18%, but since then the situation has been deteriorating, with 5% in 2019, -5% in 2020, and 8% in 2021. Whether the company will create value above its WACC in 2022 is uncertain. Given the negative FCFE in 2021 and the market's reaction to share buybacks in 2022, we classify Adidas as a sick child, but with great potential, and recommend that the company focus more on its internal problems, reduce its dividends and buybacks, and invest in projects with value-added, in order to become profitable again in the near future.<sup>22</sup>

## 7. Valuation

In the final part of this analysis, the previous calculations and considerations are brought together to look at an overall picture of Adidas and determine a share price. Here the discounted cash flow method is used because Adidas has changed its debt ratios regularly and a change in the future is not excluded. To work with this method, some assumptions must be made. First, it is assumed that Adidas will enter a high growth phase with its market power and market share in the next 5 years. After five years, Adidas will move to gradually reduce the growth rate and finally reach a steady state after ten years. To support this with numbers, the following calculations are made: first, the FCFE must be discounted. These amounted to 1.249,58€ mm. in 2021 while the discount rate is the cost of capital. These changes depend on the debt ratio, which itself develops dynamically with the 10 years. In the growth period, years 1 – 5, the debt ratio is assumed to be the one already calculated, namely 14.28%. Thereafter, it increases linearly to the optimal  $D/C$  ratio of 20% in year 10.<sup>23</sup>

Accordingly, the discount rate in the first 5 years is 6.47% and subsequently, it decreases to 6.53%. This also has the background that the beta over the 10 years moves towards 1, as older companies like Adidas tend to have a beta of 1 over a longer period. The CAPM or cost of equity will change in parallel with the changing beta, increasing

<sup>22</sup>Details about Event-Study can be found in worksheet 5.2. and about EVA and ROE in worksheet 5.4.

<sup>23</sup>Excel sheet Valuation

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from 7.26% in the growth period to 8.41% in year 10.<sup>24</sup> The question of the growth rate can be explained by multiplying the ROIC and the equity reinvestment rate. However, the equity reinvestment rate in 2021 was 74.75%, which indicates a liquidation of the company in the long term. However, it must be noted that the year 2020 – 2021 were strongly affected by Corona and Adidas had immense problems getting the problem under control initially. Since the company will show a different growth rate after Corona than before the Corona pandemic, looking at the average of the last 5 years is not helpful. After calculating the cost of capital for the respective years and discounting the respective cash flow, a price per share of 148.87€ is obtained, which is slightly above the traded price of 138.38€. This may also be due to the assumptions made, which are very individual and therefore cannot be considered a prediction, but rather a possible variant of the price.

## 8. Conclusion (Author: Lenon Ferreira)

In our analysis of the company, we were able to show that Adidas attempts to balance the task of maximizing the utility of its stakeholders with the support of a board of directors with 6 people and supervisory board with 16 people, whose system is typical of German companies. The company's corporate governance measures are effective in finding a balance between management and shareholders, and the company relies on a "pay-to-performance" method as a way to motivate its employees.

Specifically regarding the company's performance during the analysis period, Adidas can be divided into two categories: before and after the start of the pandemic. In the pre-pandemic period, the company presented very promising results, being one of the best companies among the group analyzed, only behind Nike. However, these results could not be sustained after the pandemic. Adidas is faced with internal management problems, a drop in sales following a boycott in the Chinese market, costs due to divestments in Russia, and a problematic (ended) partnership with Kanye West, whose statements do not align with the worldview of the generation that Adidas' business strategy is said to focus on. Furthermore, in terms of aggregate values, the company paid more than 100% of its FCFE, supposedly this number is linked to the amount returned by its competitor Nike, and Adidas feels pressured to do the same as a strategy to attract or not lose investors. However, we advise the company to first solve its internal project and management problems, as the company's market value has fallen by more than 50% between the beginning of 2022 and the day of our evaluation. As exemplified, neither the company's ROE nor its EVA-Spread has returned to its pre-pandemic level. Regarding how Adidas returns cash to its investors, the company presents a good balance between dividends (43.63%) and share buybacks (56.37%) in aggregated terms. As analyzed through a regression, the average investor in the company, practically public and institutional investors, appears to have an advantage in the tax rate on capital gains over dividends. However, by paying dividends, the company also shows interest in its smaller investors, who may not have as much knowledge about tax optimization.

The company follows an optimized capital structure, which reduces its cost of capital and makes it more financially efficient. The estimated value for D/C of 20% (10%) is close to the company's current metric 14.28%.

Despite the problems outlined during the analysis, Adidas can be, and has shown to be, a company with a lot of potential. With an estimated stock price at 148.47€, its share was trading at a difference of only -7.58% on 22 Nov. 2022, i.e. 138.38€, hence

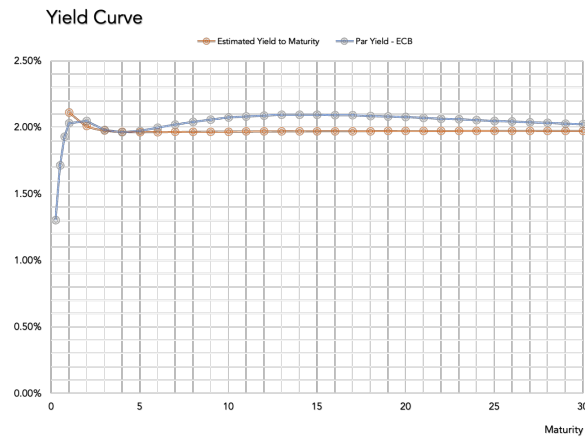
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<sup>24</sup>Excel sheet tab APV

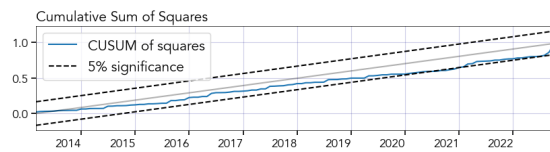
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we conclude that, given the small difference, the company's value is in line with the reality reflected in the market.

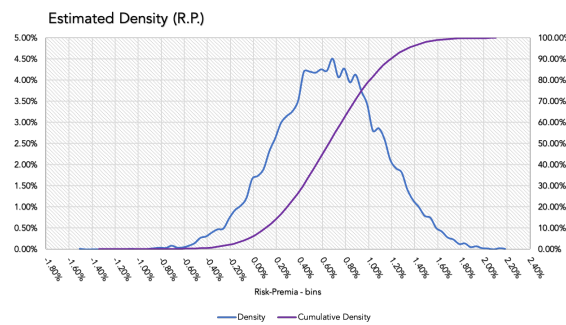
## A. Pictures



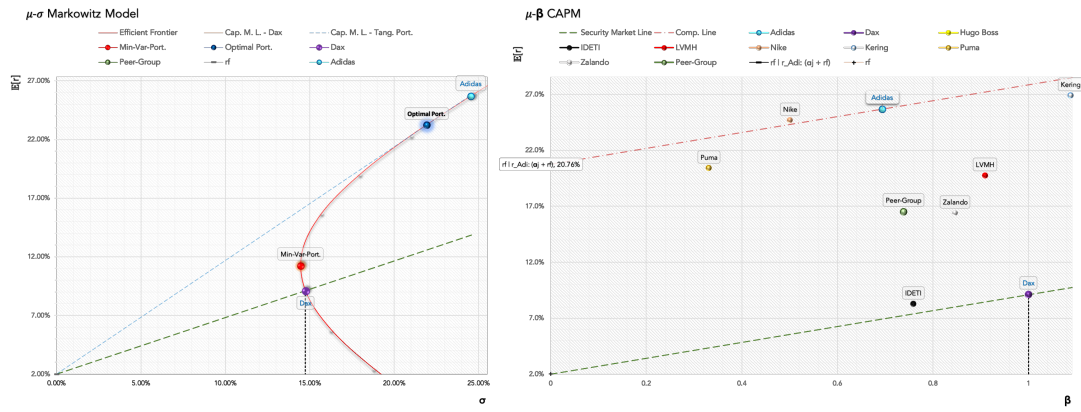
**Fig. 1: Yield Curve:** In orange is the yield curve estimated using german zero-bonds with 5, 10, 7, 15 and 30 years maturity. As matter of comparison, the blue curve is the one estimated using the parameters values for the Svensson method available at ECB website for the date 2022/11/22.



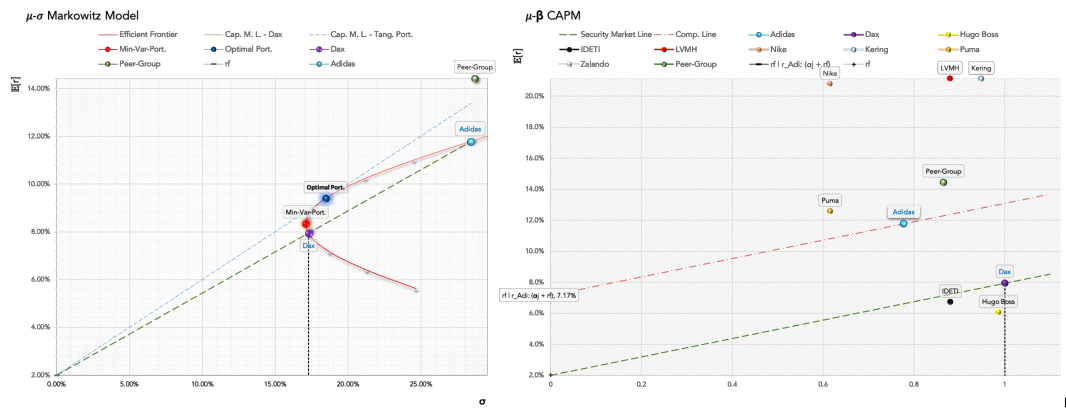
**Fig. 2: Test for Structural Breaks:** The cumulative sum of squares is a test based on the residuals of the regression, whenever the expected value crosses the significance level line, there is a break in the series.



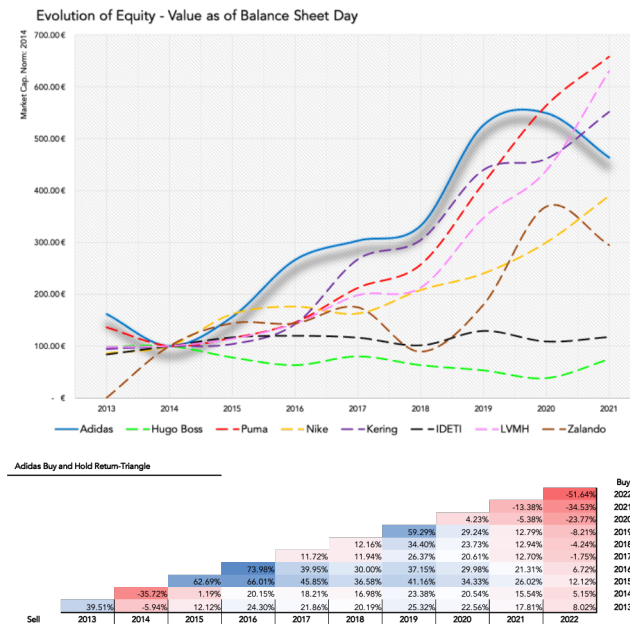
**Fig. 3: R.P. Dentisy:** The blue curve is the estimated Density for the Risk-Premium of Adidas. The purple one illustrates the the cumulative density. As it is expected by the central limit theorem, after 15,000 iterations (observations), the distribution is similar to a bell-shaped curve (normal distribution) and has first and second moments equal to  $(\mu; \sigma^2) = (0.626\%; 0.002\%)$ .



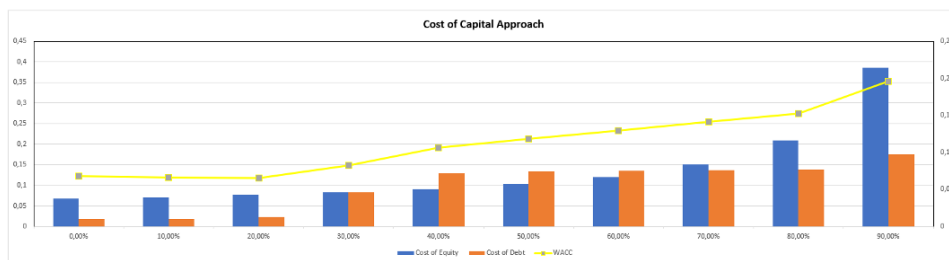
**Fig. 4: CAPM and Markowitz Model 2013/01 – 2019/11:** The picture on the left shows the composition of the best portfolio composed by Adidas and the DAX. The tangency (optimal) portfolio is much closer to Adidas, than to the DAX itself and given their positive correlation, this indicates better performance by Adidas. The picture on the right shows the return of Adidas, of the constituents of the peer group as well as of the Dax. The distance between the red and the green line is Jensen's Alpha, had adidas performed as expected by CAPM, it would lie on the green line. All portfolios between the comparison and the security market line had a performance worse than Adidas. For reasons of comparability we used only the German Risk-Premium to compute Adidas' Jensen's Alpha and did not adjusted it for net sales.



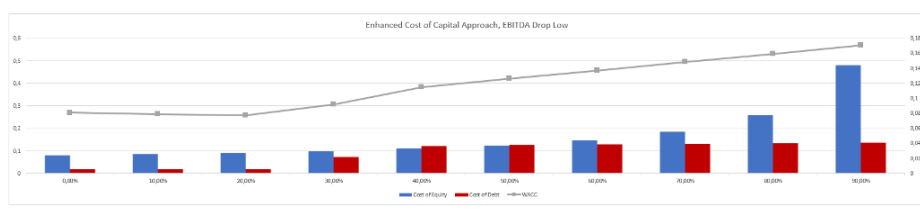
**Fig. 5: CAPM and Markowitz Model 2013/01 – 2022/11:** The picture on the left shows the composition of the best portfolio composed by Adidas and the DAX. The tangency portfolio is now closer to DAX then to Adidas. The picture on the right shows the return of Adidas, of the constituents of the peer group as well as of the DAX. The distance between the red and the green line is Jensen's Alpha, comparing it with the range 2013/01 – 2019/11 the reader finds a reduction of 72.44% in Adidas Jensen's Alpha.



**Fig. 6: Equity Value and Buy and Holding Return Triangle of Adidas:** The first picture illustrates the evolution of the Market Cap given the Balance-Sheet day price of both Adidas and its Peers. The Market Cap was normalized with the base year 2014, to make the comparison easier. The second picture shows a Buy-and-Hold return triangle. Uniting both pictures it is possible to see that Adidas has lost over 50% of its market value between the disclosure of its Balance-Sheet in 2021 up and valuation date Nov. 2022.

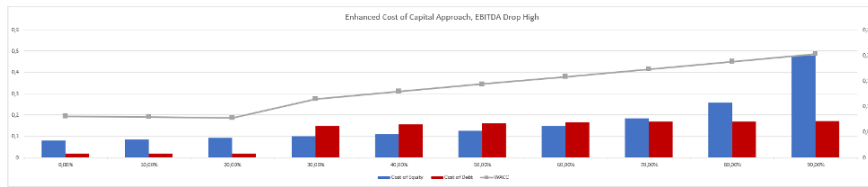


**Fig. 7: Cost of Capital Approach**



**Fig. 8: Enhanced Cost of Capital Approach, EBITDA Drop Low**

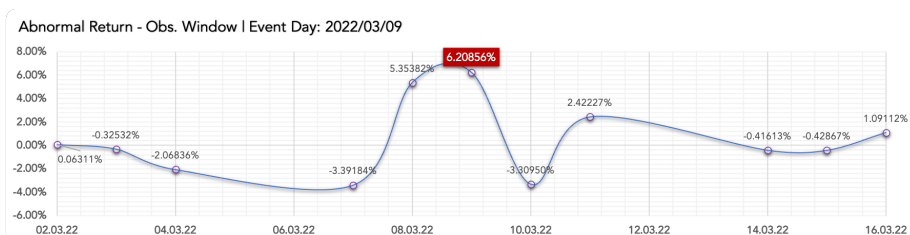




**Fig. 9: Enhanced Cost of Capital Approach, EBITDA Drop Low, EBITDA Drop High**



**Fig. 10: Abnormal Return | Event Type - Announcement on Initialization of Share-Repurchases:** The picture shows the abnormal return in the event window 5 days after and before Adidas announced it would start repurchasing its own shares on different dates in 2022.



**Fig. 11: Abnormal Return | Event Type - Dividend Announcement:** The picture shows the abnormal return in the event window 5 days after and before Adidas announced it would pay a dividend in 2022.

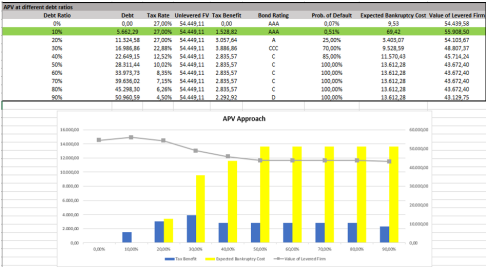


Fig. 12: APV at different debt ratios.

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## References | Theoretical Background

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