**2022F MFIN1756 FP&A with Excel.**

**Final Project Assignment: Forecasted Financial Statements and Analysis Report.**

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# Company Analysis

# Business & Industry description

The Pharma industry has always been one of the most prominent in the world. However, thanks to the COVID-19 impact, the industry has strengthened its market power to become even more recognizable worldwide. The impact of the pandemic is set to have repercussions both in the short, mid, and long term with changes on demands, regulations and taxes and the process of developments in drugs and testing.

US holds the highest market share as well as the highest investment in R&D for pharma, followed by China and Japan. However Middle East is expected to be the highest growing region in the following periods. The pharmaceutical industry is supposed to have a compound annual growth rate (CAGR) of approximately 9%.

*Figure 1. Estimated industry revenue in billions of $ (actual in blue, forecasted in green)*

Merck, as well as some of the other main companies in the industry, focuses on developing new drugs and vaccines. This is why, due to covid, the revenues of those companies hit levels never seen before. Although in 2022 the effects are still noticeable, we can see *(Figure 2)* a small decline compared to the previous year, which sustains the uncertainty of the revenues in the future.

*Figure 2. Revenue comparison 2022-2021 of the main US pharma companies in billions of $*

One of the main factors that drive the profits in this industry is the cost in R&D. As said before, after the first impact of the pandemic, numerous rumors aroused on how politics and companies wanted to change policies and prices that have an immediate effect on the costs of R&D.

*Figure 3. Research & Development forecast in billions of $*

As we know, the main driver of profit is the price of sales. Pharmaceutical companies’ price is relative unregulated hence they have certain freedom to raise prices even if demand remains unchanged. However, as seen previously, the cost of Research and Development for a new drug is excessively high. The success rate a company has on the approval of new drugs as well as the general costs of developing it are the main factors that explain the prices and thus the profits of the company. In the following table (*Figure 4*) we can see how the investment in R&D impacts the revenues of the main pharma companies in the US.

*Figure 4. Research & Development forecast in billions of $*

Merck Sharp and Dohme is the second largest multinational corporation specialized in the Pharmaceuticals in the US. It was created in 1891 as a subsidiary of Merck Group, a German multinational company of science and technology, and in 1917 it was established as an independent company in the United States. Merck’s operations rely in three different areas; pharma, animal health and electronics; however, it’s main source of revenue relies on the pharmaceutical products. Their products are not only focused on creating new drugs and vaccines but also to create innovative technology to ease patients life’s. They also distinct themselves with a strong research program for drug development.

# Management Discussion

**Management**

The board of directors unanimously elected a Robert M. Davis as the new chairman of the board effective December 1, 2022.

**Business Developments**

In September 2022, Merck pursued an existent agreement with Moderna Inc. to jointly develop and commercialize a cancer vaccine which caused a $250 million increase in R&D for the first 3 quarters of 2022.

In August 2022, Merck and Orna Therapeutics, entered a joined agreement to develop and commercialize numerous programs for the area of infectious diseases and oncology. This lead to an increase of R&D of $150 million for the first three quarters of 2022.

In July 2022, Merck and Orion Corporation shared an agreement of cooperation for cytochrome drugs which was reported as an expense of R&D of $290 million. They also got to an arrangement with Sichuan Kelun-Biotech Biopharmaceutial that gave Merck the complete rights for an antibody drug for solid tumors worldwide. The R&D expense resulting was $35 million.

In May 2022, Merck exercised a license for another of Kelun-Biotech’s drug, currently in the second phase of evaluation which was already expensed in the first quarter.

**Spin-Off of Organon & Co.**

Merck finished on June the transition into a new company called Organon & Co. of different spin-off’s products. The past statements of the brand businesses included in the new company were shown as discontinued operations. The rest of established programs will carry one with their development.

**Other Developments**

Ukraine’s war: Introduction of monitoring and extenuation of the impact on the supply chain, trials and operations caused by the war. Embracement extra cost of supplying resources in Russia, and to assuage the humanitarian costs in Ukraine which add up to 1% of last year’s consolidated sales.

Covid-19: Negative repercussion of the pandemic on sales in the first quarters of 2022. Discontinuance of the development for covid hospitalized patients. Accord to expand manufacturing capacity and supply of covid related vaccines and received $102 million in funding to do so. This transaction was recorded as a reduction of cost of sales.

**Pricing**

Increased pressure to reduce prices, and talks of new drug regulation by the US congress that will make pharma companies more liable for certain drugs.

**Supply Chain**

Turmoil on the global supply chain due to macroeconomic events.

**Operating Results**

Sales

Sales increased in a rate of 24% in the 3rd quarter of 2022 and overall the rise was of 29%, driven by oncology virology sales as well as results of vaccinations.

Negative repercussions of covid-19 but lesser than the previous year which lead to a rise in the year-to-year growth of sales.

Pharmaceutical Segment

The approval of a therapy for specific cancer patients also had a positive on sales, having an overall growth of 20% just in the last quarter. Approval of other drugs that also contributed to revenue but in a higher developed stage. Expansion of products in other regions around the globe and increase of sales on the international market.

FDA final approval of kids vaccine in June that later in October lead to an endorsement for an expansion of set vaccine.

In the hospital acute care area, the sales for a drug used for surgical procedures rose 15% in the current quarter in the US as well as globally. On the other hand, Merck suspended the sales of a drug due to it causing long-term health issues.

Getting to specialized products, a cardiovascular drug shared with Bayer was authorized for a new treatment however this caused a reduction in revenue of 12% this last quarter due to the previous arrangement with the consort company but all over ended up causing an increase in 2022.

The virology drugs also experienced a boom of authorizations around the world which turned up to result in a huge increase on sales on Australia as well as certain Asian countries. The predicted sales of this drug for the hole 2022 year are amongst $5 and $5.5 billion. The company expects another virological drug to put pressure on the market in the following periods despite having a negative return so far.

Finally for diabetes, sales declined around 15% this past quarter, with that decrease in demand being not only in the US but also in some European and Asian countries. This was compensated by an increase in the other regions of the world. Merck expects the competitive advantage of American pricing to push around sales in the following years. After the boom in China, the company lost the patent rights of two drugs to treat diabetes in that country and later on September they also lost the privileges in EU. Although the patent is currently still standing in the US, it is sat to expire in the first quarter of 2023. Merck is currently in court to try to appeal for an extension to that patent. The sales caused by the inclusivity of this drugs depicted 10% of sales in China, 21 in EU and 34% in the United States in the first three quarters of this year.

Animal Health

Sale of products related to animal health experimented a downturn of 4% in the 3rd quarter.

Due to the macroeconomic effects the foreign exchange rate had a negative effect that was not taken into account in this results.

Costs, expenses and other

Cost of sales:

Increment of 14% in the last quarter and 39% overall in 2022. Amortization is present in the recorded costs as well as costs for restructure and dismantlement of covid related programs.

Gross margin had a value of 73.7% and was slightly lower when compared to the previous year. This is mainly due to the a low gross margin drug that accounted for a high revenue percentage and the increase of intangible’s assets amortization.

Selling, General and Administrative: SG&A costs augmented 8% as a result of an escalation of administrative costs.

Research and Development:

R&D rose to double in this quarter, primarily because of impairment and higher charges. The R&D encompass all different areas of the company as well as other expenses caused during the process.

Restructuring Costs:

The company passed a restructuring program in 2019 to optimize manufacturing, supply, and cost of facilities. Such costs are set to be expended in 2023 and only reflected now with the pretax costs that amount to more a less $3.5 billion in the lifespan of the program and of $600 million in 2022. The restructuring program expects to reduce costs by $900 million in 2023.

Other (Income) Expense, Net:

Other (income) expense, net consisted of $429 million this quarter which represents a small reduction of the expense when comparing it to the past year. This can be explained by unrealized losses as to net gains from investments in equity securities.

Segment Profits

Profits for the pharmaceutical segment embody segment sales minus standard costs and selling, general and administrative expenses that aroused by the segment. Such profits augmented this quarter in 11% which leads to assume higher sales, higher costs and unfavorable consequences of the foreign exchange rate.

In contrast profits for the Animal Health segment also reflect R&D expenses in addition to the other costs incurred in the pharma segment. The profits rose 2% in the last quarter due to a favorable product mix.

Taxes on Income

The effective income tax rate decreased to 9.2% from 13.2% in a year due to the positive effect of foreign earnings and net unrealized losses form investments, and impairment charges on intangible assets. Contrarily, the negative effect caused by the acquisition of a drug offset the favorable income.

The IRS required $190 million to the company that exceeded the reserves for unrecognized tax benefits.

Non-GAAP Income and Non-GAAP EPS from Continuing Operations

Merck’s management provides a second standpoint on its performance to help investors. Non-GAAP income and EPS rule out non-recurring incomes. These measures can also be used for planning and forecasting. This year Merck modified the items that fall under Non-GAAP Income and Non-GAAP EPS so they take into account costs related to pre-approval assets from acquisition transactions.

Non-GAAP income went from 17,270 in the 09-30-2021 to 5,452 in 09-30-2022.

Acquisition and Divestiture-Related Costs: the effect caused by relations with acquisitions and divestitures are not included. It is also not comprehended amortization linked to collaborations and licensing arrangements.

Restructuring Costs: cost that arise from restructuring are also not included.

Income and Losses from Investments in Equity Securities: gains and losses from investments in equity securities owned in investment funds are excluded.

Certain Other Items: Other items not accounted for are frequently not common and have a high level of significance. For example, losses from discontinuing covid development programs.

Research and Development Update

Deal with another pharmaceutical company to develop a covid drug currently not approved for use but in progress and largely praised amongst the community.

Extension for revisal of a cancer treatment and further analysis.

Advance of numerous drugs to last phase of trial and testing with different environmental conditions, however so far the results have not been as promising as expected in this situations, in exception of HIV prescriptions.

Abolition of other drugs in the last trial stage due to no noticeable progress in health or failure to meet the mandatory requirements.

Funding agreement for founding with Royalty Pharma for schizophrenia treatments.

Extended plan of the different drugs organized in the medical area they belong to and the phase they are currently in can be found in pages 48 to 49 on the sec report ([*Inline XBRL Viewer*](#_References)).

Liquidity and Capital Resources

Cash from operating differed by an increase of $6.7 billion when comparing this year with the previous one. It remains the main point of financing for operations. As a consequence of regulatory changes, the tax expense has increased set side by side with the other years.

As for cash from financing, it tripled compared to the previous year, for de most part due to the spin-off and an increased in long-term debt payments.

Accounts receivable accounted for $2.8 billion due to favorable agreements, capital expenditures $3.2 and dividends $5.3 in the course of 2022. The dividends had a value of 0.69 dollars per share and there was no stock repurchases during the year.

$6.0 billion credit reserve in case of need if commercial paper is not enough which remains untouched.

# Input Variables

In order to get an accurate prediction of the sales of the company different methods were tried. The most approximated forecast to the current sales was the one made using the Holt-Winters Multiplicative Seasonal (HWMS) method. This method includes the forecast equation and smoothing factors: alpha for level, beta for trend and gamma for seasonality. We can see in Table 1 the values for each variable.

|  |  |  |  |
| --- | --- | --- | --- |
| **Sensitivity Factors & Forecast Error** | | |  |
| **Alpha** |  |  | 0.3060 |
| **Beta** |  |  | 0.1569 |
| **Gamma** |  |  | 0.5010 |
| **Mean Squared Error (MSE)** | | | 1,185,886 |
| **Mean Absolute % Error (MAPE)** | | | 5.55% |
|  | | |  |

*Table 1. Values of the variables*

Although the Mean squared error is relatively high and higher than some of the other models computed, looking at the graph of the forecast we can conclude that overall presents a good fit exempting the quarter 5/01/2022.

*Figure 4. HWMS sales forecast for Merck Co..*

For forecasting Cost of Sales and Net Property Plan and Equipment, further analysis was done.

In Figure 4, we can see the how COGS does not follow a clear trend, and that generally doesn’t behave hand by hand with sales. However we can see that it has a linear tendency, thus the best way to forecast sales is by using a linear regression with sales (*Figure 5*).

*Figure 5. Quarterly sales and Cost of Sales*

*Figure 5. Relation Sales-COGS*

If we pay attention, even if the majority of values follow the trend line, the R2 is relatively low. This is because we can see two outliers where sales are higher than 5,000 that don’t line up with the trend. Hence I redid the regression without taking into account the outliers (*Figure 6*).

*Figure 6. Relation Sales-COGS without outliers*

With the new regression, to obtain the forecasted value for COGS, we just have to put the value of the sale forecasted before in the regression equation.

On the other hand, in Figure 7, we find reflected that Net PPE does have a trend. Hence for forecasting this item we can just use the values obtained with the TREND formula in excel.

*Figure 7. Quarterly sales and Net Property Plant & Equipment*

To forecast R&D is trickier than it looks. As explained in the [Company and Industry Analysis](#_Business_&_Industry), R&D accounts for the most important aspect in companies that belong in the pharmaceutical industry. Also seen there, we know that R&D expenses tent to have a positive tendency; thus, the first step in the analysis was to use the TREND function to predict the expense. Surprisingly though, the values obtained where lower than the previous period. The explanation for that can be found in the 10K fillings of the company for this past year ([*Inline XBRL Viewer*](#_References)). In The Management Discussions (*page 8*) we find all the exceptional charges made in R&D resulting from agreements made in previous years. The charges are way higher than previous years, this could be explained by the projects being put on standby due to Covid-19 and resumed this year.

Since even if the values are lower, the projected values still have a positive trend, the value obtained with the TREND function is a good forecasting.

Selling, general and administrative expenses are also forecasted with TREND, since even though they are related to sales, they don’t always move the same way so the forecast with excel gives a more accurate value.

For Restructuring costs, the past couple years had a lower value than the previous ones. However, on the Business Developments section in the 10K report for 2022 ([*Inline XBRL Viewer*](#_References)), they showed how the company is going to incurring the expense in the following quarters. By using TREND using at least 20 quarter of data we can approximate this cost since there were also big restructuring costs in the past.

Since the financials of the company are not stable due to the high amount of prior agreements with other pharma companies that come into place this year, and for which Merck is reliable to receive income or have to incur an expense and that depends on the external company, the item Other (income) expense, net was calculated with TREND.

The tax rate was calculated by the division of Provision for Income tax by Income before tax. In order to obtain the value for Provision for Income tax, we calculated the percentage of tax from the previous quarters by dividing the tax values from that year by the income before tax for the past three years. With that we were able to obtain the projected tax rates, and using the real forecasted values obtained in the forecasted income statement for Income before tax, we multiplied it by the tax rate obtained.

Finally, net income attributable to noncontrolling interest was also calculated using TREND but using a shorter period of time since that value was pretty stable during the past three years.

For the Balance Sheet accounts, Inventory was also predicted using a trend based on the past three years since there’s no specific explanation on what will happen in the future with inventories and the values are closer to the real ones by following the tendency than relating it to sales.

PPE was explained at the beginning of this section.

By looking at the previous data of accrued and other current liabilities, we can clearly see a tendency, so TREND was used to forecast it.

Short and Long term debt was the hardest to forecast. After extensive research, we found out that Merck had over 26% of their long-term debt whose maturity felt within the year, thus was going to move to short term debt.

Also, Merck is a company that is generally characterized by having a small proportion of debt, having a net debt of only 0.8 times its EBITDA and an interest expense coverage of 23.5 times with its EBIT. Adding up the fact that there’s no mention of intentions of the company to acquire a high volume of new debt, we can assume than in the following year Merck is not going to incur a huge increase in long-term debt.

So, in order to estimate the future values, first we calculated the trend for long-term debt to account for a little increase just in case. Then we multiplied it by the percentage that was going to change to short term debt. Subtracting that from the forecasted value and we get the new and final forecasting. For the short-term debt, we also calculated the trend and added up the value subtracted from long-term debt.

Income taxes payable follow a special distribution. The fluctuate around a value for a few periods, the change to a different value and again fluctuate so on and so off. At the end it was forecasted using trend since there was a high probability of a change in the following periods.

After looking at valuations on Merck and a recent announcement the company making a leap when increasing the payment of dividends after the second quarter of November 2022, in order to forecast the dividends payable, we adjusted the trend to account for that increase.

Deferred Income Taxes and Noncontrolling Interests were also forecasted using trend since we can see a consistency in the past periods and don’t depend on sales.

The interest rates remain the same for the forecast since it’s only for one year and the interest rates are annually. The interest rates were obtained from the Federal Reserve System and debt analysis.

At last, even though Depreciation and Amortization don’t appear in the income statement, they have a registered expense for each item in the 10Q report. With that we calculated the amount of depreciation and amortization as a percentage of net PPE (since according to the report the majority of the expense is accounted from PPE).

\*All the TREND calculations and past quarter data can be found in the second window of the excel file called F.

\*In the company reports they don’t give importance to inflation, so it’s not present in the calculations.

# Forecasted IS

Total net sales increased almost 10% in the year forecasted.

Cost of sales also increased with a percentage of 9.03 due to the fact that if was forecasted with a regression dependent on sales. It represents almost the same % of sales.

Hence the gross margin increased in a similar proportion as sales and COGS.

For the operating expenses; R&D costs were reduced and represent a lower percentage of sales since it wasn’t forecasted only taking into that variable.

Same goes for selling, general and administrative costs.

Restructuring costs decreased in approximately 500% during the forecasted period and represent a bigger percentage of sales than the present due to the restructure caused by the opening of a new sub business.

On the whole, total operating expenses decreased, but less than the increase in gross margin, hence the total operating income increased.

Other income went from a positive to a negative value and in the last forecasted period represents a higher % of sales. This difference is explained by the past values of the item.

Interest expense is 0 in the current period and increases by the last one.

Income before tax also increased, but ever more did the tax rate, hence the difference in Net Income is the lowest one yet.

Net income attributable to noncontrolling interest barely changed, thus Net income attributable increased in the same percentage as Net Income.

# Forecasted BS

**Assets**

Cash had the most drastical change in the Forecasted Balance Sheet, with an increase of over 300%.

For simplicity we assumed that there weren’t any significant changes in the % of sales in most assets. Accordingly, all assets changed in the same percentage as sales except for inventories that was forecasted using trend and had a decline, and net PPE that had an augment. Overall total assets increased in almost 40%.

**Liabilities**

Due to the restructuring of debt, the liabilities experienced a higher variation than sales.

Accounts payable decreased while other current liabilities increased, both around 5% which is lower than the change in sales.

Commercial paper wasn’t issued thus remained unchanged.

Short-term debt had an astronomical increase of over 1000% thanks to the change in maturity of the long-term debt.

Income taxes payable and dividends payable experienced a grow of around 50% each.

Due to the high variation in short-term debt, the change in total current liabilities was of almost 100%.

Long-term debt decrease since it moved to short-term, and the % of change was relatively similar to the proportion of debt to moved to less than one year maturity. The reason why the change was not exactly the same is because we still added a small increase each quarter.

Deferred income taxes barely had any change during the forecasted period.

We assumed other non-current liabilities remained the same since we had no reason to suspect any variation.

Adding everything up, we get a decrease in total non-current liabilities, but a growth in total liabilities of almost 25%.

**Equities**

For simplicity, we assumed that the company does not issue equity during the forecasted period, and that was after confirmed in the 10Q report of the company.

This means the majority of equity had a change of 0 except for Retained Earning that have a projected increase of almost 80% from the current period.

All-embracing, total shareholders’ equity experienced a rise of over 100%. Making the joined change in liabilities and equity positive.

# Forecasted CF

**CF in Operating**

The cash flows from operating activities fluctuate depending on the forecasted period.

This is mainly due to Net Income which represents almost the entire balance. The overall result is positive which indicates an inflow of cash from operating.

**CF in Investing**

The cash flows from investing activities also fluctuate depending on the forecasted period.

Nonetheless, the discrepancy is higher since in some quarters the cash flow is negative (outflow) while in one it’s positive (inflow). The source of this is located in Change in other intangibles. That was forecasted using the trend which means some quarters the company decides to cut down investments.

**CF in Financing**

The cash flows from financing activities also fluctuate depending on the forecasted period.

As the cash flow from investing, the total is not the same, being negative in most quarters, which indicates an outflow of cash from financing, which means they acquired less debt; however the first forecasted quarter experiences a positive flow due to the huge increase in short-term debt.

**CF Balance**

The final balance of cash flows varies drastically from quarter to quarter.

In all periods, there’s a cash inflow. The first quarter has the highest value b due to the restructure of debt, followed by the third one due to the positive flow in investing activities. The second and last quarter have similar values.

# Comparative Analysis

Financial ratios are a measure for evaluation of different aspects of a company’s performance.

They are generally divided into four main groups: Liquidity ratios (also known as safety ratios) assess the company’s ability to meet its short-term obligations. Solvency ratios (also called insolvency or financial leverage ratios) determine the same but with tong-term and other obligations. Profitability ratios (or performance ratios) analyze the ability of a company to generate future earnings. Lastly, efficiency ratios (also called productivity ratios) measure the capacity of generating income through its assets.

# Liquidity

Current ratio

The current ratio measures the company’s ability to meet its short term obligations with its short term assets.

The forecast of that ratio has a positive trend with the ratio being almost double in the last forecasted period. Since we know that current liabilities increased due to the boom in short-term debt from the maturity of long-term debt, that means current assets have increased in a higher proportion. Ideally, the ratio should be around 1.2, or at least bigger than 1 to ensure the company is liquid enough to pay the liabilities if needed. In our case the ratio is of 1.46 and the forecast in the last period of 2.76 which means in one year the company will be able to pay its current liabilities 2.76 times with their current assets.

Quick ratio

The quick ratio measures the company’s ability to meet its short term obligations with its short term assets excluding inventory since it’s harder to convert to cash.

The quick ratio has also increased similarly to the current ratio. That means that the boost in current assets is not mainly due to an increase in inventory.

Accounts Receivable Turnover

The Accounts Receivable Turnover ratio shows how efficient a company is in collecting receivables form its clients.

The ratio remained the same during the forecasted period. This is due to the fact that the ratio is calculated as total sales divided by accounts receivable and that last item was forecasted in respect to sales.

Days in Receivable

This ratio tells you the number of days the company needed to collect its accounts receivable.

The number of days was the same during the forecasted period for the reason explained in the previous ratio. The value for that ratio is of 57.84 days which is higher than an ideal value, however its still higher than the pharmaceutical industry ratio average.

# Efficiency

Inventory Turnover

Inventory turnover measures how efficiently a company treats inventory.

The ratio increased slightly during the forecast going form 0.7 in the current quarter to 0.8 in the last one.

Days in Inventory

Days in inventory show the the number of days the company needed to collect its accounts receivable.

It decreased by almost 20 days of the 130 they currently have during the forecasted year which means the company is going to manage the inventory more efficiently.

Total Asset Turnover

Asset turnover measures how effectively a company uses its assets.

Surprisingly this ratio is predicted to decrease. This means the company is going to generate less revenue from its assets thus operating less efficiently.

Total Fixed Asset Turnover

Total Fixed Asset Turnover is the same ratio as Total Asset Turnover (the previous ratio explained), but only taking into account fixed assets instead of total assets.

However, this ratio behaves very differently from the previous one. The first quarter decreases, then increases and the same happens in the last two quarters. This can be explained since fixed assets and sales predicted follow the same fluctuation.

# Profitability

Operating Profit Margin

This ratio reflects how much profit a company makes from a dollar in sales (after tax, after interest).

The ratio follows the same trend as before, it decreases or increases depending on the period, but always staying at a higher value than the present ratio.

Return on Asset (ROA)

ROA, also known as operating margin, measures the percentage a company makes in profit from operations.

As before, the slope of the trend depends on the quarter, however, unlike before, the future values are predicted below the current one.

Nevertheless the ratio is still maintaining above desired values, but gets away from the industry average which is of 12%.

Return on Sales (Net Profit Margin)

Net profit margin shows the percentage of profit gained from its revenue.

Return on sales follows the same distribution as ROA.

Return on Equity (ROE)

Return on Equity is one of the most important ratios for investors since it shows the profitability of the investment by stockholders.

This ratios decreases substantially during the forecasted quarters which is a bad indicator for the company. We will further analyze what causes this decrease in the ROE break-down analysis (*point 3.5*).

# Solvency

Debt ratio

Debt ratio is calculated by dividing total debt by total assets. If the ratio is greater than 1, it means a company has more debt than assets.

The debt ratio decreases during the forecasted period. This is a good thing since it’s moving towards the ideal value for the ratio, and since it’s lesser than 1, it means the company can fulfill all its obligations with its assets.

Asset to Equity (Equity Multiplier)

Also known as the Financial Leverage ratio, it reveals the proportion of assets funded by shareholders. A high equity multiplier indicates a higher level of debt. The company starts with a value of 2.41 and finishes with 1.63 which means over time, the assets are less funded with debt and more with equity.

The average Equity Multiplier for the Pharmaceutical industry is 2, which means at first Merck is overindebted, at the end of the periods it’s healthier than the competition.

Nevertheless, if the trend continued to decrease, the company would loose financial leverage to grow with debt.

Current Liabilities to Total Debt Ratio

Proportion of current debt related to total one.

The ratio changes from the current period to the first forecasted one and then it practically stays constant. This is due to the big increase in short term debt from long-term debt explained in the analysis.

Interest Coverage

Interest Coverage is used to find out how easily a company can pay interest on its outstanding debt.

Since the current interest expense is null, the ratio changes during the forecasted period. After that initial increase, the ratio decreases following the trend of the interest expense.

# Dupont analysis

Dupont analysis breaks-down the different drivers of ROE (Return on equity).

ROE is equal to Net income divided by the average shareholder’s equity. If we add average total assets, we can rewrite ROE as . The first part of the equation is also the formula for ROA, while the second part is the financial leverage. Additionally, ROA can also be written as . Hence, total ROE can further be broken-down as Net Profit Margin Total Asset Turnover Leverage.

As said before, the ROE decreases substantially during the predicted periods. By using the Dupont analysis, we can get a higher insight on where the problem relies. After separating it in NPM, TAT and leverage, we see that all ratios decrease, hence, the final reduction on ROE is due to all three parts.

# Other ratios

Debt to Equity

This ratio is mainly used to know for every dollar invested in the company, which percentage comes from debt and which from equity.

The ratio falls during the projected span which indicates that the company finances itself with less debt and more equity every quarter.

Long-term Debt to Equity

Long-term debt to equity measures the same as the debt-to-equity ratio without including short term debt.

The ratio moves as the previous one but decreases in a slower pace.

Gross Profit Margin

GPM shows the company’s net sales that exceeds the cost of goods sold.

The gross profit margin shows little variation during the forecasted periods. This is due to the fact that we predicted COGS relative to sales.

Payables Turnover

Accounts payable turnover ratio presents how fast a company makes payments to creditors.

The ratio follows the same uneven distribution as other prior ratios since both COGS and Accounts payable were calculated related to sales, and maintains a higher level than the current value.

This ratio is calculated to later obtain the Net operating cycle.

Days of Payables

DPO shows the number of days the company takes to pay the creditors. It moves in line with the Payables turnover ratio.

This ratio is calculated to later obtain the Cash operating cycle.

Cash Conversion Cycle (Net Operating Cycle)

Finally, we use DSO, DPO and DIO to calculate our Net Operating Cycle, which is the generally used metric to express the days it takes the company to convert its investments into cash flows from sales. Although technically is not a ratio, it helps measure the efficiency of the company in operation activities and managements.

Ideally, we want the CCC to have a negative trend, which is exactly what happens in our forecast.

That means the company will operate more efficiently and will show stronger management.

# Ethics Sustainability & Responsibility (ESR) and Diversity, Equity, Inclusion & Belonging (DEIB)

Ethics Sustainability & Responsibility (ESR)

Merck’s main goal is to be the premier research-intensive biopharmaceutical company, they want to achieve it by using leading-edge science to improve and help people’s lives around the world.

Hence patients’ well-being is a priority for the company, followed by respect for people, ethics and integrity and excellency in scientific innovation.

One of the main statements in their ESG report ([Environmental, Social & Governance (ESG). (n.d.))](#_References) is to operate responsibly to enable a safe, sustainable, and healthy future for their clients. Thus, understanding ESG issues is key in order to properly comply with the company’s standards. To fulfill this commitment, their strategic framework is set to grow taking into account the needs of a health care ecosystem, and allocates direct resources to mainly four areas in ESG: environmental sustainability, access to health, employees and ethics.

The environmental sustainability area is to consider the impact of their operations and adapt it to support the preservation of our planet. This area has four main goals, firstly to reduce the greenhouse emissions to 46% in less than 8 years. In one year they’ve manage to reduce 9% of their last year emissions. The second goal is to get to carbon neutrality, however they still haven’t achieve any remarkable progress towards that goal. Another objective is to outsource the totality of their electricity purchase and so far they have sourced 41% from renewables. Lastly they plan to reduce their value chain emissions by 30% before the end of this decade, nevertheless, not only have they not reduced them, but they had a 9% increase this last year. Even if they had a setback in their last goal, the covid-19 pandemic could have caused a rapid change in plans, and looking at the progress the company has had in this area, we can conclude they are accomplishing some improvement towards sustainability.

Thanks to the help of some of the main stakeholders, Merck is currently on track to ensure their products are accessible and affordable for those in need. Specifically, they hope to reach around 30 million low-income people around the world and help underprivileged people in the US by 2025. So far, they’ve managed to get to half this milestone. When they defined the goals for the ESG report, they wanted to offer their products to at least 75% of the countries, and by 2022 they already surpassed 80%. Not only do they hope to empower their reach geographically, but also demographically, by giving access to around 100 million access to Merck’s portfolio and partnerships all around the world. So far, they have managed to enable access for 66.7 million people.

Another area they focus in their ESR report is Employees, I which they recognize the importance of integrity and importance of diversity and well-being amongst their employees *(This will be further discussed in the following section: Diversity, Equity, Inclusion & Belonging).*

Merck also has an area to maintain ethical values. Their main goals are to preserve compliance of regulatory requirements of data protection and drug development. They boast of transparency in both animal research and human treatments as well as respect of human rights. However, this company is notorious for numerous scandals and lawsuits.

The most infamous lawsuit was the Vioxx scandal. Vioxx was one of Merck’s most successful drug at the time, and it was used as pain treatment for some diseases like osteoarthritis. However, it was later related to heart attacks and death, and it was discovered that Merck was knowingly covering up its risks. In only the last decade, the company has settled almost $5 billion in lawsuits for the Vioxx scandal, and some are still battling in open court.

In order to maintain an ethical appearance, in 2022 Merck initiated an organization called Alliance for Equity in Cancer Care to help patients living in prejudiced communities get access to high-quality extensive care. In addition to that, Merck was recognized for its work to make the HPV vaccines available in underdeveloped countries thanks to their investment in numerous partnerships and manufacturing deals. With this changes, Merck’s appearance drastically changed from the people’s point of view. However the prolongation of the various lawsuits, and the continuous discoveries of cover ups made from the company, brings us doubt on whether Merck’s pursuit of ethics is really a change the company’s values or if it’s all scheme to improve the company’s public outward presentation.

**Diversity, Equity, Inclusion & Belonging (DEIB)**

Merck is known to be a one of the more diverse companies in the US, currently being on the top 15% and winning a diversity award in 2018.

Taking a quick look at the demographics of the company, we can see that 54% of their employees are women and 44% are of an ethnicity different than White, from where 16% are Hispanic, 14% Asian and 10.5% Black, being one of the highest in the industry in that ethnicity. In contrast to the pharmaceutical industry, they are higher than the average which is of 37% women and 42% non-white. However, it does have a lower percentage of Asian workers. This could be due to the rise of the industry in Asia and China and Japan becoming the second and third largest pharmaceutical markets globally. Nevertheless, it is not only important to have diversity in the workforce, but also in leadership. Merck has an objective for gender parity in the top positions which they hope to achieve by 2023, currently composed of 36% females (increased of 1% from 2020). Not only they have a plan to increase diversity in gender, but also, they plan to empower racial diversity up to 30% from 21% in leadership positions. Even though there’s not a big pay gap between sexes, Merck likes to disclose a pay equity inquiry to ensure transparency and to maintain equal salaries.

Not only does Merck take into account gender and race diversity, but also they continuously make progress with the LGBTQI+ group. They obtained the maximum score in the “Corporate Equality Index” that values the equality and inclusion of LGBTQI+ in the workplace. Moreover, they have recently launched a program to incorporate people with disabilities and prepare management and recruitment to foster an inclusive an supportive environment.

Merck defines inclusion as “creating a culture and environment where everyone can reach their full potential and is able to add value”. In 2021 they created a program to help leaders achieve this goal, and it’s currently still functioning with almost 40% participation. They also have a survey of engagement in inclusion and numerous partnerships around the world with over 40 employee resource groups.

In order to boost racial diversity, the company offers intercultural training and digital tools to ease the problem of distance as well as to facilitate international communication.

Merck has minimum requirements for diversity in some areas, which although diminishes the discrimination, disregards the possibility of a better candidate, since they may have to hire a candidate to fit the minimum condition. They also recently incorporated the use of AI when scrutinizing for jobs as well as adopted neutral gender policies in the workplace and developed an algorithm to predict and keep up with the process. With the use of technology, they can analyze which demographic areas lack work applications and in order to foster diversity, Merck recently offered an increase in pay for employees for referrals of qualified candidates that fit the diversity requirements, and set in motion mentoring, sponsoring and talent programs for the target groups.

Not only do they use technology for market analysis, but as of 2022, Merck managed to achieve a percentage of over 50% of employees using AI technology to modify recognition language thus ensuring a higher feeling of belonging between workers.

Finally, the company has a strict policy against discrimination. They have contracts that bind employees to a workplace free of discrimination or intolerance and of course harassment. They also have resources in place for reporting those actions as well as a hotline for anonymity. In the previous years there were six cases confirmed out of 74000 employees.

Although Merck has numerous plans in order to achieve a more equalitarian workplace, they are aware of the limitations unconscious bias impose. For that, they have different training courses to increase awareness and helping managers as well as employees identify when bias is present even though they may not notice.

What surprised me the most, is the statement made by the Chairman of the Executive Board in 2011 ([Fierce Pharma 2011](#_References)). For starters the company set the goal to increase the percentage of women in management position from 22% to between 25% and 30%. However, in 2022 they managed to achieve a percentage of 36% which suggest their policies are actually active and effective. Another thing that struck me is that they had the same opinion as me regarding minimum requirements. All over, Merck’s priority is to hire the best fit for the company regardless of the gender or race. Hence, they have set a new objective to extent the resources for the hiring process to make sure they find the best candidate while considering as much diversity as they can.

Finally, Merck also tries to optimize the sense of belonging of all employees. They built an inclusive work environment to strengthen the foundation of the workforce which relies on mutual respect and value, so all employees feel trusting and free to speak up. There are numerous Employee Business Resource Groups, members of Merck can participate on to find a sense of belonging. Furthermore, they keep an open mind, which means they not only look within the company but look at other companies and the industry in general to see if there’s an idea that could create a better environment.

Overall, we can see that Merck has a clear priority of promoting diversity and inclusion, and continuous to make efforts to improve the resources that ensure such equality persevere., and integrity and respect are still core values of the company. Many companies in the United States made commitments to assure broader diversity since the racial protest of 2020. However, Merck was one of the few big companies that started that progress a decade ago and continues to make improvements every year since.

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