



FS ASSOCIATES
STUDENT INITIATIVE OF
FRANKFURT SCHOOL

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Investment Report



Picture: FS Associates research



On December 23rd, our MD got curious about the vaccine companies and having looked at Biontech's headquarter a few weeks earlier, decided to look into the financials. After very extensive reports in the past which have yet to deliver outstanding returns (particularly 60 pages on Ceconomy were rather a headache regarding returns up to now) we will try out a condensed version and see how that will work out with regard to returns.

The sources for this report are:

- a) Biontech quarterly reports
- b) Biontech AR 2019
- c) FS Associates Research

FS Associates closed the SAP position of 400 shares at EUR 105 (gap close) past Friday and we now expect a setback in that particular security. In the meantime, the cash is now invested in Biontech and SAP is back on the watchlist.

I. Chart Situation

The chart situation of Biontech is the following:



Source: Guidants Charting Tool

Note primarily that Biontech is an extremely volatile stock in which drawdowns of 50% and subsequent 100% price increases are no exception. This can be justified with the high uncertainty regarding future cash flows of the company and its cutting-edge technology which is inherently difficult to value. More on this later.

Note how, despite its news-driven chart, Biontech has up to now been well tradeable with its lower Bollinger Band:



Source: Guidants Charting Tool

Consequently, with its 30%+ drawdown from the latest ATH and triple reflection from the lower BB, Biontech seems to be in a, from a chart perspective, attractive setup.

However, as we also follow a valuation approach, the decisive part of the analysis is to assess the intrinsic value of Biontech.

II. Base Case Valuation

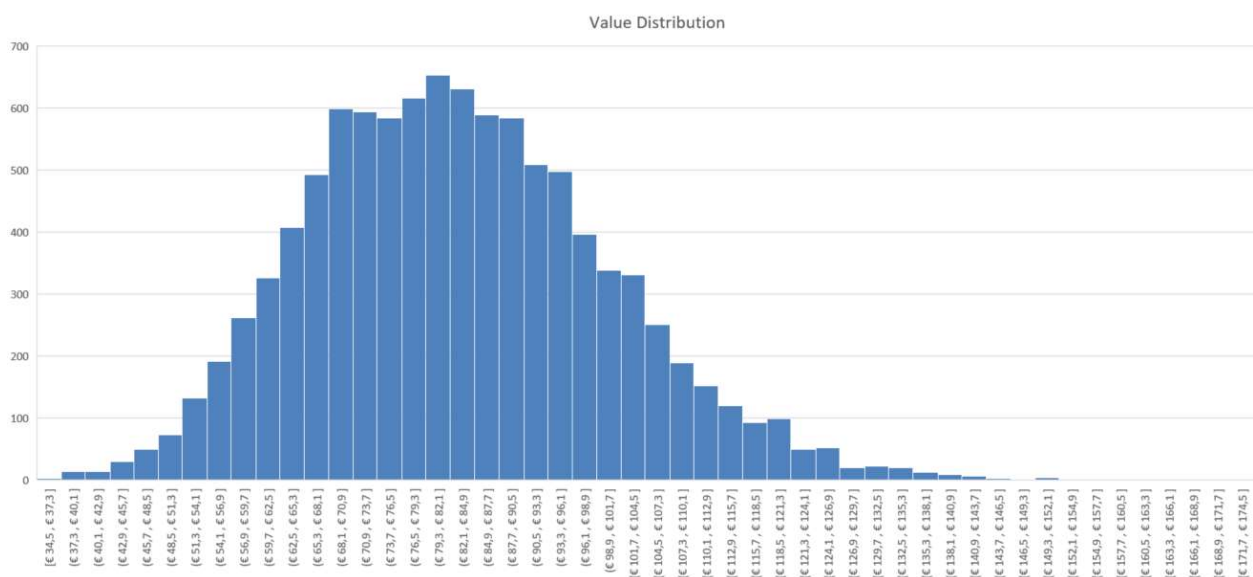
Biontech's valuation is based on high levels of uncertainty with regard to the assumptions. We attempt to use conservative assumptions in the base case in order to reduce the downside risk.

The company has a 50% gross profit share agreement with Pfizer with regard to its Covid-19 vaccine. Up to today, the US has agreed to buy 200mn doses of the vaccine until July 2021 for a price of ca. USD 20 per dose. We assume another 300mn doses to be bought by the EU (including UK) by 2021 for a similar price. We assume the gross profit per dose at EUR 16, i.e. EUR 8 which Biontech receives per dose.



We are aware that Biontech and Pfizer are probably set to produce and sell more than 1bn doses in 2021. However, our model is not well suited for one-off spikes in cash flows and then similarly fast declines. Further, by smoothing the cash flow it gets discounted and tends to give us more conservative valuations. Additionally, Covid-19 has proven to be a virus capable of mutation (similar to influenza), which can make future, new vaccines necessary and make cash flows more recurring. Our model relies on weakened but existing demand for new Covid-19 vaccines in the coming years.

In our conservative base model, Biontech will be able to increase its revenue from ca. EUR 165mn 2020 YTD to EUR 3,5bn in 2021 and steadily increase to EUR 4,5bn by 2030. We assume the EBIT margin at 80% in 2021 and to flatten out to 40% by 2030. The tax rate is the German tax rate of 30% and the risk-free rate is -0,5%, the 10y German government bond yield. Both are expected to stay constant. The cost of capital is 7,12%, computed as usual with the debt and equity component and a single business multi region approach. We estimated Biontech's rating conservatively at B+, since no rating was available in their Annual Report 2019. The valuation considers capitalized R&D and leasing contracts.



Source: FS Associates Research

The result of our base valuation is an average value of EUR 83,1 per share and lower and upper 95% bounds at EUR 57 and EUR 113,1, respectively. Note that this valuation considers a flattened cash flow curve on the proceeds from the vaccine sales in 2021 and recurring revenues based on future Covid-19 mutations which will make future vaccines necessary. The value distribution considers large uncertainty with regard to future margins (35-40% EBIT margin with SD of 4pp), growth (assumed at medium single digits) and has a conservative sales to invested capital ratio assumption between 0,4 and 1,0. In this scenario Biontech would be a hold with the hope for a multiple expansion due to the fact that it is currently a trend stock with significant momentum.



However, note that Biontech was not founded to discover a Covid-19 vaccine. Actually, Covid-19 was only a pitiable virus to get in the way of the novel mRNA technology used for individualized treatment methods which trigger immune responses. Biontech's actual mission is as follows:

We aspire to individualize cancer medicine

BioNTech was founded in 2008 on the understanding that every cancer patient's tumor is unique and therefore each patient's treatment should be individualized. To translate this idea into reality, we have combined ground-breaking research with cutting-edge technologies to develop pioneering therapeutics for cancer and beyond. As we prove the value of our approach in the clinic, we will continue to build the partnerships, manufacturing and team required to bring individualized treatments to patients worldwide. From our roots in Mainz, Germany, we are driven to become the leading global biotechnology company for individualized cancer medicine.

Source: <https://investors.biontech.de/>

III. Best Case Valuation

In our best case valuation, we assume that Biontech will be able to develop a cancer treatment based on the mRNA technology in the next years. The market potential of such a treatment would be enormous and lead to even larger uncertainty with regard to the numbers.

Statistics at a Glance: The Burden of Cancer in the United States

- In 2020, an estimated 1,806,590 new cases of cancer will be diagnosed in the United States and 606,520 people will die from the disease.
- The most common cancers (listed in descending order according to estimated new cases in 2020) are breast cancer, lung and bronchus cancer, prostate cancer, colon and rectum cancer, melanoma of the skin, bladder cancer, non-Hodgkin lymphoma, kidney and renal pelvis cancer, endometrial cancer, leukemia, pancreatic cancer, thyroid cancer, and liver cancer.
- Prostate, lung, and colorectal cancers account for an estimated 43% of all cancers diagnosed in men in 2020. For women, the three most common cancers are breast, lung, and colorectal, and they will account for an estimated 50% of all new cancer diagnoses in women in 2020.
- The rate of new cases of cancer (cancer incidence) is 442.4 per 100,000 men and women per year (based on 2013–2017 cases).
- The cancer death rate (cancer mortality) is 158.3 per 100,000 men and women per year (based on 2013–2017 deaths).

Source: <https://www.cancer.gov/about-cancer/understanding/statistics#:~:text=The%20rate%20of%20new%20cases,on%202013%E2%80%932017%20deaths>



Note that the figures above are US-only. If we extrapolate this, we can estimate 15-20mn cases of cancer per year which would be able to finance a mRNA treatment by Biontech. Completely unclear is the price and profit range that such a treatment could have. However, there is data on the costs of existing cancer treatments in the US:

Cost of Cancer Care Reaches Nearly \$150B Nationally

Many cancer patients struggle with out-of-pocket cancer care expenses, with one drug costing nearly \$12,000 annually and FDA approved drugs priced over \$100,000 a year.



Source: Thinkstock



By Samantha McGrail



January 15, 2020 - Price tags of life-saving treatments are continuing to increase, with nearly \$150 billion being spent nationally per year for cancer care, four times more than treatment for other common health conditions, according to a [report](#) from The Mesothelioma Center.

Source: <https://healthpayerintelligence.com/news/cost-of-cancer-care-reaches-nearly-150b-nationally>

Consequently, if Biontech was able to supply an effective treatment which costs “only” USD 50k this would be relatively cheap and have the potential to dominate the market. Additionally, note that EBIT margins on such treatments can be significant (40%+), particularly in the patent protection period.



Curing 5m cancer patients worldwide per year would, using these numbers, yield USD 250bn in revenues and possibly USD 100bn+ EBIT. Curing “only” half the new cases per year in the US alone at the above assumed price tag would yield USD 50bn in revenues and USD 20bn+ EBIT.

Assuming that Pfizer provides the manufacturing capacity and Biontech the intellectual property, a 50% gross profit share agreement as seen in the Covid-19 case seems realistic. Under these circumstances, Biontech’s valuation would explode. Remaining everything else equal, the valuations reach values between EUR 500 per share and EUR 1500 per share, depending on production capacities, margins, timing of the development, and the price tag of the treatment.

To name a concrete example: In case the development is successful in 2025 and revenues increase by EUR 50bn with a 40% EBIT margin, and revenue growth in the period 2025-2030 occurs at 8% p.a., the intrinsic value of Biontech would reach EUR 926 per share.

We cannot emphasize sufficiently how uncertain particularly the optimistic scenarios are in which Biontech would discover an effective cancer treatment. However, in the current market environment investors are increasingly risk-seeking and the valuations of companies with high hopes, e.g. Tesla, Snowflake, Compass Pathways etc. tend to be slightly stretched as the market values future growth potential.

IV. Conclusion

FS Associates is long Biontech and we are willing to increase the exposure if we deem it prudent. Based on our valuation, we bought a fairly priced Covid-19 vaccine developer which, if successful in its cancer research, will turn into what its address says:



Source: FS Associates Research



“An der Goldgrube”, German for “At the bonanza” is precisely what some investors might hope will become an accurate description for the location of Biontech’s headquarters in Mainz, Germany.

Note that we did not discuss M&A possibilities, however with a market capitalization of ca. EUR 20bn, Biontech could become an attractive target for Big Pharma. After all, EUR 20bn + premium would not be an unusually large deal for companies like Pfizer which has a market capitalization of ca. USD 200bn.

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