

An Equity Valuation and Investment Recommendation for BASF

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Abstract- With the intention of making a final investment recommendation, this thesis is written in the format of an equity valuation study for the global chemical company BASF (BAS:GR), based in Germany. Prior to undertaking an in-depth study of BASF's financial status and outlook for the 6 operational areas of the company, the research assesses the state of the global economy and the chemical industry in light of the political and economic challenges encountered in 2021. The discounted cash flow model is used as the main technique of valuation, and it projects 10 years' worth of free cash flows to the end of 2031. BASF reported healthy performance in Q1 2021, in line with the preliminary results, which had surprised positively in terms of both revenues and adj. EBIT. However, an impairment charge of approximately EUR 1.1 billion recognised by its subsidiary Wintershall Dea (in which BASF owns a 72.7 percent share) weighed down the net income, particularly in relation to a loan to the abandoned pipeline project Nord Stream 2. Despite the ongoing uncertainty, the company reaffirmed its guidance for 2022, with sales expected at EUR 74bn-EUR 77bn (down 4% yoy at the midpoint) and adj. EBIT expected at EUR 6.6bn- EUR 7.2bn (down 11% yoy at the midpoint). Upstream business decreased EBIT by adj. Adj. EBIT decreased 1% year over year to EUR 2.3 billion, but somehow it surprised to the upside by outperforming expectations by 12% on a difficult comparative base and in a challenging market environment (at the time of pre-release). Due to the inflation of raw material costs and rising energy prices, the margin shrank 170bps yoy to 10.2 percent. Except for Surface Technologies, almost all of the downstream business' segments recorded overall EBIT growth. In contrast, the Materials and Chemicals upstream segments recorded reductions, albeit in line with expectations. Recommendation stays Buy. Profiting from ongoing strong demand for its goods and large price increases, BASF reported strong performance in Q2, demonstrating the company's ability to pass on rising input cost inflation. In light of the excellent quarter, management raised its sales forecast but decreased its expectation for 2022's full-year adjusted EBIT. Our BUY recommendation remains maintained, and our PT remains at EUR 82.58.

I. INTRODUCTION

BASF is the world's largest chemical corporation and German multi-national chemical manufacturer. With six global integrated production facilities and more than 240 additional production sites around the world, the group has operations in over 90 countries. The company has a wide variety of products to choose from, including crop protection items as well as chemicals, polymers, performance goods, dispersions, and pigments. Agriculture, the automotive and transportation sectors, chemicals, construction, electronics and electricals, energy and resource, nutrition, personal care and hygiene, pharmaceuticals, plastics, and textile industries are some of its end-user industries. The Frankfurt Shares Exchange Group's XETRA has listed BASF's stock (BAS:GR), which as of July 1, 2021, had a market price of €67.35 and a market capitalization of €61.86 billion (Bloomberg L.P, 2021).

With its headquarters in Ludwigshafen, Germany, Badische Anilin & SodaFabrik, more generally referred to as BASF, is a diverse chemical manufacturing and processing firm. BASF is a multinational company with activities in over 80 nations and sales in practically every country in the globe. With 2020 revenues of €59.15 billion, BASF will be the world's largest producer of chemicals and intermediates (BASF, 2021). The Frankfurt Shares Exchange Group's XETRA has listed BASF's stock (BAS:GR), which as of July 1, 2021, had a market price of €67.35 and a market capitalization of €61.86 billion (Bloomberg L.P, 2021).

There are 918.5 million common shares in float at BASF, of which 47% are held by German investors and 20% by American/Canadian investors. According to estimates, institutional investors hold 29% of BASF common stock, while retail investors

hold the remaining 71%. (BASF 2021). BlackRock Inc. (5.46%), The Vanguard Group Inc. (3.4%), and Deutsche Asset & Wealth Management (1.7%) are the top three shareholders in BASF (Bloomberg L.P, 2021)

When it comes to top-level management, BASF has a 12-member supervisory board that is traditionally chaired by Dr. Kurt Wilhelm-Bock, and a management board of seven executives that is led by CEO Dr. Martin Brudermueller (Bloomberg L.P, 2021). Approximately 110,000 people are employed by BASF at the time of this publication, spread across 390 regular production sites, 6 Verbund locations, offices, and R&D facilities in 80 different nations.

Chemical business BASF SE has operations all around the world. Chemicals, Materials, Industrial Solutions, Surface Technologies, Nutrition & Care, and Agricultural Solutions are the company's six business segments. Petrochemicals and intermediates are offered by the Chemicals section. The Materials section provides inorganic basic goods and specialties for the plastic and plastic processing industries, as well as advanced materials and their precursors for applications and systems, such as polyamides and isocyanates. For industrial applications such as polymer dispersions, pigments, resins, electronic materials, antioxidants, light stabilisers, oilfield chemicals, mineral processing, and hydrometallurgical chemicals, the Industrial Solutions sector develops and markets components and additives.

For the chemical and automotive industries, the Surface Technologies section provides refinish coatings, surface treatment, catalysts, battery materials, precious and base metal services, and automotive OEM. The pharmaceutical, cosmetics, detergent, and cleaning sectors, as well as food and feed producers, can all get the nutrition and care ingredients they need from the Nutrition & Care section. Crop protection products and seeds, including fungicides, herbicides, insecticides, and biological crop production products, are available from the Agricultural Solutions segment, along with seed treatment items. Contemporary Amperex

TechnologyCo., Limited and the corporation have strategic alliances for battery material solutions, such as cathode active materials and battery recycling. The headquarters of BASF SE are in Ludwigshafen am Rhein, Germany, where it was established in 1865.

II. LITERATURE REVIEW

The discounted cash flow (DCF) and multiples approaches are two of the most popular and well-respected valuation methods used by finance professionals worldwide, according to the theoretical framework for the selected methods of valuation, which is closely aligned with "Business Analysis and Valuation" by Palepu et al (2019).

The value of any asset is equal to the present value of all of its anticipated future cashflows, which is one of the tenets of finance theory (Perek and Perek, 2012).

The chosen stock valuation approach, whether it be the dividend discount model (DDM), residual income (RI), or discounted cash flow (DCF), should, in principle, not matter. However, in practise, the three models are probably going to result in three distinct valuations of the same company, a possibility that has stimulated a sizable amount of academic study. Because they may produce a valuation based on forecasting with a short time horizon, residual income models based on GAAP accounting practise are superior for minimising valuation error, according to Penman and Sougiannis' research from 1998. A traditional DCF model, on the other hand, often needs the forecasting of 5–10 years' worth of free cash flows.

This finding is backed up by Francis et al. (2000), who claimed that the RI model was more accurate since abnormal earnings can be projected more easily than free cash flows and equity book value is a reliable indicator of intrinsic value. Penman and Sougiannis (1998) and Francis et al. (2000) came to various conclusions about the three models, while Lundholm and O'Keefe (2001) directly addressed these conclusions by coming to the conclusion that, when implemented appropriately, none of the models gave more accuracy than the others.

Hamadi & Hamadeh (2013) find that Wall Street analysts prefer the DCF technique despite academic research typically concluding that, if any, the RI approach is the more accurate. Similar to this, Imam et al. (2013) discovered that European analysts similarly favour the discounted cash flow model, but the DCF and RI models are frequently employed in tandem. This research analysis raises the possibility that professionals and educators prefer the DCF strategy, whereas academics generally favour the RI approach.

Comparable to absolute approaches, multiples are developed and computed utilising historical and anticipated fundamentals like EBIT, Sales, EBITDA, or earnings. However, the multiples strategy is influenced by the success of other businesses operating in the same industry as the focal firm, in contrast to Queen Mary University of London's 7 absolute methodologies (Liu et al. 2000). Although Fernandez (2001) provides evidence that the P/E and P/Sales, P/BV, and EV/EBITDA multiples are some of the most often used multiples in industry, a large portion of the multiples literature raises concerns about the procedures followed to generate multiples valuations. Because it is unaffected by interest, taxes, or depreciation and amortisation, the EV/EBITDA multiple is one of the most accurate multiples, according to Chastenet and Mairon (2015). This conclusion is in accordance with that of Lie and Lie (2019), who discovered that the EV/EBITDA was independent of different capital structures within the peer group and was less subject to bias than the EV/EBIT and earnings multiples. When utilising a historical approach to multiples, Yoo (2006) proposed the use of a weighted average combination of numerous multiples, allowing consideration of a larger diversity of corporate factors. The best peer group size, according to research by Cooper and Cordeiro (2008), is 10 businesses. However, it's important to make sure that the firms in the peer group are comparable and that peer groups of 5 still provide correct multiples valuations.

Financial information from BASF's audited quarterly and annual financial reports, including the balance sheet, income statement, and cash flow statement, was used in this report (BASF, 2021). Alternately,

non-accounts numerical data from the Bloomberg Terminal is used for analyst reports, ratios, and historical stock prices for BASF and any other firms mentioned in this report (Bloomberg L.P 2021). A wide range of suppliers, including Deloitte and KMPG, were taken into consideration for their industry and sector reports, which offered an overview and perspective for BASF's six operational segments.

III. BACKGROUND ANALYSIS:

3.1 Global Economic Analysis:

The crisis between Russia and Ukraine is becoming worse every day, and there is no sign of an end in sight. However, the conflict between the two nations has exploded into a severe economic crisis around the world.

The war has had a direct economic impact on the prices of food, energy, fertilisers, pharmaceuticals, etc., and the prices will likely continue to rise until the conflict is resolved because many nations around the world are either directly or indirectly dependent on Russia and Ukraine for a variety of commodities.

As a result, there has been a serious disruption in the supply of many different products from these two nations. Additionally, the trading circumstances have been negatively damaged by the harsh sanctions that have been placed on Russia by a number of nations, including the US, European Union, UK, Japan, Germany, Canada, and Australia. More and more nations are imposing asset freezes, investment bans, trade restrictions, stock exchange restrictions, blacklisting of politicians and officials, etc.

By ceasing their business there, numerous chemical companies have protested Russia's stance and are still doing so. On the other hand, big power and chemical industries are being forced to halt production as gas prices continue to rise.

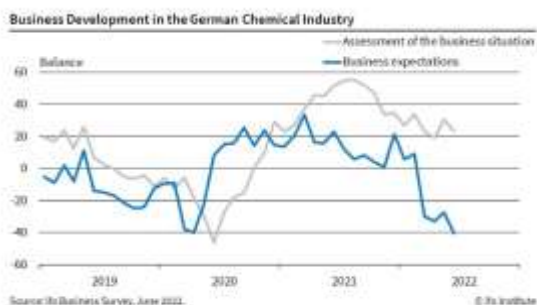
A number of businesses are cutting their relations with Russia and ending their business operations there. In light of the possibility of a global food catastrophe brought on by the war, BASF recently declared that it would cease all operations in Russia

and Belarus save from those supporting food production. "Recent events in the war and in international law, particularly the fifth EU sanctions package, have influenced this choice. Currently, BASF employs 684 people in Belarus and Russia. According to BASF's statement, the company has chosen to support its employees in both countries till the end of 2022.

3.2 Industry Environment:

Before the Russian invasion, the primary organisation for the chemical industry in Germany, VCI, predicted that the sector would increase by 1.5% this year. But with 3 percent (\$7.5 billion) of Germany's total chemical sector sales going to Russia and Ukraine, the war is now likely to cause the German chemical industry to enter a recession. Similar to other industries, the chemical industry has placed self-imposed limitations on its trading with Russia.

In a statement, BASF said that since March 3, it has not performed any new business in Russia or Belarus and that it solely supports food production to prevent a "world food catastrophe" and maintains chemical facilities in Russia to ensure their safety. Dow claims it has severed most relations with Russia and "seriously limited its activities and product offerings in the nation," as well as halting all feedstock purchases, importing energy, and new investment. As opposed to this, the corporation only keeps a limited amount of "necessary commodities in Russia, including food packaging, hygiene, cleaning and sanitation products, and domestic goods" on hand.



In addition to any dividend payments from its \$1.6 billion polyvinyl chloride joint venture with the Russian chemical producer Sibur, Solvay has halted all operations and new investments in Russia. Despite

receiving 2% of its sales (\$94 million) from Russia, Clariant has likewise discontinued doing business there.

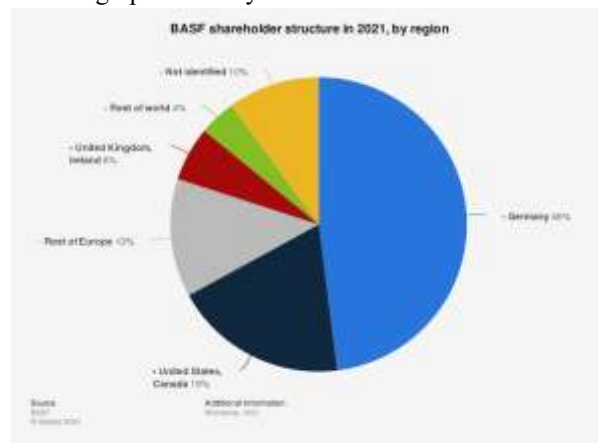
DuPont and LyondellBasell Industries have likewise decided to stop doing business in Russia and Belarus until the war is finished. The sale of EuroChem that was previously agreed to is still questionable. The nitrogen fertiliser company, which is currently held by Austrian petrochemical manufacturer Borealis, was slated to be transferred for \$520 million.

The agreement has now been scrapped due to the fact that the majority of EuroChem's assets are located in Russia and that its founder, Andrey Melnichenko, is listed on the European Union's list of individuals from Russia who have been sanctioned. Melnichenko previously controlled 90% of the company.

The industry is under additional stress due to growing raw material and energy costs, as well as the continuous economic damage and unpredictability caused by the crisis in Ukraine, which is affecting chemical industries all over the world.

IV. BASF INTERNAL ANALYSIS

4.1 Geographical analysis:



4.2 Segment Review and Outlook:



The six major revenue-generating segments of BASF—Chemicals, Materials, Industrial Solutions, Surface Technologies, Nutrition & Care, and Agricultural Solutions—will be examined in-depth in this segment. Its goal will be to evaluate previous performance and pinpoint value-creating factors and trends that have an impact on each segment both now and in the future.

4.2.1 Chemical, Material and Industrial Solution:

Factors influencing sales in Q2 2022 – Chemicals

	Chemicals	Petrochemicals	Intermediates
Volumes	-3.9%	-2.2%	-8.4%
Prices	24.9%	23.6%	28.2%
Portfolio	-0.1%	-0.1%	-0.1%
Currencies	6.4%	6.1%	6.9%
Sales	27.2%	27.4%	26.6%

Sales in the Chemicals segment increased significantly when compared to the same quarter last year. To the rise, both operating divisions contributed. Prices in both categories rose dramatically, which was the main factor driving sales increase. This resulted from the sustained high demand and the passing on of rising prices for energy and raw materials. The Prices were increased across the board by the Petrochemicals Division, particularly for steam cracker products, styrene monomers, and in the value chains for butadiene and propylene. Prices were increased by the Intermediates division, particularly in the butanediol and derivatives, amines, and acids and polyalcohols businesses.

Positive currency effects, primarily linked to the U.S. dollar, helped sales performance.

With constant demand, overall sales volumes were marginally higher than the corresponding period last year. Volumes in the Intermediates category were slightly lower, but they were more than made up for by slightly higher volumes in the Petrochemicals division. Due primarily to better margins in both divisions, income from operations (EBIT) before exceptional items¹ increased significantly compared to the first quarter of 2021. In North America and Asia Pacific, the Intermediates segment considerably increased margins across all business areas. As a result of the steep increase in natural gas prices, this more than made up for reduced margins in the butanediol and derivatives business as well as in the acetylenics and carbonyl derivatives business in Europe. Earnings increase was aided by improved shareholder income calculated using the equity method. The growth in Petrochemicals earnings

Higher margins in the butadiene and propylene value chains as well as for styrene monomers were the driving forces behind the division. Due to rising raw material and energy prices, steam cracker product margins were reduced, but this more than made up for it. A balancing impact was created by higher fixed costs, which were partly caused by currency effects and higher energy and gas prices.

4.2.2 Surface Technologies

Sales in the Surface Technologies category were significantly lower than they had been in the first quarter of 2021. The huge decline in the Catalysts segment could not be made up for by the Coatings business's strong sales growth. The Catalysts division's substantially lower volumes were the main cause of the sales decline. Sales volumes fell drastically in this area, especially for mobile emissions catalysts and precious metal trading. This was mostly caused by a decline in demand from the automotive sector. Growth in the volume of catalysts used in refineries and chemical processes may only partially counteract this. Volumes in the Coatings division significantly increased.

Significantly lower precious metal prices also resulted in decreased sales for the Catalysts sector. At

€2,208 million (Q1 2021: €2,904 million), precious metal trading sales were much lower than in the corresponding quarter the previous year. The Coatings sector, however, drastically increased pricing. The acquisition of a controlling stake in BASF Shanshan Battery Materials Co., Ltd. generated positive portfolio implications in the Catalysts segment that had an equalising effect.

Sales were also marginally boosted by currency effects, primarily those related to the US dollar and the Chinese yuan. When compared to the same quarter last year, income from operations (EBIT) before exceptional items fell dramatically in both divisions.

The Catalysts division's earnings decline was primarily caused by a drastically reduced contribution from trading in precious metals. The EBIT before special items for the Coatings division decreased, principally as a result of higher fixed costs and worse margins brought on by higher raw material prices.

4.2.3 Nutrition & Care:

Sales in the Nutrition & Care division significantly increased when compared to the same quarter last year. The contribution of both divisions to the increase along with notable revenue growth. Significantly higher prices across the board in both divisions' businesses allowed them to pass on higher costs for energy and raw materials, which in turn drove sales growth.

Significantly larger volumes helped to enhance the sales success. Animal feeding and pharmaceutical companies drove volume growth in the Nutrition & Health sector. With Care Sales volumes increased in the chemical division's personal care solutions, oleo surfactants, and alcohols businesses.

Sales were somewhat boosted by favourable currency impacts, particularly those linked to the US dollar and the Chinese yuan.

Sales in both divisions were impacted by portfolio impacts from the sale of the Kankakee, Illinois, production facility. Before special factors, the

segment's income from operations (EBIT) was significantly higher than it was in the first quarter of 2021. Positive volume development was the main factor in the Care Chemicals division's higher EBIT before exceptional items. Higher margins were responsible for the Nutrition & Health division's increasing earnings. This more than made up for higher fixed expenses, which were mostly due to greater depreciation when the second quarter of 2021 saw the launch of the vitamin A factory expansion in Ludwigshafen, Germany.

4.2.4 Agricultural Solutions:

Sales in the segment for Agricultural Solutions increased significantly from the first quarter of 2021. Except for North America, volumes climbed throughout all regions, and prices were higher than they were during the same period last year. The U.S. dollar in particular had favourable currency effects that boosted sales growth. Increased volumes, particularly for fungicides and herbicides, were a major factor in Europe's sales growth. Sales were boosted by higher prices as well. The Turkish lira's negative currency consequences mostly had an offsetting effect.

Sales in North America saw a significant uptick, primarily as a result of favourable currency effects. Prices were much higher than they were in the same quarter last year, although volumes were marginally lower.

Sales in Asia increased significantly as a result of larger volumes, particularly in China for fungicides and herbicides. Price increases and favourable currency effects also had a role in the upward trend in sales.

South America, Africa, and the Middle East saw a significant increase in sales as well. Increased volumes, particularly for fungicides and field crop seeds, were the main cause of this. Sales were boosted by favourable currency effects, primarily from the Brazilian real, and higher pricing levels.

The rise in sales resulted in a small increase in income from operations (EBIT) before exceptional items when compared to the first quarter of 2021.

The increase in fixed costs slowed the growth in profits.

V. FINANCIAL ANALYSIS

To determine the company's financial health and performance and enable more precise forecasting, a thorough examination of BASF's financial condition has been conducted. Some ratios and values have been measured on a 5-year average or trailing twelve-month (TTM) basis, as well as at financial year-end 31/12/2021, to allow an assessment of BASF in more typical operating conditions. This is due to the well-reported effects of the Russia- Ukraine political tension on business activity and economic crisis globally.

VI. THEORETICAL FRAMEWORK

The two valuation methods that were applied to create the BASF valuation are described in this section. The Discounted Cash Flow Model will be employed as the primary method of valuation, and the multiples approach will be used to get a relative valuation.

6.1 The Discounted Cashflow (DCF) Model:

In order to create a 10-year estimate of BASF's cashflows between the years of 2022 and 2031, it is first required to review prior financial statements in order to identify significant patterns, ratios and margins, and growth rates. In addition to backward-looking analysis, forward-looking analysis of industry outlook reports, reports from specialised analysts, and BASF's Q1 financial reports and Q2 preliminary expectations, which project what the company's finances might look like over the valuation period, have an impact on projections.

6.1.1.1 Revenue

Prior to estimating revenue, BASF's six key business divisions were examined individually. Each division's year-by-year growth over the previous five years as well as the five years leading up to the Political crisis in 2022 were evaluated. If there is evidence to support an anticipated increase or drop in growth throughout the projection period, it is taken into consideration in future industry outlook studies from providers like Deloitte and KMPG.

Total Revenue: Revenue from Chemicals + Revenue from Materials + Revenue from Industrial Solutions + Revenue from Surface Technology + Revenue from Nutrition & Care + Revenue from Agricultural Solutions

6.1.1.2 EBIT:

The foundation of the DCF valuation model is earnings before interest and tax. Past EBIT is computed by deducting all operational costs from total revenue, including selling, general, and administrative (SG&A), COGS, and any other costs related to regular business operations.

$$EBIT = Total\ Revenue - Total\ Operating\ Expenses$$

6.1.1.3 Depreciation and Amortization:

The amount by which the market value of non-current assets like property, plant, and equipment decreases throughout an accounting period is known as depreciation and amortisation (D&A). Depreciation and amortisation are non-cash costs, meaning they must be added back to EBIT in the context of a discounted cashflow assessment because they are deducted during accounting.

6.1.1.4 Capital Expenditure:

Investment in non-current assets is represented by capital expenditures (CAPEX). In the case of BASF, this comprises investments in tangible assets like patents as well as intangible assets like property, plant, and equipment in the form of production and R&D facilities like Verbund locations. Capex must equal D&A in the last year of forecasting to indicate a mature and stable state and to imply reinvestment in long-term assets at a rate equivalent to the rate of depreciation of current long-term assets.

6.1.1.5 Change in Net Working Capital:

Working capital is, in its most basic form, the difference between a company's current assets and current liabilities; as a result, the change in net working capital is the change in working capital from one year to the next. n $n+1$

Trade receivables, inventory, prepayments, and cash and equivalents are reported as current assets in BASF's annual report. The only current liability reported is trade payables.

$$\Delta N. W. C = \Delta Trade Recievables - \Delta Trade Payables + \Delta Inventories + \Delta Prepayments + \Delta Cash \& Equivilants$$

7.1.1.6 Taxation:

The effective tax rate is a comprehensive tax measurement that takes into account all forms of taxation at various rates. The effective tax rate for year n is determined using information from BASF Annual Reports as follows:

$$Effective\ Tax\ Rate = \frac{Tax\ Paid_n}{EBIT_n}$$

6.1.2.1 Free Cashflow to the firm:

A company's total cash accessible to investors after all operating expenses, depreciation and amortisation, capital expenditures for investments, changes in net working capital, and taxation is known as free cashflow (FCF) to the firm.

$$FCF = EBIT + D\&A - CAPEX - \Delta N. W. C - t$$

6.1.2.2 Weighted Average Cost of Capital:

When performing a DCF valuation, the weighted average cost of capital (WACC), which serves as the discount rate used to present the firm's future cashflows, must be taken into account (Palepu et al, 2019). The cost of debt and cost of equity for BASF will be weighted using a company-specific rate based on the company's long-term target capital structure.

$$r = w * re + w * rd * (1 - T)$$

The Capital Asset Pricing Model is used to determine the cost of equity (r) (CAPM). In order to calculate the return on investment in percentage terms that investors would expect given the company's specific inputs to the CAPM model, this equation takes into account the company's relationship with the systemic risk factor, the risk-free rate, and a weighted average equity premium.

$$CAPM = rf + B(rm - rf)$$

Divide total interest paid by total debt outstanding (d) for the most recent fiscal year to get cost of debt (r). The average cost of the company's outstanding debt is determined using this method.

$$rd = \frac{Interest\ Paid_{2020}}{Total\ Debt_{2020}}$$

$$Total\ Debt = Short\ Term\ Debt + Long\ Term\ Debt$$

6.1.2.3 Terminal Value:

Since there is no proof that BASF has a limited lifespan, the perpetual growth model is used to determine terminal value in order to account for all cashflows that will occur after the valuation period (year-end 2021 to 2030). The estimated rate at which the company's cash flows are anticipated to increase once it has reached steady state is known as the growth rate, or g.

$$TV = \frac{FCF_n * (1 + g_n)}{(r_{wacc} - g)}$$

6.1.2.4 Discounted Cash Flows:

The present value of all future free cashflows the company is expected to earn, as well as the terminal value, are determined by discounting each by the company's unique weighted average cost of capital (r) with respect to how far into the future the cash flow is anticipated.

6.1.2.5 Enterprise Value:

The sum of all the discounted cash flows to the company that are available to all relevant parties, including debtholders, makes up the enterprise value.

$$Enterprise\ Value = \sum DCF + DCF + \dots + DCF + TV_{2022-2023}$$

6.1.2.6 Equity Value and Target Price:

To account for the fact that debtholders have a senior claim over equity holders on the company's assets, enterprise value must be converted to equity value.

$$Equity\ Value = Enterprise\ Value + Financial\ Investments - Net\ Debt - Minority\ Interests$$

The value of cash and similarly liquid securities that may be utilised to immediately reduce outstanding debt are subtracted from the computation of net debt.

$$\text{Net Debt} = \text{Long Term Debt} + \text{Short Term Debt} - \text{Cash \& Equivalents}$$

Minority Interests are non-controlling shares of non-parent companies that are subsidiaries of the company being valued. Since the parent and subsidiary financial statements are frequently combined, it is required to deduct the value attributable to the minority shareholders of the subsidiary (Palepu et al., 2019).

The target value of the company on a per share basis is then generated by dividing the total equity value by the total number of outstanding shares, from which the upside or downside potential may then be computed.

$$\text{Target Price (per share)} = \text{Equity Value} / \text{Shares Outstanding}$$

The stock's price potential, based on the target price determined by the DCF valuation and the current market price, is the projected range of movement for the stock.

$$\text{Premium Potential (\%)} = (\text{Target Price} - \text{Market Price}) / \text{Market Price}$$

6.1.3 Sensitivity Analysis:

The fact that fundamental assumptions like the weighted average cost of capital or perpetuity growth rate are constants is one of the shortcomings of the DCF valuation approach. However, both are actually likely to change over time, depending on a variety of circumstances that are both inside and external to the target organisation (Barth 2000).

To determine the impact of changing the input assumptions that were used to create this specific discounted cashflow valuation, a sensitivity analysis will be performed on the anticipated target share price and enterprise value. The anticipated target share price will be sensitive to the weighted average cost of capital (r), which influences how free cashflows are converted to discounted cashflows, and the weighted average perpetuity growth rate (g),

which together with r affects the computation of terminal value.

6.1.4. Scenario Analysis:

To understand how different BASF performance levels and shifting macroeconomic conditions over the forecasting period can affect the value conclusion offered in this research, a scenario analysis will be done. A Bull case and a Bear case will be offered in addition to the Base case, which will be the main focus of the valuation report. The three scenarios' assumptions will be based on a variety of internal and external possibilities with regard to political aspects and a war between Russia and Ukraine, BASF's financial performance and margins, and the performance of the BASF segment within its industry and the overall global economy.

Relative Valuation Method:

By using the known values or ratios of other firms operating in the same industry as the focal company, relative valuation methodologies are utilised to reach valuation judgments.

6.2.1 Multiples Approach:

The price/earnings (P/E), price/sales (P/S), and enterprise value/EBITDA (EV/EBITDA) multiples should be employed for the multiples approach, which was chosen as the preferred relative valuation methodology.

Choosing a peer group of 5 to 10 comparable firms is the first stage in creating the final valuation multiples. To create a 5-year mean of each multiple for each peer firm, the values for P/E, P/Sales, and EV/EBITDA of each peer company will then be recorded for the years 2016–2020. The final multiples will then be the average of all the peer group's 5-year means for each multiple, which will be used to produce the valuation.

The use of 5-year averages has been chosen since it is thought to be more representative than using data from 2020 or 2021F, for which the consequences of COVID19, such as negative earnings or EBIT, are anticipated to have affected multiples.

Following that, a weighted average of the equity valuations produced from each multiple will be added to create the final valuation for this approach, which will look like this:

$$\text{Multiples Valuation} = 0.5 * \text{EV/EBITDA} + 0.25 * \text{P/E} + 0.25 * \text{P/Sales}$$

While the EV/EBITDA multiple has been given greater weighting in accordance with the findings of both Chastenet and Mairon (2015) and Lie and Lie (2019) as the most accurate multiple for producing a valuation, this method borrows from Yoo's (2006) methods to take into account a wider range of company fundamentals that drive value.

More info

BASF reported healthy performance in Q1 2021, in line with the preliminary results, which had surprised positively in terms of both revenues and adj. EBIT. However, the net income was burdened due to an impairment charge of ca EUR 1.1bn recognised by its subsidiary Wintershall Dea (BASF holds a 72.7% stake), especially related to a loan to the defunct pipeline project Nord Stream 2. Despite the ongoing uncertainty, the company reaffirmed its guidance for 2022, with sales expected at EUR 74bn-EUR 77bn (down 4% yoy at the midpoint) and adj. EBIT expected at EUR 6.6bn- EUR 7.2bn (down 11% yoy at the midpoint).

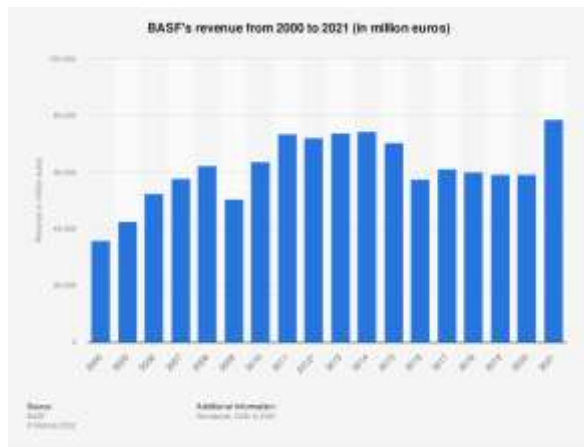
VII. DISCOUNTED CASH FLOW

7.1.1.1 Free cash Flows to the Firm:

USD in millions	Fiscal Years Ending					
	Dec-17 FY 4	Dec-18 FY 5	Dec-19 FY 6	Dec-20 FY 1	Dec-21 FY 2	Mar-22 FY 3
Revenue (total)	15,221	18,128	19,314	19,549	18,588	23,081
Cost of Revenue	(11,871)	(13,196)	(13,347)	(14,302)	(13,891)	(17,081)
Gross Profit	3,350	4,932	5,967	5,247	4,697	5,999
R&D Expenses	(2,843)	(2,884)	(2,158)	(2,086)	(2,214)	(2,580)
SG&A Expenses	(2,813)	(2,838)	(2,427)	(2,470)	(2,520)	(2,586)
Other Expenses (Income)	(1,074)	(390)	(1,088)	(1,370)	96	(98)
Total Expenses	(11,500)	(11,481)	(12,407)	(14,326)	(11,258)	(14,144)
EBIT	1,850	3,451	3,560	971	3,443	1,815
(*) Net Interest Expense	288	325	403	303	349	78
(*) Other Non-Op Expenses, Total	353	342	123	190	(279)	486
(*) Depreciation & Amortization	4,050	3,980	3,752	3,871	3,547	404
(*) Restructuring Charges	349	360	364	(1,088)	433	8
(*) Gains / Losses on Sale of Assets	19	(31)	43	88	(38)	8
(*) Goodwill Impairment	0	0	0	0	0	0
(*) Gain/Loss on Sale of Intang.	129	(100)	86	(178)	114	32
(*) Gain/Loss on Sale of Assoc.	(248)	(389)	(486)	(71)	(28)	8
(*) Asset Imbalances	(24)	(8)	90	(2,368)	103	8
(*) In-Process R&D Expenses	0	0	0	0	0	0
(*) Insurance Settlements	(447)	0	0	0	6	8
(*) Legal Settlements	19	0	0	0	0	8
(*) Other Intangible Items	0	(81)	(17)	0	0	0
Adjusted EBITDA	10,586	8,978	7,444	7,072	11,119	3,277
% Margin	69.5%	49.5%	38.5%	35.7%	60.0%	14.2%
Adjusted EBIT	8,732	8,653	5,272	5,142	7,847	2,815
% Margin	57.4%	47.7%	27.3%	26.3%	42.2%	12.2%

Revenue	Fiscal Quarters Ending					
	Apr-18 FY 4	Jul-18 FY 5	Oct-18 FY 6	Jan-19 FY 1	Apr-19 FY 2	Jul-19 FY 3
Revenue	15,811	15,403	16,408	16,713	16,669	18,776

Q1 revenues grew 19% yoy to EUR 23.1bn, 5% above consensus at the time of the pre-release, mainly driven by increased pricing, particularly in the Chemicals and Materials segments, demonstrating that BASF still can pass through input cost inflation. Positive currency effects also supported the top line. All segments achieved volume growth except for Surface Technologies, which continued to suffer from the slump in automotive production globally amid shortages of semiconductor and wire harnesses. This dragged overall volumes down 1% yoy. BASF reported healthy sales growth across geographies in Q1, with a strong showing in Europe (+22.8% yoy), followed by Asia Pacific (+17.8% yoy) and North America (+12.9% yoy).



The revenues of BASF may exhibit some cyclicity, according to the 3-year moving average. While there

is a general upward trend in sales, the study finds flatter areas, which are indicated by the red arrows, where revenue growth appears to be negative and subsequently sluggish over the course of 2–5 years. The data also suggests that, despite the fact that these periods do happen frequently, the recovery in the years that follow is typically robust. This hypothesis is confirmed by BASF's Q1 quarterly report, which showed sales of €19.4 billion and an upbeat revenue prediction for 2021 of between €68 billion and €71 billion (BASF, 2021). This means that high revenue growth may return starting in 2021.

7.1.1.2 Assumptions of the Base Case scenario:

Assumptions	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
EBIT	18,041	18,222	18,848	19,754	21,481	23,494	25,807	28,420	31,344	34,691
Operating Exp.	0	0	0	0	0	0	0	0	0	0
CapEx	4,200	3,820	4,200	4,470	4,800	5,100	5,400	5,700	6,000	6,300
Debt	0	0	0	0	0	0	0	0	0	0
Equity	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Free Cash Flow	12,841	14,402	14,648	15,284	16,681	18,394	20,120	21,720	23,344	25,391

BASF is currently trading at a very appealing risk/reward ratio despite having lost roughly 40% YTD. Chemical manufacturer BASF is headquartered in Germany. The forward one-year EV/EBITDA ratio is as low as x5.8. Furthermore, BASF's 8% dividend yield seems to be durable and should act as a potential floor against further decline. In my perspective, BASF is significantly cheap, and building up a stock stake at prices under \$12 seems reasonable. For myself, BASF is worth \$14.73 per share. I base my valuation on analyst consensus expectations for EPS and a residual earnings framework.

Upstream business continues to drive adj. EBIT
 Adj. EBIT grew 21% yoy to EUR 2.8bn, coming in above analyst expectations at the time of the pre-release. This translated into an EBIT margin of 12.2% (+24bps yoy), its highest since Q1 2018. Within the upstream business, both the Chemicals (+46% yoy) and Materials (+12% yoy) segments were strong. In the downstream business, robust adj. EBIT growth in Industrial Solutions (+31% yoy) was more than offset by a substantially weak showing in

Surface Technologies (-26% yoy). Both Nutrition & Care (+12% yoy) and Agricultural Solutions (+8% yoy) reported healthy adj. EBIT growth. Higher raw material, energy, and freight costs continued to impact profitability, but BASF has so far been able to pass on the burden through substantial price increases.

Remains a BUY

In line with its preliminary release, BASF reported healthy growth in revenues and adj. EBIT in an inflationary environment amid supply disruptions. Wintershall DEA already announced that no new/additional projects will be advanced or implemented in Russia; however, it remains active in natural gas production projects in Siberia. Given the uncertain future of Wintershall DEA and concerns about surging natural gas, oil, and electricity prices, investor sentiment is likely to remain weak in the near term. However, we believe that these risks seem more than reflected in the valuation. Meanwhile, so far, BASF has proven that it can pass through input cost inflation, and barring a European import stop of natural gas, operating profits seem defensible. We reiterate our BUY rating. However, we reduce our PT to EUR 80.00 (EUR 87.00), reflecting the dividend paid and some finetuning of estimates.

