



Merck Acquires Prometheus Biosciences for \$10.8bn

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Deal Introduction

DETAILS ABOUT THE DEAL

In an operation concluded on the 16th of June, 2023, Merck acquired the California-based Prometheus Biosciences, Inc., with all common stock of the acquired firm no longer listed or traded on the Nasdaq Global Market. With negotiations concerning the deal agreement ongoing since April, the definitive agreement outlined Merck's acquisition (through a subsidiary) of all outstanding shares of Prometheus for \$200.00 per share in cash, amounting to a total equity value of approximately \$10.8 billion USD.

Type of Deal: Negotiated Buyout

Deal Financing: With the transaction being accounted for as an asset acquisition, Merck recorded a charge of approximately \$10.3 billion (~\$4.00 per share), with the charge expected to produce a reduction in both second-quarter and full-year 2023 GAAP and non-GAAP results.

REASONS FOR M&A

One of the primary drivers of Merck's decision to acquire Prometheus were promising mid-stage clinical trials for one of Prometheus' flagship drugs, PRA023, a versatile product initially developed to treat two prominent inflammatory bowel diseases (IBDs - ulcerative colitis and Crohn's disease), but with potential applications in treating a variety of other autoimmune conditions. Aiming to strengthen up its presence in the immunology market (a medical sub-sector characterised by significant unmet patient needs), Prometheus' acquisition represented not only a diversification of Merck's drug portfolio but, with the versatility of PRA023, a potential pivot to pave the way for expansion opportunities into other sectors down the line.



REASONS FOR M&A (CONTINUED)

Many in the sector expect that, by combining Prometheus' current research pipeline with Merck's global presence as an industry giant, PRA023 will continue to undergo trials and refinements until it becomes, in Merck Chief Executive Robert Davis' own words, a "multibillion-dollar seller". In the same interview, Davis expressed optimism for the drug's future, envisioned as spanning well into the 2030s, given its exceptional patent life; with the acquisition closing in the second quarter of 2023, the path is clear for Merck to launch a late-stage ulcerative colitis study of the drug in Q4 2023 or even Q1 2024.

Another critical element to understanding Merck's decision to acquire Prometheus lies in the expiration of the patent for one of the corporation's signature products, the cancer immunotherapy antibody Keytruda. With the patent looking to expire by the end of the decade, Merck has been active in seeking out new deals for promising pharmaceuticals to shore up the eventual loss, with Keytruda alone contributing \$21 billion in revenue to Merck in 2021. With the acquisition of Prometheus, there is a discrete chance Merck may begin selling future editions of PRA023 by the time Keytruda expires. Furthermore, Merck is ideally positioned to acquire Prometheus due to other large pharmaceutical firms already having an established presence in the IBD and immunology sector, an area which the firm lacks, in addition to Merck being the "cleanest" acquirer from an antitrust point of view, as per Stifel analyst Annabel Samimy.



Acquirer Overview



Merck is a leading global pharmaceutical company headquartered in Kenilworth, New Jersey. The company was established in 1891, and since then, it has been recognised for its innovative contributions to the healthcare industry. Merck, which employs about 74,000 people globally, is committed to discovering, generating, and distributing medication at the forefront of the industry including vaccines and animal health products.

Robert M Davis is the current CEO of Merck, known for his commitment to social responsibility. Merck has a history of bond issuances to finance research and development, as well as acquisitions and general corporate purposes. For example, the company issued an \$8B high-grade corporate debt sale to aid in financing their \$11.5B takeover of Acceleron Pharma. Following this, was their \$6B “jumbo bond” to help fund the Prometheus acquisition. Such financial decisions have played an integral role in financing the company’s advancements in healthcare and fulfilling the company's mission of improving human and animal health.



BUSINESS MODEL & ESG PRACTICES

Merck & Co., Inc. operates with a diversified business model, focussed on developing novel medications, vaccines, and solutions for animal health. Merck prioritises research, development, and commercialisation of products that address critical health challenges as part of its commitment to advancing global healthcare.

The company primarily generates revenue through product sales, particularly those of vaccines and animal wellness drugs. Sales are driven globally by their broad product portfolio, which includes treatments for conditions like cancer, infectious diseases, and chronic illnesses. Licensing contracts and joint ventures (such as Moderna and Sun Pharma) are yet another source that contributes to their revenue. Merck's sales have played a considerable role in making trailblazing medication commercially available.

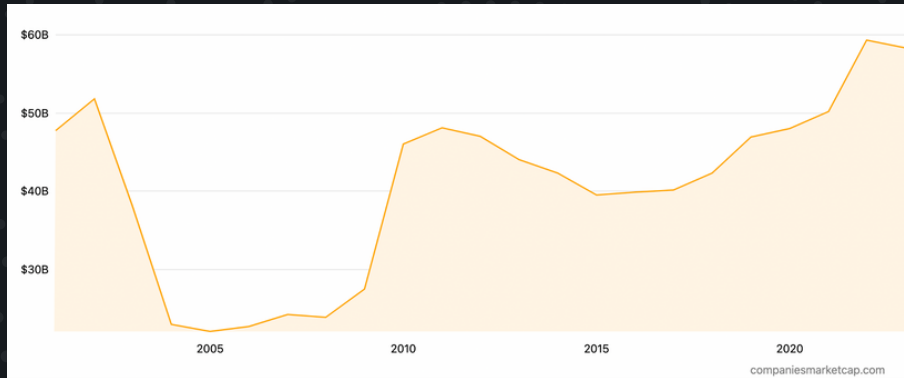
Merck's strategy places a strong emphasis on being globally present in multiple international markets. Additionally, the core tenets of their business strategy are sustainability, ethical business practices, and a dedication to enhancing both human and animal health. These elements have contributed to the company's reputation for leadership in the healthcare and pharmaceutical industries.

In particular, Merck places a significant importance to “governance” as part of their ESG criteria. and their governance principles stand as follows: Patients First Ethics, Integrity, Respect for People, Innovation and Scientific Excellence. In other areas, they are working towards meeting their ESG goals despite moving slower than expected. For example, they endeavoured to reduce their value chain GHG emissions by 30% by 2030. Currently, their emissions have been cut by 9%—a slow but promising start.



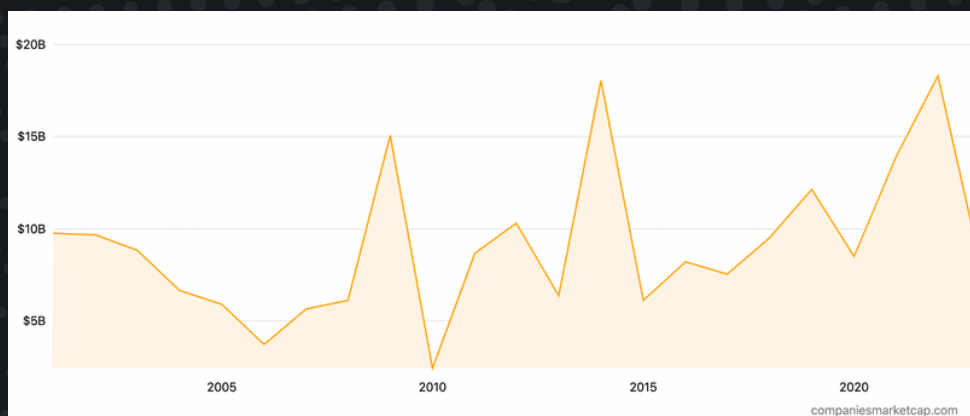
KEY FINANCIALS

Revenue



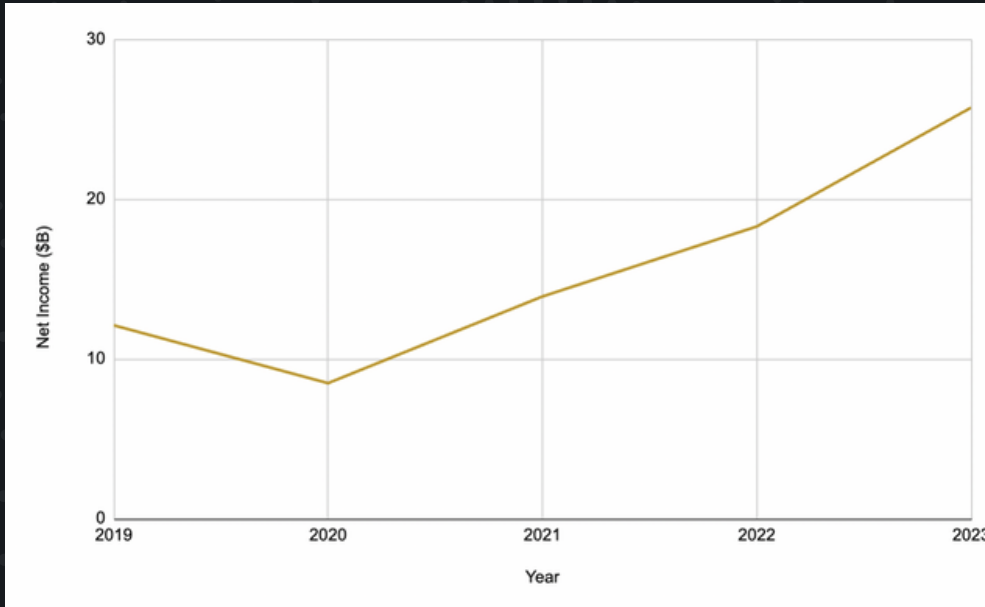
2007 onwards, Merck saw a spike in revenue followed by a positive period of revenue growth to date. Prior to this increase, the company experienced revenue-related setbacks as a result of the controversy surrounding its painkiller, Vioxx. In 2004, during a critical period in Merck's history, the company withdrew their painkiller from the market following concerns regarding an increased risk of heart attacks and strokes associated with its use. The consequential legal disputes continued up until 2006.

EBIT



Merck's earnings have seen heavy fluctuations over the last two decades. Most notable is the crash in 2010 which could be attributed to the aforementioned legal battle as well as a loss of patent exclusivity. Following the Vioxx controversy, Merck lost exclusivity over their patents, allowing competitors to more successfully penetrate the market. Consequently, a decline in sales and revenue followed.

Net Income of the company in the last 5 years



When it comes to net income, Merck represents mostly consistent positive earnings over the past 5 years. The only anomaly, however, is the year 2020 when the company experienced an approximate 30% decrease in income. This decrease is indicative of the hit that the pharmaceutical industry took as a consequence of the COVID-19 pandemic: a period that impacted sales and operations by upsetting healthcare supply chains, despite the fact that pharmaceutical companies like Merck were instrumental in the discovery of vaccines and treatments.

Stock Price Movements





Merck's (MRK) share price movement in the 12 months prior to the acquisition announcement (April 16 2023) has been a net increase (when standardising for close price): on 16 April 2022, the relative close price was at 86.07, while one year later, the relative close price gained momentum and jumped to 115.31. In fact, when it comes to volume, MRK currently is one of the biggest moving stocks during midday.

As for dividends during this time, there was a marginal increase from 0.69 in September 2022 to 0.73 in March 2023. This shift indicates that the ratio of dividend payment relative to the current stock price has become a more attractive investment. Consequently, making the stock marginally more appealing to investors following the acquisition announcement.

Market Cap: \$260.98B

Revenue: \$59.283B

EBIT (TTM): \$8.15B

EBITDA (TTM): \$10.132B

PE Ratio: 83.6

EPS: \$1.23

Dividend Yield: 2.84% (as of Nov 3, 2023)

Profitability ratio (net profit margin): 24.49% - this ratio implies that on average, Merck has been generating a positive profit

Efficiency ratio (asset turnover): 0.55 - this ratio implies that Merck's transformation revenue from their existing assets is average

Liquidity ratio: 1.47 - this ratio indicates that Merck is adequate in repaying their short-term debt

Leverage ratio: 1.38 - this ratio was impacted by Merck's liability repayment and thus currently stands under their average leverage ratio



Target Overview

Prometheus Biosciences

Prometheus Biosciences is a biotechnology company headquartered in San Diego, California, with a focus on developing precision medicines for immune-mediated diseases; its specialisation within this field is what prompted Merck's acquisition of them. Founded in 2016, the company is relatively new to the market but rapidly growing nevertheless: between 2020 and 2022, they tripled their employee headcount from 33 to nearly 100. Prior to acquisition, the company served under CEO Mark McKenna, who was the face of Prometheus' innovation and advancements in tailored therapies

Prometheus Biosciences is dedicated to using state-of-the-art research and technology to advance therapies catered to the specific needs of each patient. Their objective is to offer inventive remedies to tackle the intricacies of immune-mediated illnesses. As a newer company in the biotechnological industry—with less than a decade of activity in the market—their financial strategies have not yet included the buying of bonds.



BUSINESS MODEL & ESG PRACTICES

The core of Prometheus Biosciences' business strategy is centred around leveraging the unique utilities of biology and technology.

Drug development and licensing are two of Prometheus' main sources of revenue generation, along with sales, royalties, and licensing contracts. Partnerships with other pharmaceutical companies aid the company's financial support and the possibility of target-based compensation. As additional revenue streams, the company benefits from clinical trial participation and precision medicine consulting for autoimmune conditions. The aforementioned streams, together advance Prometheus' novel treatments within the biotechnological sphere.

To progress its treatments, Prometheus Biosciences frequently works with academic institutions and pharmaceutical companies such as Takeda (for IBD therapy), and now Merck. Their business strategy is in line with the expanding movement in healthcare toward personalised therapy and novel approaches to treating difficult autoimmune diseases.

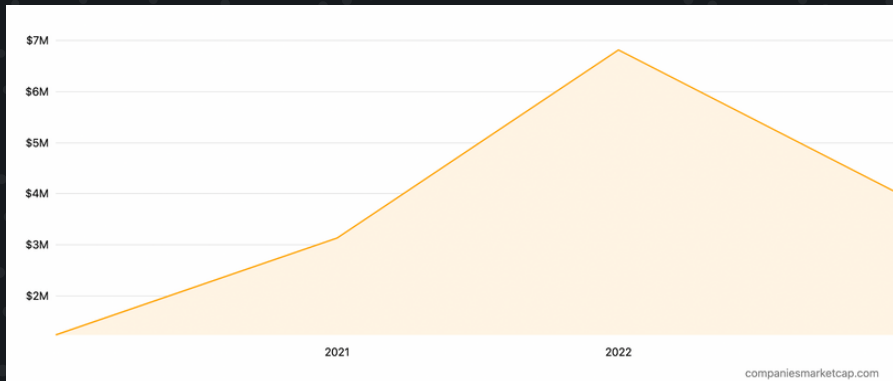
They strive for more efficient and focused therapies by customising treatments using cutting-edge technologies and genomic insights. The organisation carries out comprehensive investigations to comprehend the fundamental workings of autoimmune disorders, pinpointing molecular pathways and biomarkers. By minimising adverse effects, this precision medicine approach maximises the effectiveness of treatment.

The company does not have any notable ESG initiatives and consequently has a risk rating of 20.4 which corresponds to medium risk.



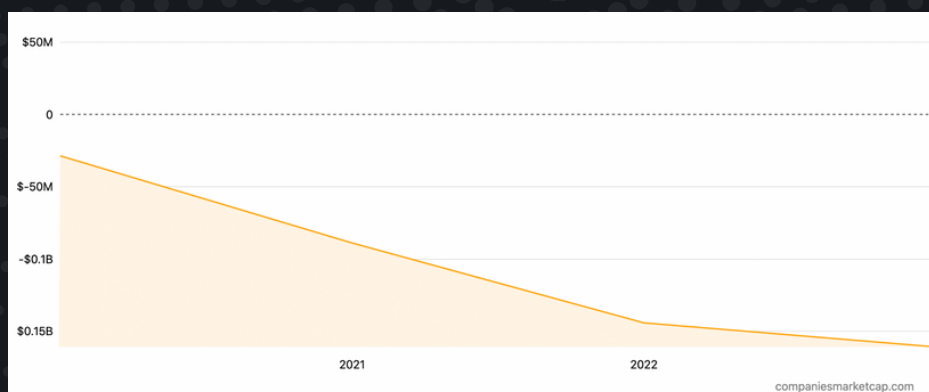
KEY FINANCIALS

Revenue



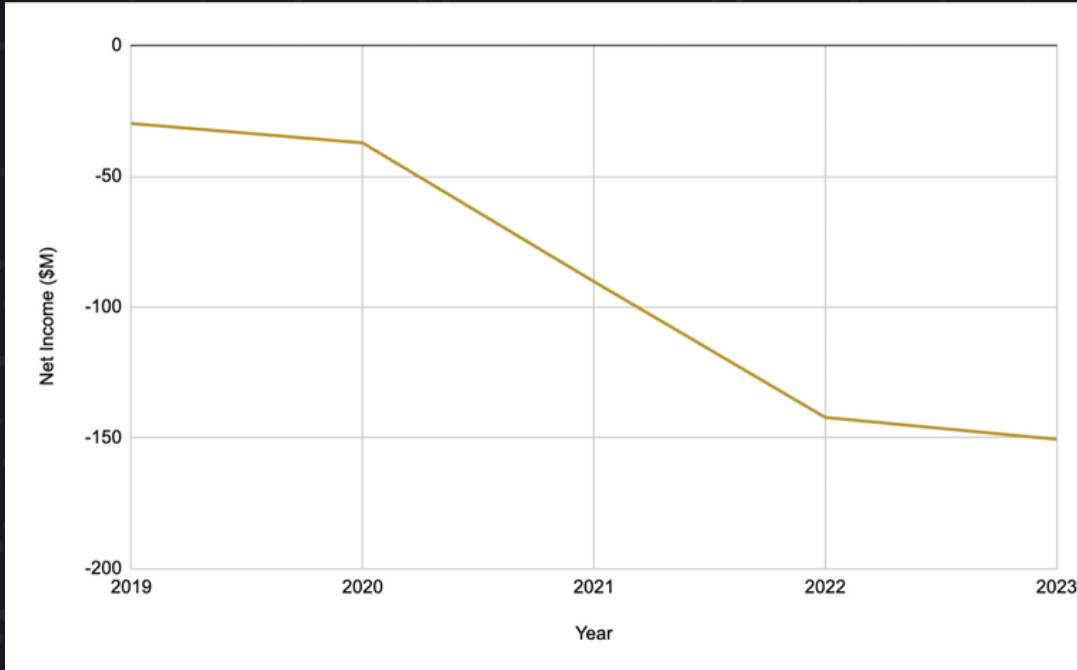
Despite its short lifespan, Prometheus Biosciences experienced fast-paced and positive revenue growth from 2016 up until 2022. Following this period, the company faced a steady decline in revenues which could be possibly attributed to the after-shocks of COVID-19 wherein competitive drug pricing within the industry played a role in the revenue decline, challenging the profitability of many pharmaceutical companies.

EBIT



Much unlike the earnings trend experienced by Merck over the past 7 years, Prometheus has not only seen a consistently negative trend in earnings but a trend pointing towards decreasing EBIT: with time, the company moves closer to aggregating net losses. A contributor to this trend could be the startup costs affiliated with drug testing and development that consequently detract from financing sales and drug marketing.

Net Income of the company in the last 5 years



Prometheus' net income has not only exhibited a negative trend, but also consistently been negative over the past years: there has been an overall financial loss due to the company spending more capital on expenses and being undercompensated by revenue. In Prometheus' case, this can be attributed to large expenses and unprofitable business operations—two features that are commonplace in the early stages of a biotechnological enterprise.

Stock Price Movements





Prometheus' (RXDX) share price movement in the 12 months before the acquisition announcement (April 16 2023) has followed a similar trend to that of Merck's—aside from a rather noticeable price hike. Again, standardising for the close price, at the date of the announcement, the relative close price was at 31.37, while one year later, the relative close price gained momentum and accelerated to a substantial 114.01. The cause for this substantial hike right before 2023, was a consequence of the positive news following its lead therapy, PRA023: it performed well in terms of its clinical remission rate (49.1%) and passed two phases of trialling. The drug also conformed favourably to safety profiles and tolerance, with minimal side effects observed in both trials..

Market Cap: \$9.502B

Revenue: \$6.089M

EBIT (TTM): \$-145.778M

EBITDA (TTM): \$-147.831

PE Ratio: -56.8

EPS: \$ -5.25M

Profitability ratio (net profit margin): -3699.19% - this ratio implies that Prometheus' profitability saw a stark and substantial negative shock

Efficiency ratio (asset turnover): 0.01 - this ratio is lower than usual for Prometheus and is in light of their increased investments in Q3 2023

Liquidity ratio: 1.66 - this ratio indicates that Prometheus is adequate in repaying their short-term debt

Leverage ratio: 0.23 - this ratio is below Prometheus' net average and is attributed to net new borrowings



Valuation Analysis

COMPARABLE COMPANY ANALYSIS

Buyout Share Price	\$200.00
FY2030 Revenue (Base Case)	2,895,000
FY2030 EBITDA (Base Case)	619,000
Implied Market Cap (P/S)	10,254,757
No. of Shares	54,000
Implied Share Price (P/S)	\$ 189.90
	Premium 5.0%
Implied Enterprise Value (EV/EBITDA)	6,922,435
Net Debt	(666)
Implied Equity Value	6,921,769
No. of Shares	54000
Implied Share Price (EV/EBITDA)	\$ 128.18
	Premium 35.9%

[Please click on the table to access the full model](#)

Considering Prometheus has negative EBITDA and EBIT and negligible revenue, it meant it couldn't be modelled using its LTM multiples. In our Base case, we see PRA-052 and PRA-023 being granted FDA approval by the end of 2030. As such, we have built a comparable model using our forecast for FY2030 and have compared it to pharmaceutical firms of similar Enterprise value (+/- 40%) who have been granted FDA approval on at least one drug.

Using such a method, we find that on a Price/Sales basis, Merck paid a 5.0% premium (i.e., about fair value), but on an EV/EBITDA basis, they paid a 36.5% premium. This is because multiple expansion (as modelled in our base case) will only start to occur once scale is achieved – we see this happening several years after FDA approval.



PROMETHEUS DISCOUNTED CASH FLOW MODEL

Sensitivity Table						
		Growth Rate				
		1.5%	2.0%	2.5%	3.0%	3.5%
WACC	\$124.40					
	15.6%	\$172.01	\$174.11	\$176.37	\$178.82	\$181.47
	16.6%	\$144.72	\$146.27	\$147.93	\$149.71	\$151.63
	17.6%	\$122.01	\$123.17	\$124.40	\$125.72	\$127.13
	18.6%	\$102.98	\$103.85	\$104.77	\$105.76	\$106.80
	19.6%	\$86.92	\$87.58	\$88.28	\$89.02	\$89.81

[Please click on the table to access the full model](#)

In the base case scenario, assuming a WACC (calculated using CAPM) of 17.6% and Perpetuity Growth Rate of 2.5%, we forecast an implied share price of \$124.40 for Prometheus Biosciences. This represents an accretive EPS (7%) by 2032 and 88% of its 6-month trading average prior to closing on June 15, 2023. The base case scenario assumes that both PRA-023 (for Ulcerative Colitis, Crohn’s Disease & SSc-ILD) and PRA-052 (Antagonist for Ulcerative Colitis) are approved by the U.S. Food and Drug Administration (FDA) in December 2026 and June 2030 respectively.

The bull case further assumes faster sales, greater scale economies of distribution and / or margin expansions, leading to accretive EPS (2%) by 2032. This case is modelled through more aggressive Revenue growth rates, and lower Cost growth rates, associated with the pipeline drugs and other sources, resulting in a \$201.57 share price forecast. In contrast, the bear case assumes neither of the key pipeline drugs are approved by the FDA, and other revenue sources grow slowly, implying a \$3.79 share price and dilutive EPS (-7%) by 2032.



MERCK DISCOUNTED CASH FLOW MODEL

		Growth Rate				
		1.5%	2.0%	2.5%	3.0%	3.5%
WACC	\$107.93					
	5.6%	\$115.03	\$125.69	\$139.74	\$159.11	\$187.51
	6.1%	\$103.35	\$111.40	\$121.66	\$135.19	\$153.82
	6.6%	\$93.93	\$100.17	\$107.92	\$117.80	\$130.81
	7.1%	\$86.16	\$91.10	\$97.11	\$104.58	\$114.08
	7.6%	\$79.64	\$83.63	\$88.39	\$94.18	\$101.36

Please click on the table to access the full model

Given a 6.6% WACC, calculated using the CAPM, and a 2.5% terminal growth rate as the base case we arrive at an implied share price of \$107.92. Therefore, we believe Merck is trading at a discount compared to its current share price.

Merck’s stable COGS and operating expenses as % of revenue allowed for straight-line forecasting. Adjustments of the forecasts because of anomalies due to the COVID-19 pandemic were made when appropriate.



MERGER MODEL

Post-merger EPS Calculation	
Revenues	97,140
Less: COGS	22,681
Gross Profit	74,459
Less: Operating Expense	43,572
Less: D&A	13,780
EBIT	17,106
Interest Foregone on Cash	540
PBT	16,566
Less: Income Tax	2,336
Net Income	14,231
Outstanding Diluted Shares of Combined Company	2,588
EPS of Combined Company	5.50
EPS of Acquirer Standalone	5.40
Accretive/Dilutive	Accretive
Accretive/Dilutive	\$0.10
Accretive/Dilutive (%)	2%

[Please click on the table to access the full model](#)

Using our Base case forecast for FY2032, we find that this acquisition will eventually be accretive for Merck. It should be noted that this is wholly contingent on PRA-052 and PRA-023 being granted FDA Approval. In our Bear case, we have modelled for neither drug to be approved and for other revenue to plateau; if said situation was to unfold, this deal would be dilutive. However, assuming both drugs are approved by 2030, this deal will become increasingly accretive for Merck.



Deal Analysis

STRENGTHS

- **Portfolio Diversification:** Merck's CEO, Robert M Davis, announced that the acquisition of Prometheus was essential in supporting the diversification of the company's investments: "this transaction adds diversity to our overall portfolio and is an important building block as we strengthen the sustainable innovation engine that will drive our growth well into the next decade."
- **Capitalising on Immunology:** The immunology sphere within the pharmaceutical space is becoming a region that more and more firms seek to invest in due to the promise of substantial synergies and profit. For example, this February, Takeda Pharmaceutical committed \$6 billion to Nimbus Therapeutics to acquire a candidate autoimmune drug while, the year prior, Pfizer acquired Arena to expand their immuno-inflammatory disease drugs.

WEAKNESSES

- **Financial Performance:** Prior to the acquisition announcement and acquisition date, Prometheus' financial figures—including revenues and net income—did not show much scope for improvement. If anything, they only pointed towards signs of decay, commencing from the past 4-5 year time frame.
- **Proof of Concept:** Given Prometheus's relatively short-lived time within the biotechnological landscape—especially so for a company invested in immunology and drug development—it may be premature to use their successes as a solid ground for proof of concept. In other words, having assurance that their immunology niche would certainly yield profit-promising consequences could be a naive assumption.



Deal Analysis

OPPORTUNITIES

- **Responding to Exclusivity Threats:** Merck struggled with losing the drug exclusivity of some of its best-selling products as a consequence of increasing competition. Therefore, a potential opportunity provided by the acquisition allows Merck to break into new sectors in an attempt to bounce-back from patent related setbacks.

THREATS

- **Regulatory Challenges:** Given the nature of the biotechnological industry, the R&D as well as regulatory approval process is one that is complex and time-consuming: investments may suffer greatly from regulatory agencies' delays or rejections.
- **Clinical Trial Failures:** Another arduous process within the drug development space is the passing of clinical trials. Considering the investments that are made to bring a therapy or drug to trial, immunology medications may falter in clinical trials as a result of safety or efficacy issues and result in large financial losses.
- **Patent Expiry:** As can be gathered from Merck's success within the healthcare sector, having patent exclusivity is an integral part of staying ahead of market competition. An important feature of patents for immunology drugs is that they have strict time-limits. As a result, generic competition has the potential to reduce market share and revenue when patents expire.



GLOSSARY

CAPM: Capital asset pricing model - a model used to find the expected return of an asset

COGS: Cost of goods sold

Dividend: Regular payments made to shareholders of a company

EPS: Earnings per share

Equity Value: Value of a company that is available to shareholders


Terminal Growth Rate: Assumption of the rate that a company is expected to grow forever

WACC: Cost of capital used to represent a firm's after-tax costs from all resources.



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