



Merck & Co., Inc (NYSE: MRK)

Stock Price as of 7/12/2021	Target Price	Upside	Recommendation
\$77.55	\$101.66	31.3%	BUY

Summary

Merck & Co., Inc. (Merck), doing business as Merck Sharp & Dohme outside the United States and Canada, is a global health care company that delivers innovative health solutions through its prescription medicines, vaccines, biologic therapies and animal health products. It includes two operating segments, which are the Pharmaceutical and Animal Health segments, both of which are reportable segments.

Investment Thesis

We recommend a BUY rating on MRK with a price target of \$101.66, a 31.1% upside to current stock price, with the following reasons:

- MRK is intrinsically undervalued due to the market volatility.
- Strong sales from star products, led by Keytruda®, drive a higher-than-average growth.
- Consistent ability to differentiate products portfolio and to innovate.
- The industry keeps heated due to global aging, growing cancer population, etc.

Risks

- Reduction in revenues as COVID-19 pandemic continues.
- Price adjustments in the whole stock market.
- Continued pricing pressures globally, especially in mature market.
- Any events that adversely affect the key product Keytruda® and loss of market exclusivity will have a material adverse effect.
- Diabetes drugs Januvia® and Janumet® sales would decline substantially due to patent expiration in 2023.

Market Data

Ticker	MRK
Sector	Health Care
Industry	Pharmaceuticals
Market Cap	196.36B
Shares Outstanding	2.53B
Beta 5Y	0.42

Financial Data

Revenue (2020)	\$47.99B
Revenue Growth (YoY %)	2%
EPS (TTM)	2.77

Performance

52 Week Price High	\$86.78
52 Week Price Low	\$68.44
1 Year return	2.44%
Dividend Yield	3.43%

NYSE:MRK - Share Pricing



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Company Overview

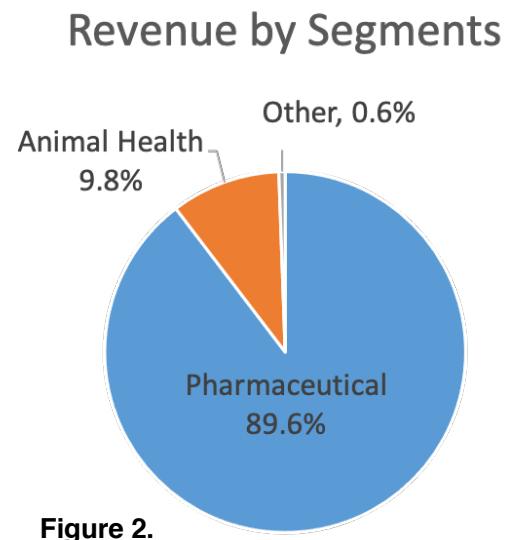
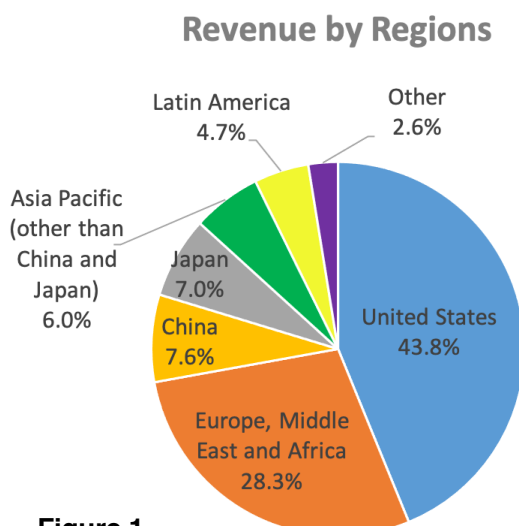
General Overview

Merck & Co., Inc. (Merck) was founded in 1891 as a subsidiary of German Merck group (founded in 1668). During the first World War, Merck was acquired by the U.S. government and later became an independent U.S. company. In the United States and Canada, Merck & Co. holds the rights to the trademark “Merck” while the original Merck company owns the rights to the “Merck” name¹ everywhere else. In 1953, Merck merged with Sharp & Dohme, thus it operates Merck Sharpe & Dohme (MSD) outside the United States and Canada. Headquartered in Kenilworth, New jersey, the company as of December 31, 2020 had approximately 74,000 employees worldwide, with approximately 27,000 employed in the United States².

In 2020, Merck generated \$47,994 million in revenue, 2% increase from 2019, and posted the earnings per share as \$2.78. Due to the COVID-19 pandemic, the demand of specific products declined, leading to slow overall sales growth. As a global health care, Merck that delivers innovative health solutions through its prescription medicines, vaccines, biologic therapies and animal health products.² In June 2020, Merck completed the spin-off of Organon & Co. (Organon) which will focus on women’s health, biosimilars and established brands businesses. The company’s operations are principally managed on a products basis and include two operating segments, which are the Pharmaceutical and Animal Health segments, both of which are reportable segments.²

Business Segments

In terms of geographic areas, United States market topped with \$21,027 million (43.8%), trailing with Europe, Middle East and Africa region at \$13,600 million (28.3%), China at \$3,624 million (7.6%), Japan at \$3,376 million (7.0%), Asia Pacific (other than China and Japan) at \$2864 million (6.0%), and Latin America at \$1,229 million (4.7%) (Figure 1). Among all regions, China has grown rapidly in the past few years with 13% increase in sales from 2019 to 2020, followed by 7% in Europe, Middle East and Africa market, 2.5% in U.S. market and all other markets having negative sale growth.



Pharmaceutical Segment

Merck’s pharmaceutical segment drives the most revenues within the company and the 2020 **growth rate is 3%**.² Pharmaceutical segments contributed \$43,021 million to the total \$47,994 million revenue, **89.6%** of total sales (Figure 2). This segment includes human health pharmaceutical and vaccine products. Human health pharmaceutical products consist of Oncology, Hospital Acute Care, Immunology, Neuroscience, Virology, Cardiovascular, Diabetes and Women’s Health, generally sold by prescription, for the treatment of human disorders². Human health vaccine products consist of preventive pediatric, adolescent and adult vaccines, primarily administered at physician offices².

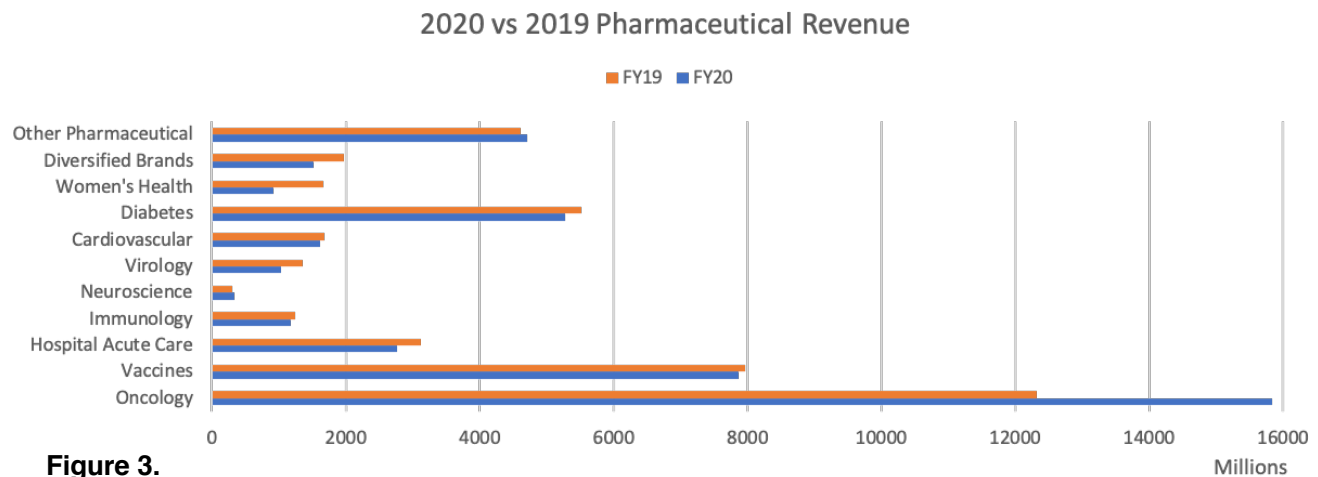


Figure 3.

Top 10 selling products in Pharmaceutical segment

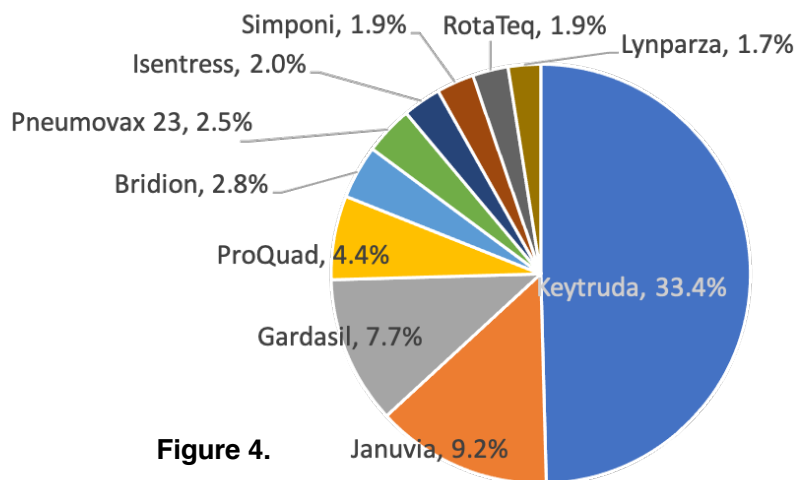


Figure 4.

Part of Merck’s pharmaceutical products are as follows²:

Oncology

- Keytruda®**: Merck’s anti-PD-1 therapy, as monotherapy for the treatment of certain patients with cervical cancer, classical Hodgkin Lymphoma, esophageal cancer, head and neck squamous cell carcinoma (HNSCC), small-cell lung cancer (SCLC), etc. It is also approved for the treatment of certain patients in combination with chemotherapy for other cancers. Keytruda® contribute the vast majority of sales revenue with \$14,380



million in 2020. It consists **33.4%** sales of Pharmaceutical segments (Figure 4).

- Lynparza®: an oral poly polymerase inhibitor being developed as part of a collaboration with AstraZeneca². It is approved for the treatment of certain types of advanced ovarian, breast, pancreatic and prostate cancers. Profits from product sales are shared equally between AstraZeneca and Merck. Alliance revenue related to Lynparza® grew 63% in 2020².
- Lenvima®: an oral receptor tyrosine kinase inhibitor being developed as part of a collaboration with Japanese company Eisai. It is approved for the treatment of certain types of thyroid cancer, HCC, in combination with Keytruda® for the treatment of certain patients with endometrial carcinoma. Merck and Eisai share applicable profits equally.
- Emend®: used for the prevention of certain chemotherapy-induced nausea and vomiting.

Hospital Acute Care

- Bridion®: a medication for the reversal of two types of neuromuscular blocking agents used during surgery
- Noxafil®: an antifungal agent for the prevention of certain invasive fungal infections.

Immunology

- Simponi®: a once-monthly subcutaneous treatment for certain inflammatory diseases.

Neuroscience

- Belsomra®: an orexin receptor antagonist indicated for the treatment of insomnia, characterized by difficulties with sleep onset and/or sleep maintenance.

Virology

- Isentress/Isentress HD: an HIV integrase inhibitor for use in combination with other antiretroviral agents for the treatment of HIV-1 infection.

Cardiovascular

- Zetia®: cholesterol modifying medicines.

Diabetes

- Januvia® and Janumet® help lower blood sugar levels in adults with type 2 diabetes

Vaccines

- Gardasil®/Gardasil 9®: help prevent certain diseases caused by certain types of human papillomavirus (HPV). Its sales grew 5% in 2020.
- ProQuad®: a pediatric combination vaccine to help protect against measles, mumps, rubella and varicella.
- M-M-R II®: help protect against measles, mumps and rubella.
- Varivax®: help prevent chickenpox (varicella).
- Pnewmovax 23®: help prevent pneumococcal disease. Its sales grew 17% in 2020.
- RotaTeq®: help protect against rotavirus gastroenteritis in infants and children.

Animal Health Segment

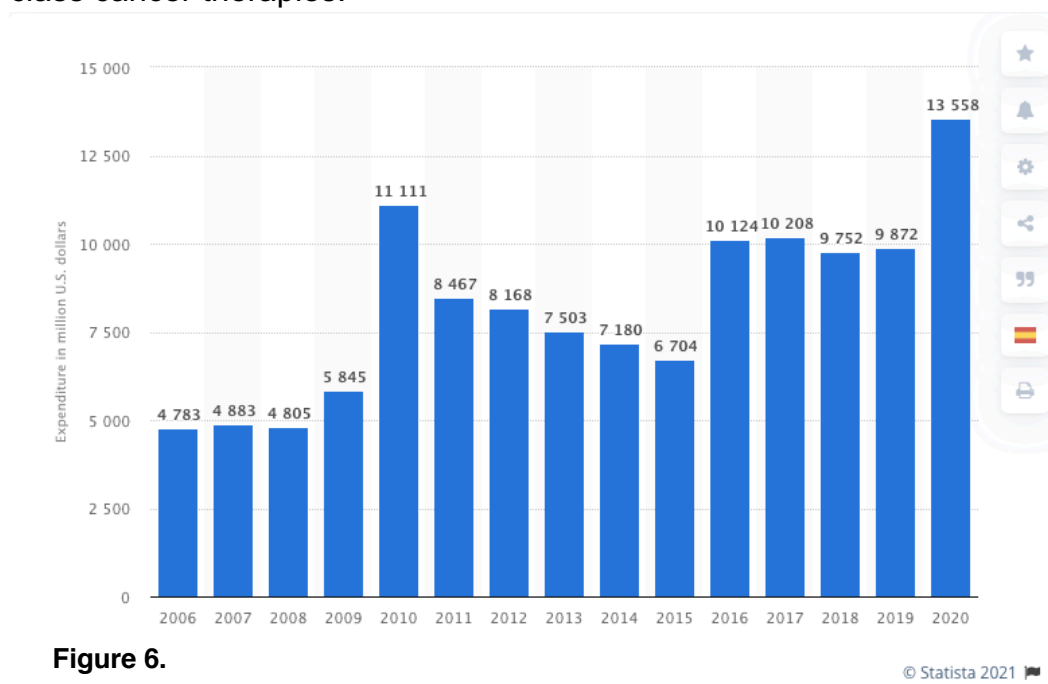
The Animal Health segment generated 9.8% of total sales in 2020 (Figure 2), a 7.1% increase from 2019. This segment discovers, develops, manufactures and markets a wide range of veterinary pharmaceuticals, vaccines and health management solutions and services, as well as an extensive suite of digitally connected identification, traceability and

monitoring products². Principal products Merck provided can be sorted into livestock and companion animals.

Sustained competitive advantages

Differentiation. Because of the special business model, Merck as a Pharmaceutical company heavily depends on patent. To mitigate the shock from loss of exclusive ownership and from the fake drug manufactures, Merck adopted the differentiation strategy to broaden its product catalog and expand its business globally. Merck’s products differ vastly from oncology to diabetes, capturing customers with various interests. Keytruda® is the first anti-PD-1 therapy to be approved in the United States⁴. It works by aiding the body’s own immune system to fight and kill cancer cells.³ After receiving its first FDA approval in 2014, it continues to be tested in a wide range of clinical trials worldwide. Now Keytruda® receives 32 FDA approvals as first treatment or in combination with others to several cancers and is approved in 93 countries⁴. This advantage is sustained unless a new competitor that has the same effects as Keytruda® has emerge or the patent expires in 2028².

Innovation. After acquiring Schering-Plough in 2009, Merck reorganized its department structure into 5 main departments: Global Human Health, Animal Health, Consumer Health Car, Merck Research Laboratories, and Merck Manufacturing. Since then, Merck started its long-standing emphasis on research and development². With the success of Keytruda® in 2014, Merck was able to balance the huge expense on R&D and further applied a companywide focus on developing its oncology division⁶. In 2020, it spent over \$13 billion (28.25% of total revenue) on research and development (Figure 5), an increase of 37% compared with 2019². It currently has 23 candidates in phase II, 8 in phase III, 6 in under view². Besides, the acquisition of two biopharmaceutical companies: ArQule, Inc. (ArQule) and VelosBio Inc. (VelosBio), presents Merck’s ambition in developing first-in-class cancer therapies.



Market Landscape

In the past ten years, S&P 500 Healthcare sector (267.29%) experienced a higher increase than S&P 500 (232.74%) had. But Pharmaceutical industry actually had a much lower increase (163.35%) than these two had. The weakening of Pharmaceuticals started at 2018, primarily affected by pricing pressures, fierce competition, and slow industry growth. Although the pandemic brought benefits from vaccine producers and healthcare providers & services industry in healthcare sector, most Pharmaceutical companies are negatively impacted.



Growth Drivers

Merck has a competitive product portfolio and cutting-edge pipeline. In 2020, Keytruda® received 11 new approvals from U.S., China, and Japan. These approvals were the result of a broad clinical development program that currently consists of more than 1,400 clinical trials, including more than 1,000 trials that combine Keytruda® with other cancer treatments². These studies encompass more than 30 cancer types, many of which are currently in Phase 3 clinical development². It can be expected that Keytruda® will keep its strong growth in the next few years. Also, alliance revenues from Lynparza® and Lenvima® are likely to keep increasing due to continued uptake across the multiple approved indications in the United States, the EU, China and Japan². The company is well-positioned to compete in the search for technological innovations² and to widen the pipeline through acquisitions and external alliances. Although COVID pandemic impedes the process of research, Merck's pipeline currently has 23 candidates in phase II, 8 in phase III, 6 in under view, which includes multiple disease areas—cancer, cardiovascular diseases, metabolic diseases, infectious diseases, neurosciences, respiratory diseases, and vaccines.

Recent Stock News

- On June 30th, Merck & Co Inc will hold its second-quarter 2021 sales and earnings conference call with institutional investors and analysts at 8:00 a.m. EDT on Thursday, July 29. During the call, company executives will provide an overview of Merck's performance for the quarter¹⁷.
- On June 3rd, Merck announced it has completed the spinoff of Organon & Co. (Organon). The stock price for Merck bounced from the bottom by 2.16% at that day.

- On April 29th, Merck & Co. shares are trading lower (from \$79.88 to \$69.656) after the company reported worse-than-expected Q1 EPS and sales results.
- On March 15th, Gilead Sciences, Inc. and Merck announced that they have entered into an agreement to co-develop and co-commercialize long-acting treatments in HIV that combine two inhibitors respectively from Gilead and Merck into a two-drug regimen with the potential to provide new, meaningful treatment options for people living with HIV¹⁹. Investors reflected positively with over 2% rise in share price.

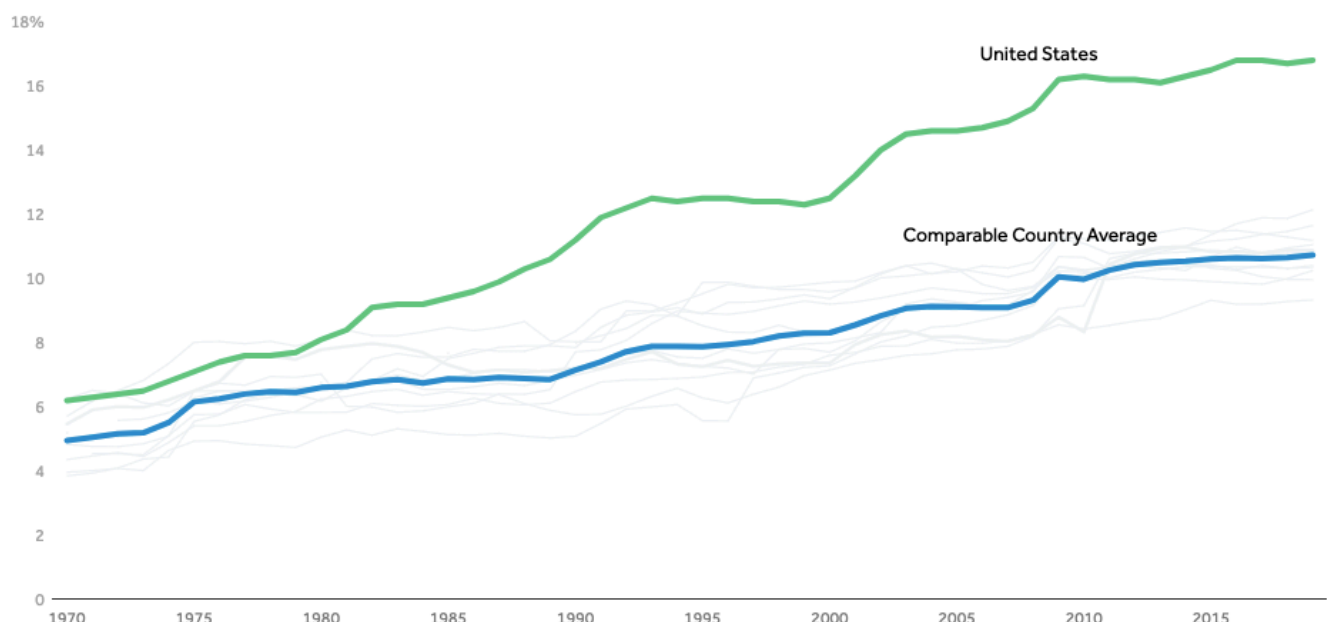
Investment Thesis

Fundamental Drivers

Merck's 2020 top three selling products are in Oncology, Vaccines and Diabetes lines. Keytruda®, Gardasil®/Gardasil 9®, and Januvia® contributes \$14,380 million, \$3,938 million, and \$3,306 million, representing 33.4%, 9.2%, 7.7% of total sales revenue in 2020, respectively. The strong demand in these three fields as I demonstrated below will promote Merck's revenue growth in the long run.

The demand in health care is highly likely to increase, especially for oncology. According to the most recent statistical data from NCI's Surveillance, Epidemiology, and End Results (SEER) Program, the median age of a cancer diagnosis is 66 years⁷. It can be presumed that in the coming years, due to population aging, more people have cancer. By 2040, 29.5 million new cancer case is expected to occur worldwide⁴. Generally, cancer rates are highest in countries whose populations have the highest life expectancy, education level, and standard of living⁸. By 2017, 5.42% of U.S. population are with cancer⁹.

Health consumption expenditures as percent of GDP, 1970-2019



Notes: U.S. values obtained from National Health Expenditure data. Health consumption does not include investments in structures, equipment, or research.

Source: KFF analysis of OECD and National Health Expenditure (NHE) data • Get the data • PNG

Peterson-KFF
Health System Tracker

Figure 8.



Figure 8 shows that people’s expenditures on healthcare are increasing worldwide along with time changes. In other words, revenue for health care companies tends to rise since people adopt and consider new, and often more expensive, treatments as standards of care. In 2019, the U.S. spent 17% of its GDP on health consumption, whereas the average is 11%¹⁰. These data prove that the anti-cancer market is potential and in high demand.

Type 2 diabetes could be cause by unhealthy diets, physical inactivity, excess body weight and tobacco use. More than 34 million Americans have diabetes (about 1 in 10), and approximately 90-95% of them have type 2 diabetes¹¹. It most often develops in people over age 45, but more and more children, teens, and young adults are also developing it¹¹. 1.5 million Americans are diagnosed with diabetes every year¹². This indicates strong and constant demand for diabetes-control drugs.

In addition, HPV vaccine was introduced in 106 WHO member States by the end of 2019, however, global coverage with the final dose of HPV currently is estimated at 15%¹³. With the spread in more countries and a more comprehensive understanding of HPV vaccine, the market will enlarge in the future. For example, Merck’s Gardasil®/Gardasil 9® receives approvals in China and created high volumes in 2020. Currently, only two manufacturers, Merck and GlaxoSmithKline, produce WHO-prequalified HPV vaccines¹⁴. So, there is less competition for Merck.

Economic Sector

Healthcare sector is relatively defensive to the market, but factors pertinent to buyers and suppliers directly influence its performance. Unemployment rate reflects people’s disposable income—the high the unemployment rate is, the lower the consumer income people have. Also, more than 50% of Americans get insurance from their employers, so high medical expenses are not affordable. Reduction in healthcare spending often ensues. Further, revenues for healthcare companies will go down.

Financials

Financially, Merck performs well. Merck’s revenue grows steadily with effective cost management. From 2015 to 2019, the operating margin as percentage of sales continued rising without influencing the R&D expense. In 2020, Merck spent 28.2% of total revenues on research and development, the highest among peers in Figure 9. Also, SG&A expenses of Merck (21.8%) is lower than the average (23.4%).

	Average	MRK	JNJ	PFE	ABBV	LLY	BMJ
R&D	21.0%	28.2%	14.6%	22.4%	13.5%	24.8%	22.5%
SG&A	23.4%	21.8%	26.7%	27.2%	21.6%	24.9%	18.0%
Current Ratio	1.23	1.02	1.21	1.35	0.84	1.40	1.58
LTM Debt/Capital %	55.91%	53.61%	33.80%	36.57%	86.17%	69.65%	55.65%

Figure 9. Source: MacroTrends, Net Advantage

Comparing five-year cumulative total return, Merck is at 12%, higher than its peer group average at 9%². The current ratio of Merck (1.02) is less than the industry average (1.23).



The higher current ratio is, the better a company's ability to pay short-term obligations. The reduction in current assets is probably explained by the fact that transactions stagnated during the pandemic. The last twelve months (LTM) debt/ capital ratio tells the proportion of debt that a company uses to run its operations. Merck is at 53.61%, behind Johnson & Johnson and Pfizer. Although this ratio is not low, it must be mentioned that these liabilities for contingent sales-based milestone payments related to collaborations with AstraZeneca and Eisai where payment remains subject to the achievement of the related sales milestone aggregating \$1.0 billion².

Income Statement Projections

Splitting the sales revenue into separate products is more precise to estimate the 2021-2023 numbers. With recovery of the economy, sales of Keytruda® tend to consistently grow. Its multiple usages discovered and that are in-progress found the base of high sales volume. Its approvals in Europe, China, and Japan ensure a global market which contributes over 40% of total revenues in 2020. Merck has to face a slump in sales of Januvia® and Janumet® because the patent is going to expire in 2023. I assume the pressure from products having same effects will lead to a 50% decrease in Merck's sale. The spin-off of Organon completed in June 2021, so I forecast "Women's Health" part with data from Q1 2021 and exclude it for next few years. "Remaining Pharma Products" can go back to \$11 billion in 2023 because I believe Merck as a company addressing innovation is going to launch more products not mentioned in Figure 10. Overall, I believe there will be a **8.4%** sales growth in 2021, reaching up to \$52,025 million, 9% in 2022, and drop to 4% in 2023.

Product	2018	2019	2020	2021E	2022E	2023E
Keytruda	7,171	11,084	14,380	17,511	20,973	23,043
Januvia/Janumet	5,914	5,524	5,276	5,144	5,118	2,559
Gardasil/Gaidasil 9	3,151	3,737	3,938	4,204	4,540	5,267
ProQuad/ MMR II/ Varivax	1,798	2,275	1,878	2,023	2,266	2,833
Bridion	917	1,131	1,198	1,263	1,389	1,597
Pneumovax 23	907	926	1,087	1,167	1,254	1,348
Isentress/Isentress HD	1,140	957	857	788	725	635
Simponi	893	830	838	788	780	733
RotaTeq	728	791	797	837	879	923
Zetia/Vytorin	1,355	874	664	564	480	491
Alliance -- Lynparza	187	444	725	972	1,137	1,216
Alliance -- Lenvima	149	404	580	725	906	1,042
Women's Health	1,605	1,666	916	458	-	-
Remaining Pharma Products	11,774	11,108	9,887	10,035	10,186	11,204
Livestock	2,630	2,784	2,939	3,104	3,259	3,357
Companion Animals	1,582	1,609	1,764	2,011	2,212	2,305
Other	393	696	270	432	605	423
Total	42,294	46,840	47,994	52,025	56,708	58,976

Figure 10.



The spin-off of Organon optimizes Merck’s product mix, reducing the budget for SG&A. While growing annual non-tax deductible health care reform fee² (\$85 million, \$112 million, and \$124 million in 2020, 2019, and 2018, respectively) partially offsets the positive effect from product structure update. So, there is small cut-down in growth of SG&A costs as I forecast. Based on Q1 2021 report, the tax rate is around 8%, much lower than that of in 2020 (16.1%). Considering Democrats policy on corporate tax and possible encouragement for healthcare sector, I pick 18% as estimated tax rate. Since Merck plans to invest more than \$20 billion in new capital projects from 2020-2024², I assume 8% growth of “CapEx” in the next few years. My EPS estimates are similar to the consensus. Review the attached income statement projection in Appendix for more details.

Valuation Analysis and Price Target

With the aforementioned financial and income projections, the Discounted Cash Flow (DCF) Model is an appropriate model to determine Merck’s intrinsic stock value. Additionally, DCF isn’t affected by short-term market volatility or non-economic factors. Thus, I have assigned a **70% weight to the DCF based valuation**. On the other hand, multiples are dynamic and fluctuated with market conditions change. The current stock price \$77.55 reflects the market uncertainty created by COVID-19 pandemic and by gradually tightened Fed policy. Hence, I have assigned a **30% weight to relative valuation model based on multiples**.

Relative Valuation Model

The healthcare sector as a whole currently trades at higher pricing ratio (23.52) compared to its median (19.14) over the past 20 years and they traditionally trade in line relative to the S&P 500 (Figure 13). However, healthcare sector is now trading below the market (Figure 13), representing that this sector is relatively cheap. This may be attributed to postponed and cancelled transactions affected by the pandemic.

At the same time, the S&P 500 is trading close to its history highest with a quick speed after the deep drop in March 2020 (Figure 11). This uptrend could be caused by rounds of quantitative easing and influx of spare cash into heated sectors like Info Tech.

While in the long term the market will return to the normal growth, some vaccine producers and COVID-19 related companies

S&P 500	High	Low	Median	Current
P/E	30.77	12.12	18.87	29.91
P/B	4.51	1.64	2.78	4.49
P/S	2.86	0.78	1.62	2.84
P/EBITDA	16.81	4.38	8.72	16.19

Figure 11. Source: MacroTrends, Net Advantage

Healthcare Absolute Valuation				
	High	Low	Median	Current
P/E	31.26	10.35	19.14	23.52
P/B	8.44	2.20	3.91	5.18
P/S	3.42	0.97	1.72	1.93
P/EBITDA	18.48	6.55	11.83	16.66

Figure 12. Source: Class Notes

Healthcare Relative Valuation				
	High	Low	Median	Current
P/E	1.32	0.54	1.02	0.77
P/B	2.47	1.06	1.39	1.10
P/S	2.03	0.64	1.09	0.65
P/EBITDA	2.31	0.91	1.39	1.00

Figure 13. Source: Class Notes



benefited in 2020 hugely are less “profitable” with the amelioration of pandemic, and other companies are being adjusted back to reasonable prices with the daily change of S&P 500.

Ticker	P/E	P/S	P/B	P/CF	EV/ EBITDA
MRK	28.12	4.1	7.29	30.28	17.03
JNJ	29.91	5.37	6.77	21.67	18.17
PFE	20.23	5.03	3.23	17.34	15.89
ABBV	41.66	4.11	15.18	11.62	19.17
LLY	35.74	8.43	32.72	38.5	27.21
BMJ	0	3.57	4	11.5	23.24
AMGN	20.28	5.71	15.07	14.6	12.8
NVS	26.63	4.25	4.12	20.64	14.08
Average	28.94	5.07	11.05	20.77	18.45

Figure 14. Source: Gurufocus

Absolute Valuation	Current Stock Price	Current Multiple	Your Target Multiple	Target/ Current	Target Price
P/E	77.55	28.12	28.94	1.03	79.81
P/B	77.55	7.29	11.05	1.52	117.52
P/S	77.55	4.1	5.07	1.24	95.92
P/EBITDA	77.55	17.03	18.45	1.08	84.01
Equal Weighted Valuation					94.32

Figure 15.

DCF Model

The appendix contains details in regard to the DCF modeling used. I have taken a **discounted rate of 8.75%** and a **terminal growth rate of 3%**. The current S&P 500 implies a 5% growth rate and 8.5% discount rate. With possibly high burden on debt repayments and current assets implied by current ratio at 1.02 and LTM debt/capital ratio at 53.61%, I believe 8.75% discount rate is warranted.

	8.50%	8.75%	9.00%
2.75%	106.6	102.0	97.8
3.00%	109.8	104.8	100.3
3.25%	113.2	107.9	103.2
3.50%	117.0	111.2	106.0

Figure 15. Source: Class Notes

	8.50%	8.75%	9.00%
2.75%	37.5%	31.5%	26.0%
3.00%	41.5%	35.2%	29.3%
3.25%	45.9%	39.1%	32.8%
3.50%	50.8%	43.4%	36.7%

Figure 16. Source: Class Notes

The stock valuation from the DCF model (See Appendix) is **\$104.81 (35.2% upside)**. Notably, if an 8.5% discount rate were used, the valuation would increase to \$109.76 (41.5% upside). The DCF valuation prices and upside/downside percentages are listed in Figure 15 and 16 based on various combinations of terminal growth rate and weighted average cost of capital rate.

Final Target Price

The final target price is **\$101.66** after summarizing up 70% weight to DCF implied price \$104.81 and 30% weight to relative valuation implied price \$94.32 (Figure 17). It's a **31.1% upside** to current stock price.

	Valuation Weight	Implied Value	Implied Value per Weight	Discount to Current (\$77.55)
Multiples Valuation	30%	94.32	28.30	
DCF Valuation	70%	104.81	73.37	
Final Target Price			101.66	31.1%

Figure 17.

Risks

- Reduction in revenues as COVID-19 pandemic continues.
 - Ongoing residual negative impacts will persist, particularly during the first half of 2021 and most notably with respect to vaccine sales, with the impact expected to be more acute in the United States²
 - Roughly two-thirds of Merck's Pharmaceutical segment revenue is comprised of physician-administered products, which have been affected by social distancing measures, fewer well visits and delays in elective surgeries².
- Price adjustments in the whole stock market.
 - Although Chair Powell signaled the central bank would be patient before scaling back its loose monetary policy²⁰, Federal Reserve officials have announced to expect to raising interest rates in 2023. Stock markets remain sensitive to comments from the Fed and inflation expectations.
- Continued pricing pressures globally, especially in mature market.
 - In 2020, Merck's gross U.S. sales were reduced by 45.5% as a result of rebates, discounts and returns².
 - Changes to the health care system enacted as part of health care reform in the United States, as well as increased purchasing power of entities that negotiate on behalf of Medicare, Medicaid, and private sector beneficiaries, could result in further pricing pressures².
- Keytruda® as key product generates a significant amount (33.4% in 2020) of Merck's profits. Any events that adversely affect the markets for it and loss of market exclusivity will have a material adverse effect.
 - Novartis will co-develop BeiGene to develop an anti-PD-1 antibody similar to Keytruda from Merck and Opdivo from Bristol-Myers Squibb which help the immune system attack cancers¹⁸. If this product was successfully commercialized, Merck will face severe threats.
 - Patent rights for Keytruda® will expire in 2028. Although it is a long time before



patent invalidation, new successful products are needed to mitigate the risk of concentrating sales in one single product.

- Diabetes drugs Januvia® and Janumet® sales would decline substantially after the loss of the market exclusivity² in 2023.

Conclusion

BUY Merck & Co., Inc. (NYSE: MRK) with a price target of **\$101.66** as it is currently undervalued by approximately 31%.

The wide range of Merck's product mix has reaped billions of sales, building reliable brand images among consumers. Merck's oncology portfolio, led by Keytruda®, represented strong growth in recent years. Keytruda® is used as first treatment and/or auxiliary medicine by cancer patients around the world. This ensures Merck's competitive advantage over its competitors.

Combining Merck's promising pipeline with the optimistic factors (global aging, increasing population with cancer, increased healthcare spending, defensive sector, etc.) underlying the pharmaceutical industry, Merck looks poised to continue its success for the foreseeable future.





Appendix

Income Statement Projections

(In millions)	FY 2023E	FY 2022E	FY 2021E	FY 2020	FY 2019	FY 2018	FY 2017	FY 2016
Income Statement								
<i>Consensus</i>	<i>58,976</i>	<i>56,708</i>	<i>52,025</i>					
Total Sales	58,976	56,708	52,025	47,994	46,840	42,294	40,122	39,807
Pharmaceutical Segment	52,891	50,632	46,479	43,021	41,751	37,689	35,390	35,151
Animal Health Segment	5,661	5,471	5,115	4,703	4,393	4,212	3,875	3,478
Other Revenues	423	605	432	270	696	393	857	1,178
	58,975	56,708	52,025					
Cost of Goods Sold	16,513	15,878	14,567	15,485	14,112	13,509	12,912	14,030
Gross Profit	42,463	40,830	37,458	32,509	32,728	28,785	27,210	25,777
Restructuring costs	590	567	520	578	638	632	776	651
Research and development	12,385	11,909	10,925	13,558	9,872	9,752	10,339	10,261
SG&A Expense	11,205	11,058	10,145	10,468	10,615	10,102	10,074	10,017
Other operating costs, Net	(177)	(170)	(156)	(827)	413	(59)	(115)	517
Operating Income	18,460	17,466	16,024	8,732	11,190	8,358	6,136	4,331
Interest Income, Net	-	-	-	(59)	(274)	(343)	(385)	(328)
Income Before Income Taxes	18,460	17,466	16,024	8,791	11,464	8,701	6,521	4,659
Provision for Taxes	3,323	3,144	2,884	1,709	1,687	2,508	4,103	718
Net Income from Cont Ops	15,137	14,322	13,140	7,082	9,777	6,193	2,418	3,941
Net Loss Attributable to Noncontrolling Interests	-	-	-	(15)	66	27	(24)	(21)
Net Income	15,137	14,322	13,140	7,067	9,843	6,220	2,394	3,920
EPS								
Basic	6.69	6.08	5.35	2.79	3.84	2.34	0.88	1.42
Diluted	6.66	6.05	5.33	2.78	3.81	2.32	0.87	1.41
<i>Consensus - GAAP Guidance</i>	<i>6.69</i>	<i>6.06</i>	<i>5.37</i>					
			Unknown					
Shares Outstanding								
Basic	2,262	2,356	2,454	2,530	2,565	2,664	2,730	2,766
Diluted	2,272	2,366	2,465	2,541	2,580	2,679	2,748	2,787
% buyback from prior year	-4.0%	-4.0%	-3.0%	-1.5%	-3.7%	-2.5%	-1.4%	-1.9%
Tax Rate	18.0%	18.0%	18.0%	19.4%	14.7%	28.8%	62.9%	15.4%
Cash Flow								
D&A	3,833	3,686	3,538	3,625	3,652	4,519	4,676	5,471
% of Sales	6.5%	6.5%	6.8%	7.6%	7.8%	10.7%	11.7%	13.7%
CapEx	4,718	4,537	4,162	4,684	3,473	2,615	1,888	1,614
% of Sales	8.0%	8.0%	8.0%	9.8%	7.4%	6.2%	4.7%	4.1%
Balance Sheet								
Account Receivables	9,436	9,187	8,532	7,851	6,778	7,071	6,873	6,515
% of Sales	16.0%	16.2%	16.4%	16.4%	14.5%	16.7%	17.1%	16.4%
Inventories	5,898	5,444	4,994	6,310	5,978	5,440	5,096	4,866
% of Sales	10.0%	9.6%	9.6%	13.1%	12.8%	12.9%	12.7%	12.2%
Account Payables-Trade	3,951	3,799	3,538	4,594	3,738	3,318	3,102	2,807
% of Sales	6.7%	6.7%	6.8%	9.6%	8.0%	7.8%	7.7%	7.1%
Change in WC	(551)	(842)	(422)	(549)	175	(326)	(293)	2,117
Sales Growth								
Pharmaceutical Segment	4.46%	8.94%	8.04%	3.04%	10.78%	6.50%	0.68%	1.06%
Animal Health Segment	3.47%	6.97%	8.75%	7.06%	4.30%	8.70%	11.41%	4.41%
Other Revenues	-30.00%	40.00%	60.00%	-61.21%	77.10%	-54.14%	-27.25%	-14.95%
Expenses as % of Sales								
Gross Margin	72.0%	72.0%	72.0%	67.7%	69.9%	68.1%	67.8%	64.8%
Restructuring costs	1.0%	1.0%	1.0%	1.2%	1.4%	1.5%	1.9%	1.6%
Research and development	21.0%	21.0%	21.0%	28.2%	21.1%	23.1%	25.8%	25.8%
SG&A Expense	19.0%	19.5%	19.5%	21.8%	22.7%	23.9%	25.1%	25.2%
Other operating income, Net	-0.3%	-0.3%	-0.3%	-1.7%	0.9%	-0.1%	-0.3%	1.3%
Interest Income, Net	0.0%	0.0%	0.0%	-0.1%	-0.6%	-0.8%	-1.0%	-0.8%
Operating Margin	31.3%	30.8%	30.8%	18.2%	23.9%	19.8%	15.3%	10.9%



Discounted Cash Flow Model

Merck (MRK)

Analyst: Yang Zhou
2021/7/12

Terminal Discount Rate = 8.75%
Terminal FCF Growth = 3.00%

(In millions)

Year	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E
Revenue	52,025	56,708	58,976	61,335	63,789	66,340	68,662	71,065	73,197	75,393	77,655
% Growth		9.0%	4.0%	4.0%	4.0%	4.0%	3.5%	3.5%	3.0%	3.0%	3.0%
Operating Income	16,024	17,466	18,460	19,627	20,412	21,229	23,002	23,807	24,521	26,388	27,179
Operating Margin	30.8%	30.8%	31.3%	32.0%	32.0%	32.0%	33.5%	33.5%	33.5%	35.0%	35.0%
Interest Income	-	-	-	307	319	332	343	711	732	754	777
Interest % of Sales	0.0%	0.0%	0.0%	0.5%	0.5%	0.5%	0.5%	1.0%	1.0%	1.0%	1.0%
Taxes	2,884	3,144	3,323	3,478	3,617	3,761	4,079	4,157	4,282	4,614	4,752
Tax Rate	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%
Net Income	13,140	14,322	15,137	15,843	16,477	17,136	18,580	18,939	19,507	21,020	21,650
% Growth		9.0%	5.7%	4.7%	4.0%	4.0%	8.4%	1.9%	3.0%	7.8%	3.0%
Add Depreciation/Amort	3,538	3,686	3,833	3,680	3,827	3,980	3,433	3,553	2,928	3,016	3,106
% of Sales	6.8%	6.5%	6.5%	6.0%	6.0%	6.0%	5.0%	5.0%	4.0%	4.0%	4.0%
Plus/(minus) Changes WC	(422)	(842)	(551)	(573)	(596)	(620)	(642)	(664)	(684)	(705)	(726)
% of Sales	-0.8%	-1.5%	-0.9%	-0.9%	-0.9%	-0.9%	-0.9%	-0.9%	-0.9%	-0.9%	-0.9%
Subtract Cap Ex	4,162	4,537	4,718	4,293	4,465	4,644	4,120	4,264	2,928	3,016	3,106
Capex % of sales	8.0%	8.0%	8.0%	7.0%	7.0%	7.0%	6.0%	6.0%	4.0%	4.0%	4.0%
Free Cash Flow	12,093	12,629	13,701	14,656	15,243	15,852	17,252	17,564	18,823	20,315	20,924
% Growth		4.4%	8.5%	7.0%	4.0%	4.0%	8.8%	1.8%	7.2%	7.9%	3.0%
NPV of Cash Flows	104,321	39%									
NPV of terminal value	162,005	61%									
Projected Equity Value	266,326	100%									
Free Cash Flow Yield	6.14%										
									Terminal Value	374,820	
									Free Cash Yield	5.58%	
Current P/E	15.0	13.8	13.0							Terminal P/E	17.3
Projected P/E	20.3	18.6	17.6								
Current EV/EBITDA	11.3	10.5	9.9							Terminal EV/EBITDA	13.2
Projected EV/EBITDA	14.9	13.7	13.0								
Shares Outstanding	2,541										
Current Price	\$ 77.55										
Implied equity value/share	\$ 104.81										
Upside/(Downside) to DCF	35.2%										
Debt	31,250										
Cash	6,980										
Cash/share	2.75										



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